@server zSeries

Open Systems Adapter-Express Customer's Guide and Reference

SA22-7476-03

@server zSeries

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SA22-7476-03

Note!
Before using this information and the products it supports, be sure to read the general information under “Notices” on page 401.

Fourth Edition (September, 2002)

This edition, SA22-7476-03, applies to the IBM @server zSeries Open Systems Adapter-Express Gigabit Ethernet feature (Features 2364 and 2365), ATM feature (Features 2362 and 2363), FENET feature (Feature 2366), Token Ring feature (Feature 2367), Open Systems Adapter Support Facility Version 2 Release 1 (Program Number 5655–B57) for OS/390 (Program Number 5647-A01), z/OS (5694-A01), and z/OS.e (5655–G52), Open Systems Adapter Support Facility for Virtual Machine/Enterprise Systems Architecture (VM/ESA) Version 2 Release 2.0 (Program Number 5654-030) and z/VM Version 3 Release 1 (Program Number 5654-A17), OSA/SF for VSE Version 2 Release 2 (part of VSE Central Functions 6.1.1, 5686-066) in VSE/ESA Version 2 Release 2.6 (5690-VSE), and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

There may be a newer version of this document in PDF format available on **Resource Link**. Go to

https://www.ibm.com/servers/resourcelink

and click on **Library** on the navigation bar. A newer version is indicated by a lower case, alphabetic letter following the form number suffix (for example: 00a, 00b, 01a, 01b).

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About this Document

This document describes the Open Systems Adapter-Express feature and the Open Systems Adapter Support Facility (OSA/SF) with the goal of helping you to define, install, and use these products. An OSA is an integrated IBM @server zSeries hardware feature that combines the functions of an I/O channel with the functions of a network port to provide direct connectivity between zSeries applications and their clients on the attached network.

Detailed instructions are provided in Part 1 to help you set up and use the OSA-Express feature and OSA/SF. Reference information in Part 2 includes commands, sample configurations, messages, and other supporting information. The Appendixes in Part 3 contain cabling specifications and information of interest to OSA-2 users, as well as notes on how OSA-Express features were set up in test scenarios.

Who Should Use This Document

Anyone who is responsible for connecting the zSeries to a LAN should use this document.

Where to Find More Information

This document contains all the instructions necessary to set up the OSA-Express feature and OSA Support Facility (OSA/SF). In some instances, there are references to other publications for detailed information.

Note: The *Program Directory for IBM Open Systems Adapter Support Facility for OS/390 (5645-001)* is distributed on the OS/390 product tape.

The *Program Directory for IBM Open Systems Adapter Support Facility for VM (5654-030)* is distributed on the VM product tape.

The *Program Directory for IBM Open Systems Adapter Support Facility for VSE (part of VSE Central Functions 6.1.1, 5686-066)* is distributed on the VSE product tape.

z/OS

z/OS Communications Server

- *z/OS Communications Server: IP Administrator's Commands*, SC31-8781
- *z/OS Communications Server: IP Migration Guide*, SC31-8773
- *z/OS Communications Server: IP Configuration Guide*, SC31-8775
- *z/OS Communications Server: IP User's Guide,* SC31-8780
- *z/OS Communications Server: SNA Network Implementation Guide,* SC31-8777
- *z/OS Communications Server: SNA Resource Definition Reference,* SC31-8778
- *z/OS Communications Server: SNA Migration Guide,* SC31-8774
- *z/OS Communications Server: IPv6 Network and Application Design Guide,* SC31-8885

HCD

- *z/OS HCD Users's Guide,* SC33-7988

MVS

- *z/OS MVS Initialization and Tuning Reference*, SA22-7592

Security Server (RACF)

- *z/OS Security Server (RACF) Server Administration and Using*, SC24-5923
- *z/OS Security Server (RACF) Command Language Reference*, SC22-7687

APPC

- *z/OS MVS Planning: APPC Management*, SA22-7598

RMF

- *z/OS RMF User's Guide*, SC33-7990
- *z/OS RMF Report Analysis*, SC33-7991

UNIX System Services

- *z/OS UNIX System Services: Planning,* GA22-7801
- *z/OS UNIX System Services: Command Reference,* SA22-7802
- *z/OS UNIX System Services: User's Guide,* SA22-7801

OS/390

OS/390 Communication Server

- *OS/390 Communications Server: IP Planning and Migration Guide*, SC31-8512
- *OS/390 Communications Server: IP Configuration Guide*, SC31-8513
- *OS/390 Communications Server: IP User's Guide,* SC31-8514
- *OS/390 Communications Server: SNA Network Implementation Guide,* SC31-8563
- *OS/390 Communications Server: SNA Resource Definition Reference,* SC31-8565
- *OS/390 Communications Server: SNA Planning and Migration Guide,* SC31-8622
- *OS/390 Communications Server TCP/IP: Guide to Enhancements,* SG24-5631

HCD

- *OS/390 HCD Users's Guide,* SC28-1848

Security Server (RACF)

- *OS/390 Security Server (RACF) Planning*, GC28-1920
- *OS/390 Security Server (RACF) Command Language Reference*, SC28-1919

APPC

- *OS/390 and MVS Planning: APPC/MVS Management*, GC28-1807

RMF

- *OS/390 RMF User's Guide*, SC28-1949
- *OS/390 RMF Report Analysis*, SC28-1950

UNIX System Services

- *OS/390 UNIX System Services: Planning,* SC28-1890
- *OS/390 UNIX System Services: Command Reference,* SC28-1892
- *OS/390 UNIX System Services: User's Guide,* SC28-1891

z/VM

- *z/VM: General Information,* GC24-5944
- *z/VM: Planning and Administration,* SC24-5948
- *z/VM: VMSES/E Introduction and Reference,* GC24-5947
- *z/VM: CMS Application Development Guide,* SC24-5957
- *z/VM: CMS File Pool Planning, Administration, and Operation,* SC24-5949
- *z/VM: CP Command and Utility Reference,* SC24-5773
- *z/VM: CMS Command Reference,* SC24-5969
- *z/VM: TCP/IP Level 3A0 Planning and Customization,* SC24-5981
- *z/VM: TCP/IP Level 3A0 User's Guide,* SC24-5982

VM/ESA

- *VM/ESA: General Information,* GC24-5745
- *Planning and Administration,* SC24-5740
- *VM/ESA: VMSES/E Introduction and Reference,* SC24-5747
- *VM/ESA: CMS Application Development Guide,* SC24-5761
- *VM/ESA: CMS File Pool Planning, Administration, and Operation,* SC24-5751
- *VM/ESA: CP Command and Utility Reference,* SC24-5773
- *VM/ESA: CMS Command Reference,* SC24-5776
- *VM/ESA: CPIC Communications User's Guide,* SC24-5595
- *VM/ESA: TCP/IP FL320 Planning and Customization,* SC24-5847
- *VM/ESA: TCP/IP FL320 User's Guide,* SC24-5848

VSE/ESA

- *VSE/ESA Release Guide*, SC33-6718
- *VSE/ESA System Upgrade and Service*, SC33-6702
- *VSE/ESA Planning*, SC33-6703
- *VSE/ESA Installation*, SC33-6704
- *VSE/ESA Administration*, SC33-6705
- *VTAM V4R2 for MVS/ESA*, VM/ESA, VSE/ESA Resource Definition Reference, SC31-6498
- *VTAM V4R2 Resource Definition Samples*, SC31-6499
- *Getting Started with TCP/IP for VSE/ESA 1.4*, SG24-5626
- *TCP/IP IBM Program Setup and Supplementary Information*, SC33-6601

The following TCP/IP for VSE/ESA 1.4 manuals are available in PDF format at www.ibm.com/servers/s390/os390/bkserv/vse/vsepdf/

- *TCP/IP for VSE V1R4.0 Concepts and Facilities*
- *TCP/IP for VSE V1R4.0 Commands*
- *TCP/IP for VSE V1R4.0 Installation Guide*
- *TCP/IP for VSE V1R4.0 Messages and Codes*
- *TCP/IP for VSE V1R4.0 Optional Products*
- *TCP/IP for VSE V1R4.0 Programmer's Reference*
- *TCP/IP for VSE V1R4.0 User's Guide*

Linux

- *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml
- www.linux.org/docs

VTAM

- *VTAM V4R4 Resource Definition Reference,* SC31-8377
- *VTAM V4R4 Resource Definition Samples,* SC31-8378
- *VTAM V4R4 Network Implementation Guide,* SC31-8370

NetView

- *TME 10 NetView for OS/390 V1R1 Application Programming Guide,* SC31-8223
- *TME 10 NetView for OS/390 V1R1 Installation and Administration Guide,* SC31-8236
- *NetView for MVS/ESA V3R1 Application Programming Guide,* SC31-8061
- *NetView for MVS/ESA V3R1 Installation and Administration Guide,* SC31-8043
- *NetView Installation and Administration Guide (VM) V2R3,* SC31-6181

TPF

- *Transaction Processing Facility TCP/IP,* SH31-0120
- *Transaction Processing Facility Migration Guide (Volume 2)* GH31-0187
- *IBM Novell NetWare Services Utilities Reference,* SA22-7318

Novell

- *IBM Novell NetWare Services for OS/390 Installation,* GA22-7312
- *IBM Novell NetWare Services for OS/390 Concepts,* SA22-7313
- *IBM Novell NetWare Services Utilities Reference,* SA22-7318

On the LANs and LAN Cables that OSA Supports

- *X3T9.5 ANSI FDDI Statement Management,* Revision 7.2, is the FDDI SMT standard
- *RFC 1231* is the TCP/IP protocol standard for IEEE 802.5 token ring MIB
- *RFC 1398* is the TCP/IP protocol standard for managed objects for the Ethernet-like interface types
- *RFC 1483: Multiprotocol Encapsulation over ATM Adaptation Layer 5,* Section 4.1, Routed Encapsulation, is the standard used for the ATM IP Forwarding mode
- *Maintenance Information for ATM and FDDI Links,* SY27-0331
- *IBM Local Area Network Administrator's Guide*, GA27-3748
- *IBM FDDI Network Introduction and Planning Guide,* GA27-3892
- *Token Ring Network Introduction and Planning Guide,* GA27-3677
- *IBM Multisegment LAN Design Guidelines,* GG24-3398
- *IBM 8250/8260/8285 Planning and Site Preparation,* GA33-0285
- *IBM Cabling System Optical Fiber Planning and Installation Guide,* GA27-3943
- *Token Ring Network Architecture Reference,* SC30-3374

z900

- *zSeries 900 System Overview*, SA22-1027
- *Placement Report* and *CHPID Report* produced by the IBM Configurator (CFSYSTEM) which may be available from your IBM marketing representative.

z800

- *zSeries 800 System Overview*, SA22-1028
- *Placement Report* and *CHPID Report* produced by the IBM Configurator (CFSYSTEM) which may be available from your IBM marketing representative.

zSeries

- *zSeries PR/SM Planning Guide*, SB10-7033
- *zSeries IOCP User's Guide*, SB10-7029
- *zSeries Hardware Management Console Guide* (See www.ibm.com/servers/resourcelink for current edition)
- *zSeries Support Element Operations Guide* (See www.ibm.com/servers/resourcelink for current edition)

OSA-2 Publications

Attention

This publication is not intended to address OSA-2 setup. Refer to the following list of titles and Appendix B, "OSA-Express Coexistence with OSA-2" for more information.

Document Title	Document Hardcopy Order #	Document Softcopy File Name	In OS/390 Collection Kit # (Note 1)	Documentshelf File Name	Bookshelf Index File Name
Planning for the z900 Open Systems Adapter-2	GA22-7477 (Note 3)	IOA2GP*xx*	SK3T-4269(z/OS)	IOA2BK*xx*	IOA2BK*xx*
Planning for the S/390 Open Systems Adapter-2	GC23-3870 (Note 2)	IOA1PG*xx*	SK2T-6700	IOA390*xx*	IOA390*xx*
OS/390: OSA/SF User's Guide for OSA-2	SC28-1855 (Note 2)	IOASUG*xx*	SK2T-6700	IOA390*xx*	IOA390*xx*
VM/ESA: OSA/SF User's Guide for OSA-2	SC28-1992	IOAVMS*xx*	SK2T-2067	IOAVUG*xx*	IOAVMS*xx*
VSE/ESA: OSA/SF User's Guide	SC28-1946	IOAVSE*xx*	SK2T-0060	IOAVSE*xx*	IOAVSE*xx*

Notes:

1. The OS/390 collection kit, which is distributed with OS/390, is also available on the Internet through the OS/390 home page (www.s390.ibm.com/os390). Double-click on the Library icon. *OS/390 Information Roadmap* should help you locate the OSA Planning Guide and OSA/SF User's Guide.
2. GC23-3870 and SC28-1855 are distributed on the OSA/SF bookshelf in the OS/390 softcopy collection kit. These documents can be ordered separately in hardcopy.
3. GA22-7477 is also available in PDF format on Resource Link. Go to www.ibm.com/servers/resourcelink and click on **Library** on the navigation bar.

ATM Information Resources

ATM technology is too broad a topic to cover in this document. The following information units are recommended as good starting points:

The following web sites:

IBM Networking Home Page at www.raleigh.ibm.com
ATM Forum Home Page at www.atmforum.com
International Telecommunication Union Home Page at www.itu.com

The ATM LAN Emulation Standard: Refer to *LAN Emulation Over ATM Version 1.0,* in the ATM Forum Technical Committee Specification. In this document, the standard is referenced by the following identifiers:

- (1) ATM Forum Technical Committee User-Network Interface (UNI) Specification Version 3.1 - Interim Local Management Interface
  - (1A) Physical Port Group
  - (1B) ATM Layer Group
  - (1C) ATM Statistics Group
  - (1D) Network Prefix Table
- RFC 1695 - Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2 (ATM Interface Configuration Parameters Group)
- RFC 1573 - Evolution of the Interfaces Group of MIB-II
  - (3A) Interfaces Group - ATM Layer, further defined in RFC 1695, section 6.2.1
  - (3B) Interfaces Group - AAL5 Layer, further defined in RFC 1695, section 8.3
  - (3C) Interfaces Group - LAN Emulation Layer, further defined in the ATM Forum Technical Committee's document # 94–0737R3 entitled *LAN Emulation Client Management: DRAFT Version 1.0 Specification, Section 4.2*
- (4) ATM Forum Technical Committee's document # 94–0737R3 entitled *LAN Emulation Client Management: DRAFT Version 1.0 Specification,* (April 26, 1995) Actual MIB definitions in the LAN Emulation Client MIB Text
  - (4A) Configuration Group
  - (4B) Status Group
  - (4C) Statistics Group
  - (4D) Server Connections Group

ATM Forum publications can be requested from:

The ATM Forum
Worldwide Headquarters
303 Vintage Park Drive
Foster City CA 99404–1138
Tel 1–415–578–6860
Fax 1–414–525–0182

Additionally, refer to:

- *ATM User-Network Interface (UNI) Specification, Version 3.1,* SR28-5702, ISBN 0-13-225863-3, published by Prentice Hall PTR, Prentice Hall Inc.
- *ATM General Information Manual,* GA27-4089
- *Asynchronous Transfer Mode (Broadband ISDN) Technical Overview,* GG24-4330, IBM International Technical Support Organization, Raleigh Center
- *ATM Campus Introduction, Planning, & Troubleshooting,* GA27-4089
- *IBM 8250 Multiprotocol Intelligent Hub,* GA33-0285
- *IBM 8260 Multiprotocol Intelligent Hub,* GA24-4370

Using LookAt to look up message explanations

LookAt is an online facility that allows you to look up explanations for most messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can access LookAt from the Internet at:

`http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/`

or from anywhere in z/OS where you can access a TSO/E command line (for example, TSO/E prompt, ISPF, z/OS UNIX System Services running OMVS). You can also download code from the *z/OS Collection* (SK3T-4269) and the LookAt Web site that will allow you to access LookAt from a handheld computer (Palm Pilot VIIx suggested).

To use LookAt as a TSO/E command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO/E from a disk on your *z/OS Collection* (SK3T-4269) or from the **News** section on the LookAt Web site.

Some messages have information in more than one document. For those messages, LookAt displays a list of documents in which the message appears.

A Note on Terminology

Throughout this publication, certain equipment terms and short versions of product names are used to make the information more easily understood. These are:

FENET
: Fast Ethernet

GbE
: Gigabit Ethernet

Hub
: A common connection point for devices in a network, typically connecting segments of a LAN. A hub contains multiple ports into which each segment is plugged. When a packet arrives at one port, it is copied to the other ports so that all ports see all packets.

MAU
: Multistation Access Unit, allows multiple network nodes to access a LAN through a single device as opposed to a single network tap.

OSA
: Abbreviation for S/390 Open Systems Adapter (OSA-Express and OSA-2) feature. Although this publication primarily addresses the OSA-Express features, Appendix B, “OSA-Express Coexistence with OSA-2” on page 349, Chapter 14, “OSA/SF Commands for REXX” on page 247 and Chapter 15, “OSA/SF Messages and Codes” on page 275 include information on OSA-2.

OSA-Express
: Abbreviation for S/390, zSeries 800, and zSeries 900 Open Systems Adapter-Express features.

OSD
: The channel type name for OSA-Express features that run under Queued Direct I/O architecture (QDIO).

OSE
: The channel type name for OSA-Express features that do not use QDIO architecture (typically SNA/APPN/HPR applications).

QDIO
: A new architecture that allows an OSA-Express feature to communicate directly with system memory through the use of queues and a never-ending channel program.

QoS Quality of Service; tools to manage network congestion, shape network traffic, and set traffic policies end-to-end from the application across the network to the client.

Router
A device that moves packets between networks that use a common network layer protocol.

Switch
An intelligent hub that reads the destination address of a packet and propagates it only on the port through which that address can be reached.

TR Token Ring

Windows
Refers to Microsoft Windows 95 and Windows NT. The OSA/SF Version 2 GUI runs on each of these Windows operating systems.

Summary of Changes

**Summary of Changes
for SA22-7476-03
as updated September, 2002**

- IPv6 on z/OS V1R4

  OSA-Express Gigabit Ethernet and Fast Ethernet features running QDIO support IPv6 when running in an environment with Communications Server for z/OS V1R4. “IPv6 on z/OS and Linux” on page 11 contains a brief description of IPv6 enhancements. “Sample TCP/IP Profile (IPv4 and IPv6)” on page 395 shows IPv6 definitions.
- OSA-Express Direct SNMP support on z/OS V1R4

  A new OSA-Express SNMP subagent provides direct access to OSA management information bases (MIBs) containing information about OSA-Express features running QDIO. “Support for Simple Network Management Protocol” on page 16 contains a description. “OSA-Express Direct SNMP Support” on page 196 contains setup information.
- Purge ARP support on z/OS V1R4

  OSA-Express features running QDIO add support for purging the ARP cache for a specified TCP/IP stack using the VARY TCPIP PURGECACHE command. Examples are shown in “Querying and Purging the ARP Cache (z/OS and Linux)” on page 195. The ARP cache is discussed in “ARP Takeover” on page 17.
- Support for multiple secondary routers on z/OS V1R4

  Multiple TCP/IP instances can now be registered as secondary default routers for OSA-Express GbE and FENET features running QDIO. “Primary and Secondary Default Routing” on page 18 explains primary and secondary routing.
- Broadcast Support is Added for QDIO on z/OS V1R4

  Broadcast traffic is now supported for IPv4 and IPv6 for OSA-Express features defined as OSD (QDIO) CHPIDs.
- A new appendix, Appendix D, “OSA-Express Function/Mode Summary” on page 397, has been added, showing functions and device limitations by OSA-Express feature and channel type.

Vertical lines in the left margin indicate technical changes or additions to the text and illustrations. This document also includes terminology, maintenance, and editorial changes.

You may notice changes in the style and structure of some content in this book–for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

**Summary of Changes
for SA22-7476-02
as updated May, 2002**

- IPv6 on Linux

  OSA-Express Gigabit Ethernet and Fast Ethernet features running QDIO support IPv6 in a Linux environment. “IPv6 on z/OS and Linux” on page 11 contains a brief description of IPv6 enhancements.

- VLAN Support for OSA-Express on Linux

  OSA-Express Gigabit Ethernet and Fast Ethernet features running QDIO support Virtual Local Area Networks (VLANs). VLANs increase bandwidth and reduce overhead by allowing networks to be organized for optimum traffic flow. “Virtual LAN Support for Linux” on page 11 contains a description of VLAN.
- OSA-Express Direct SNMP Support on Linux

  A new OSA-Express SNMP subagent provides direct access to OSA management information bases (MIBs) containing information about OSA-Express features running QDIO. “Support for Simple Network Management Protocol” on page 16 contains a description. “OSA-Express Direct SNMP Support” on page 196 contains setup information.
- Purge ARP and Query ARP support on Linux

  OSA-Express features running QDIO on Linux kernel 2.4.14 add support for querying and purging the ARP cache for a specified TCP/IP stack using the qetharp command. These functions are available for both IPv4 and IPv6. The ARP cache is discussed in “ARP Takeover” on page 17. The qetharp command is described in “Querying and Purging the ARP Cache (z/OS and Linux)” on page 195.
- Broadcast Support is Added for QDIO on Linux and z/VM

  Broadcast traffic is now supported for IPv4 in Linux kernel 2.4.14 and z/VM 4.3 for OSA-Express features defined as OSD (QDIO) CHPIDs.

Vertical lines in the left margin indicate technical changes or additions to the text and illustrations. This document also includes terminology, maintenance, and editorial changes.

You may notice changes in the style and structure of some content in this book–for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

Summary of Changes
for SA22-7476-01a
as updated February, 2002

Information is added to indicate this publication supports the z800 and z/OS.e.

This edition includes terminology, maintenance, and editorial changes. Technical changes or additions to text and illustrations are indicated by a vertical bar (|) in the margin to the left of the change.

Summary of Changes
for SA22-7476-01
as updated October, 2001

- Token Ring Support

  A new OSA-Express feature for Token Ring traffic is available. Chapter 1 contains information describing its operating characteristics. Chapter 8 contains configuration instructions.
- VSE V2R6 Support

Beginning with Version 2 Release 6, VSE/ESA supports the OSA-Express Gigabit Ethernet, Fast Ethernet, Token Ring, and ATM features. Chapter contains information on the OSA modes supported by VSE. Chapter 5 is devoted to setting up OSA/SF on VSE.

- Enhanced SNMP Management Support

  OSA-Express support for SNMP is expanded. See Chapter 1 for details.

- Linux Support

  OSA-Express features now run in a Linux environment. See Chapter 1 for supported feature/mode combinations and software requirements.

- VLAN Priority Tagging

  This allows prioritization and service differentiation across LAN bridges and switches. See Chapter 1 for a brief description. Appendix C, “Examples and Notes from Our Test Team” contains test configuration information.

Part 1. OSA-Express Guide

Part 1 of the document begins by describing the OSA-Express features, functions, and modes of operation. It provides instructions for defining the OSA hardware in the host I/O configuration, installing and setting up the OSA/SF application and interfaces, and setting up the host program to handle OSA traffic. The final task is to configure the mode of operation for the OSA using OSA/SF.

Chapter 1. Introducing OSA-Express

The IBM® Open Systems Adapter-Express is an integrated hardware feature that provides direct connection to clients on local area networks (LANs). The OSA-Express feature plugs into an I/O slot just like a channel card. Up to twelve OSA-Express features may be installed in an IBM @server zSeries.

zSeries OSA-Express features are available for ATM, Fast Ethernet (FENET), Gigabit Ethernet (GbE), and Token Ring (TR) LAN connection. All can use IBM's new Queued Direct I/O (QDIO) architecture to eliminate the need for channel control words (CCWs) and interrupts, resulting in accelerated TCP/IP data packet transmission.

Each zSeries OSA-Express feature has two separate channels for direct LAN attachment. If you install the maximum of 12 OSA-Express features, you will have 24 channels to use.

Start Here

Bringing your OSA-Express feature online is a four-step process.

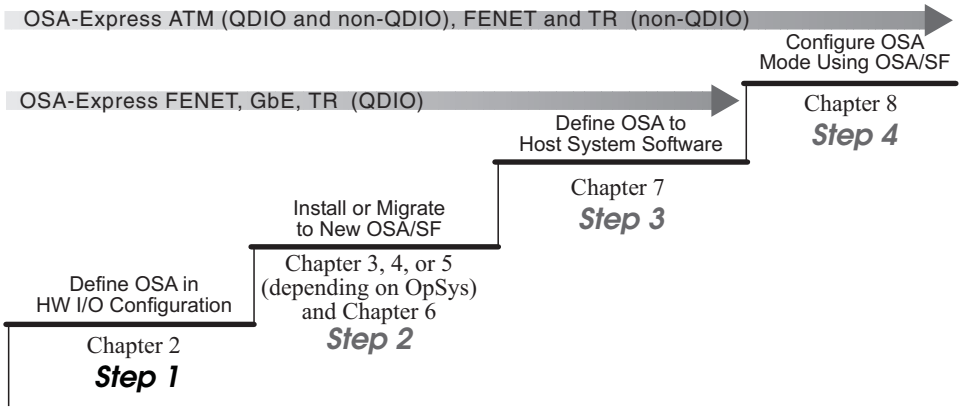


Figure 1. Four Steps to Bringing OSA-Express Online

If you are setting up the Gigabit Ethernet, FENET, or TR feature to use QDIO, configuration is done automatically, making step 4 optional. Step 4 is required for the ATM feature to use QDIO.

When setting up the ATM, FENET, or TR features for non-QDIO operation, step 4 is required to configure the OSA-Express for the right type of traffic.

If you have already installed or updated OSA/SF, you can skip step 2.

If you are familiar with OSA/SF and the OSA-Express features and functions, proceed to Chapter 2, "OSA-Express Hardware Configuration" on page 31 and begin the first step. Otherwise, continue with this chapter to learn about the OSA-Express features.

The OSA-Express Gigabit Ethernet Feature

The zSeries OSA-Express Gigabit Ethernet supports direct attachment through two separate channels to **Gigabit Ethernet** (GbE) LANs where clients communicate using Transmission Control Protocol/Internet Protocol (TCP/IP). The OSA-Express Gigabit Ethernet feature

- Is available as short and long wavelength features
- Provides 1000 mbps/full duplex operation via point-to-point link.
- Supports two types of frames:
  - IEEE 802.3 (ISO/IEC 802.3)
  - Ethernet V2.0, including jumbo frames (those larger than 1,518 bytes). Larger frame sizes increase efficiency for data-intensive applications by reducing frame transmission processing.

    Note: The MTU size can vary and can be set manually in the TCP/IP profile to a maximum of 1492 bytes for 802.3 (1500 for DIX II), and to a maximum of 8992 bytes for jumbo frames.
- Supports multicast traffic but will only send Ethernet V2.0 (DIX) formatted frames
- Uses Queued Direct I/O architecture (QDIO)
- Can be upgraded and repaired while server is powered on

SNA traffic is also supported by the OSA-Express Gigabit Ethernet when Enterprise Extender is enabled (page 20).

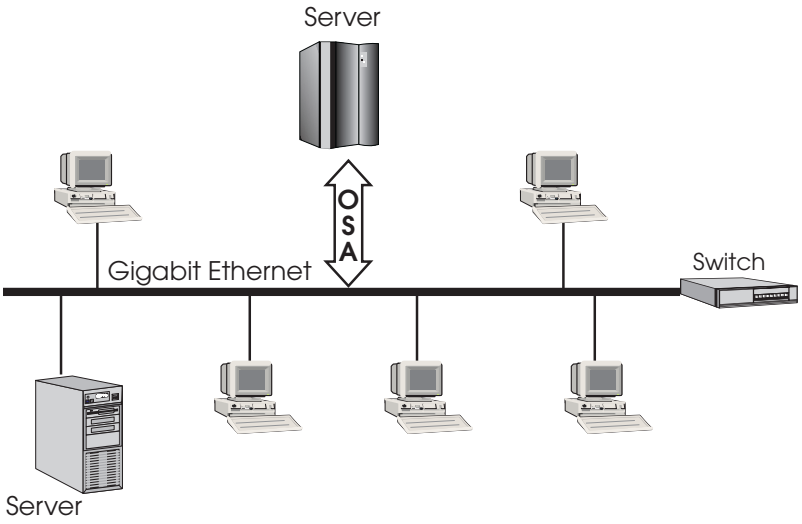


Figure 2. The OSA-Express Gigabit Ethernet Feature Connects Directly to a LAN

"Physical Ports and LEDs" on page 343 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

The OSA-Express FENET Feature

The zSeries OSA-Express FENET feature provides direct attachment through two separate channels to 100 Mbps or 10 Mbps Ethernet LANs running in either half- or full-duplex mode. The OSA-Express FENET supports auto-negotiation[1] with its attached Ethernet hub, router, or switch.

"Physical Ports and LEDs" on page 343 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

LP-to-LP communication is supported when the destination IP address is the same as the IP address for the target LP and the port is enabled. Otherwise the packet is sent out on the network.

FENET Operating Modes

The OSA-Express FENET handles IP traffic in QDIO mode when defined as an OSD CHPID (page 9). When set up for non-QDIO operation as an OSE CHPID, it can run TCP/IP Passthru or SNA, or both concurrently.

For TCP/IP Passthru mode, the default OAT may be used with no configuration or setup required. When running SNA, the OSA-Express FENET supports SNA management services provided by OSA/SF.

Ethernet LAN Speeds and Duplex Modes

You can choose any one of the following settings for the OSA-Express FENET feature:

- Auto negotiate
- 10 Mbps half-duplex
- 10 Mbps full-duplex
- 100 Mbps half-duplex
- 100 Mbps full-duplex

You can use OSA/SF, the standalone support element, or single object operations via the hardware management console to select these settings.

If you allow the LAN speed to default to auto-negotiation, the FENET OSA-Express and the attached hub, router, or switch auto-negotiate the LAN speed setting between them. If the attached Ethernet hub, router, or switch does not support auto-negotiation, the OSA enters the LAN at the default speed of 100 Mbps in half-duplex mode.

The LAN must conform either to the IEEE 802.3 (ISO/IEC 8802.3) standard or to the Ethernet V2.0 specifications.

If you are not using auto-negotiate, the OSA will attempt to join the LAN at the specified speed/mode, however, the speed/mode settings are only used when the OSA is first in the LAN. If this fails, the OSA will attempt to join the LAN as if auto negotiate were specified.

1. Auto-negotiation is a process that takes control of the cable when a connection to a network device is established. It detects the various modes that exist in the device on the other end of the wire and advertises its own abilities in order to automatically configure the highest common performance mode of interoperation.

The OSA-Express Token Ring Feature

The OSA-Express Token Ring (TR) feature provides direct attachment through two separate channels to 100, 16, or 4 Mbps LANs running in either half- or full-duplex mode. The OSA-Express TR also supports autosensing.

"Physical Ports and LEDs" on page 343 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

LP-to-LP communication is supported when the destination IP address is the same as the IP address for the target LP and the port is enabled. Otherwise the packet is sent out on the network.

Token Ring Operating Modes

The OSA-Express TR feature handles IP traffic in QDIO mode when defined as an OSD CHPID (page 9). When set up for non-QDIO operation as an OSE CHPID, it can run TCP/IP Passthru or SNA, or both concurrently.

For TCP/IP Passthru mode, the default OAT may be used with no configuration or setup required. When running SNA, the OSA-Express TR supports SNA management services provided by OSA/SF.

Token Ring LAN Speeds and Duplex Modes

You can choose any one of the following settings for the OSA-Express TR feature:

- Autosense
- 4 Mbps half-duplex
- 4 Mbps full-duplex
- 16 Mbps half-duplex
- 16 Mbps full-duplex
- 100 Mbps full-duplex

You can use OSA/SF, the standalone support element, or single object operations via the hardware management console to select these settings.

If you allow the LAN speed to default to autosense, the OSA-Express Token Ring feature will sense the speed of the attached hub, router, or switch and insert into the LAN at the appropriate speed. If the OSA-Express is the first station on the LAN and the user specifies autosense, it will default to a speed of 16 Mbps and will attempt to open in full duplex mode. If unsuccessful, it will default to half duplex mode.

The LAN must conform to the IEEE 802.5 (ISO/IEC 8802.5) standard.

If you are not using auto-negotiate, the OSA will attempt to join the ring at the specified speed/mode, however, the speed/mode settings are only used when the OSA is first in the LAN or ring. If this fails, the OSA will attempt to join the ring as if auto negotiate were specified.

The OSA-Express ATM Feature

The OSA-Express ATM feature supports 155 Mbps over single mode or multi-mode fiber optic connection. When set up for QDIO, the ATM feature can be configured for Ethernet LAN emulation. When set up for non-QDIO, it can be configured for ATM Native or LAN emulation (Ethernet and token ring).

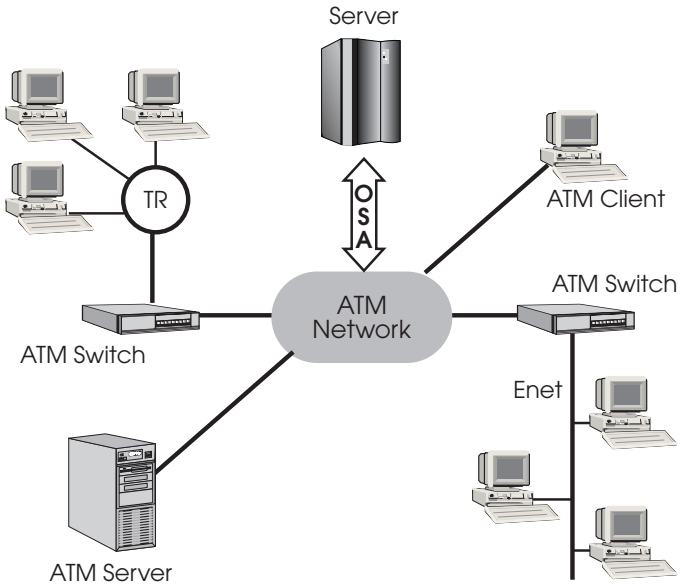


Figure 3. The OSA-Express ATM Feature Provides Access to ATM Native or Legacy Networks When Set Up for Non-QDIO

An asynchronous transfer mode (ATM) network is connection-oriented, not media-shared as is the case with LANs. The ATM switching technology provides the high bandwidths needed for simultaneous traffic of various types of data (voice, video, etc.) across the ATM connections, or virtual circuits.

The ATM OSA-Express attaches to a 155 Mbps ATM device, such as an ATM switch or router, through single or multi-mode fiber. The ATM device must conform to the ATM User Network Interface (UNI) 3.0 or 3.1 requirements.

Services that are *native* on the ATM network are, for example, the connections created by the TCP/IP and SNA functions of IBM Communications Server (CS for OS/390® or CS for z/OS™) and the VTAM® High Performance Routing (HPR) capabilities that allow fast transmission of ATM cells.

"Physical Ports and LEDs" on page 343 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

OSA-Express Ports for ATM Connection

The zSeries OSA-Express ATM feature provides direct attachment through two separate channels to ATM Native networks or an ATM networks with LAN emulation (LANE) for Ethernet or token ring clients. Regardless of the type of network the ATM feature is connecting, you must configure the ATM physical port.

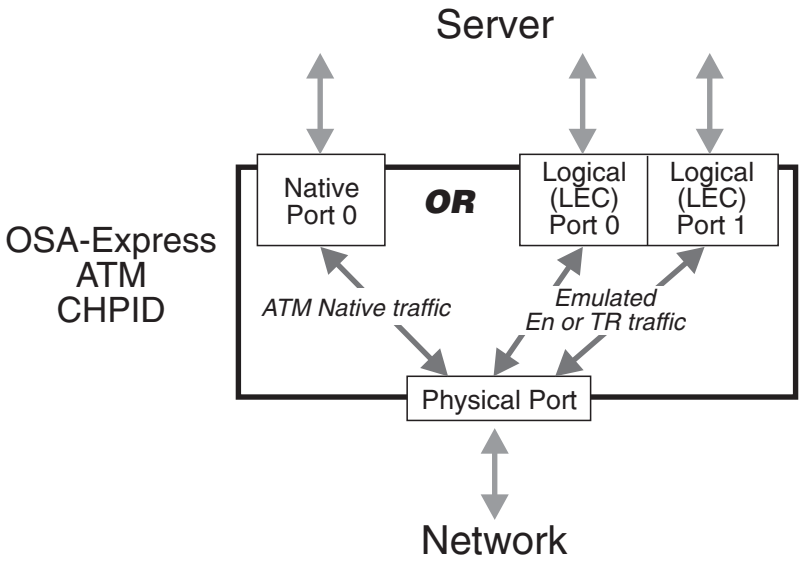


Figure 4. Each OSA-Express ATM CHPID Supports One Port for ATM Native or Two Emulated Ports for LEC Services

The OSA-Express ATM feature supports one Native port for virtual connection between the server and an ATM Native network. You must configure this port when running ATM Native mode.

An *emulated* port is a virtual connection between the server and an existing Ethernet or token ring network. When running LAN emulation, you can define one or two emulated ports for the OSA-Express to connect to two separate networks, creating two LAN Emulation Clients (LECs). An emulated port provides LEC services for SNA and IP clients. Because the OSA-Express ATM feature allows two emulated ports to be configured, the CHPID can handle two different kinds of network traffic with no recabling at the *physical* port. In this way, an ATM feature set up for non-QDIO operation can support simultaneous connection to two Ethernet, or two token ring networks, or one of each. When set up for QDIO, the ATM feature can support one or two Ethernet network connections.

Chapter 8, “Configuring OSA-Express Modes” on page 149 provides instructions for configuring these ports.

Partial Activation

A new option called *partial activation* enables you to add or change one emulated port without interrupting traffic on the other emulated port. Partial activation applies only to emulated ports.

See page 149 for more information.

ATM Operating Modes

The OSA-Express ATM feature can run in the following modes:

- QDIO when set up for Ethernet LAN emulation.
- HPDT ATM Native mode in the OS/390 and VM environments. This mode requires the exclusive use of the ATM OSA-Express. Data transfer is supported via VTAM for both the SNA and TCP/IP functions of CS for OS/390.

  Note: Although you cannot define multiple TRLEs for the same port in one LP, you can have multiple instances of TCP/IP in a single LP access the same

port by defining additional devices in the DATAPATH parameter for the TRLE. See step 3 on page 130 for an example.

- TCP/IP Passthru and SNA modes concurrently with each other in (non-QDIO) Ethernet or token ring LAN emulation.

Supported Operating Systems

OSA-Express features run in a variety of operating systems.

- z/OS, z/OS.e, and OS/390
- VM/ESA® and z/VM
- VSE/ESA™
- Linux

  For information on Linux, see

  www10.software.ibm.com/developerworks/opensource/linux390/index.shtml

  www.linux.org/docs
- Transaction Processing Facility (TPF) Version 4.1 at PUT 13 (or higher) supports the OSA-Express Gigabit Ethernet feature running QDIO. OSA/SF does not run on TPF. For more information about TPF, see the www.s390.ibm.com/products/tpf/ web site.

The exact version and release required depends on the OSA-Express feature and operating mode. See “Supported Operating Modes” and “Software Requirements” on page 25 for more information.

The Open Systems Adapter/Support Facility (OSA/SF) runs on z/OS, z/OS.e, OS/390, z/VM, VM/ESA, and VSE/ESA operating systems.

Supported Operating Modes

One of the first tasks you perform is to define the OSA-Express feature to the hardware I/O configuration as a channel that uses QDIO or one that does not use QDIO. Channels that use QDIO are defined as channel type OSD. Those that do not use QDIO are defined as channel type OSE. Figure 5 on page 10 shows the various operating modes supported by the OSA-Express when set up as OSD and OSE Channels.

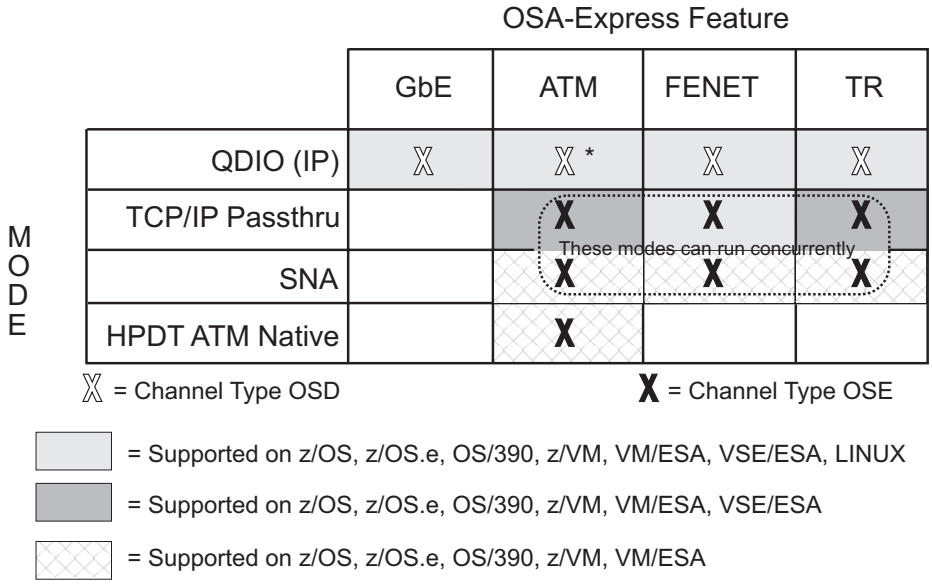


*Figure 5. OSA-Express Features Operate in a Variety of Modes. SNA and HPDT ATM Native are not supported on VSE. Linux supports only QDIO mode and the FENET feature in TCP/IP Passthru mode. *QDIO mode is an option for the ATM feature only when it is emulating an Ethernet LAN.*

QDIO Mode

All OSA-Express features can handle IP traffic in QDIO mode but the software requirements differ by feature type.

Gigabit Ethernet on z/OS, z/OS.e, or OS/390
Requires Release 9 (or later) of Communications Server for OS/390.

Gigabit Ethernet on TPF
The Gigabit Ethernet feature runs on zSeries partitions operating in a TPF 4.1 environment.

ATM or FENET on z/OS, z/OS.e, or OS/390
Requires Release 9 (or later) of Communications Server for OS/390.

Token Ring on z/OS, z/OS.e, or OS/390
Requires Release 10 (or later) of Communications Server for OS/390.

Any OSA-Express on VM
Requires VM/ESA Version 2 Release 4 or later for QDIO operation on a VM guest or z/VM™ Version 3 Release 1 for QDIO on a native VM operating system.

Any OSA-Express on VSE
Requires VSE/ESA Version 2 Release 6 or later.

ATM, FENET, or Gigabit Ethernet on Linux
Requires Linux kernel V2.2.16 or later. Only one ATM emulated port is supported by kernel V2.2.16. Kernel V2.4 is required for two ATM emulated ports.

Token Ring on Linux
Requires Linux kernel V2.4 or later.

These software releases support the OSD channel type and signalling protocol that minimize I/O interruptions. Once the QDIO data queues are activated, continuous,

direct data exchange between the OSA-Express and CS for OS/390 is initiated and remains active without the need for additional instructions to start the subchannel.

OSA-Express features running in QDIO mode support IP broadcast traffic beginning with Z/OS V1R4, z/VM V4R3, and Linux kernel 2.4.14.

QDIO includes an IP assist function, which gathers Address Resolution Protocol (ARP) data during the mapping of IP addresses to media access (MAC) addresses. Starting with Release 10 of CS for OS/390, you can use the TSO NETSTAT ARP command to query the OSA-Express feature for this data, which may prove useful in problem determination. z/OS V1R4 introduces an additional method for querying the ARP cache using the DISPLAY TCPIP NETSTAT ARP command.

IPv6 on z/OS and Linux

OSA-Express Gigabit Ethernet and FENET features running QDIO in a z/OS V1R4 or Linux (kernel 2.4.14 or later) environment can use the IPv6 protocol. IPv6 provides improved traffic management in the following areas:

128–bit addressing
Eliminates all practical limitations on global addressability. This means that private address space—and the network address translators (NATs) used between private intranet and public internet—are no longer needed.

Simplified header formats
Allow for more efficient packet handling and reduced bandwidth cost.

Hierarchical addressing and routing
Keep routing tables small and backbone routing efficient by using address prefixes rather than address classes.

Improved support for options
Changes the way IP header options are encoded, allowing more efficient forwarding and greater flexibility.

Address autoconfiguration
Allows stateless IP address configuration without a configuration server.

In addition, IPv6 brings greater authentication and privacy capabilities through the definition of new extensions, and integrated Quality of Service (QoS) through a new traffic class byte in the header.

Certain commands that specify IP addresses, such those dealing with VIPA addresses and IP address takeover, use syntax specific to a particular IP version. “Sample TCP/IP Profile (IPv4 and IPv6)” on page 395 shows IPv6 definitions. See the following for more information:

- *z/OS Communications Server: IPv6 Network and Application Design Guide*
- *z/OS Communications Server: IP Configuration Guide*
- *z/OS Communications Server: IP Configuration Reference*
- *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103

Virtual LAN Support for Linux

OSA-Express GbE and FENET features running QDIO in a Linux kernel 2.4.14 (or later) environment support Virtual Local Area Networks (VLANs) as described in IEEE standard 802.1Q.

VLANs increase traffic flow and reduce overhead by allowing you to organize your network by traffic patterns rather than by physical location. In a conventional network topology, such as that shown in Figure 6 on page 12, devices communicate

across LAN segments to different broadcast domains using routers. Although routers add latency by delaying transmission of data while using more of the data packet to determine destinations, they are preferable to building a single broadcast domain, which could more easily be flooded with traffic.

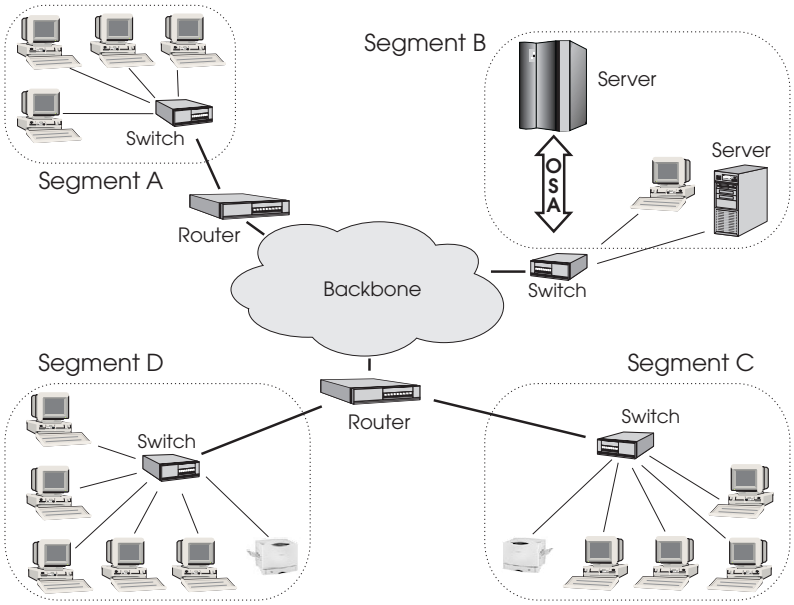


Figure 6. Conventional routed network

By organizing the network into VLANs through the use of Ethernet switches, distinct broadcast domains can be maintained without the latency introduced by multiple routers. As Figure 7 shows, a single router can provide the interfaces for all VLANs that appeared as separate LAN segments in Figure 6.

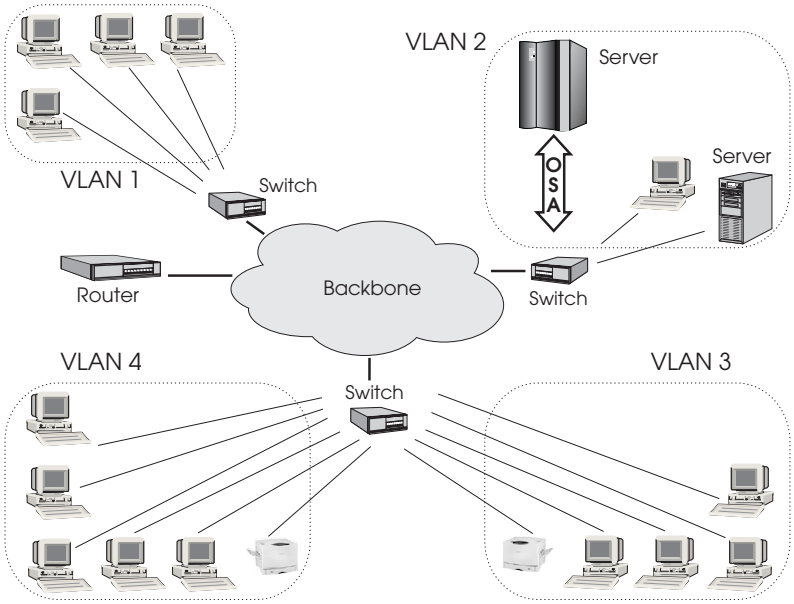


Figure 7. Switched VLAN network

Figure 8 on page 13 shows how VLANs can be organized logically, according to traffic flow, rather than being restricted by physical location. If workstations 1–3

communicate mainly with the small server, VLANs can be used to organize only these devices in a single broadcast domain that keeps broadcast traffic within the group. This reduces traffic both inside the domain and outside, on the rest of the network.

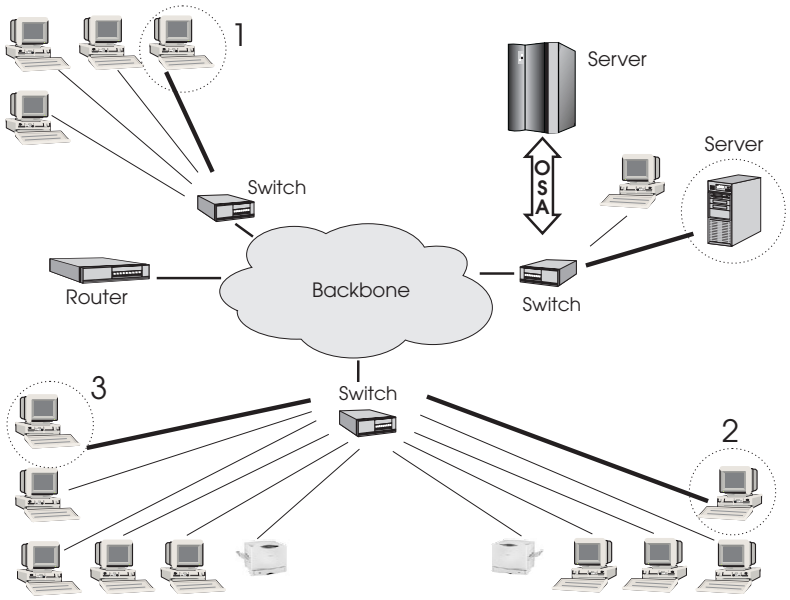


Figure 8. VLAN network organized for traffic flow

Refer to *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, for configuration information.

VLAN Priority Tagging

VLAN priority tagging extends the capabilities of priority queuing beyond the server to include LAN bridges and switches. This function provides a way to manage consistent QoS traffic prioritization and service differentiation end-to-end, across switched LAN and WAN networks. VLAN priority tagging is supported by z/OS Communications Server.

By using standard based 802.1Q priority tagged frames and setting appropriate priorities based on policy, you can ensure that mission-critical traffic is not affected by non-critical traffic. The standard 802.1Q VLAN header enables interoperability with switch vendors, more flexibility in setting traffic priorities, and increased efficiency in switching and routing frames. “VLAN Priority Tagging” on page 390 contains test configuration information. Refer to *z/OS Communications Server: IP Configuration Guide* for more information.

Non-QDIO Modes

OSA-Express ATM features defined as OSE CHPIDs can be configured to run TCP/IP Passthru, SNA, and HPDT MPC Native modes.

OSA-Express FENET features defined as OSE CHPIDs can be configured to run TCP/IP Passthru and SNA modes.

OSA-Express TR features defined as OSE CHPIDs can be configured to run TCP/IP Passthru and SNA modes.

TCP/IP Passthru Mode

The OSA-Express ATM, FENET, and TR features can be run in this mode. These OSA-Express features can be run concurrently in the TCP/IP Passthru and SNA mode.

TCP/IP Passthru requires one of the following:

- OS/390 V2R6 or later
- VM/ESA V2R2 or later
- VSE/ESA V2R6 or later
- Linux kernel V2.2.16 or later (FENET only)

In TCP/IP Passthru mode, an OSA transfers data between a host IP program to which it is defined and clients on the following networks:

- An ATM emulated LAN on an ATM-based network that is attached to an ATM OSA-Express and adheres to one of the following frame protocols:
  - Ethernet II using the DEC Ethernet V 2.0 envelope
  - Ethernet 802.3 using the 802.2 envelope with SNAP
  - Token Ring 802.5 using the 802.2 envelope with SNAP

  The ATM OSA-Express must be attached to a 155 Mbps ATM switch. On each ELAN, the ATM OSA-Express provides ATM LAN emulation client (LEC) services by means of one of its two LEC ports.
- An Ethernet LAN that is attached to the port on an FENET OSA-Express and supports one of the following frame protocols:
  - Ethernet II using the DEC Ethernet V 2.0 envelope
  - Ethernet 802.3 using the 802.2 envelope with SNAP
- A token ring LAN that is attached to the port on a TR OSA-Express and supports the following frame protocol:
  - Token Ring 802.5 using the 802.2 envelope with SNAP

HPDT ATM Native Mode

The High Performance Data Transfer (HPDT) ATM Native mode allows you to take full advantage of the facilities of the ATM network to which the ATM OSA-Express is attached. For this mode, which requires the exclusive use of the OSA, you can specify that the ATM OSA-Express transfers data across both permanent virtual circuits (PVCs) and switched virtual circuits (SVCs).

An ATM OSA-Express can be run in the HPDT ATM Native mode to support Communications Server (CS for OS/390, CS for z/OS) high speed networking for classical IP networks (RFC 1577).

For VM/ESA 2.4.0, an ATM OSA-Express can be run in the HPDT ATM Native mode to support TCP/IP 2.3.0.

SNA Mode

The OSA-Express FENET, TR, and ATM features support SNA. An OSA-Express ATM feature can run SNA traffic while operating in either ATM Native or LAN emulation.

If an OSA is being run in the SNA mode, it is viewed by VTAM and the SNA function of CS OS/390 as an external communications adapter (XCA) that can have either switched or non-switched lines of communication.

In this mode, an OSA acts as an SNA passthru agent to the clients that use the SNA protocol on the LAN that is directly attached to the OSA or, in the case of an ATM OSA-Express, that are bridged from the ATM network in an emulated LAN (ELAN) configuration.

SNA mode requires one of the following:

- OS/390 V2R3 or later
- VM/ESA V2R2 or later

OSA-Express Characteristics

Each zSeries OSA-Express feature has two channels. Each channel has one physical ***OSA port*** for direct LAN attachment. These ports accept fiber optic cable on the ATM and GbE features, shielded or unshielded twisted pair on FENET and TR features. See Appendix A, “Physical Connection Information” on page 343 for more information on cabling.

The OSA-Express is identified in the hardware I/O configuration by its channel path identifier (CHPID). The CHPID is assigned when the OSA is installed and is based on the number of features already installed in the server. For each OSA-Express CHPID installed, you must specify device numbers and unit addresses using Hardware Configuration Definition (HCD) or System Element (SE) panels. During this hardware configuration process, you will also define the type of OSA-Express channel as either **OSD** (QDIO) or **OSE** (non-QDIO). Chapter 2, “OSA-Express Hardware Configuration” on page 31, shows you how this is done.

The OSA-Express channel can be shared among all logical partitions (LPs) of the server. In some OSA documentation this is referred to as ***port sharing*** (page 17). A significant difference between OSA-Express features defined as OSD channels and those defined as OSE, is that the OSA Support Facility (OSA/SF) is not required to set up port sharing for OSD GbE, TR, or FENET features (QDIO mode). OSA/SF ***is*** required for any ATM features defined as OSD, and for all OSE features with port sharing.

Each OSA is shipped with the set of IBM-supplied default port parameters that are shown in Chapter 9. Some of these port parameters can be set through OSA/SF or at the standalone support element or single object operations via the hardware management console, or at only one of these input devices. Some port parameters, however, cannot be set through user input.

- The IBM-supplied default settings for port traffic and those parameters that can be altered, or changed by user input appear in the OSA/SF Port Notebook pages shown in Chapter 9.
- A number of port parameters can be set only if an OSA is being run in the SNA mode. These parameters, which can only be set with OSA/SF, can be used to enhance SNA session availability, to change the link level control timer values, and so on. A discussion on these SNA mode port parameters starts on page 178.
- User-provided settings to OSA/SF are *required* to establish a LAN emulation client (LEC) port that allows an ATM OSA-Express to be run in QDIO, TCP/IP Passthru, or SNA mode to support Ethernet and token ring LAN clients that are bridged from the ATM-based network (“Configuring ATM LAN Emulation” on page 166).
- Each OSA-Express is shipped with a world-wide unique, or universal, media access control (MAC) address. This MAC address permits the OSA to be uniquely identifiable on the attached LAN. If you prefer, you can use the OSA

Support Facility (OSA/SF), the Hardware Management Console, or the Support Element to create and activate a local or group Media Access Control (MAC) address for a physical OSA port, or for the two ATM LEC ports. Local MAC addresses can also be set for OSA-Express physical ports using the Support Element or single object operations via the hardware management console.

Support for Simple Network Management Protocol

You can use Simple Network Management Protocol (SNMP) to monitor and control your OSA-Express ports in real time, just as you would other network devices. OSA-Express features provide data for use by an SNMP management application such as Tivoli® or NetView®. This data is organized in two different management information base (MIB) tables:

- OSA-Express MIB
- Communications Server IBM MVS™ TCP/IP Enterprise Specific MIB

If you are running z/OS V1R4 or Linux kernel 2.4.14 or above with an OSA-Express feature in QDIO mode, the OSA-Express MIB is directly accessible through an OSA-Express SNMP subagent. The Communications Server subagent for the IBM MVS TCP/IP Enterprise Specific MIB requires OSA/SF for access and can be used by z/OS and OS/390.

The Communications Server SNMP TCP/IP Subagent

Communications Server for OS/390 Version 2 Release 10 introduced SNMP support for the following OSA-Express features and modes only:

ATM	any mode
FENET	QDIO only
Gigabit Ethernet	QDIO only

z/OS V1R2 Communications Server expanded SNMP support for OSA-Express ATM, FENET, and Gigabit Ethernet features to all their operating modes. See “Setting up the Communications Server SNMP TCP/IP subagent” on page 51 for more information.

See *z/OS Communications Server: IP Configuration Guide* and the SNMP chapter of *IP System Administrator’s Commands* in your Communications Server library for a complete description of the SNMP TCP/IP subagent support for OSA-Express management data.

The OSA-Express Direct SNMP Subagent

Communications Server for z/OS V1R4 and Linux kernel 2.4.14 support the OSA-Express subagent for accessing OSA MIBs. This subagent communicates directly with the OSA and does not require OSA/SF to access OSA MIBs as the CS SNMP TCP/IP subagent does. Although the OSA subagent supports all OSA-Express features[2], they must be operating in QDIO mode (defined as OSD CHPIDs) for communication with the OSA subagent. See “OSA-Express Direct SNMP Support” on page 196 for more information.

2. The OSA-Express ATM feature must be running Ethernet LAN emulation for OSA direct SNMP subagent support.

Port Sharing Among Logical Partitions

If a system is running in logically-partitioned (LPAR) mode, an OSA channel path can be defined to be shared among those logical partitions (LPs) to which it is defined in the system hardware I/O configuration (IOCDS). This allows access to a network port on the OSA to be shared by as many as 15 LPs, the maximum allowed.

The principle of *port sharing* is shown in Figure 9, where two IP programs share access to the OSA-Express physical port.

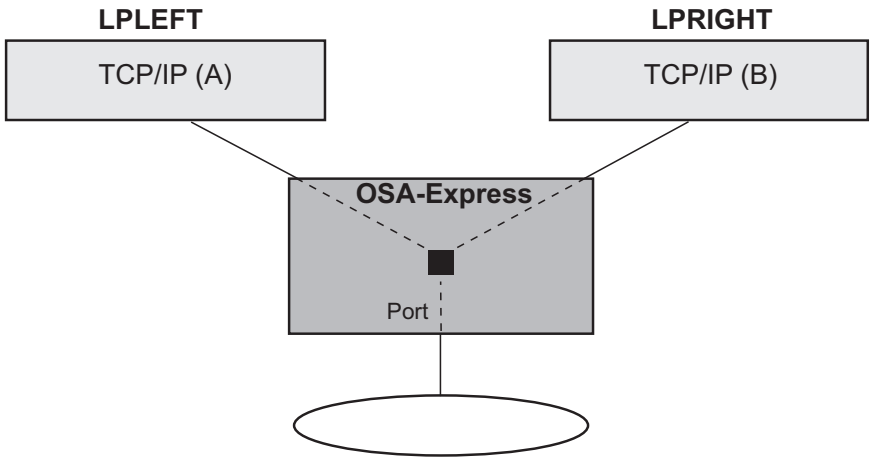


Figure 9. Port Sharing Allows Multiple Partitions Access to OSA-Express Channels

IP Multicast Support

IP Multicast improves scalability by increasing data traffic recipients without a corresponding increase in bandwidth. Any application connecting to a multicast socket can pass traffic through any OSA-Express feature. OSA-Express features accept LAN packets based on multicast addresses, which are displayed through the Open Systems Adapter/Support Facility (OSA/SF).

Enhanced Network Availability

There are several ways to ensure network availability should failure occur at either the logical partition or the CHPID/network connection level. Port sharing, redundant paths, and the use of primary and secondary ports all provide some measure of recovery. A combination of these can guarantee network availability regardless of the failing component.

As always, careful planning before configuration can help you avoid problems later on. It is not advisable to configure two paths to a network through the same OSA-Express feature when you can use different OSA-Express features instead, ensuring network availability should either OSA-Express be down. This is especially important to keep in mind when setting up the two CHPIDS included with the zSeries OSA-Express feature.

ARP Takeover

When TCP/IP is started in QDIO mode, it downloads all the home IP addresses in the stack and stores them in each OSA-Express feature. This is a service of QDIO architecture and only occurs automatically for OSD channels. For OSA-Express

features set up as OSE channels (non-QDIO), you must define multiple IP addresses in the OSA Address Table using OSA/SF. The OSA-Express then responds to ARP requests for its own IP address, as well as for virtual IP addresses (VIPAs). If an OSA-Express feature fails while there is a backup OSA-Express available on the same network or subnetwork, TCP/IP informs the backup OSA which IP addresses (real and VIPA) to take over, and the network connection is maintained.

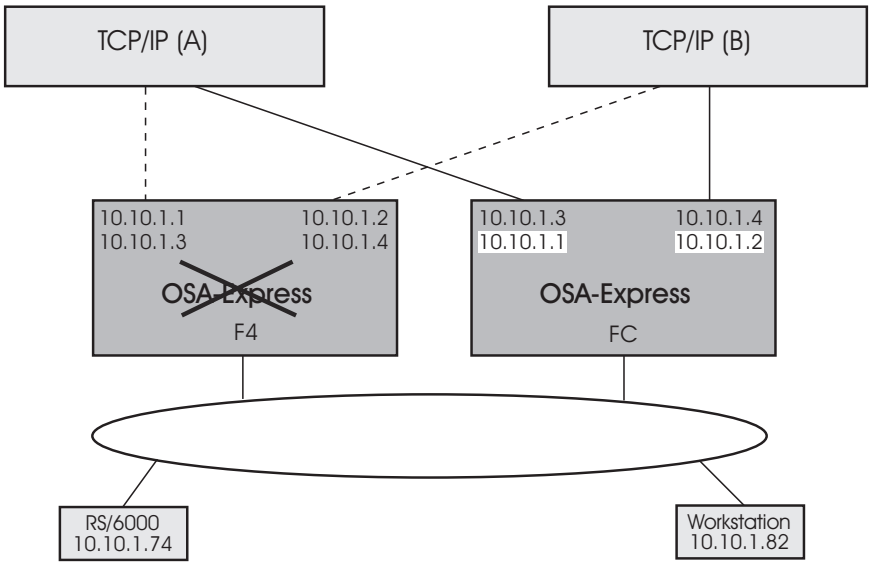


Figure 10. IP Address Control is Automatically Taken Over from Failing OSA-Express

Figure 10 shows two OSA-Express features, each storing the same four IP addresses that were either downloaded by TCP/IP for OSD channels, or defined in the OAT for OSE channels. Under normal conditions, OSA-Express CHPID F4 controls the network connection to IP addresses 10.10.1.1 and 10.10.1.2, while CHPID FC controls the connection to 10.10.1.3 and 10.10.1.4. If CHPID F4 fails, OSA-Express CHPID FC automatically takes control of IP addresses 10.10.1.1 and 10.10.1.2, while maintaining control of 10.10.1.3 and 10.10.1.4. These changes are made dynamically in the CHPID's OSA Address Table and communicated to the clients, alerting them to the new path.

The ARP cache for a targeted TCP/IP stack can be queried and purged from the z/OS console. "Querying and Purging the ARP Cache (z/OS and Linux)" on page 195 shows command examples.

The qetharp utility is available on Linux to query and purge the ARP cache for a targeted TCP/IP stack. See "Querying and Purging the ARP Cache (z/OS and Linux)" on page 195 for usage information.

Primary and Secondary Default Routing

When multiple TCP/IP instances are using the same OSA-Express feature, you can designate a TCP/IP instance as the primary default or secondary default for handling unknown IP address destinations. (CS for OS/390 uses the terms *primary router* and *secondary router*.) For the OSA-Express feature, you must designate a primary or secondary instance of TCP/IP in order to access an IP address on another LAN. Only one TCP/IP instance can be registered as the primary default on any OSA-Express. For OSA-Express GbE and FENET features running QDIO, multiple TCP/IP instances can be registered as secondary defaults, but for all other

OSA-Express CHPIDs, only one TCP/IP instance can be registered as the secondary default. (See the description of the PRIROUTER and SECROUTER parameters on the DEVICE statement for MPCIPA in *z/OS Communications Server: IP Configuration Guide* for details on how to designate a primary or secondary router. For Linux, see *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103.)

When running the OSA-Express feature dedicated to one LPAR, the primary router flag must be specified if the dedicated LPAR is to be used as a router. When the primary router flag is set, the OSA-Express feature will forward all IP packets received that do not contain a destination IP address registered with the feature. The HOME IP statements in each TCP/IP stack are the addresses registered to the OSA Express feature. If the primary router flag is NOT specified, then all packets received by the OSA-Express feature without a registered IP address are dropped. This includes all packets to be routed through the dedicated LPAR that is serving as a router to other networks.

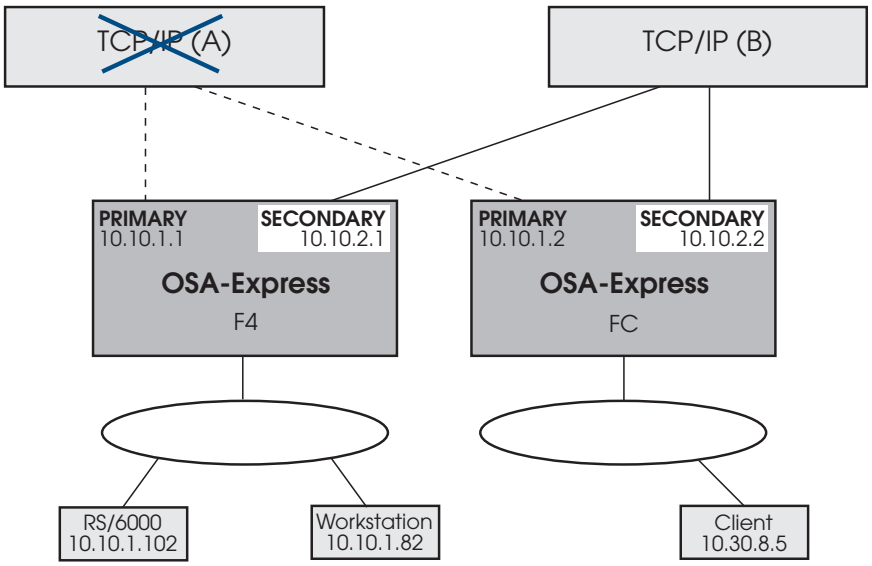


Figure 11. Secondary Router Provides Path to Unknown IP Addresses When Primary Router Fails

Figure 11 shows two TCP/IP instances, one of which is designated *Primary TCP/IP Router*, the other, *Secondary TCP/IP Router*. Two OSA-Express features provide redundant paths to both TCP/IP instances, ensuring that both the RS/6000® and the workstation can access the client at IP address 10.30.8.5 on another LAN. In Figure 11, TCP/IP instance A has failed, removing the primary path between the 10.10 LAN and the 10.30 LAN, but TCP/IP instance B provides a secondary path for recovery.

"Primary and Secondary Routing" on page 353 and "Multiple Secondary Routes with Dynamic Routing" on page 360 describe how we set up our environment to test this function.

Virtual IP Addressing

The Virtual IP Address (VIPA) adds another layer of protection against network connection failure. A Virtual IP Address (VIPA) is configured on a TCP/IP stack rather than a physical adapter, and is therefore not associated with any particular endpoint device. By configuring multiple paths to a stack using VIPA in combination

with conventional IP addresses, you can eliminate hardware and transmission media as a single point of failure for many connections. A server can still become unavailable, however, if a TCP/IP stack or operating system fails. Such a problem can be fixed by moving the VIPA to another stack. Dynamic VIPA (DVIPA) automates this movement.

Automatic VIPA takeover allows a VIPA address to automatically move to a stack where an existing suitable application instance is already active and allows the application to serve the client formerly going to the failed stack. DVIPA for an application server allows an application to create and activate VIPA so that the VIPA moves when the application moves. This means that application instances on a failing node may be distributed among all surviving nodes.

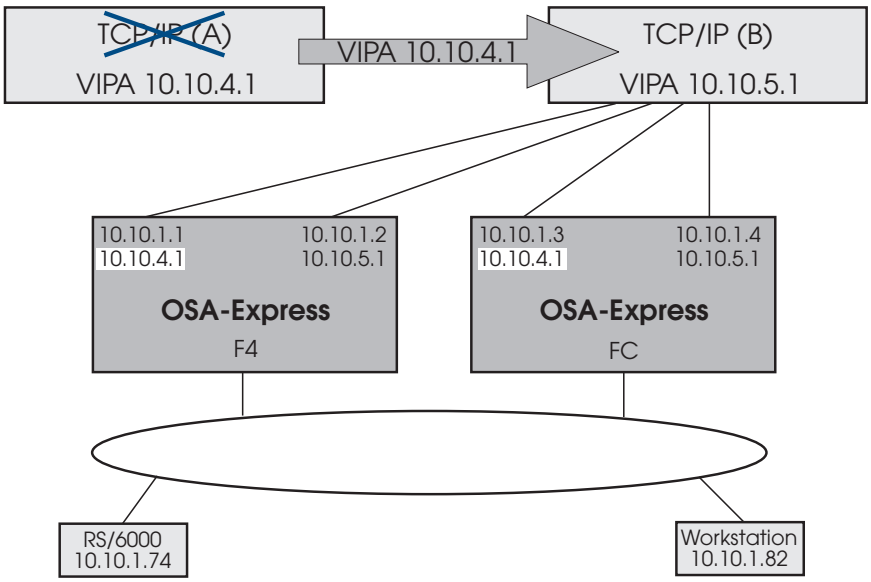


Figure 12. DVIPA Automatically Relocates When TCP/IP Stack Fails

In Figure 12, TCP/IP stack A has failed, but DVIPA 10.10.4.1 is automatically started on another node with the same application environment, which now handles all the failing node's clients.

CS for OS/390 V2R8 TCP/IP: Guide to Enhancements contains a thorough description and detailed examples of DVIPA configuration.

Enterprise Extender

The Enterprise Extender (EE) function of CS for OS/390 allows you to run SNA applications and data on IP networks and IP-attached clients. It can be used with any OSA-Express feature running IP traffic. EE is a simple set of extensions to the open High Performance Routing technology that integrates HPR frames into User Datagram Protocol/Internet Protocol (UDP/IP) packets, providing:

- SNA application connectivity using an IP backbone support for
  - SNA-style priority
  - SNA parallel sysplex exploitation
- Improved throughput and response times
- Compatible support for TCP and UDP traffic on the IP portion of the application traffic path (SNA/HPR and UDP/IP traffic can coexist on an EE connection)

In order to enable EE, you must configure the TCP/IP stack with a virtual IP address (VIPA) and define an XCA major node. The XCA major node is used to define the PORT, GROUP, and LINE statements for the EE connections.

In addition, a switched major node is required when an APPN connection network is **not** used. The switched major node is used to define the PU statements for the EE connections. When an APPN connection network **is** used, the switched major node is not used on the dial-out side and is optional on the dial-in side. If a switched major node is not defined on the dial-in side, a PU is dynamically created.

Starting with Release 10 of CS for OS/390, if you want to activate EE connections when starting VTAM, you must use either the TCPNAME start option or the IPADDR start option. No default values are applied. See *z/OS Communications Server: SNA Network Implementation Guide* for detailed instructions.

Open Systems Adapter/Support Facility (OSA/SF)

OSA/SF is a base element of z/OS, z/OS.e, OS/390, z/VM, and VM/ESA. OSA/SF provides a user-friendly interface for monitoring OSA operation and managing its communication. OSA/SF includes software that runs on a personal computer communicating with the server. This tool delivers a simple means to configure and manage the OSA-Express.

Beginning with OSA/SF Version 2 on OS/390, and on VM/ESA Version 2 Release 2.0 with APAR OW36927, OSA/SF includes a graphical user interface (GUI) that runs on Microsoft® Windows® 95 and Microsoft Windows NT® as well as on IBM OS/2®. (This publication refers to Windows 95 and Windows NT collectively as Windows.) You need not use the GUI; a REXX command interface is also included with OSA/SF.

Deciding Whether OSA/SF is Required

OSA/SF ***is required*** to set up the OSA-Express TR, FENET and ATM features using channel type OSE (non-QDIO), except when an OSE FENET or TR feature uses the default OAT without port sharing. OSA/SF is also required to set up the OSA-Express ATM feature to use channel type OSD (QDIO) for emulated Ethernet traffic.

OSA/SF ***is required*** for SNMP support using the Communications Server SNMP TCP/IP SNMP subagent. OSA/SF is ***not required*** for for the OSA-Express Direct SNMP subagent. See “Support for Simple Network Management Protocol” on page 16 for more information.

OSA/SF is ***not required*** to set up the OSA-Express Gigabit Ethernet, TR, or FENET feature to use channel type OSD (QDIO mode). For these features, all data required to configure an OSD CHPID is automatically taken from the HCD hardware definition and software definition input to Communication Server for OS/390 (or z/OS). The only configuration data you may need to define are local or group MAC addresses and port speeds. If you choose to change the MAC address that is shipped with the OSA-Express, it can be changed from the Hardware Management Console, the Support Element, or OSA/SF. If your installation requires setting group addresses, you must use OSA/SF.

OSA/SF is recommended for monitoring network information and assisting with problem determination for ***all OSA-Express features***. If you already have a previous OSA/SF installed, we recommend you migrate to the latest OSA/SF. If you

have other OSAs installed or plan to install other OSAs in the future, we suggest you install the latest OSA/SF. If this is your first and only OSA and setup time is critical, you can postpone installation of OSA/SF until you want to use it.

Install the Latest OSA/SF if:

- A previous release of OSA/SF is already installed.
- Other OSA features that require OSA/SF are installed or planned.

  The latest OSA/SF supports all OSA-Express and OSA-2 features. If you install OSA/SF, you can set up and manage OSA-Express as well as OSA-2 features from one OSA/SF image. Any pre-existing OSA-2 configurations will still be available for use.
- You do not have access to the S/390 Hardware Management Console (HMC) or the Support Element (SE) and you want to set a local MAC address in place of the MAC address that shipped with the OSA. The SE is an IBM Thinkpad located in the frame of the S/390. The HMC is LAN-attached to the SE and might be located anywhere in the complex.

  If you have access to either of these consoles, some of the tasks you can do are:
  - Enable or disable the port
  - Query port status
  - View port parameters
  - Set a local MAC address
  - Collect trace information for service

  Note: To review the instructions for accessing the OSA information from the HMC or SE, see “Using the Hardware Consoles (HMC or SE)” on page 195.

Deciding Which Interface to Use with OSA/SF

- If you decide to use OSA/SF, all setup[3], management, and problem determination tasks can be performed from:
  - A command line, using a REXX EXEC named IOACMD
  - OS/2
  - Microsoft Windows

  The OSA/SF GUI has the same look and feel whether it’s installed on Windows or OS/2. Use the operating system that you have available or the one you are most familiar with. See “Software Requirements” on page 25.

  If you prefer not to use a graphical user interface (GUI), use the **IOACMD** REXX EXEC. The EXEC usage is shown in “Using the IOACMD EXEC Interface” on page 107.
- Instructions are provided for using all three interfaces in Chapter 6, “Using the OSA/SF Interfaces” on page 107.

Determining the OSA/SF Management Span

Only one instance, or copy, of OSA/SF can run on an OS/390, z/OS, z/OS.e, or VM system image. However, that instance of OSA/SF can be used to customize, or

3. OSA-Express GbE and FENET (OSD) do not require the setup performed from these interfaces.

configure, the modes of operation on all the OSAs defined in the system hardware I/O configuration data set (IOCDS) that the copy of OSA/SF can view.

For a managing instance of OSA/SF to recognize an OSA, you must associate one device number with the OSA channel path that is defined in the same logical partition (or system in basic mode) as the system image on which OSA/SF is running. Furthermore, this device number must be specified as device type = OSAD with unit address = X'FE'. Because of these requirements, this device number is usually called either the OSAD device or FE device.

An OSA/SF interface partly determines the OSA/SF's span of control. Using the OSA/SF GUI interface (OS/2 or Windows), you can establish an active host session with as many OS/390 images running OSA/SF as the GUI interface recognizes. Potentially, therefore, this interface allows OSA/SF's span of control to cross CPC boundaries as shown in the following figure. The other OSA/SF interfaces allow the instance of OSA/SF that is running on that system image to manage only those OSAs that it can recognize in its system hardware I/O configuration, that is, in the I/O configuration data set (IOCDS) or I/O definition file (IODF).

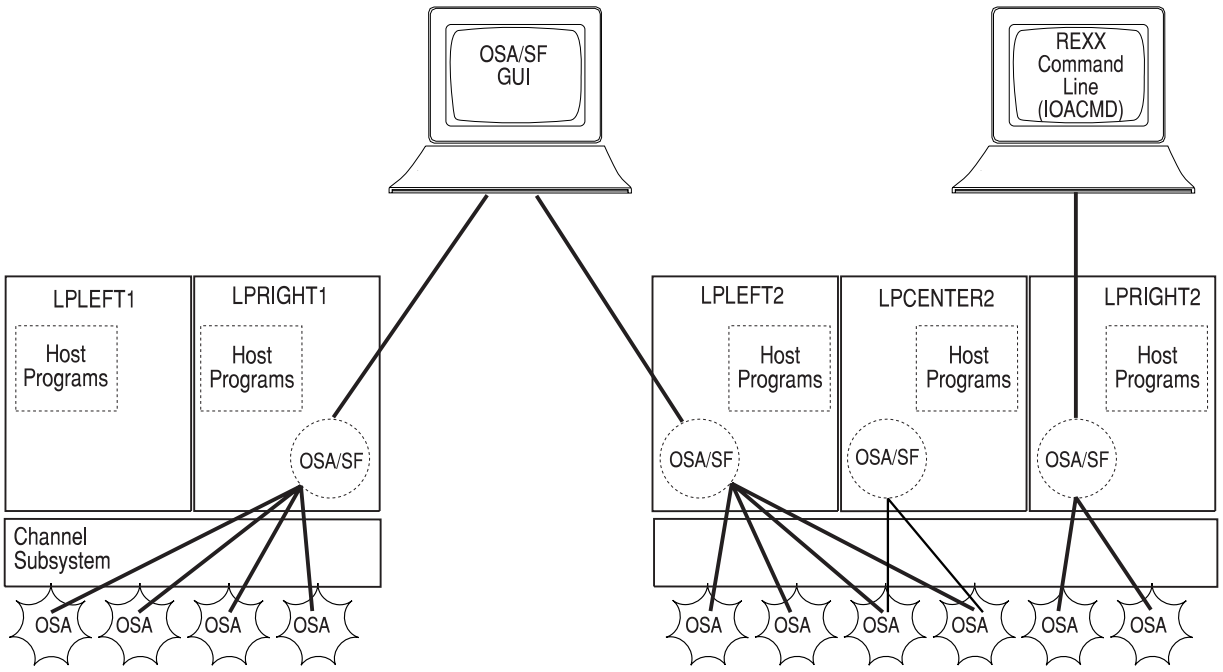


Figure 13. GUI Manages Multiple Sessions Across LP Boundaries

The system environment partially determines the OSA/SF's span of control. In the OS/390, z/OS, and VM environments, OSA/SF supports all OSAs and all OSA modes. Generally, therefore, one of these OSA/SFs will be managing the OSAs that are defined to the partitions in which these operating systems are running.

Here are some guidelines for OSA/SF's management.

- Suppose an OSA is online and operational before OSA/SF is running. That OSA will be managed by the first instance of OSA/SF that is started and that can recognize the OSA.

- Now, suppose one or more OSA/SFs are running, but a particular OSA is not online. That OSA will be managed by the first OSA/SF that can recognize the OSA CHPID and that receives an OSA/SF command to start managing the OSA.
- Conversely, if a managing OSA/SF is terminated, another instance of OSA/SF does not automatically start managing the OSA.

  For example:

  – If another instance of OSA/SF is already active, it waits until it is instructed to start managing an unmanaged OSA by a user ID through the OSA/SF Start Managing command. The OSA channel, however, continues to transfer data in the OSA mode that is active at the time.

  – If another instance of OSA/SF is started, it automatically starts managing all the unmanaged OSAs that have been assigned to its logical partition.

Hardware Requirements

- IBM 2064 @server zSeries 900 general purpose model

or

- IBM 2066 @server zSeries™ 800 general purpose model or Linux facility model

with one or more of the following:

- OSA-Express Gigabit Ethernet feature (FC 2364, FC2365)

  Note: FC 2364 and FC 2365 support the GbE 1000 mbps/full duplex auto-negotiate standard

- OSA-Express ATM feature (FC 2362, FC2363)
- OSA-Express FENET feature (FC 2366)
- OSA-Express TR feature (FC 2367)

*Refer to the IBM Preventive Service Planning (PSP) bucket 2064DEVICE, subset OSA, for the latest service levels.

For OSA/SF

- To install OSA/SF on the server, one of the following:
  – A 9-track 6250 bpi magnetic tape drive
  – An 18-track 34K 3480 tape cartridge drive
- To install and use an OSA/SF GUI, the following is *recommended*:
  – A PC with a Pentium® 200Mhz (or equivalent) processor, 32 MB RAM, and an SVGA display with resolution of 1024x768x16 colors.

  You may be satisfied with OSA/SF GUI performance on the minimum processor required by your OS/2 or Windows operating system, but the GUI may not display correctly at a lesser resolution.
- To use the OSA/SF GUI, a connection between the workstation running the OSA/SF GUI and the host systems running OSA/SF is *required*.

Attention: OSA/SF and a GUI are optional for the Gigabit Ethernet feature, TR feature, and the FENET feature running QDIO. See “Deciding Whether OSA/SF is Required” on page 21 for more information.

Cabling Requirements

See Appendix A for cabling requirements.

Software Requirements

Requirements depend on the OSA-Express feature and operating mode.

Certain functions require the latest operating system releases. Refer to the functional descriptions earlier in this section for specific version releases, and the IBM Preventive Service Planning (PSP) bucket 2064DEVICE, subset OSA, for news on the latest service levels.

The latest release of z/OS (and z/OS.e) can be considered the latest version release of OS/390 for the following software requirements.

The latest release of z/VM can be considered the latest version release of VM for the following software requirements.

For the OSA-Express Gigabit Ethernet Feature

The OSA-Express Gigabit Ethernet feature uses QDIO architecture, which handles IP traffic and requires the following:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communication Server (CS for OS/390 element of OS/390) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- z/VM Version 3 Release 1 for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- VM/ESA Version 2 Release 4 for QDIO operation on a VM guest.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.2.16.
- TPF 4.1 at PUT 13 supports the OSA-Express Gigabit Ethernet feature.

For the OSA-Express ATM Feature

The ATM feature operates in LAN emulation or in ATM Native mode. When supporting Ethernet LAN emulation, the ATM feature can take advantage of QDIO architecture.

To Run QDIO Using Ethernet LAN Emulation

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communication Server (CS for OS/390 element of OS/390) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- z/VM Version 3 Release 1 for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- VM/ESA Version 2 Release 4 for QDIO operation on a VM guest.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.2.16 (logical port 0 only) or 2.2.4 or later (logical ports 0 and 1).

To Run TCP/IP Passthru Using Ethernet or TR LAN Emulation

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (CS for OS/390 element of OS/390) supporting the LCS TCP/IP device type

or

- VM/ESA Version 2 Release 4 or later, and
  - TCP/IP for VM Version 2 Release 4 or later

  or
  - VSE/ESA Version 2 Release 6.

To Run SNA Using Ethernet or TR LAN Emulation

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (SNA function of CS for OS/390 element of OS/390)

or

- VM/ESA Version 2 Release 4, and
  - VTAM for VM Version 4 Release 8 or later.

To Run ATM Native

Requirements differ depending on the type of traffic.

For IP Traffic: One of the following operating systems:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communication Server (CS for OS/390 element of OS/390) supporting the ATM TCP/IP device type

or

- VM/ESA Version 2 Release 4 and
  - TCP/IP for VM Version 2 Release 4 for VM

For SNA Traffic:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communication Server (SNA function of CS for OS/390 element of OS/390)

For the OSA-Express FENET Feature

The FENET feature handles TCP/IP Passthru and SNA traffic. QDIO mode can be used for IP traffic when the CHPID is set up as an OSD channel.

To Run IP Traffic in QDIO Mode

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communication Server (CS for OS/390 element of OS/390) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- z/VM Version 3 Release 1 for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- VM/ESA Version 2 Release 4 for QDIO operation on a VM guest.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.2.16.

To Run TCP/IP Passthru

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (CS for OS/390 element of OS/390) supporting the LCS TCP/IP device type.

or

- VM/ESA Version 2 Release 4, and
  - TCP/IP for VM Version 2 Release 4 or later.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.2.16.

To Run SNA

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (SNA function of CS for OS/390 element of OS/390)

or

- VM/ESA Version 2 Release 4, and
  - VTAM for VM Version 4 Release 2 or later.

For the OSA-Express Token Ring Feature

The TR feature handles TCP/IP Passthru and SNA traffic. QDIO mode can be used for IP traffic when the CHPID is set up as an OSD channel.

To Run IP Traffic in QDIO Mode

One of the following operating systems is required:

- OS/390 Version 2 Release 10 or later, which includes:
  - Communication Server (CS for OS/390 element of OS/390) supporting the MPCIPA TCP/IP device type and the IPAQTR link type.

or

- z/VM Version 3 Release 1 or later for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- VM/ESA Version 2 Release 4 for QDIO operation on a VM guest.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.4.0.

To Run TCP/IP Passthru

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (CS for OS/390 element of OS/390) supporting the LCS TCP/IP device type

or

- VM/ESA Version 2 Release 4, and
  - TCP/IP for VM Version 2 Release 4 or later.

or

- VSE/ESA Version 2 Release 6.

To Run SNA

One of the following operating systems is required:

- OS/390 Version 2 Release 9 or later, which includes:
  - Communications Server (SNA function of CS for OS/390 element of OS/390)

or

- VM/ESA Version 2 Release 4, and
  - VTAM for VM Version 4 Release 4 or later.

For OSA/SF

Running on z/OS, z/OS.e, or OS/390

OS/390 Open Systems Adapter Support Facility Version 2 Release 1 with PTFs is required.

To use a GUI:

- Microsoft Windows 95 4.00.950B (OSR2) or later, or Microsoft Windows NT 4.0 with Service Pack 3 or later

or

- OS/2 Warp Version 4.0 with fixpack 6 or later.

For GUI-to-server communications (TCP/IP, APPC, or EHLLAPI):

- Communications Server (CS for OS/390) Version 2 Release 9 or later

  To use APPC or EHLLAPI,
  - Personal Communications/3270 Version 4 Release 2 with APAR IC22680 or later (we recommend Version 4 Release 3)

  is also required.

Running on VM/ESA or z/VM

OSA/SF for VM/ESA Version 2 Release 4. (APAR# OW36927) or later is required.

To use a GUI:

- Microsoft Windows 95 4.00.950B (OSR2) or later, or Microsoft Windows NT 4.0 with Service Pack 3 or later

or

- OS/2 Warp Version 4.0 with fixpack 6 or later.

For GUI-to-server communications:

- If you use TCP/IP:
  - TCP/IP Version 2 Release 3 or later on the host
  - TCP/IP on the workstation

- If you use APPC:
  - VTAM Version 4 Release 2 or later on the host
  - Personal Communications/3270 Version 4 Release 2 with APAR IC22680 or later (we recommend Version 4 Release 3) on the workstation.
- If you use EHLLAPI:
  - 3270–PC File Transfer Program on the host
  - Personal Communications/3270 Version 4 Release 2 with APAR IC22680 or later (we recommend Version 4 Release 3) on the workstation.

Running on VSE/ESA

OSA/SF for VSE/ESA Version 2 Release 6 or later is required.

To use a GUI:

- Microsoft Windows 95 4.00.950B (OSR2) or later, or Microsoft Windows NT 4.0 with Service Pack 3 or later

or

- OS/2 Warp Version 4.0 with fixpack 6 or later.

For GUI-to-server communications:

- If you use TCP/IP:
  - TCP/IP Version 2 Release 3 or later on the host
  - TCP/IP on the workstation
- If you use EHLLAPI:
  - 3270–PC File Transfer Program on the host
  - Personal Communications/3270 Version 4 Release 2 with APAR IC22680 or later (we recommend Version 4 Release 3) on the workstation.

Chapter 2. OSA-Express Hardware Configuration

All OSA-Express features must be defined to the I/O configuration. This is the first step in bringing your OSA-Express feature online.

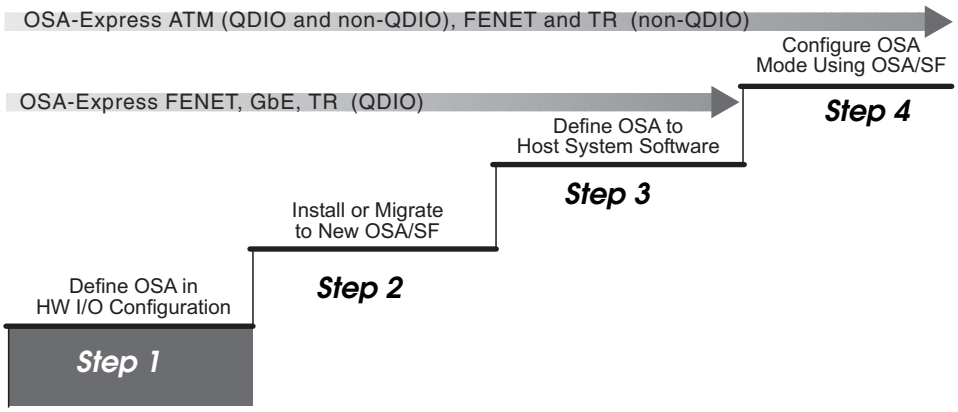


Figure 14. Step One in a Four-Step Process

The following procedure is for z/OS, z/OS.e, and OS/390. To configure the hardware I/O for z/VM or VM/ESA, go to “VM Hardware I/O Configuration” on page 40. For VSE/ESA, go to “VSE/ESA Hardware Configuration” on page 41. “Using the Hardware Consoles (HMC or SE)” on page 195 can be used regardless of the environment.

Using HCD for Hardware I/O Configuration

This procedure shows you how to define an OSA-Express channel, *or port*, to the channel subsystem. The HCD data provides the basis for the TCP/IP or SNA definitions and OSA address table data that complete the port definition in Chapter 7, “Host Program Setup” on page 123 and Chapter 8, “Configuring OSA-Express Modes” on page 149.

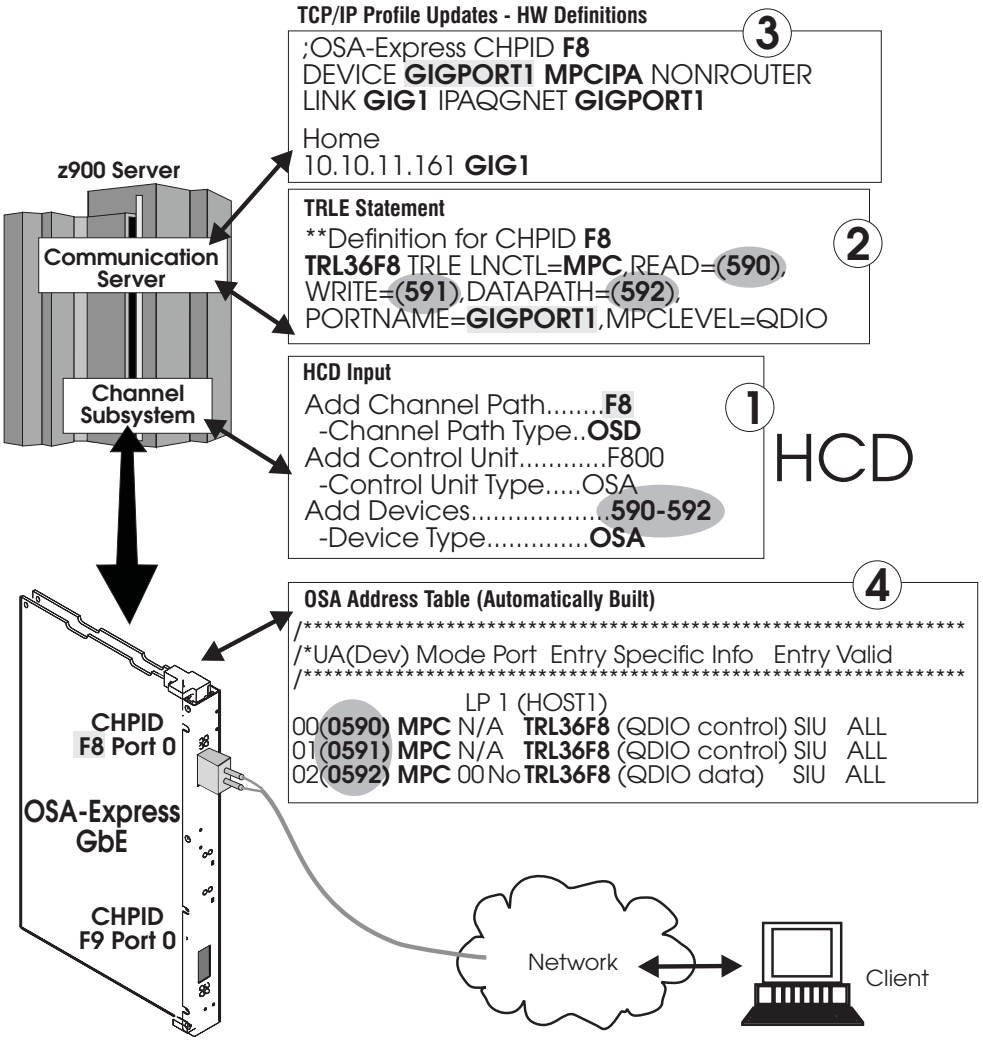


Figure 15. Defining an OSA-Express Port Connection

Figure 15 shows how the device addresses specified in HCD are keyed to later definition statements that further describe the characteristics of the OSA channel:

1. HCD identifies CHPID F8 and assigns device addresses 590 through 592. A minimum of three device addresses are required for QDIO, one each for READ and WRITE, and one DATAPATH per TCP/IP stack.
2. The TRLE statement associates portname GIGPORT1 with device addresses 590–592. For OSE CHPIDs, the portname is used for communication with the SNMP subagent. A port name is required for QDIO reqardless of the operating system. This port name must match the device name specified for all TCP/IP stacks using this CHPID.
3. The TCP/IP profile defines GIGPORT1 as device type MPCIPA with link type IPAQGNET.
4. For QDIO, the OSA Address (OAT) is automatically generated from HCD and TCP/IP definitions. For non-QDIO modes, data must be entered as described in Chapter 8, “Configuring OSA-Express Modes” on page 149.

Although the following HCD samples show data entered for an OSA-Express Gigabit Ethernet feature, the panels are the same for TR, FENET and ATM.

Required parameter values that differ are noted. If you need more information for HCD or the hardware configuration definitions, refer to the one of these publications:

- *zSeries 900 IOCP User's Guide*, SB10-7029
- *z/OS Hardware Management Console Guide*, SC28-6805

or

- *OS/390 HCD User's Guide*, SC28-1848

Information You Need: When an OSA-Express feature is installed, either in a new server or as an MES for an existing server, the ordering system used by your IBM representative automatically specifies where the OSA-Express is to be plugged. This is the OSA-Express CHPID number, which appears in a ***CHPID Report*** that your IBM representative gives you. The CHPID number will be required for all OSA-Express configuration and setup tasks.

Before You Begin

You will be asked to associate a unit address with each device number that you specify in the system hardware I/O configuration (IOCDS). In this book, the unit addresses are specified explicitly, but they can be specified implicitly as the last two digits of the corresponding device numbers. The difficulty with such implicit definition, however, is that you increase the likelihood of defaulting to an incorrect unit address.

When configuring an OSA mode in Chapter 8, "Configuring OSA-Express Modes", you must specify the unit address to OSA/SF that you specify in the hardware I/O configuration in this procedure. OSA/SF correlates the unit address with the appropriate OAT entry and device number. If an OSA mode requires an even/odd, read/write pair of device numbers, OSA/SF requires only the unit address of the even (lower) device number when configuring the OSA mode.

When defining an OSA device, specify a unit address from X'00' through X'FD' for any device except the OSAD device for communications between the OSA and OSA/SF.

Specify X'FE' as the unit address for the OSAD device for OSA/SF communications.

For an OSA-Express FENET using the default OAT, you must associate X'00' and X'01' as the unit addresses for the device pair for data transfer across port 0.

The OSA-Express Gigabit Ethernet feature provides 1000 mbps/full duplex operation via point-to-point link. An active auto-negotiation sequence is not required to enable the link, but is recommended. Auto-negotiation is the standard for Gigabit Ethernet.

QDIO Stack and Device Limitations

When defining devices for QDIO it is important to remember these limiting factors.

- The maximum number of unit addresses per OSD CHPID is 240
- The maximum number of LPs sharing an OSA-Express port is 15
- The maximum number of TCP/IP stacks that can be defined on z/OS is 8

- The maximum of TCP/IP stacks per OSD CHPID is 80[4].

Defining Devices for z/OS: Three device numbers are required for the first TCP/IP stack defined on a z/OS image for QDIO: two control devices (one for READ, one for WRITE) and one DATAPATH device. Each subsequent stack defined on the z/OS image will share control devices but require its own DATAPATH device. For example, if 8 stacks are defined on a single z/OS image for QDIO CHPID 3, then 10 devices are used, 8 DATAPATH, 1 READ, and 1 WRITE device. Therefore, theoretically, the maximum number of TCP/IP stacks that can be defined for a single OSA-Express CHPID is 192: (24 z/OS images x 3 devices for the first stack) + (24 z/OS images x 7 devices for the subsequent 7 stacks) = 240 devices and 192 stacks.

Defining Devices for Linux: Three devices are needed for each Linux interface that is defined for a QDIO CHPID: two control devices (one for READ, one for WRITE) and one DATAPATH device. Therefore, the maximum number of Linux interfaces that can be defined for a single OSA-Express QDIO CHPID is 80: 240 devices ÷ 3 devices per interface = 80 interfaces. For example, you could have 80 Linux images each with one interface defined for the QDIO CHPID, or you could have 40 Linux images each with 2 interfaces defined for the QDIO CHPID. Either way, you reach the maximum of 80 Linux interfaces for the QDIO CHPID.

Defining Devices for both z/OS and Linux: Since z/OS and Linux allocate devices differently, the maximum number of TCP/IP stacks that can be defined depends on the distribution of z/OS and Linux images where the CHPID will be defined. The following two examples illustrate how stacks might be distributed in a mixed environment.

Example 1: CHPID 1 is used to define three TCP/IP stacks on each of five z/OS LPs. This requires [(3 TCP/IP stacks) x (5 z/OS images) = 15 DATAPATH devices] + [(2 control devices) x (5 first TCP/IP stacks) = 10 control devices] resulting in 15 stacks using 25 devices. If the remaining available devices were used by Linux, they could potentially add another 65 stacks because: 240 (max dev per CHPID) - 25 (dev used for z/OS) / 3 (dev per Linux stack) = 71 device triplets. 80 Max stacks/interfaces - 15 z/OS TCP/IP stacks = 65 Linux interfaces stacks that will work since there are more than 65 device triplets still available.

Example 2: CHPID 2 is used by 24 z/OS images, where at least some would be z/OS guests running under z/VM. Eight TCP/IP stacks could be defined on each, which would use all 240 devices but yield a total of 192 stacks, because: [(24 z/OS images) x (8 DATAPATH DEVICES)] + [(24 first TCP/IP stacks) x (2 CONTROL DEVICES)] = 240 DEVICES. This is a theoretical maximum of 192 stacks.

Define the Channel Path

Using HCD, do the following to define the Channel Path.

__ 1. From the ***Define, Modify, or View Configuration Data*** (main panel), select ***3. Processors***.

__ 2. Select the required processor from the ***Processor List*** panel and then select ***7–Work with attached channel paths***. The ***Channel Path List*** is displayed.

4. 80 - 192 TCP/IP stacks are available for OSD on all z800 and on the z900 with OSA licensed internal code level 1.48 and later. To determine your OSA licensed internal code level, issue `D NET,TRL,TRLE=`*`portname`* and examine the returned value for a OSA code level of 0148 or higher. For OSD CHPIDs on z900 with lower OSA code levels, the TCP/IP stack limit is 15. Contact your IBM service representative for more information.

__ 3. Press F11 on the keyboard to add a new channel path. The ***Add Channel Path*** panel is displayed.

```
Goto    Filter    Backup    Query    Help

                        Add Channel Path

Specify or revise the following values.

Processor ID . . . . : OS390S1
Configuration mode : LPAR

Channel path ID . . . . . . . . . . : F8 +
Number of CHPIDs . . . . . . . . . : 1
Channel path type  . . . . . . . . : OSD +

Operation mode . . . . . . . . . . : SHR +
Description  . . . . . . . . . . . : _________________________

Specify the following values only if connected to a switch:
Dynamic switch ID. . . . . . . . . : __ + (00 - FF)
Entry switch ID  . . . . . . . . . : __ +
Entry port  . . . . . . . . . . . . : __ +

F1=Help   F2=Split   F4=Prompt   F5=Reset   F9=Swap   F12=Cancel
```

Figure 16. Add Channel Path

__ 4. Enter the required information using the following guidelines:

- Channel path ID is the OSA-Express (CHPID) number.
- Channel path type must be either **OSD** for QDIO, or **OSE** for non-QDIO. The OSA-Express Gigabit Ethernet feature only uses channel path type **OSD**. The ATM feature can use channel path type **OSD** or **OSE** when running Ethernet LAN emulation but uses only **OSE** for all other modes of operation. The FENET feature can use **OSD** or **OSE** for IP traffic but uses only **OSE** for SNA. The TR feature can use **OSD** or **OSE** for IP traffic but uses only **OSE** for SNA.
- Operation mode is either **DED** (dedicated), **SHR** (shared), or **REC** (reconfigurable). If the system is in ***Basic*** mode, the channel path is by default dedicated.
- Enter a description of **OSA-Express (*feature type*)** for future reference.
- The other fields for switches are not applicable.

__ 5. When complete, press Enter and the ***Define Access List panel*** is displayed.

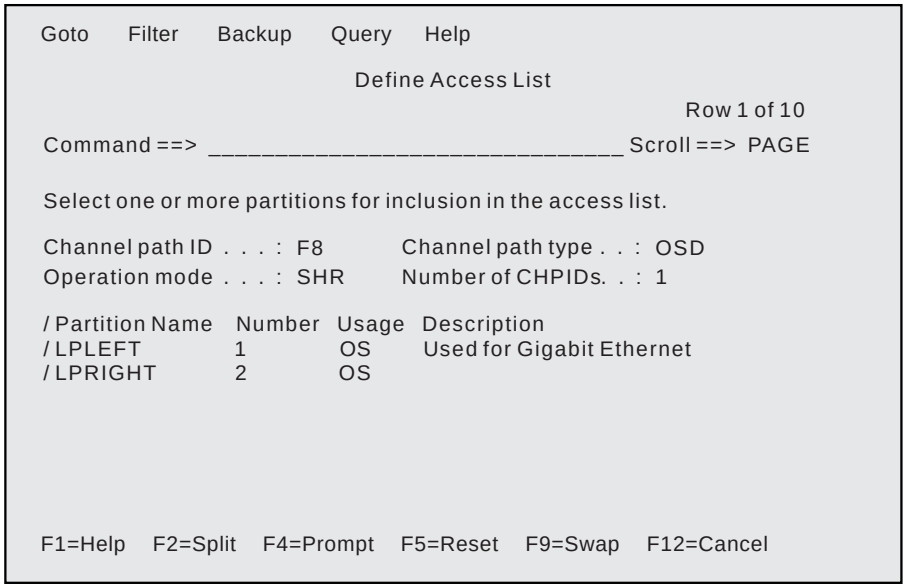


Figure 17. Define Access List

__ 6. Specify only those logical partitions (LPs) which access this OSA-Express (CHPID). If you will use OSA/SF, include all the LPs that run OSA/SF.

If the OSA-Express will initially be used by only one LP, but other LPs will use it in the future, define it in the hardware configuration as shared and list those LPs in the access list.

__ 7. Press Enter to return to the ***Channel Path List panel***.

Define a Control Unit

__ 1. From the ***Channel Path List*** panel, enter **s** next to the CHPID (OSD or OSE) you previously defined.

__ 2. From the Control Unit List panel, press F11 to add a control unit for the channel path.

```
Goto       Filter       Backup       Query       Help

                          Add Control Unit

Specify or revise the following values

Control unit number  . . . . F800
Control unit type  . . . . . . . OSA_____ +
Serial number  . . . . . . . . . _________ +
Description                      OSA connection to OS390S1
Connected to switches  . . . __ __ __ __ __ __ __ +
Ports  . . . . . . . . . . . . . __ __ __ __ __ __ __ +

If connected to a switch, select whether to have CHPIDs/link
addresses, and unit address range proposed.

Auto-assign . . . . . . . . . 2   1. Yes
                                  2. No

F1=Help     F2=Split     F4=Prompt     F5=Reset     F9=Swap     F12=Cancel
```

Figure 18. Add Control Unit

__ 3. Specify the control unit number and a ***Control unit type*** of **OSA**. Space is provided for a description. The other fields are not applicable.

__ 4. Press the Enter key and the ***Select Processor / Control Unit*** panel will be displayed.

__ 5. Type **s** to choose the processor in which this OSA feature is installed (If you have a large number of processors defined, you may have to scroll forward to show the required processor entry, depending on how you came to this panel). The OSA control unit can be shared between the LPs within the same processor, so do not assign this OSA CU number to more than one processor in this HCD IODF unless the device number is the same.

__ 6. Press Enter and the next ***ADD Control Unit*** panel will be displayed.

```
Goto    Filter    Backup    Query    Help

                          Add Control Unit

Specify or revise the following values

Control unit number     . : F800          Type  . . . . . . . . : OSA
Processor ID    . . . . . . : OS390S1

Channel path IDs  . . . . .  F8 __ __ __ __ __ __ __ +
Link address  . . . . . . .  __ __ __ __ __ __ __ __ +

Unit address  . . . . . . .  00 __ __ __ __ __ __ __ +
Number of units . . . . . .  255___ ___ ___ ___ ___ ___ ___

Logical address . . . . . .  __ + (same as CUADD)

Protocol . . . . . . . . . . . __ + (D,S or S4)
I/O concurrency level  . . . 2 + (1, 2 or 3)

F1=Help   F2=Split   F4=Prompt   F5=Reset   F9=Swap   F12=Cancel
```

Figure 19. Add Control Unit

__ 7. Enter the remaining control unit definitions using the following guidelines.
- The CHPID number entry is provided if you are using the HCD hierarchical definition method to define this OSA CU (Processor to CHPID to CU to I/O device).
- The OSA control unit requires 00 as the starting unit address and 255 as the number of units (although only 240 devices can be used).
- Define an OSA control unit I/O concurrency level of 2. I/O concurrency level 2 specifies that multiple I/O operations may be sent between the channel subsystem and the OSA control unit and will be managed by the OSA-Express feature.

Define OSA Devices

__ 1. From the ***Control Unit List panel*** enter **s** next to the control unit that you just defined. The ***I/O Device List***. panel is displayed.

__ 2. Press F11 to add devices. The ***Add Device*** panel is displayed.

```
Goto    Filter    Backup    Query    Help

                          Add Device

Specify or revise the following values

Device number . . . . . 590    (0000 - FFFF)
Number of devices . . . . . 3__
Device type                OSA ______ +

Serial number . . . . . _________
Description . . . . . _____________________________

Connected to CUs . . F800 ____ ____ ____ ____ ____ ____ ____ +




F1=Help   F2=Split   F4=Prompt   F5=Reset   F9=Swap   F12=Cancel
```

Figure 20. Add Device

__ 3. Enter the OSA-Express device definitions using the following guidelines. These definitions must be entered on each logical partition that will use the device.
- For Number of devices:

  Any OSD (ATM, FENET, TR, or Gigabit Ethernet)
  Requires three devices per TCP/IP stack (READ, WRITE, and DATAPATH).

  Note: QDIO architecture does not support dynamic addition or changes to devices to be used for the READ/WRITE pair of control devices. You can add new DATAPATH devices for a given CHPID at any time.

  TR (OSE) IP Traffic
  Define one READ/WRITE, even/odd device pair for the physical port to run in TCP/IP Passthru mode.

TR (OSE) SNA Traffic
Define one device number for the physical port to run in SNA mode.

FENET (OSE) IP Traffic
Define one READ/WRITE, even/odd device pair for the physical port to run in TCP/IP Passthru mode.

FENET (OSE) SNA Traffic
Define one device number for the physical port to run in SNA mode.

ATM (OSE) IP Traffic in LAN Emulation Mode
Define one READ/WRITE, even/odd device pair for each emulated port to run TCP/IP Passthru.

ATM (OSE) SNA Traffic in LAN Emulation Mode
Define one device number for each emulated port to run SNA traffic.

ATM (OSE) IP Traffic in ATM Native Mode
Define one READ/WRITE, even/odd device pair for the ATM Native port to run IP traffic.

ATM (OSE) SNA Traffic in ATM Native Mode
Define one READ/WRITE, even/odd device pair for the ATM Native port to run SNA traffic.

- Enter **OSA** as the ***Device type*** and any appropriate description.
- When complete, press Enter and either the ***Update Serial Number and Description*** panel or the ***Device/Processor Definition*** panel will be displayed.
- Make any changes to the device description in the ***Update Serial Number and Description*** panel.
- On the **Device/Processor Definition** panel, you need to specify the starting unit address and use the explicit device candidate list.

  We recommend that you specify **00** as the starting unit address. **You must specify 00 for the OSA-Express FENET feature to run TCP/IP Passthru using the default OAT.**

  Enter **YES** to define the explicit device candidate list. This is required to restrict these OSA devices to the required partition.
- Accept the default values for the other panel fields.
- When defining devices for OSD CHPIDs, it is important to remember that there is a maximum of 240 device unit addresses per OSD CHPID, and a maximum of 80 TCP/IP stacks per OSD CHPID, since 3 devices (2 control + 1 data) are required for each TCP/IP stack (240 ÷ 3 = 80). See “QDIO Stack and Device Limitations” on page 33 for more information.
- Press Enter and the **Define Device Candidate List** panel will be displayed because the Explicit List option **Yes** was specified.
- If you defined the CHPID as dedicated (DED), there is no device candidate list. Continue with the next step. Otherwise, complete the **Define Device Candidate List** panel by selecting the partition that needs access to these OSA devices.
- Now define the devices to the Operation System Configurations.

  Use HCD action code **s** to select the relevant software configurations, and the press Enter.
- Enter the following in the ***Define Device Parameters/Features*** panel.

  - OFFLINE=NO (default), for these devices to be available online upon IPL.
  - Specify DYNAMIC=YES (default).

Define the OSAD Device for OSA/SF

Follow these guidelines only if you are using OSA/SF.

There is only one OSAD device. This device is used to communicate the adapter status to OS/390 and OSA/SF. Do the same steps listed in “Define OSA Devices” on page 38, but use these guidelines.

- The OSA control unit number that was associated with the OSAD device is the same control unit number associated with the OSA devices.
- Specify **OSAD** for the ***Device type***.
- For OSAD, define one device number with the unit address of **FE**. It is recommended that the last digit of the device number be X’F’ (nnnF) to keep the adapter device number range within 16 devices for convenience when using the OS/390 Display Units command. Any available device number, however, is acceptable.
- Accept the default **No** for the device explicit candidate list to allow the OSAD device to be shared among multiple partitions
- Define this device with the following Operating System Configuration parameter values:
  - OFFLINE=NO (default), for these devices to be available online upon IPL.
  - DYNAMIC=YES (default), for the device to be dynamic

VM Hardware I/O Configuration

To z/VM or VM/ESA, define an OSA channel path with its connected, or attached, control unit plus the devices that are required by the OSA mode or modes in which the OSA is being run.

If you define an OSA to z/VM or VM/ESA dynamically, you can use the dynamic I/O configuration commands, but the data is put in the HSA and will not be kept after the system is shut down. To keep data across IPLs, you must also define the OSA in the system hardware I/O configuration using IOCP statements. Shown below are the VM dynamic I/O configuration statements for an OSA-Express OSE CHPID identified as X'20'.

```
CP DEFINE CHPID 20 TYPE OSE SHARED ACC LPLEFT1 LPRIGHT1 INIT LPLEFT1 INIT LPRIGHT1
CP DEFINE CU F00 TYPE OSA CHPID 20
CP DEFINE DEVICE F00-F03 UNIT_A 00 CU F00 PAR LPLEFT1 LPRIGHT1
CP DEFINE DEVICE 1FE UNIT_A FE CU F00 PAR LPLEFT1 LPRIGHT1
```

For more information on the user input required, see the descriptions that start on page 31. For information on the VM statements, refer to *Planning and Administration* in the VM/ESA or z/VM library, listed in the bibliography (page xvii).

If more than one copy of OSA/SF is running in a logical partition, at least one copy is running on a guest system in a VM/ESA host environment (page 70). Therefore:

- Specify the same unit address for the guest and host system for each device number that is required for the TCP/IP or SNA modes.
- Specify the RMCHINFO option in the VM/ESA OPTION Directory Control statement.

- Attach, or activate, only one copy of OSA/SF in a logical partition at a time.

VSE/ESA Hardware Configuration

There are two ways to add device numbers to a VSE/ESA system image.

- Select ***Fastpath 241*** to get to the *Configure Hardware* dialog and add the device numbers to VSE/ESA that way.

  You must have the highest authority level, which is usually reserved for the system programmer under user ID ***SYSA.***
- Alternatively, you can code the device numbers for VSE/ESA manually for each logical partition in the VSE/ESA $IPLESA.PROC member in the IJSYSRS.SYSLIB library. Note, however, that these definitions are lost once you use the *Configure Hardware* dialog.

  For information on defining devices to VSE/ESA, see the VSE/ESA books listed in the bibliography (page xvii). Note that VSE/ESA views an OSA device as a telecommunications device.

Chapter 3. Setting Up OSA/SF on z/OS, z/OS.e, and OS/390

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice. This chapter provides instructions for:

- Setting up OSA/SF on the server (OS/390, z/OS, z/OS.e)
- Setting up a command interface (REXX EXEC - IOACMD)
- Installing and setting up a graphical user interface (OS/2 or Windows)

If you will be running OSA/SF in a VM environment, go to Chapter 4, “Setting Up OSA/SF on z/VM and VM/ESA” on page 69.

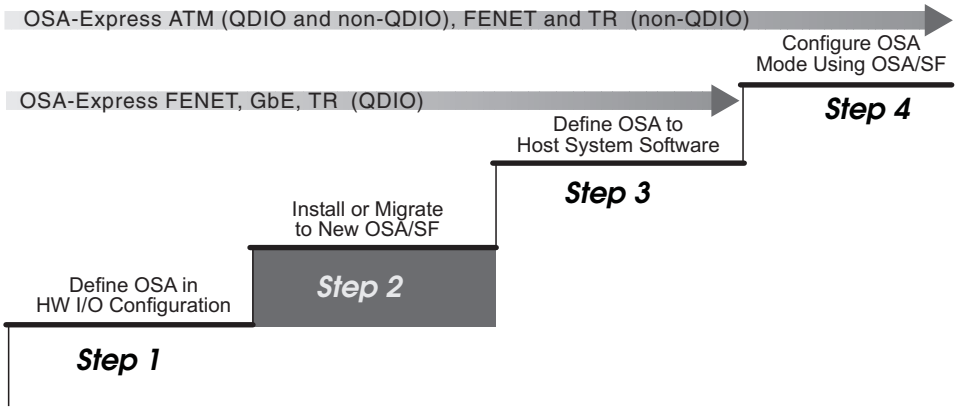


Figure 21. Step Two (z/OS, z/OS.e, OS/390) in a Four-Step Process

Before You Begin

Determine which OSA mode or modes will be used for each OSA. This decision underlies all of the remaining setup tasks. OSA/SF is required for all OSA-Express ATM modes, all TR modes other than QDIO, and all FENET modes other than QDIO and TCP/IP Passthru using the default OAT.

OSA/SF is not required for the OSA-Express Gigabit Ethernet feature. OSA/SF is not required for the OSA-Express Direct SNMP subagent but it ***is required*** for SNMP support using the Communications Server SNMP TCP/IP SNMP subagent. See “Support for Simple Network Management Protocol” on page 16 for more information.

Ensure the system pre- and co-requisites are met for hardware and software in an OS/390, z/OS, or z/OS.e environment. These are listed on page 24.

Setting Up OSA/SF

Use these instructions to set up the following for OSA/SF:

1. Started Procedure (task) for OS/390, z/OS, or z/OS.e
2. Startup Profile
3. Configuration and Master Index Files
4. Start PROC for SNMP
5. REXX IOACMD EXEC for TSO
6. APPC Communications (**OSA/SF will not work without it**)

When to Use These Instructions

- After the OSA/SF install is complete using the Program Directory.

__ 1. Do the following to set up an OSA/SF Started Procedure (task) for OS/390, z/OS, or z/OS.e:

__ a. Copy the sample procedure from the **IOA.SIOASAMP** library member **IOAOSASF** into SYS1.PROCLIB or another system procedure library.

__ b. Edit the sample procedure you just copied. See Figure 22.

OSASF1 is the name of the EXEC used in the sample, but you can change the name.

OSA/SF Started Procedure Name _____

Note: OSA/SF must be APF-authorized or it will not function. You must have SIOALMOD in either the PROGxx or IEAAPFxx member in your SYS1.PARMLIB data set. Depending on your library structure, there may be other ways to authorize OSA/SF. See *z/OS MVS Initialization and Tuning Reference* for more information.

```
//*   START OSA SUPPORT FACILITY
//*
//OSASF1   EXEC PGM=IOAMAIN,TIME=1440,REGION=6000K,DYNAMNBR=5,
//STEPLIB  DD  DSN=CEE.SCEERUN,DISP=SHR
//         DD  DSN=SYS1.SIOALMOD,DISP=SHR
//IOALIB   DD  DSN=SYS1.SIOALMOD,DISP=SHR
//IOAPROF  DD  DSN=IOA.STARTUP.PROFILE,DISP=SHR
//SYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=121)
//SYSUDUMP DD  SYSOUT=H
```

Figure 22. Sample Started Procedure (IOA.SIOASAMP Member IOAOSASF)

__ c. Ensure that the data set names in the **STEPLIB** and **IOALIB** statements match the names used for the C runtime libraries and the OSA/SF code loadlib of your OS/390, z/OS or z/OS.e system. The Program Directory provides instructions for including the SIOALMOD data set in the link list. The LE/370 runtime libraries must be in an APF library.

__ d. Change the IOAPROF DD statement, **STARTUP.PROFILE**, to a name that you want to use for the Startup Profile. You will copy the sample Startup Profile into this data set in the next step.

If there will be multiple OSA/SF images on the system, you can use the same Startup Profile.

Attention

If you use dynamic allocation for SYSPRINT or SYSUDUMP, you will not be warned when an existing copy of OSA/SF is already running.

__ 2. Do the following to set up an OSA/SF Startup Profile as shown in Figure 23 on page 45:

```
 *  See the OSA/SF User's Guide for OSA-2 or the OSA-Express Customer's
 *  Guide and Reference for information on setting up the Startup Profile.
 *
 *  The SET NAME statements that follow are used to define datasets
 *  that are needed by OSA/SF.  You can have variable names in these
 *  definitions using the reserved keywords CECNAME and/or SYSNAME.
 *  Usage of these keywords are shown in the examples that follow.
 *
 *  You must specify the values these keywords will have using the
 *  SET ALIAS command before any of the SET NAME statements occur.
 *  The SET ALIAS CECNAME statement is required even if you do
 *  not use it in any of the SET NAME statements.
 *  The SET ALIAS SYSNAME statement is optional.
 *
 SET ALIAS CECNAME CEC1
 SET ALIAS SYSNAME SYSTEM1
 *
 *  IOACFG defines the OSA configuration file that is used by OSA/SF.
 *
 SET NAME IOACFG
     DATASET 'IOA.&CECNAME.OSAS.CONFIG'
     UNIT 3390
     VOLSER 339008
 *
 *  IOAINX defines the OSA master index file that is used by OSA/SF.
 *
 SET NAME IOAINX
     DATASET 'IOA.&CECNAME.MASTER.INDEX'
     UNIT 3390
         VOLSER  339005
 *
 *  IOAMSG defines the OSA message log file that is used by OSA/SF.
 *  The OSA/SF started task will add '.LPnn' to the dataset name
 *  you specify where 'nn' is the LP number that OSA/SF is running on.
 *
 *  SET NAME IOAMSG
    DATASET 'IOA.&CECNAME.MESSAGE.LOG'
    UNIT 3390
    VOLSER 33900C
 *
 *  IOADSN defines the high level qualifier OSA/SF will use when
 *  creating datasets for its own use.
 *
SET NAME IOADSN
    DATASET 'IOA.&CECNAME.OSASF'
    UNIT 3390
    VOLSER  33900C
 *
 *  The following SET APPC statement is used to specify the LU
 *  name that OSA/SF should use. If omitted, the default is IOASERV.
 *
SET APPC NAME IOASERV
 *
 *  The SET SYSINFO statements can be used to remap existing CHPID
 *  and DEVICE numbers.  See the OSA/SF User's Guide for OSA-2 or
 *  the OSA-Express Customer's Guide and Reference for details.
 *
```

Figure 23. Sample Startup Profile (IOA.SIOASAMP Member IOASPROF)

__ a. Allocate a data set for the Startup Profile name you selected. Request primary quantity (space) of 2 tracks, secondary quantity of 2 tracks, and sequential directory blocks=0. The attributes of this data set should be RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ b. Copy the sample Startup Profile from the **IOA.SIOASAMP** library member **IOASPROF** into the Startup Profile data set you just allocated.

OSA/SF Startup Profile Name _____

__ c. Edit the sample Startup Profile you just copied, using the instructions within the profile and the Startup Profile Guidelines on page 46.

__ 1) As indicated in the header of the profile, the SET ALIAS CECNAME statement is required. Record the name you specify. The SET ALIAS SYSNAME is optional. If you use it, also record the name for later use.

SET ALIAS CECNAME = _____ (required)
SET ALIAS SYSNAME = _____ (optional)

__ 2) Change the VOLSER and UNIT to identify the disk pack you want the files on. If you do not want to specify a unit type for each data set, replace UNIT 3390 with UNIT SYSALLDA. If VOLSER is specified, you must specify UNIT.

__ 3) If you do not want to use the default **IOASERV** for the APPC LU name, include the statement **SET APPC NAME *luname***, replacing ***luname*** with an eight-character name that starts with an alpha character. If the statement is not included in the profile, the LU name defaults to IOASERV.

LU name for APPC = _____

Note: This APPC LU name must agree with the LU name specified for MVS and VTAM in step 4a2 on page 48.

Startup Profile Guidelines:

- The SET ALIAS statements must occur before the SET NAME statements. SET ALIAS CECNAME is required. Specify a name with a maximum of eight characters. The SET ALIAS SYSNAME is optional. You can provide the name of the logical partition (system) or remove the statement.
- The SET command defines the data set names for: IOACFG, IOAINX, IOAMSG, and IOADSN.
- Data set names must be unique and contained within single quotes.
- Data set names for IOACFG and IOAINX can contain a maximum of 44 characters. IOAMSG can contain a maximum of 30 characters, and IOADSN can contain a maximum of 26 characters.
  - Periods are counted as part of the allowed number of characters.
  - Qualifiers cannot exceed eight characters.
  - The first character of all qualifiers must be a letter.
- If &CECNAME or &SYSNAME are used as variables in the data set names, they must be
  - Followed immediately by a period when used as the first item in the data set name
  - Preceded immediately by a period when used as the last item in the data set name.
- The SET APPC NAME command defines the LU name for APPC. If the command is not included, the LU name defaults to IOASERV.
- VOLSER can have a maximum of six characters and UNIT a maximum of eight characters. When VOLSER is used, there must be a UNIT specified.
- No blank lines.
- Comment lines are indicated with the first non-blank character set to an asterisk ″*″. Everything after the asterisk is omitted until the next line in the data set.

- Comments between the SET command and the other keywords (DATASET, VOLSER, and UNIT) can be used within the command.
- Data must be in columns 1 to 70.
- No wrapping is supported.
- File is not case sensitive, as all characters are translated to upper case.

Descriptions of the data set names:

- **IOACFG** is the OSA configuration file used internally by OSA/SF. It defines what should be installed for each OSA. Since the same OSA CHPID can be shared by multiple systems (LPs), it should be defined as shared between the logical partitions within the System/390. You will allocate space for this file in step 3 on page 48 but *you do not have to do anything with this file.*
- **IOAINX** is the OSA master index file that defines all the available OSA mode code. It should be defined as shared between logical partitions within the System/390. You will set up this file in step 3 on page 48.
- **IOAMSG** is used by OSA/SF to store messages and status. The OSA/SF started task will add '.LPnn' to the data set name you specify, where 'nn' is the logical partition number the OSA/SF is running on. IOAMSG is not shared between systems (LPs). OSA/SF will allocate and use the data set as needed. *You do not have to do anything with this file*.
- **IOADSN** is the starting high level qualifier for all data sets that are created for use by OSA/SF. These data sets have two main purposes:
  a. To store user input for configuration in a compact format until needed upon activation
  b. To store data pertaining to each OSA CHPID in files built and updated dynamically by OSA/SF

  In order to allow instances of OSA/SF running on different LPs to get to the same data, or perform activation on previously defined configurations, these data sets should be defined as shared across all partitions. The files that use this high-level qualifier will be allocated by OSA/SF as needed.

If OS/390, z/OS, or z/OS.e is Running as a Guest of VM:

- You must define the OSA to the VM host system image.
- You must authorize the host to put OSA/SF in the guest's directory by specifying the RMCHINFO option in the OPTION Directory Control statement.

Continue with this section ***only if*** OS/390, z/OS, or z/OS.e is running as a guest of VM ***and*** you have a need to identify virtual CHPID numbers and device numbers. In the Startup Profile, you can associate a virtual number with a real number for CHPIDs and device numbers. Otherwise, proceed to 3 on page 48.

Specifying a real and virtual device number for the OSAD device (OSA/SF) allows OSA/SF to start from OS/390, z/OS, or z/OS.e when running as a guest of VM. Specifying real and virtual CHPID numbers allows the use of CHPIDs by OS/390, z/OS, or z/OS.e when running as a guest of VM.

Include the SET SYSINFO command in the Startup Profile as shown below. Specify the real and virtual CHPID numbers and device numbers that you want to associate:

```
SET SYSINFO CHPID (REAL xx VIRTUAL yy) DEVICE (REAL aaaa VIRTUAL bbbb)
```

- The maximum length of the command string is 70 characters.
- The command is not case sensitive.
- Replace the variables with hexadecimal numbers.
- All command parameters must be separated by spaces.
- If you include more than one SYSINFO statement, they do not have to be next to each other.
- Do not include this command if OS/390, z/OS, or z/OS.e is not running as a guest of VM.

This information will not be shared between multiple partitions on the same system and will not be saved between invocations of OSA/SF. It must be present in the STARTUP.PROFILE on each invocation of OSA/SF for which the remapping is required.

__ 3. Do the following to set up the OSA Configuration and Master Index files:

__ a. Allocate the following two new sequential data sets and then copy the members shown in **IOA.SIOASAMP** into the new data sets. Replace *&CECNAME.* with the name used in step 2c1 on page 46.

Members in IOA.SIOASAMP	New Sequential Data Set Names
IOACFG	IOA.*&CECNAME*.OSAS.CONFIG
IOAINX	IOA.*&CECNAME*.MASTER.INDEX

__ 1) Set the initial allocation of IOACFG to request primary space of 1 track, secondary space of 2 tracks, and the attributes of RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ 2) Set the initial allocation of IOAINX to request primary space of 2 tracks, secondary space of 2 tracks, and the attributes of RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ 3) Edit the IOAINX file that you just copied and update the server destination names that start in column 1 to match your specific environment. The names in the file must all start in column 1.

__ 4. Set up APPC/MVS and VTAM for OSA/SF.

If APPC/MVS is not already set up on the server, see *z/OS MVS Planning: APPC/MVS Management*.

__ a. After APPC/MVS is set up on the server, do the following for OSA/SF to define the APPC local LU, no scheduling, and provide the TPDATA cataloged data set name:

Note: OSA/SF is an APPC server and there is no dependency on the APPC scheduler for OSA/SF.

1) Determine which APPCPM member you are using for initialization.
2) Edit member APPCPMxx in SYS1.PARMLIB and add the following statements:

```
LUADD ACBNAME(luname)
NOSCHED,
TPDATA(SYS1.APPCTP)
```

Notes:

a) Change luname to the same name defined in the Startup Profile (see step 2c3 on page 46). If SET APPC NAME is not included in the profile, luname defaults to IOASERV. In that case replace luname in the APPCPMxx member with IOASERV. At least one LU name must be specified here.

b) The data set name specified by SYS1.APPCTP may be the same as an existing TP data set.

3) Implement changes with SET command as follows:

```
SET APPC=xx
```

Note: If APPC/MVS must be stopped and restarted to include the changes, use the following commands. **APPC** is the procedure name in these commands; use the APPC procedure name for your installation.

Enter: **C APPC** to stop APPC/MVS

Enter: **S APPC,SUB=MSTR** to start APPC/MVS

If the required APPC parm is not hard-coded in the APPC procedure or it doesn't default to 00, start APPC as follows:

Enter: **S APPC,SUB=MSTR,APPC=xx**

To determine if APPC is running:

Enter: **D A,L or D A,APPC**

To determine if OSA/SF APPC LU is active:

Enter: **D APPC,LU,ALL**

__ b. Set up VTAM for OSA/SF

__ 1) Define the VTAM APPL statement for OSA/SF.

Copy member **IOAAPPL** (Figure 24 on page 50) from **IOA.SIOASAMP** into SYS1.VTAMLST, renaming it from IOAAPPL to APPCOSA. Make sure SECACPT=ALREADYV.

```
*************************************************************************
*                                                                       *
**** MEMBER NAME: IOAAPPL                                               *
*                                                                       *
**** DESCRIPTIVE NAME: SAMPLE VTAM APPL STATEMENT FOR OSA/SF            *
*                                                                       *
**** FUNCTION: This APPL statement identifies OSA/SF as a VTAM          *
*              application, with one ACB defined for LU IOASERV.        *
*                                                                       *
**** SETUP:  Copy and rename this sample to APPCOSA or select           *
*            another name.                                              *
*            Use one of the following 3 methods to activate the         *
*            definition:                                                *
*            1.- Add the selected name to your VTAM APPL List           *
*            2.- Add the selected name to your VTAM ATCCONxx member     *
*            3.- Activate the definition manually before you start      *
*                OSA/SF.                                                *
*                For example:                                           *
*                    V NET,ACT,ID=APPCOSA                               *
*                                                                       *
*                To verify that this worked:                            *
*                    D NET,ID=APPCOSA,E                                 *
*                                                                       *
****   SUGGESTED MODIFICATIONS:                                         *
*                                                                       *
*        - SECURITY:  This APPL statement is set at a security level    *
*          of "conversation" (see keyword SECACPT=CONV below.)          *
*          Set SECACPT to the security level for your installation.     *
*                                                                       *
*        - This sample uses the IBM VTAM default values for             *
*          DLOGMOD and MODETAB.  You may want to specify your own       *
*          installation values.                                         *
*                                                                       *
*        - if not OS/390 then use:                                      *
*              SECACPT=CONV                                             *
*        - if OS/390 then use:                                          *
*              SECACPT=ALREADYV                                         *
*                                                                       *
*************************************************************************
*                                                                       *
IOASERV APPL   ACBNAME=IOASERV,                                        C
               APPC=YES,                                               C
               AUTOSES=0,                                              C
               DDRAINL=NALLOW,                                         C
               DMINWNL=5,                                              C
               DMINWNR=5,                                              C
               DRESPL=NALLOW,                                          C
               DSESLIM=10,                                             C
               LMDENT=19,                                              C
               PARSESS=YES,                                            C
               SECACPT=ALREADYV,                                       C
               SRBEXIT=YES,                                            C
               VPACING=1
*
********* OPTIONAL
*              MODETAB=
*              DLOGMOD=
```

Figure 24. Member IOAAPPL from IOA.SIOASAMP

__ 2) Place the new APPL member name (APPCOSA) in the APPLxx member list *or* in the ATCCONxx member.

SYS1.VTAMLST member APPLXX (include the APPCOSA name)

SYS1.VTAMLST member ATCCONxx (include the APPCOSA name)

__ 3) Vary active the new OSA/SF application to VTAM.

Enter: **V NET,ID=APPCOSA,ACT**

__ 4) Build a logmodes file and place it in the system VTAMLIB data set. You can use the sample job in SYS1.SAMPLIB member ATBLJOB to build the LOGMODES file and place in the VTAMLIB. There is also a sample LOGMODES source input file in SYS1.SAMPLIB member ATBLMODE.

SYS1.SAMPLIB member ATBLJOB (example logmodes job)

SYS1.SAMPLIB member ATBLMODE (example logmode source)

SYS1.VTAMLIB member LOGMODES (logmode assembled program)

Setting up the Communications Server SNMP TCP/IP subagent

In order for an SNMP management application to receive OSA-Express MIB data, the Communications Server SNMP TCP/IP subagent must first connect to OSA/SF. For this connection to be established, two OSA/SF components must be started:

IOAOSASF
A sample JCL procedure that can be used to start the main OSA/SF address space. The sample, shown in Figure 22 on page 44, has a jobname of OSASF1.

IOASNMP
A sample JCL procedure, shown in Figure 25, that starts the OSA/SF-provided OS/390 UNIX transport application that interconnects a subagent with OSASF1.

When setting up SNMP for OSE CHPIDs, ensure that the portname in the configuration file (Chapter 8, “Configuring OSA-Express Modes” on page 149) matches the name you define in the TCP/IP profile DEVICE and LINK statements (Chapter 7, “Host Program Setup” on page 123).

```
//*
//* START OSA SUPPORT FACILITY SNMP COMMUNICATION FACILITY
//*
//IOASNMP EXEC PGM=IOANMAIN,TIME=1440,REGION=0K,DYNAMNBR=5
//STEPLIB  DD  DSN=SYS1.SIOALMOD,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
```

Figure 25. Sample Started Procedure (IOA.SIOASAMP Member IOASNMP)

You must also provide RACF CONTROL authority for IOA.CONNECT.FILE, which is an internal command used by OSA/SF to respond to SNMP data queries.

For more about SNMP, see *z/OS Communications Server: IP Configuration Guide*.

Setting Up a REXX Command Interface (IOACMD EXEC)

__ 1. Do the following to set up the IOACMD REXX EXEC that can be used from TSO or the Ready prompt to enter OSA/SF commands.

Before Starting

- You can copy the EXEC into a local CLIST or EXEC data set that is allocated to //SYSPROC DD of a TSO logon proc.
- During installation of OSA/SF, the program directory gave the installer the option of making the OSA/SF program library accessible either by the LNKLSTxx, or by including the OSA/SF program library (SIOALMOD) in a STEPLIB of the OSA/SF startup proc. If the SIOALMOD library was not put in LNKLSTxx and a STEPLIB was used instead, you must also place the SIOALMOD library in a STEPLIB within the users TSO logon proc in order for the TSO user to have access to the OSA/SF code.

__ a. Allocate a data set for the IOACMD.EXEC, requesting primary space of 350 blocks with secondary space of 35 blocks. The attributes of this data set should be: RECFM=FB, LRECL=80, and BLKSIZE=5120.

Fully-qualified data set name for IOACMD.EXEC
_____

__ b. Copy the EXEC from **IOA.SIOASAMP** library member **IOACMD**.

IOACMD is used to enter OSA/SF commands from TSO or a Ready prompt. Two data sets are written each time the command is entered, one for input, the other for output. These data sets are used for problem determination by IBM. The datasets are cataloged using the UserID that issued the command as the high-level qualifier. If you wish to use a different high level qualifier, there is a header at the beginning of the EXEC that contains information for changing the high-level qualifier of the data sets. This is just for your awareness. You do not have to do anything with these data sets.

Controlling Access to OSA/SF

OSA/SF uses the System Authorization Facility (SAF) interface to allow you to control user access to its commands through an optional security product such as RACF. The following discussion assumes that RACF is installed but any security product using the SAF interface can be substituted. Note, however, that any such product that is installed **must be set up and activated** for the OSA/SF GUI and REXX command interfaces to function correctly.

OSA/SF supports these RACF levels of authority:

- **None**, which prevents a user ID from entering any OSA/SF command.
- **Read**, which allows a user ID to view the OSA address table (OAT) and debug information, get configuration data, and query mode information about OSA features.
- **Update**, which allows a user ID to enter all OSA/SF commands except Set Parameters, Clear Debug, Install, Start Managing with Force, and those that use Get File and Put File.
- **Control**, which allows a user ID to enter all OSA/SF commands with all the options.

The OSA/SF commands are listed in the following table. For details of each command see the appendix.

If you protect data sets, follow the same procedures that you use for other system data sets.

OSA/SF runs as a started task. So give OSA/SF access to the data sets which it uses and which are listed in the OSA/SF startup profile.

OSA/SF Tasks and Commands

We suggest you provide RACF authority for all the OSA/SF commands shown in the table. The ***Configure OSA*** command, which is not included in this list, uses many of the commands listed to accomplish its tasks. Although ***Configure OSA*** does not require RACF authority itself, many of the commands it uses do. Providing authority for all the commands in the table will assist with any problem determination in the future.

Configure OSA uses the **Query**, **Get File**, **Put File**, **Start Managing** and **Install** commands.

Command	Task	RACF Facility	Level
Clear Debug	Clears the OSA/SF message log.	IOA.CLEAR.DEBUG	Control
N/A	Internal command to allow data to be passed in response to SNMP query.	IOA.CONNECT.FILE	Control
Get Config	Gets configuration data for any OSA-Express feature or for the OSA-2 ATM feature.	IOA.GET.CONFIG	Read
Get Debug	Gets the OSA/SF message log, OSA/SF trace table, and other OSA debug data.	IOA.GET.DEBUG	Read
N/A	Internal command to get a file.	IOA.GET.FILE	Control
Put Table with Force	Update and store an OSA-2 OAT disregarding whether an entry is in use. This command can be issued only through IOACMD.	IOA.PUT.TABLE	Control
Put Table without Force	Update and store an OSA-2 OAT only if an entry is not in use. This command can be issued only through IOACMD.	IOA.PUT.TABLE	Update
Get OAT	Gets the OSA Address Table for a specified CHPID.	IOA.GET.OAT	Read
Install	Create and install (or activate) an OSA mode configuration.	IOA.INSTALL	Control
N/A	Internal command to put a File.	IOA.PUT.FILE	Control
Query	Get data about an OSA, OSA/SF, and/or active OSA modes on an OSA.	IOA.QUERY	Read
Set Parameters	Set the OSA LAN port parameters that are settable with OSA/SF.	IOA.SET.PARAMETERS	Control
Start Managing with Force	Start managing an OSA by this instance of OSA/SF even if that forces another instance of OSA/SF to stop management.	IOA.START.MANAGING	Control
Start Managing without Force	Start managing the specified OSA by this instance of OSA/SF without forcing another instance of OSA/SF to stop managing the same OSA.	IOA.START.MANAGING	Update
Stop Managing	Stop managing the specified OSA by OSA/SF.	IOA.STOP.MANAGING	Update

Some Examples of RACF Profile Definitions

When defining a RACF profile generically or for an individual OSA/SF command, use the RACF RDEFINE command with a class of FACILITY. Enter the fully-qualified facility name, starting with the characters IOA and using periods as separators, as shown in the following examples. For more information on the RACF commands, see *z/OS Security Server RACF Command Language Reference*.

- To define a profile for an individual OSA/SF command, for example, the Get Table command to read an OAT, enter:

  ```
  RDEF FACILITY IOA.GET.TABLE
  ```

- To define a profile to allow user IDs to enter this command, enter:

  ```
  RDEF FACILITY IOA.GET.TABLE UACC(READ)
  ```

- To allow the use of generics for a class of service facility, enter:

  ```
  SETROPTS GENERIC FACILITY
  ```

- To prevent unauthorized use of OSA/SF commands, enter:

  ```
  RDEF FACILITY IOA.* UACC(NONE).
  ```

  If you have already prohibited all user IDs from using OSA/SF commands, you must explicitly assign RACF authorization to allow designated user IDs to enter an OSA/SF command.

Some Examples of RACF Authorization Assignments

Enter the RACF PERMIT command and its parameters. The profile parameter, for example, IOA.GET.TABLE or *, determines the authorization level of the user ID identified in the ID parameter. (The Access parameter identifies the authorization given. You can use an asterisk to designate a generic class on the PERMIT parameters.)

- To allow all users to send all commands that require the Read authority, enter:

  ```
  PERMIT IOA.* ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To assign authorization by Access level, for example, to authorize user ID RPAUL to access the Control level, enter:

  ```
  PERMIT IOA.* ACCESS(CONTROL) CLASS(FACILITY) ID(RPAUL)
  ```

- To authorize another user (GLASER) to enter all commands that require the update authorization, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(GLASER)
  ```

- To assign authorization by specific OSA/SF commands, for example, to authorize all user IDs to enter the Get Table command, enter:

  ```
  PERMIT IOA.GET.TABLE ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To authorize ID PINGCHAN to enter any command requiring the Update control option, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(PINGCHAN)
  ```

- To authorize a specific profile name, for example, to authorize user ID JGOLDMAN to enter the Put Table command with or without the Force option, enter:

  ```
  PERMIT IOA.PUT.TABLE ACCESS(CONTROL) CLASS(FACILITY) ID(JGOLDMAN)
  ```

Starting OSA/SF

From the system console, enter the OSA/SF Started Procedure name that you selected in step 1b on page 44. **OSASF1** was the default name.

S <*procedure name*>

The following figure is an example of a typical ***message log*** from starting OSA/SF.

```
IOAC101I OSA Support Facility initialization started 06/06/2001 20:06:58
IOAC100I OSA Support Facility version V2R1MO BASE
IOAC153I Processing of OSA/SF startup profile file started
IOAC152I Finished OSA/SF startup profile processing
IOAK326I CHPID 40 is currently managed by partition 0A
IOAK326I CHPID 9C is currently managed by partition 0A
IOAK326I CHPID C8 is currently managed by partition 0A
IOAC102I OSA Support Facility initialization completed 06/06/2001 20:07:02
```

Figure 26. Example of Messages Log Created While Starting OSA/SF

Verifying That OSA/SF Started

To verify that OSA/SF has been started on the primary server, enter the following:

D A,<*procedure name*>

The Started *procedure name* was established in step 1b on page 44.

Stopping OSA/SF

Enter the following to stop OSA/SF:

P <*procedure name*>

The Started *procedure name* was established in step 1b on page 44 to stop OSA/SF.

Note: If a step name was given with the start command, then the step name must be used with the stop command.

What to Do After OSA/SF is Started

After OSA/SF is started, to communicate with it, you have a choice of using an OSA/SF GUI on OS/2, Windows, or a command interface (IOACMD REXX EXEC). The OSA/SF GUI looks and performs similarly whether it is installed on Windows or OS/2. The command interface prompts you for input and commands from a TSO or Ready prompt. See Chapter 14, “OSA/SF Commands for REXX” on page 247 if you want to get an idea of the type of commands.

- If you want to use a command prompt, the OSA/SF setup is complete.
- If you want to use a Windows OSA/SF GUI, see “Setting Up an OSA/SF GUI on Windows”.
- If you want to use an OS/2 OSA/SF GUI, see “Setting Up the OSA/SF GUI on OS/2” on page 56.

Note: The OSA/SF GUI programs take only a few minutes to set up if the server to GUI communications already exist.

Setting Up an OSA/SF GUI on Windows

Do the following to set up the OSA/SF GUI on Windows.

When to Use These Instructions

Use these instruction after you have:

- Installed OSA/SF using the Program Directory
- Set up OSA/SF

__ 1. At the server, transfer in binary the installation program, **IOAWINST** from IOA.SIOAWIN to a temporary directory of your choice. Use any server-to-workstation transfer program. The file should be **IOAWINST.EXE** on the workstation.

__ 2. Start **IOAWINST.EXE**, either by double-clicking the IOAWINST object in Windows Explorer, or by entering `IOAWINST` at a command prompt. Follow the prompts.

When the EXEC completes, Click **Start** on the Taskbar and select **Programs**. Look for an entry named **IBM OSA Support Facility**. The first time you start the program, you will be prompted for a User Data Path. Enter the name of a temporary directory for the User Data Path.

What to do next:

After the OSA/SF GUI is installed, continue at “Customizing a Workstation Connection for the OSA/SF GUI” on page 59.

Setting Up the OSA/SF GUI on OS/2

The OSA/SF Version 2 GUI for OS/2 and the OSA/SF Version 1 GUI for OS/2 can reside in the same directory. In order to install the OSA/SF Version 2 GUI for OS/2, you must download the new IOAINENU member, which contains IOA2PKG instead of the IOAPKGB file that was used for version 1. The directions for updating an OS/2 GUI that you may have used in the past should not be followed when installing the version 2 GUI for OS/2 for the first time.

Setting Up an OSA/SF GUI on OS/2 with a 3270 Emulator

If you do not have 3270 emulator support from Personal Communications Manager/3270), go to “Setting Up the OSA/SF GUI on OS/2 without a 3270 Emulator” on page 58.

Use the following instructions to download and install the OSA/SF GUI files from the server to an OS/2 workstation. The instructions include steps to:

- Download an installation tool referred to as the *Software Installer* (SI/2)
- Use Software Installer to download and install the OSA/SF GUI.

Note: Although install times can vary for downloading and installing the OSA/SF GUI, tests have shown that for one workstation or server the process may take approximately 15 minutes.

When to Use These Instructions

Use these instruction after you have:

- Installed OSA/SF using the Program Directory
- Set up OSA/SF
- Established a Personal Communications/3270 emulation session for OS/2.

__ 1. Establish a 3270 emulator session on the OS/2 workstation. You might have to start Personal Communications/3270 if no server (host) sessions are started.

__ 2. Log on to a TSO User ID that can access the **IOA.SIOAWEUI** data set that contains the OSA/SF files. If you are using an OS/2-J workstation, copy the contents of IOA2PKGJ into IOA2PKG, replacing the contents of IOA2PKG.

Note: IOA.SIOAWEUI was supplied by IBM; if your server personnel changed the name, you will need to obtain the new name and use it in place of IOA.SIOAWEUI in the following instructions.

__ 3. Position your TSO session at the READY prompt, *or* select **COMMAND** from the ISPF Primary Option Menu.

__ 4. To download the Software Installer bootstrap file, do the following from an OS/2 command line:

a. Enter: **RECEIVE IOAINENU.EXE *a*: 'IOA.SIOAWEUI(IOAINENU)'** replacing ***a*** with the server session identifier that you established in step 1. If you are using an OS/2-J workstation, enter the command exactly as shown but add a space and left bracket [at the end.

Note: If the download is successful, you will see the message, *File transfer complete*.

b. Enter: **IOAINENU** to install Software Installer.

__ 5. Select **Continue** to start the installation.

__ 6. Select the TSO session you established.

A window is displayed with the drive, subdirectory, and file name. We recommend you use these defaults for service updates.

Software Installer Drive, Directory, Filename

_____

__ 7. Select **OK** to start software installer installation. The **Install - progress** window is displayed.

__ 8. When you see the **Instructions** window, select **Continue** to proceed with installing the OSA/SF GUI.

__ 9. The **Install** window is displayed.

__ 10. If you are installing or servicing on a LAN server *or* if you do not want SI to update your CONFIG.SYS file on your machine, do the following. Otherwise select **OK** and go to the next step.

__ a. Deselect the **Update CONFIG.SYS** option.

__ b. Select **OK**.

__ c. Reply to the warning message that tells you SI will not update your CONFIG.SYS file.

__ d. Select **Yes**.

__ 11. When the **Install - Directories** window is displayed, either accept the defaults or enter your own.

OSA/SF Drive and Subdirectory _____

Note: If you want to check your disk space, select **Disk Space**.

__ 12. Select **Install...** to start downloading OSA/SF GUI files.

__ 13. Select **OK** when you see the message that indicates successful completion.

__ 14. To exit SI, double-click on the system icon or select **File** and then select **Exit**.

__ 15. Reboot the workstation. Then continue at “Customizing a Workstation Connection for the OSA/SF GUI” on page 59.

Setting Up the OSA/SF GUI on OS/2 without a 3270 Emulator

Use these instructions if you do not have 3270 emulator support (PCOM) installed on OS/2. If you do have a supported 3270 emulator installed, see “Setting Up an OSA/SF GUI on OS/2 with a 3270 Emulator” on page 56.

Software installer (SI/2) will be set up and then the OSA/SF GUI for OS/2.

__ 1. Transfer the following files from the server to the workstation using the names and details shown in the list. Put all the files in the same directory. The files will require approximately 5 Meg of disk space. If you are using an OS/2-J workstation, first copy the contents of IOA2PKGJ into IOA2PKG, replacing the contents of IOA2PKG. Use any transfer method (FTP, Almcopy, etc.) that can transfer in both ASCII and Binary.

Note: All OS/390 members are located in data set IOA.SIOAWEUI. On VM, all files are on the E disk.

Table 1. OSA/SF GUI Files

OS/390 Member	OS/2 Name	Transfer Mode	Description
IOA2CATE	IOA2CATE.ICF	ASCII	OSA/SF catalog for SI/2
IOA2PKG	IOA2PKG.PKG	ASCII	OSA/SF package file for SI/2
IOA2DESU	IOA2DESU.DSC	ASCII	OSA/SF Description File
IOAINSTS	IOAINSTS.EXE	BIN	Front-end main SI/2
IOAIPII	IOAIPII.DLL	BIN	More SI/2
IOAIPRCS	IOAIPRCS.EXE	BIN	More SI/2
IOAIUPCK	IOAIUPCK.EXE	BIN	More SI/2
IOAINENU	IOAINENU.EXE	BIN	More SI/2
IOAIEXTS	IOAIEXTS.DLL	BIN	More SI/2
IOAIHPLB	IOAIHPLB.HLP	BIN	More SI/2
IOAIMSG	IOAIMSG.MSG	BIN	More SI/2
IOAODLL	IOAODLL.BIN	BIN	OSA/SF .dll Files
IOAOEXE	IOAOEXE.BIN	BIN	OSA/SF .exe Files
IOAOHLP	IOAOHLP.BIN	BIN	OSA/SF .hlp Files
IOA2PKGJ*	IOA2PKG.PKG	BIN	OSA/SF package file(Japanese version)

Drive and Path = _____

Note: *If you are using an OS/2-J workstation, transfer IOA2PKGJ in place of IOA2PKG, but transfer it as IOA2PKG.PKG on the workstation.

__ 2. From an OS/2 window or full screen:

Enter: **IOAINSTS**

The Installation and Maintenance window is displayed.

__ 3. Select **File** from the action bar, then select **Open catalog**, and then select **Drive**.

The Open drive catalog window is displayed.

__ 4. Enter the drive (letter) of where you installed the files in step 1 on page 58

__ 5. Under Catalog (filename:) Enter the path used in step 1 on page 58 and specify a filename of **IOA2CATE.ICF**. (For example: c:\temp\IOA2CATE.ICF). You must include the drive and directory names.

__ 6. Select **Open** to return to the Maintenance and Installation window.

__ 7. Select **Action** from the action bar.

__ 8. Select **Install** to begin the OSA/SF GUI installation.

What to do next:

After the OSA/SF GUI is installed, continue at “Customizing a Workstation Connection for the OSA/SF GUI”.

Customizing a Workstation Connection for the OSA/SF GUI

Use the following section to set up the connection from the workstation to the server running OSA/SF.

Connection Types (OSA/SF GUI to OSA/SF Server)

The OS/SF GUI supports three different connection types: TCP/IP, APPC, and EHLLAPI. Any one of these can be used.

- **TCP/IP** only requires that you create an OSA/SF TCP/IP server (IOASRV) and then add the host (server) connection icon on the OSA/SF GUI Hosts window. The GUI communicates to the server using OSA/SF supplied server code running on the server. Although the user does not directly log on to a TSO user ID, access to a TSO user ID is required for this connection. The TCP/IP server uses the user ID to verify the user has security access to the OS/390 OSA/SF server resources.
- **APPC** is the most complicated connection type to set up. You need to define a transaction program and the LU6.2 connection on the server, as well as define the LU6.2 connection on the workstation in PCOM. APPC is used to communicate with the OSA/SF server using supplied transaction program installed with the GUI. As with TCP/IP, access to a TSO user ID is required for security access authorization at the OS/390 OSA/SF server.
- **EHLLAPI** is the easiest connection to setup. The connection requires only that you add a server connection icon on the OSA/SF GUI Hosts window. See “Customize an EHLLAPI Connection” on page 67 for instructions.

  EHLLAPI uses a 3270 session and Personal Communications Manager’s (PCOM 4.2). OSA/SF uses EHLLAPI to control a TSO user ID on the 3270 session. It transfers files between the workstation and the TSO user ID and then uses the EHLLAPI interface to enter TSO commands to communicate with OSA/SF on the server. EHLLAPI requires a TSO user ID to be logged on to the workstation (window) and to be at the TSO ready prompt.

Physical Connections

OSA/SF supports two types of workstation physical connections.

- **Coax** — OSA/SF supports connections to a VTAM TSO Distributed Function Terminal. Only EHLLAPI can be used with this physical connection.
- **LAN** — OSA/SF supports all three different connection types when the workstation is connected by a LAN adapter. The connection type you use is determined by the services available on the LAN. The connection types are:

  TCP/IP for the TCP/IP connection

  SNA APPN for the APPC connection

  SNA 3270 (or TCP/IP) for the EHLLAPI connection

Customize a TCP/IP Connection

Assumptions

- TCP/IP is installed on OS/390, z/OS, or z/OS.e server.
- Workstation-to-server connection is available

  Note: Either do not use the Open Systems Adapter for this connection, or have at least one connection through two different OSA cards for redundancy purposes.
- You know the server TCP/IP Name or IP address.

Update z/OS, z/OS.e, or OS/390

__ 1. Create IOASRV procedure member in SYS1.PROCLIB(IOASRV). A sample IOASRV.PROC can be found in IOA.SIOASAMP.

IOASRV is the TCP/IP server (daemon) that will be started by TCP/IP, which allows the workstation to communicate with the OSA/SF server program.

```
//*
//*   Sample TCP/IP Server Proc
//*
//SERVER   PROC
//SERVER   EXEC PGM=IOAXTSRV,PARM=2000,REGION=2M,TIME=1440
//IOALIB   DD  DSN=SYS1.SIOALMOD,DISP=SHR
//STEPLIB  DD  DSN=SYS1.SIOALMOD,DISP=SHR
//         DD  DSN=CEE.SCEERUN,DISP=SHR
//SYSPRINT DD  SYSOUT=*,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=121)
//SYSUDUMP DD  SYSOUT=H
```

Figure 27. OSA/SF IOASRV Startup Procedure

- Depending on the security procedures for your installation, you may need to authorize started procedure IOASRV, the TCP/IP socket server, to provide authority for users that logon through the GUI.

  If you are using RACF as the security management tool, authorization for a started procedure is established in one of two ways: by updating the RACF started task authorization module, ICHRIN03 in SYS1.LPALIB, or by adding a profile into general resource class STARTED in the security database.

  – To add a profile into general resource class STARTED issue the following commands:

  ```
  RDEFINE STARTED(IOASRV.*) UACC(NONE) STDATA(USER(<userid>)
          GROUP(<group>) PRIVILEGED(NO) TRUSTED(NO) TRACE(YES))
  ```

Refresh the in storage profiles if necessary

```
SETROPTS RACLIST(STARTED) REFRESH
```

– To update the local copy of the RACF started task authorization module, add the following lines of code to your existing source, then assemble and link edit the updated source into SYS1.LPALIB:

```
...
DC    CL8'IOASRV'
DC    CL8'userid'
DC    CL8'group'
...
```

For more information, refer to the RACF books listed in the bibliography, see "Where to Find More Information" on page xv.

Customize z/OS, z/OS.e, or OS/390 TCP/IP:

__ 1. Update the TCP/IP profile.

Add IOASRV (the started procedure created in the last step) to the AUTOLOG section of the TCP/IP profile. This causes the IOASRV server (daemon) to be started whenever TCP/IP is started.

```
AUTOLOG
       IOASRV        ;OSA/SF Server
ENDAUTOLOG
```

Figure 28. AUTOLOG Section of the TCP/IP Profile

Create a TCP/IP configuration file for the TCP/IP address.

__ 2. Use the TCP/IP socket number in the IOASRV started procedure to define the port number used by the OSA/SF GUI. The socket number is used to connect the GUI to TCP/IP on the server. This TCP/IP socket (port) number must also be specified at the GUI workstation as a parameter when communications are started with TCP/IP. Port number 2000 is used in the IOASRV started procedure.

```
PORT
   .
  2000 TCP IOASRV    ; OSA/SF Server
   .
ENDPORT
```

Figure 29. TCP/IP Socket (Port) Number

__ 3. Use a file, for example, *yourprefix*.TCPIP.DATA, to specify the configuration information required by the TCP/IP client programs.

- To specify the TCP server name of this system, use the HOSTNAME statement or let the name default to the node name specified in the IEFSSN*xx* PARMLIB member.

  ```
  HOSTNAME  OSASF
  ```

- Use the TCPIPJOBNAME statement to specify the member name (JOBNAME) of the procedure used to start the TCP/IP address space. If you do not specify the name and if your TCP/IP started procedure name (JOBNAME) is not the default name of TCPIP, clients will fail at startup with an irrecoverable interaddress communication error.

  ```
  TCPIPJOBNAME TCPIPSF
  ```

- Specify the DATASETPREFIX statement in *yourprefix*.TCPIP.DATA data set. The parameter in this statement, which can be up to 26 characters and must *not* end with a period, takes precedence over either the

distributed or the modified data set prefix name as changed by the EZAPPRFX installation job. If this statement is used in a profile or configuration data set that is allocated to a client or server, that client or server dynamically allocates additionally required data sets using the statement's parameter value as the data set name prefix.

```
DATASETPREFIX TCPIPSF
```

__ 4. If more than one TCP/IP image is running on the server, you must distinguish which TCP/IP image is controlling the IOASRV program. To do this, take the following steps.

a. Uniquely identify the TCP/IP configuration profile data set with the following PROFILE statement:

```
//PROFILE DD DSN=yourprefix.PROFILE.TCPIP
```

in the TCP/IP startup JCL. During initialization of the TCP/IP address space, system operation and configuration parameters are read from the configuration profile data set. (Refer to "Specify Configuration Statements in PROFILE.TCPIP" in *z/OS Communications Server: IP Configuration Guide*

b. Place the '//SYSTCPD DD' statement in the TSO logon procedure and in the JCL of any client or server executed as a background procedure. The SYSTCPD statement identifies the data set to be used to obtain the parameters defined by TCPIP.DATA.

```
//SYSTCPD   DD DISP=SHR,DSN=yourprefix.TCPIP.DATA
```

c. Ensure the IOASRV member you copied from the IOA.SIOSAMP library into SYS1.PROCLIB has the '//SYSTCPD DD' line in it to associate IOASRV to the specific TCP/IP image.

```
//SYSTCPD   DD  DSN=yourprefix.TCPIP.DATA,DISP=SHR
```

At the Workstation, Take These Steps

1. Set up TCP/IP to access the server.
2. Verify that communications have been set up by pinging the server IP address used to access IOASRV for OSA/SF as an OS/390, z/OS, or z/OS.e element.
3. Start the OSA/SF GUI program on the workstation. The first time you start the program, you will be prompted for a User Data Path. Enter the name of a temporary directory for the User Data Path.
   - For Windows — look for **IBM OSA Support Facility** in the Programs view.
   - For OS/2 — look on the OS/2 desktop.

   After the program starts, an OSA/SF server window is displayed with a Sample icon.
4. Select Help from the action bar and then select **How To**.
5. Select **Create another** server icon for the GUI to server Communications. Follow the instructions and use online help.
6. The OSA/SF GUI is now ready for use. If you want to become more familiar with the GUI, see "Using the OSA/SF GUI" on page 109. If you want to continue setting up the OSA-Express feature, go to Chapter 7, "Host Program Setup" on page 123.

Customize an APPC Connection

APPC is the term used in this section because that is the name for the LU 6.2 protocol.

Setting up APPC places requirements on each target server where the server OSA/SF application is running, the controller being used for the communication, and the workstation on which OSA/SF GUI will be running.

At the Server, Take These Steps

1. Add an APPC/MVS TP profile for the OSA/SF GUI to the APPC data set (TPADD TPNAME). for example:

```
//JOBNAME  JOB  MSGCLASS=F,CLASS=A,MSGLEVEL=(1,1),NOTIFY=????????
//*************************************************************
//*
//*  THIS JOB ADDS TP PROFILE FOR OSA/SF GUI APPC CONNECTION
//*
//*************************************************************
//STEP1    EXEC PGM=ATBSDFMU
//SYSPRINT DD   SYSOUT=*
//SYSSDLIB DD   DSN=APPC.APPCTP,DISP=SHR
//*   OLD WORKING VERSION=> SYSSDLIB DD   DSN=SYS1.APPCTP,DISP=SHR
//SYSSDOUT DD   SYSOUT=*
//SYSIN    DD   DATA,DLM=$$
   TPDELETE
      TPNAME(OSAMTP)
   TPADD
        TPNAME(OSAMTP)
        SYSTEM
        ACTIVE(YES)
        TPSCHED_DELIMITER(##)
        TAILOR_SYSOUT(NO)
        TAILOR_ACCOUNT(NO)
        CLASS(OSAM)
        TPSCHED_TYPE(STANDARD)
        JCL_DELIMITER(END_OF_JCL)
//IOAXCSR JOB ,,REGION=4096K,MSGCLASS=F,TIME=1440,MSGLEVEL=(1,1)
//STEP1   EXEC PGM=IOAXCSRV
//STEPLIB DD  DSN=IOAH103.SIOALMOD,DISP=SHR
//        DD  DSN=CEE.SCEERUN,DISP=SHR
//SYSPRINT DD SYSOUT=*
END_OF_JCL
        KEEP_MESSAGE_LOG(ERROR)
        DATASET_STATUS(NEW)
        MESSAGE_DATA_SET(OSASF.APPCCONN.&TPDATE.&TPTIME.JOBLOG)
##
$$
/*
```

Figure 30. APPC/MVS TP Profile

2. Add an entry in SYS1.PARMLIB(ASCHPMxx) for the OSA/SF-to-APPC scheduler interface (CLASSADD CLASSNAME), for example:

```
CLASSADD CLASSNAME(OSAM),   /* OSA Manager                          */
      MAX(6),               /* MAX # FOR THIS CLASS IS 6.           */
      MIN(2),               /* MIN # TO BE BROUGHT UP IS 2.         */
      RESPGOAL(0.02),       /* RESPONSE TIME GOAL IS .02 SECONDS    */
      MSGLIMIT(500)         /* MAX SIZE OF JOB LOGS FOR TPS IS 500 */
                            /* MESSAGES.                            */
```

Figure 31. SYS1.PARMLIB Entry for OSA/SF-to-APPC Scheduler Interface

3. Add an entry in SYS1.PARMLIB(APPCPMxx) for the OSA/SF-to-APPC GUI interface (LUADD ACBNAME). This ACBNAME must match the VTAM APPL-ID (next step) and the PCOM Symbolic Destination Name (SDN) for GUI communications. Note that an LUADD entry for IOASERV will have already been made as part of the OSA/SF installation; this is a second LUADD entry for the OSA/SF GUI's VTAM access control block (ACB), for example:

```
/* ---------------------------- */
/*  FOR OSA/SF APPC             */
/*                              */
LUADD  ACBNAME(OSAMACB),
  SCHED(ASCH),
  TPDATA(APPC.APPCTP),
  TPLEVEL(USER)
```

Figure 32. SYS1.PARMLIB Entry for OSA/SF-to-APPC GUI Interface

4. Add an entry in SYS1.VTAMLST for the GUI-to-VTAM-Application-ID (VBUILD TYPE=APPL). The ACBNAME in the APPL statement must match the ACBNAME in the APPCPM*xx* entry (previous step) and the PCOM SDN. (This is also a good point at which to verify that your installation APPC applications that will establish sessions through the OSA are defined to VTAM.) Here is an example:

```
*********************************************************************
* APPLICATION MAJOR NODE FOR OSA/SF APPC GUI INTERFACE
* APPC/MVS WILL EXEC PGM=IOAXCSRV WHICH WILL OPEN THIS ACB
*********************************************************************
*                                                                   72
APPLOSAM VBUILD  TYPE=APPL
OSAMACB  APPL  ACBNAME=OSAMACB,APPC=YES,AUTOSES=0,DDRAINL=NALLOW,  X
               DMINWNL=4,DMINWNR=4,DRESPL=ALLOW,                   X
               DSESLIM=20,EAS=509,DLOGMOD=#INTER,                  X
               MODETAB=ISTINCLM,SECACPT=CONV,                      X
               SRBEXIT=YES,VERIFY=NONE,VPACING=0,                  X
               SESSLIM=NO
```

Figure 33. SYS1.VTAMLST Entry for the GUI-to-VTAM-Application-ID

5. To use the APPC GUI-to-server interface, add an entry in SYS1.VTAMLST for one of the following communication control unit types if the entry does not already exist:
   - If you are using OSA as an external communications adapter (XCA), proceed with the next step.
   - For all other communications controllers, such as a 3172, 3174, or 37*x*5, refer to the books on that type of controller for more information.
6. If you use an OSA-to-VTAM connection (VBUILD TYPE=XCA), you can use the same VTAM entry, which was used to define the OSA in the SNA mode, to establish an OSA/SF APPC GUI-to-server (CP-to-CP) session. Either a VTAM server Interchange Node or Network Node is required.

   If SNA 3270 emulation support is to be used from the workstation GUI to the server across the OSA, however, it is necessary to add a VTAM TYPE=SWNET entry with a GRPNM matching the OSA XCA node name.

   Here is an example:

```
XCA989   VBUILD TYPE=XCA                                          72
P98900   PORT  ADAPNO=1,           PORT 1                          X
               CUADDR=0989,        CHP80 ENTR                      X
               MEDIUM=RING,        TOKEN RING                      X
               SAPADDR=4,                                          X
               TIMER=60
G98900   GROUP ANSWER=ON,          ACCEPT PU DIAL-INS              X
               CALL=INOUT,         SIFTED                          X
               DIAL=YES,           USING SWITCHED LINE CTL PROTOCOLS X
               DYNPU=YES,          BUILD PU WHEN GUI CALLS-IN      X
               DYNPUPFX=OS,        PREFIX OF DYNAMIC PU NAME       X
               ISTATUS=ACTIVE      SIFTED
LN98900  LINE
PU98900  PU
LN98901  LINE
PU98901  PU
```

Figure 34. SYS1.VTAMLST Entry for 3270 SNA Emulation

At the Workstation, Take These Steps

1. Configure the following on the workstation where the APPC OSA/SF GUI interface is to run:
   - Personal Communications (PCOMM) 4.2 with the resolution to APAR IC14272 including the SNA and APPC support.

   In the SNA Feature List, CPI Communications Side Information, the Symbolic Destination Name (SDN) must match the ACBNAME in the server OSA/SF GUI VTAM APPL-ID and the server APPC LUADD entry.

   If SNA 3270 emulation support is to be used from the workstation, configure PCOMM with additional support for SNA 3270 emulation.

   PCOMM configuration results in the creation of an ***.NDF*** file similar to the example in Figure 35 on page 66.

```
DEFINE_LOCAL_CP  FQ_CP_NAME(NETA.APPC37      )
                 CP_ALIAS(APPC37  )
                 NAU_ADDRESS(INDEPENDENT_LU)
                 NODE_TYPE(EN)
                 NODE_ID(X'05D00037')
                 NW_FP_SUPPORT(NONE)
                 HOST_FP_SUPPORT(YES)
                 SEARCH_REQUIRED(NO)
                 BRANCH_EXTENDER_SUPPORT(NO)
                 FREE_UNUSED_SESSIONS(NO)
                 FREE_UNUSED_SESSIONS_TIME(10)
                 HOST_FP_LINK_NAME(APPC37  )
                 MAX_COMP_LEVEL(NONE)
                 MAX_COMP_TOKENS(0);

  DEFINE_LOGICAL_LINK  LINK_NAME(APPC37  )
                       FQ_ADJACENT_CP_NAME(NETA.VTAM37      )
                       ADJACENT_NODE_TYPE(LEN)
                       DLC_NAME(IBMTRNET)
                       ADAPTER_NUMBER(0)
                       DESTINATION_ADDRESS(X'08005A8B388404')
                       ETHERNET_FORMAT(NO)
                       CP_CP_SESSION_SUPPORT(NO)
                       SOLICIT_SSCP_SESSION(YES)
                       NODE_ID(X'05D00037')
                       USE_PUNAME_AS_CPNAME(NO)
                       MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
                       AUTO_REACTIVATE(NO_RETRY)
                       ACTIVATE_AT_STARTUP(YES)
                       LIMITED_RESOURCE(USE_ADAPTER_DEFINITION)
                       LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
                       EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
                       COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
                       COST_PER_BYTE(USE_ADAPTER_DEFINITION)
                       SECURITY(USE_ADAPTER_DEFINITION)
                       PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
                       HPR_SUPPORT(NO)
                       HPR_LLERP_SUPPORT(USE_ADAPTER_DEFINITION)
                       HPR_MLTG_NUMBER(0)
                       BRANCH_EXTENDER_UPLINK(USE_ADAPTER_DEFINITION)
                       MAX_I_FIELD_SIZE(USE_ADAPTER_DEFINITION)
                       LIMITED_RESOURCE_TIMEOUT(USE_ADAPTER_DEFINITION)
                       INACTIVITY_TIMEOUT(USE_ADAPTER_DEFINITION)
                       USER_DEFINED_1(USE_ADAPTER_DEFINITION)
                       USER_DEFINED_2(USE_ADAPTER_DEFINITION)
                       USER_DEFINED_3(USE_ADAPTER_DEFINITION);

  DEFINE_PARTNER_LU  FQ_PARTNER_LU_NAME(NETA.OSAMACB     )
                     PARTNER_LU_ALIAS(SYS37)
                     PARTNER_LU_UNINTERPRETED_NAME(OSAMACB )
                     MAX_MC_LL_SEND_SIZE(32767)
                     CONV_SECURITY_VERIFICATION(NO)
                     DEFAULT_ROUTING_PREFERENCE(NATIVE_FIRST)
                     PARALLEL_SESSION_SUPPORT(YES);

  DEFINE_PARTNER_LU_LOCATION  FQ_PARTNER_LU_NAME(NETA.OSAMACB     )
                              WILDCARD_ENTRY(NO)
                              FQ_OWNING_CP_NAME(NETA.VTAM37      )
                              LOCAL_NODE_NN_SERVER(NO);
```

Figure 35. Example of .NDF File (Part 1 of 2)

```
DEFINE_DEFAULTS  IMPLICIT_INBOUND_PLU_SUPPORT(YES)
                 DEFAULT_MODE_NAME(BLANK)
                 MAX_MC_LL_SEND_SIZE(32767)
                 DIRECTORY_FOR_INBOUND_ATTACHES(*)
                 DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
                 DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
                 DEFAULT_TP_CONV_SECURITY_RQD(NO)
                 MAX_HELD_ALERTS(10)
                 DEFAULT_ROUTING_PREFERENCE(NATIVE_FIRST)
                 RETRY_COUNT(6)
                 ALIVE_TIMER(60)
                 PATH_SWITCH_TIMER_LOW(480)
                 PATH_SWITCH_TIMER_MEDIUM(240)
                 PATH_SWITCH_TIMER_HIGH(120)
                 PATH_SWITCH_TIMER_NET(60)
                 ROUTE_SETUP_TIMEOUT(10)
                 MOBILE(NO)
                 TN3270E_PORT(23)
                 TN3270E_KEEPALIVE_TYPE(NONE)
                 TN3270E_AUTOMATIC_LOGOFF(0)
                 DISABLE_DLUR_REGISTRATION(NO);

DEFINE_CPIC_SIDE_INFO  SYMBOLIC_DESTINATION_NAME(OSAMACB )
                       PARTNER_LU_ALIAS(SYS37            )
                       MODE_NAME(#INTER  )
                       TP_NAME(OSAMTP);

START_ATTACH_MANAGER;
```

Figure 35. Example of .NDF File (Part 2 of 2)

2. Using the GUI OSA/SF online help panel *Create Another Host Icon* as a guide, build an OSA/SF host icon to support the APPC protocol. The SDN in the OSA/SF GUI icon must match the PCOMM SDN, the OSA/SF host APPC LUADD name, and the OSA/SF GUI VTAM TYPE=APPL ACBNAME. The server name in the icon is a user variable.
3. The OSA/SF GUI is now ready for use. If you want to become more familiar with the GUI, see “Using the OSA/SF GUI” on page 109. If you want to continue setting up the OSA-Express feature, go to Chapter 7, “Host Program Setup” on page 123.

Customize an EHLLAPI Connection

__ 1. Ensure that the server session is able to do SENDs and RECEIVEs.

   If the server session cannot do this, you will need to set up the VTAM mode table entry for your terminal so that the device supports extended data stream capability.

__ 2. Ensure that your TSO/E logon procedure points to the code library of OSA/SF. The default is SYS1.SIOALMOD and contains module IOAXHSRV, used by EHLLAPI, and to the appropriate C runtime library.

__ 3. Log on to TSO until the TSO READY prompt is displayed.

__ 4. Start the OSA/SF GUI program on the workstation.

   - For Windows — look for **IBM OSA Support Facility** in the Programs view.
   - For OS/2 — look on the OS/2 desktop.

   After the program starts, an OSA/SF server window is displayed with a Sample icon.

__ 5. Select Help from the action bar and then select **How To**.

__ 6. Select **Create another** server icon for the GUI to server Communications.

__ 7. The OSA/SF GUI is now ready for use. If you want to become more familiar with the GUI, see “Using the OSA/SF GUI” on page 109. If you want to continue setting up the OSA-Express feature, go to Chapter 7, “Host Program Setup” on page 123.

Chapter 4. Setting Up OSA/SF on z/VM and VM/ESA

OSA/SF for VM/ESA Version 2 Release 2.0 (APAR# OW36927) or later is required for this setup procedure.

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice. This chapter provides instructions for:

- Setting up OSA/SF on the server (VM)
- Setting up a command interface (REXX EXEC - IOACMD)
- Installing and setting up a graphical user interface (OS/2 or Windows)

If you will be running OSA/SF in an OS/390 environment, go to Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43.

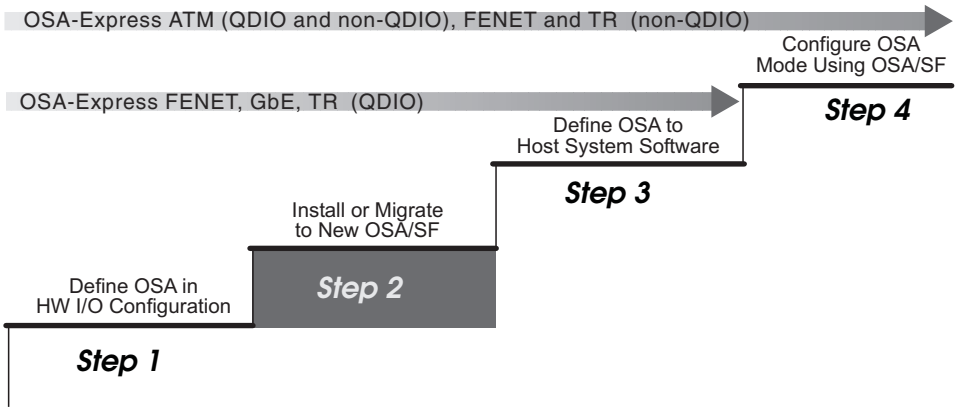


Figure 36. Step Two (VM) in a Four-Step Process

Before You Begin

Determine which OSA mode or modes will be used for each OSA. This decision underlies all of the remaining setup tasks. OSA/SF is required for all OSA-Express ATM modes, all TR modes other than QDIO, and all FENET modes other than QDIO and TCP/IP Passthru using the default OAT.

Ensure the system pre- and co-requisites are met for hardware and software in a VM environment. These are listed on page 24.

OSA/SF and the VM Environment

OSA-Express features set up as OSE channels can be run in a native or guest VM/ESA or z/VM environment, or in OS/390 or z/OS running as a guest in VM. OSA-Express features set up as OSD channels can be run in a native or guest z/VM environment, or in OS/390 or z/OS running as a guest in VM/ESA V2R4. See “Software Requirements” on page 25 for specific version/release information.

OSA/SF for VM runs in its own OSA/SF server virtual machine that:

- Runs automatically unless it is shut down with the OSA/SF Shutdown command (page 270).
- Is logged on when it receives an OSA/SF command. The server remains logged on in a disconnected state awaiting further commands.

- If the OSA channel path is not defined as shared, only the managing OSA/SF with a read/write path to the OSA's minidisk can receive a Stop Managing command for that OSA.
- If the OSA channel path is defined as shared, the OSA minidisk is secure only if you use CSE XLINK. The OSA/SF that gains control is the first OSA/SF that recognizes the OSA and receives a Start Managing command.
- Before another OSA/SF can gain control, the managing OSA/SF must receive a Stop Managing command. If that is not possible, the OSASF user ID should be logged off. If the system image cannot receive that command, the CSE XLINK Reset command will release the read/write path to the OSA's minidisk.
- OSA/SF for VM can be accessed through its GUI and by those CMS user IDs that have been set up to communicate with the OSA/SF server virtual machine's ID (OSASF).

VM as a Host to Guest System Image

If OSA/SF is running on a VM guest system image, you must define the OSA to the host VM system image as follows:

- Specify the same unit address for the guest and host systems for each device number that is required for the mode.
- Specify the same device number for OSA/SF in the guest and in the host. By definition, this must have X'FE' as its unit address.

An exception to these rules occurs if an OS/390 or z/OS system image is the guest. In that case, you can remap the channel path and device definitions.

Barring this exception, the CHPID must be the same one that is defined for it in the system hardware I/O configuration (IOCDS) so that you cannot generate an IOCDS from a guest system image.

Note: You must authorize the host virtual machine to allow the guest to access the channel subsystem by specifying the RMCHINFO option in the OPTION Directory Control statement of the guest operating system's VM ID.

OSA/SF Running on a Guest in a VM Environment

OSA/SF can run on OS/390, z/OS, VSE, or VM when that system image is running as a guest in a VM environment, as shown in Figure 37 on page 71.

The same guidelines apply to each guest. Note especially that:

- You must define the OSA to the VM host system image.
- You must authorize the host to communicate with the channel subsystem by specifying the RMCHINFO option in the OPTION Directory Control statement.
- For the requirements, see "VM as a Host to Guest System Image" above.

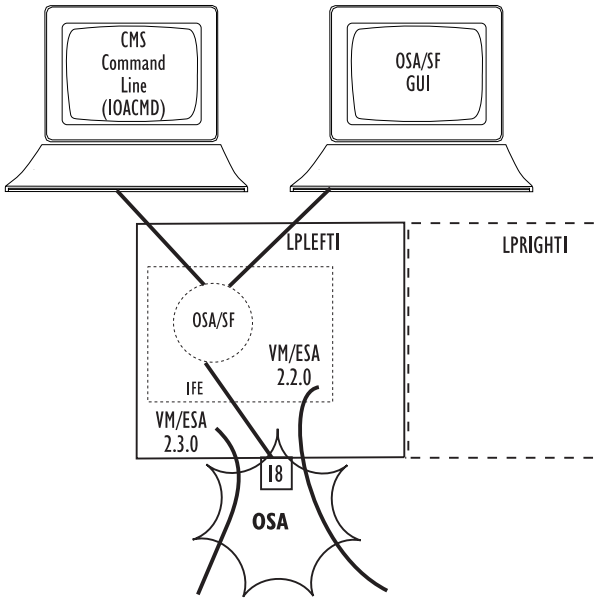


Figure 37. OSA/SF Runs on an OS/390, z/OS, or VM Guest in a VM Environment

Deciding which OSA/SF Interface to Use

OSA/SF has a REXX interface for those who prefer bottom-line commands, and a GUI for use on network-connected PCs running either Windows or OS/2. As Figure 38 shows, the GUI is able to establish more host connections than the REXX interface.

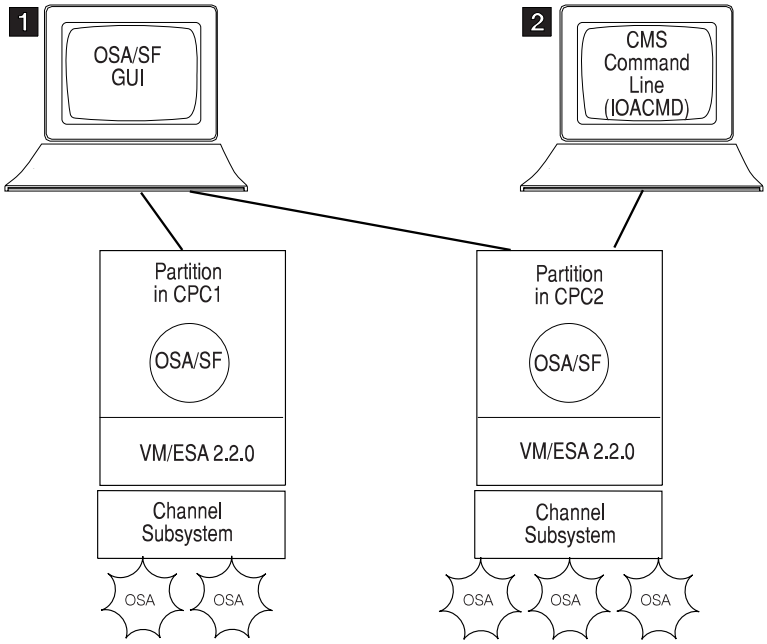


Figure 38. OSA/SF GUI and REXX Interfaces

The OSA/SF GUI (OS/2 or Windows) vs. the IOACMD EXEC

The OSA/SF GUI offers the following advantages:

- Allow you to establish an active host session with as many “host” OSA/SF sessions as the OS/2 or Windows interface recognizes. Potentially, therefore, this interface allows OSA/SF’s span of control to cross CPC boundaries as shown in the preceding figure. The other OSA/SF interfaces allow OSA/SF to manage only those OSAs the instance of OSA/SF running on their host can recognize its system hardware I/O configuration.
- Offer the advantages of an application running on an OS/2 or Windows platform at a programmable workstation, including interactive function panels with pull-down menus and online help panels.
- Can establish a session with any “host” OSA/SF running on any host operating system with which the workstation can establish an active host session.
- If you plan to use the OSA/SF GUI interface (OS/2 or Windows), you must establish a communications protocol between the workstation on which the OSA/SF GUI interface is running and the host system on which the S/390 component of OSA/SF is running.
  - For guidelines on how to accomplish this task for OSA/SF for OS/390, which can manage an OSA defined to VM, see the discussions in Connection Types (OSA/SF GUI to OSA/SF Server) for EHLAPPI (page 67), IP (page 60), and APPC (page 62).

The IOACMD EXEC:

- Controls only those OSAs defined to the same host as the managing OSA/SF.

OSA/SF Installation

OSA/SF is pre-installed, using VMSES/E, on the **VM/ESA Version 2 Release 3.0, VM/ESA Version 2 Release 4.0, and z/VM** System DDRs. It is optionally installable for these releases at initial VM DDR install time. If you installed OSA/SF for VM during VM installation, you must finish the installation by performing the setup tasks described on pages 74 through 75. Completing the installation involves allocating resources for OSA/SF, updating the PROFILE EXEC and NAMES files, and setting up the OSA/SF GUI (Windows or OS/2).

If want to install OSA/SF for VM/ESA Version 2 Release 3.0 or Version 2 Release 4.0 or z/VM at initial VM DDR install time, follow the Post Installation instructions in the Appendix of the VM Installation Guide. This involves preparing the USER DIRECT file for the new items to be loaded, running the INSTALL EXEC, and then completing the installation as described on pages 74 through 75.

To install OSA/SF in a **VM/ESA Version 2 Release 2.0** environment, you must use the VMFINS command to load files from the product tape, allocate resources as determined from VMFINS, and install the files and build the minidisks and directories. See the OSA/SF Program Directory for details. Then, complete the installation as described on pages 74 through 75.

OSA/SF installation creates five user ID entries in the VM CP system directory:

OSASF
The OSA/SF server ID, supporting the OSA/SF console.

OSAMAINT
Collects debug data. Traces and dumps are sent to this ID.

OSADMIN1 through OSADMIN3
User IDs allowing communication with OSA/SF server for REXX commands, and communication with EHLLAPI for GUI interface.

Setting Up APPC

APPC is used to pass commands from the requestor virtual machine (OSA administrator) to the server virtual machine and to send the results back.

The requestor ID and the server ID must be in the same VM system (logical partition).

Do the following to set up the APPC communications:

1. Verify the following directory entry for the server virtual machine (OSA/SF):
   IUCV ALLOW - See *Planning and Administration Guide* in VM library.
2. Verify the following entries for the PROFILE EXEC file of the server virtual machine (OSA/SF):
   SET SERVER ON
   SET FULLSCREEN OFF
   SET AUTOREAD OFF
3. Verify the following in the global search order during the LOAD/GENMOD phase.
   - DMSSVM5
   - VMLIB
   - CMSSAA
   - COMMTXT - only if using TCP/IP
   - SCEELKED
   - SCEERUN
4. For the server virtual machine (OSA/SF), create a names file called **$SERVER$ NAMES** and add the following entries:

```
:nick.IOASERV :list.OSADMIN1
                   OSADMIN2
                   OSADMIN3
              :module.IOACMAIN
```

5. For the requestor virtual machines, OSADMIN1 through OSADMIN3, update a names file called **UCOMDIR NAMES** and add the following entries:

```
:nick.IOASERVR :luname.*USERID OSASF
               :tpn.IOASERV
```

   Attention: *USERID is a keyword, type it in exactly as shown, do not substitute a userid in its place. OSASF is a variable and can be changed if you used something other than OSASF.

Setting Up OSA/SF

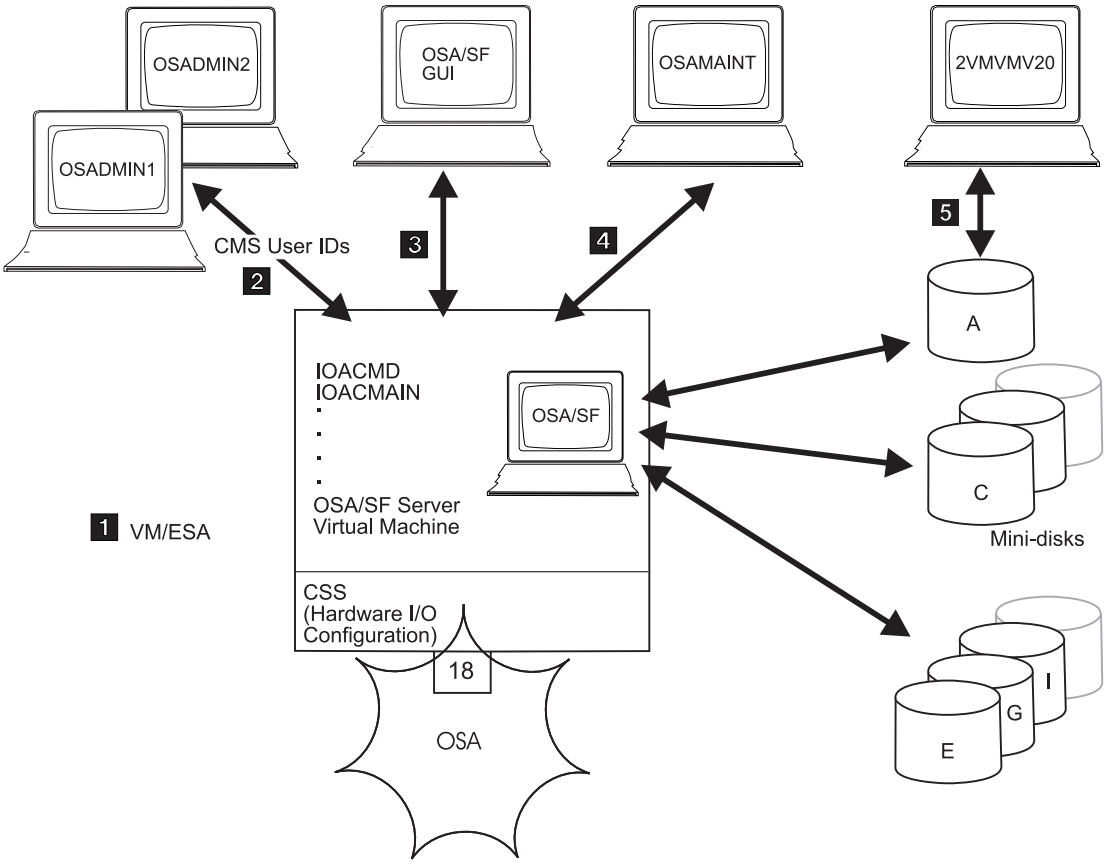


Figure 39. Setup Tasks for OSA/SF in the VM Environment

1 In a VM environment, assign the OSASF user ID to run the OSA/SF server virtual machine. OSA/SF for VM is shipped with a sample $SERVER$ NAMES file that contains this default user ID.

Note: In an ISFC environment where different OSA devices are installed on individual member systems, the OSASF server for each real system should be identified with a unique user ID. This requires changing the OSASF user ID in the CP directory and updating the UCOMDIR NAMES file on each OSADMINx ID to reflect the new ID in the .luname field.

If an OSA-Express is running in SNA mode and you want to ensure that alerts are always recorded on OSASF, make sure the following steps are taken.

- The OSASF server machine is added to the autolog list of VMs brought up during system IPL.
- The PROFILE EXEC on OSASF must have the following two lines edited in:

```
'LOADMOD  IOACMAIN'
'START'
```

- Make the OSASF virtual machine exempt from inactivity forcing in a manner similar to PVM and RSCS.

2 To set up a CMS user ID that can access OSA/SF, you must set up the server machine in the CMS user ID's UCOMDIR NAMES file. You must also add the CMS user ID in the OSASF $SERVER$ NAMES file. An example is shown below. For more information, refer to the VM books listed in the bibliography (page xvii).

- To set up the UCOMDIR NAMES file of CMS user ID ***OSADMIN1*** to contain the nickname of the OSA/SF service machine:

```
:nick.IOASERV :luname.*userid OSASF
              :tpn.IOASERV
```

- Conversely, to add the CMS user ID ***OSADMIN1*** in the OSA/SF $SERVER$ NAMES file:

```
 :nick.IOASERV :list.OSADMIN1
             :module.IOACMAIN
```

3 Ensure a communications protocol has been established with the platform on which OSA/SF GUI is to run, and download the OSA/SF GUI files. OSA/SF GUI is recommended for all OSA-Express (page 71).

For information on how to establish a communications protocol using an OSA in the SNA mode, refer to *VM/ESA: Open Systems Adapter Support Facility,* which is listed in the bibliography (page xvii).

4 Assign OSAMAINT as the CMS user ID to which OSA/SF for VM sends its dumps and trace records. Do not change this ID.

5 At installation, establish a user ID to download data, including PTFs, to the disks that OSA/SF for VM uses. The default ID is ***2VMVM20***.

C Allocate 1 minidisk to represent each OSA that is defined to the CPC where OSA/SF for VM will run.

- Allocate 5 cylinders (any model 3390 DASD) for each minidisk, and define it as ***70****cc*, replacing *cc* with the OSA-Express CHPID. Get the OSA CHPID from the *Placement Report* or *CHPID Report* produced by the IBM Configuration (CFSYSTEM) or the *Systems Assurance Product Review*, which may be available from your OSA marketing representative.
- If the OSA-Express channel path is defined as being shared among logical partitions, define the minidisks on Cross System Extensions (CSE) DASD.
- If an error has occurred in allocating the OSA minidisk, OSA/SF places an error message in the OSASF error log, which can be handled in accordance with general OSA/SF procedures.

A **E** **G** **I**

Allocate additional space for, for example, the (A) OSASF's A disk, (B) OSA/SF production files, (G) cross-partition files, and (I) OSA/SF images. Refer to the OSA/SF for VM program directory for the number of cylinders needed.

Controlling Access to OSA/SF for VM

OSA/SF uses the System Authorization Facility (SAF) interface to let you optionally control user access to its commands. In the following OSA-specific planning information, RACF is assumed but any security product that uses the RACROUTE interface can be used. (If the security product is installed, OSA/SF assumes it is active.) For more information on RACF, refer to the manuals listed in the bibliography (page xvi).

If no security product is present, the `RPIUCMS INIT` line in the OSASF userid PROFILE EXEC should be commented out.

If OSA/SF for VM is being used, authorize OSA/SF (OSASF user ID) to issue RACROUTE requirements as indicated in the following list.

1. Update the CP directory entry for the OSASF user ID to include an inter-user communication vehicle (IUCV) line that allows communications with the RACF service machine. Use either ANY or the name of the RACF VM server machine.

   `IUCV` *any* or *racf_server_machine* `PRIORITY MSGLIMIT 255`
2. If not already defined, define a profile with the name ICHCONN in the class Facility:

   `RAC RDEFINE FACILITY ICHCONN UACC(NONE)`
3. Authorize OSA/SF to issue RACROUTE requests:

   `RAC  PERMIT ICHCONN CLASS(FACILITY) ID(OSASF) ACCESS(UPDATE)`
4. If the Facility class is not active, activate it:

   `RAC SETROPTS CLASSACT(FACILITY)`

OSA/SF supports the None, Read, Update, and Control RACF levels of authority. The minimum authority level that is required for each command is listed in the next table. The CONFIGURE OSA command, not listed below, uses many of these commands to accomplish its tasks. Although CONFIGURE OSA does not require RACF authority, many of the commands it uses do. Providing authority for all the commands in the table will assist with any problem determination in the future.

Configure OSA uses the **Query**, **Get File**, **Put File**, **Start Managing** and **Install** commands.

Table 2. Level of Authority Required for OSA/SF Commands on VM

Command	Task	RACF Facility	Level
Clear Debug	Clear the OSA/SF message log.	IOA.CLEAR.DEBUG	Control
Get Config	Get the configuration data for any OSA-Express feature or the ATM OSA-2. This command can only be issued through IOACMD at the CMS command line.	IOA.GET.CONFIG	Read
Get Debug	Get the OSA/SF log of IOA messages and OSA/SF trace table. From the OSA CHPID, get a memory dump, SNA traces, and SNA message log.	IOA.GET.DEBUG	Read
N/A	Internal command to get a file.	IOA.GET.FILE	Control
Get Table	Get the entries of an OSA Address Table (OAT). This command can be issued only through IOACMD at the CMS command line.	IOA.GET.TABLE	Read
Install	Create and install (or activate) an OSA mode configuration.	IOA.INSTALL	Control

Table 2. Level of Authority Required for OSA/SF Commands on VM (continued)

Command	Task	RACF Facility	Level
N/A	Internal command to get a file.	IOA.GET.FILE	Control
Put Table with Force	Update and store an OSA-2 OAT disregarding whether an entry is in use. This command can be issued only through IOACMD at the CMS command line.	IOA.PUT.TABLE	Control
Put Table without Force	Update and store an OSA-2 OAT only if an entry is not in use. This command can be issued only through IOACMD at the CMS command line.	IOA.PUT.TABLE	Update
Query	Get data about an OSA, OSA/SF, and/or active OSA modes on an OSA.	IOA.QUERY	Read
Set Parameters	Set the OSA LAN port parameters that are settable with OSA/SF.	IOA.SET.PARAMETERS	Control
Shutdown	Shuts the OSA/SF virtual server machine down, releases all OSA/SF resources, and logs the OSA/SF server virtual machine off. The OSA/SF server virtual machine is automatically restarted by any subsequent OSA/SF command. This command can only be issued through IOACMD at the CMS command line.	IOA.SHUTDOWN	Control
Start Managing	Start managing an OSA.	IOA.START.MANAGING	Update
Stop Managing	Stop managing the specified OSA by OSA/SF.	IOA.STOP.MANAGING	Update

Some Examples of RACF Profile Definitions

When defining a RACF profile generically or for an individual OSA/SF command, use the RACF RDEF command with a class of FACILITY. Enter the fully qualified facility name, starting with the characters IOA and using periods as separators, as shown in the following examples. For more information on the RACF commands, see the RACF commands books listed in the bibliography (page xvi).

- To define a profile for an individual OSA/SF command, for example, the Get Table command to read an OAT, enter: **RDEF FACILITY IOA.GET.TABLE**
- To define a profile to allow user IDs to enter this command, enter:

  RDEF FACILITY IOA.GET.TABLE UACC(READ)
- To allow the use of generics for a class of service facility, enter: **SETROPTS GENERIC FACILITY**
- To prevent unauthorized use of OSA/SF commands, enter: **RDEF FACILITY IOA.* UACC(NONE)** If you have already prohibited all user IDs from using OSA/SF commands, you must explicitly assign RACF authorization to allow designated user IDs to enter an OSA/SF command.

Some Examples of RACF Authorization Assignments

Enter the RACF PERMIT command and its parameters. The profile parameter, for example, IOA.GET.TABLE or *, determines the authorization level of the user ID identified in the ID parameter. (The Access parameter identifies the authorization given. You can use an asterisk to designate a generic class on the PERMIT parameters.)

- To allow all users to send all commands that require the Read authority, enter:

```
PERMIT IOA.* ACCESS(READ) CLASS(FACILITY) ID(*)
```

- To assign authorization by Access level, for example, to authorize user ID NAMEROW to access the Control level, enter:

  ```
  PERMIT IOA.* ACCESS(CONTROL) CLASS(FACILITY) ID(NAMEROW)
  ```

  And, to authorize another user (SALLY) to enter all commands that require the update authorization, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(SALLY)
  ```

- To assign authorization by specific OSA/SF commands, for example, to authorize all user IDs to enter the Get Table command, enter:

  ```
  PERMIT IOA.GET.TABLE ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To authorize ID RAICHER to enter any command requiring the Update control option, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(RAICHER)
  ```

- To authorize a specific profile name, for example, to authorize user ID OMAR to enter the Put Table command with or without the Force option, enter:

  ```
  PERMIT IOA.PUT.TABLE ACCESS(CONTROL) CLASS(FACILITY) ID(OMAR)
  ```

Notes on Handling Problems with OSA/SF

Handling problems with running OSA/SF follows the system procedures generally used for a VM facility. However, OSA/SF can also display OSA-related data, such as messages and dumps that are specific to OSA/SF operations. It sends this data to the OSAMAINT ID that you have set up.

- If a problem seems to have occurred, make sure the managing OSA/SF is identified (page 69).

  If OSA/SF GUI is being used, this can be done by clicking on the OSA/SF host icon and having the statistics notebook page displayed. A CMS user ID can issue the Query command.

- In an ISFC environment where different OSA devices are installed on individual member systems, the OSASF server for each real system should be identified with a unique user ID. This requires changing the OSASF user ID in the CP directory and updating the UCOMDIR NAMES file on each OSADMINx ID to reflect the new ID in the .luname field.

- Check for OSA/SF messages, which are in the format of IOA*xyyyz*, where *x* denotes the OSA/SF component, *yyy* is the sequence number and *z* signifies the severity of the condition.

  These messages are stored in the OSA/SF message log together with the OSA/SF commands and responses that have been issued. You can get the IOA messages with the OSA/SF Get Debug command.

- Tracing is a default operation for OSA/SF. You can, therefore, get the trace log by using the Get Debug command and specifying Trace log.

- Dumps are automatically executed when abends occur. After the dump completes, the OSA/SF server logs off. The next OSA/SF command results in an autolog and restart by the OSA/SF server.

Setting Up an OSA/SF GUI on Windows

Do the following to set up the OSA/SF GUI on Windows.

When to Use These Instructions

Use these instructions after you have:

- Installed OSA/SF using the Program Directory.
- Set up OSA/SF.

__ 1. At the server, transfer in binary the installation program, IOAWINST, from IOAWINST BIN E (OSASF 200 minidisk) to a temporary directory of your choice. Use any server to workstation transfer program. The file should be IOAWINST.EXE on the workstation.

__ 2. Start IOAWINST.EXE, either by double-clicking the IOAWINST object in Windows Explorer, or by entering `IOAWINST` at a command prompt. Follow the prompts.

When the install completes, click **Start** on the Taskbar and select **Programs.** Look for an entry named **IBM OSA Support Facility**.

Setting Up an OSA/SF GUI on OS/2

This section provides instructions for downloading and installing the OSA/SF GUI files from the host to OS/2 on the workstation.

If you do not have Communications Manager/2 installed, go to “Setting Up the OSA/SF GUI on OS/2 without Personal Communications/3270” on page 83. These instructions use the RECEIVE command to download files from the host to the workstation.

Use the following instructions to download and install the OSA/SF GUI files from the host to an OS/2 workstation. The instructions include steps to:

- Download an installation tool referred to as the *Software Installer* (SI/2)
- Use Software Installer to download and install the OSA/SF GUI.

Use these instructions after you have:

- Installed OSA/SF using the Program Directory
- Verified the RECEIVE command will work to transfer files from the host to workstation. The IND$FILE MODULE is required for RECEIVE to work.

1. Establish a host session on the OS/2 workstation. You may have to start Communications Manager/2 if no host sessions are started.
2. Log on to one of the ***administrator*** IDs that can access the OSA/SF production disk 200.
3. Make sure the VM user ID has the READY prompt.
4. To download the Software Installer bootstrap file, do the following from an OS/2 command line:

   Enter: **RECEIVE IOAINENU.EXE *a***: **IOAINENU BIN** replacing ***a*** with the host session identifier that you established in step 1.

   Note: If the download is successful, you will see the message, *File transfer complete*.
5. Enter: **IOAINENU** to install Software Installer.
6. Select **Continue** to start the installation.

7. Select the VM option to indicate the Host Operating System you are installing on. Select Continue.
8. Select the ***administrator*** session you established.

   A window is displayed with the drive, subdirectory, and file name. We recommend you use these defaults for service updates.

   Software Installer Drive, Directory, Filename

   _____
9. Select **OK** to start software installer installation. The **Install - progress** window is displayed.
10. When you see the **Instructions** window, select **Continue** to proceed with installing the OSA/SF GUI.
11. The **Install** window is displayed.
12. If you are installing or servicing on a LAN server *or* if you do not want SI to update your CONFIG.SYS file on your machine, do the following. Otherwise select **OK** and go to the next step.
    a. Deselect the **Update CONFIG.SYS** option.
    b. Select **OK**.
    c. Reply to the warning message that tells you SI will not update your CONFIG.SYS file.
    d. Select **Yes**.
13. When the **Install - Directories** window is displayed, either accept the defaults or enter your own.

    OSA/SF Drive and Subdirectory _____

    Note: If you want to check your disk space, select **Disk Space**.
14. Select **Install...** to start downloading OSA/SF GUI files.
15. Select **OK** when you see the message that indicates successful completion.
16. To exit SI, double-click on the system icon or select **File** and then select **Exit**

Choose one of the following for your installation:

1. If you installed OSA/SF GUI on a LAN server, each requester on the LAN that accesses OSA/SF must now be updated. Continue at “Updating a Requester Machine” on page 81.
2. If you did not install OSA/SF GUI on a LAN server *and* if you deselected the ***Update CONFIG.SYS*** option in step 12, you must update your CONFIG.SYS file. Continue at “Updating the CONFIG.SYS File on a Non-Requester Machine”.
3. If you did not install OSA/SF GUI on a LAN server and you allowed software installer to update the CONFIG.SYS file, you will have to shut down your workstation and reboot it. The OSA/SF GUI install is complete. Proceed to Chapter 6, “Using the OSA/SF Interfaces” on page 107.

Updating the CONFIG.SYS File on a Non-Requester Machine

You must update your CONFIG.SYS file if you deselected the **Update CONFIG.SYS** option when you installed OSA/SF GUI on your machine *or* after you applied a service level to OSA/SF GUI that affects the values in the CONFIG.SYS file.

1. Back up your current **CONFIG.SYS** file.

2. View the **CONFIG.ADD** file that was created during downloading and installing the OSA/SF GUI with software installer.

   The CONFIG.ADD file is a copy of your current CONFIG.SYS file with changes for OSA/SF.
3. Verify or change the drive and directory for OSA/SF in the following statements:
   - **SET PATH**
   - **SET HELP**
   - **LIBPATH**
4. Verify or change the drive and directory for the following statements that were added:
   - **SET IOAERR**=*drive*:*dir* (IOAERR is for trace logs and error logs)
   - **SET IOAWORK**=*drive*:*dir* (The drive you choose for IOAWORK should have at least 7MB of free space. IOAWORK is the subdirectory from which the OSA/SF GUI creates other subdirectories and files.)
   - **SET IOAESIZE=2** (2 represents 2 KB of error log before wrapping.)
   - **SET HOSTPAGE**= *037* for English
5. After you verified or made the necessary changes in the CONFIG.ADD file, rename it to **CONFIG.SYS**.
6. Reboot your workstation.
7. Proceed to Chapter 6, “Using the OSA/SF Interfaces” on page 107.

Updating a Requester Machine

Requester machines are other workstations that will access the OSA/SF GUI files on the LAN server workstation.

When to update the requester machines

Update each requester machine after:

- OSA/SF GUI is installed on a LAN server and the CONFIG.SYS file was updated *and*
- After a service level has been applied to OSA/SF GUI on the LAN server that affects the values in the CONFIG.SYS file.

You can perform these tasks manually as described in “Updating a CONFIG.SYS File on a Requester Machine” on page 83 *or* using SI as described in “Updating a Requester Machine Using SI”.

Updating a Requester Machine Using SI

First, verify that the following are complete:

OSA/SF GUI must be installed on the LAN server. To check:

1. Switch to (or create and switch to) another OS/2 window.
2. Change to the drive that contains OSA/SF
3. Enter **DIR** and note the OSA/SF subdirectory. (You will need it in step 7 on page 82 or step 8 on page 82.)

SI must already have been installed on the LAN server. The default subdirectory was IBMIOA2 for the Software Installer. (Check with your LAN administrator.)

The requester machine must have SI accessed from the LAN server.

The requester machine must have OSA/SF GUI accessed from the LAN server.

Note: The drive mapping that is used to access OSA/SF GUI must be the same drive for every access. The designated drive is the one that the CONFIG.SYS file will be updated with.

Then, follow these instructions:

1. Change to the directory in which SI resides. The default was **C:\IBMIOA2**; if it was changed, see step 8 on page 80.
2. To start SI, enter:

   IOAINSTS /S:IBMIOA2

   Note: The default directory for OSA/SF was IBMIOA2. If the default directory was not used during the install, see step 13 on page 80.

   *IOA***INSTS**, where *IOA* is the prefix of the product used to install SI.

   Follow with a blank and then **/S:**

   Conclude with the name of the OSA/SF subdirectory.

   For example, if you are using the OSA/SF subdirectory, enter

   IOAINSTS /S:IBMIOA2
3. Select the **File** menu bar choice.
4. Select **Open catalog.**
5. Select **Drive...** to display the ***Open drive catalog*** window.
6. Select the drive to use. (It must have access to the OSA/SF GUI directory structure.)
7. If the OSA/SF subdirectory is IBMIOA2, enter

   \IBMIOA2\USR\IOACATE.ICF

   in the ***Filename*** field under the Catalog section.
8. If the OSA/SF subdirectory is *not* IBMIOA2, enter

   *xxx***IOACATE.ICF**

   in the ***Filename*** field under the Catalog section, where *xxx* is the value of the OSA/SF subdirectory.
9. Select the **Open** pushbutton to get the selected catalog file from the LAN server to display the ***Installation and Maintenance*** window.
10. Select **OSA/SF LAN Requester Install.**
11. Select the **Action** menu bar choice.
12. Select **Install...** to display the **Install** window.
13. If you do not want SI to update the CONFIG.SYS on your machine:
    a. Deselect the **Update CONFIG.SYS** option.
    b. Select the **OK** pushbutton.
    c. Reply to the warning message that tells you SI will not update your CONFIG.SYS file.
    d. Select the **Yes** pushbutton.
14. Select the **OK** pushbutton to display the ***Install - directories*** window.
15. Accept the defaults or enter your own.
    - The **LAN REQUESTER** label must identify the drive and directory on the requester machine that will contain the files generated by OSA/SF GUI.
    - The **LAN SERVER** label must identify the drive and OSA/SF subdirectory that were used by the requester machine to access OSA/SF GUI from the server.

16. Select **Install...** to initiate processing. (A message is displayed when processing completes successfully.)
17. Select the **OK** pushbutton.
18. To exit SI, do one of the following:
    - Double-click on the system icon.
    - *Or* select ***File*** and then select **Exit.**
19. If you choose to not have your CONFIG.SYS file updated, do the instructions in "Updating a CONFIG.SYS File on a Requester Machine", or if the CONFIG.SYS file was updated, reboot the requester machine before you start OSA/SF GUI.
20. Proceed to Chapter 6, "Using the OSA/SF Interfaces" on page 107. OSA/SF has been added to the Windows program menu, or an OSA/SF folder has been added to your OS/2 workplace (desktop) to give you access to OSA/SF GUI.
21. See "Using the OSA/SF GUI" on page 109 and Chapter 8, "Configuring OSA-Express Modes" on page 149 for instruction on using the GUI and customizing OSA modes of operation.

Updating a CONFIG.SYS File on a Requester Machine

1. Back up your current **CONFIG.SYS** file.
2. View the **CONFIG.ADD** file that was created during downloading and installing the OSA/SF GUI with software installer.

   The CONFIG.ADD file is a copy of your current CONFIG.SYS file with changes for OSA/SF.
3. Verify or change the drive and directory for OSA/SF in the following statements:
   - **SET PATH**
   - **SET HELP**
   - **LIBPATH**
4. Verify or change the drive and directory for the following statements that were added:
   - **SET IOAERR**=*drive*:*dir* (IOAERR is for trace logs and error logs)
   - **SET IOAWORK**=*drive*:*dir* (The drive you choose for IOAWORK should have at least 7MB of free space. IOAWORK is the subdirectory from which the OSA/SF GUI creates other subdirectories and files.)
   - **SET IOAESIZE=2** (2 represents 2 KB of error log before wrapping.)
   - **SET HOSTPAGE**= *037* for English
5. After you verified or made the necessary changes in the CONFIG.ADD file, rename it to **CONFIG.SYS**.
6. Reboot your workstation.
7. Proceed to Chapter 6, "Using the OSA/SF Interfaces" on page 107.

Setting Up the OSA/SF GUI on OS/2 without Personal Communications/3270

Use these instructions if you do not have Personal Communications/3270 (PCOMM) installed on the workstation, or the RECEIVE command does not work. If PCOMM is installed and the RECEIVE command works, see "Setting Up an OSA/SF GUI on Windows" on page 78 for instructions.

Software installer (SI/2) will be set up and then the OSA/SF GUI for OS/2.

1. Log on to one of the *administrator* IDs that can access the OSA/SF production disk 200.

2. Transfer the following files from the host to the workstation using the names and details shown in the list. Use the same directory for all the files. The files will require approximately 5 Meg of disk space.

   Note: All files are located on the E disk.

   Drive and Path = _____

   Note: You can use any transfer method that can transfer in both ASCII and Binary.

Table 3. OSA/SF GUI FIles

VM File	OS/2 Name	Transfer Mode	Description
IOA2CATE BIN	IOA2CATE.ICF	ASCII	OSA/SF catalog for SI/2
IOA2PKGB BIN	IOA2PKG.PKG	ASCII	OSA/SF package file for SI/2
IOA2DESU BIN	IOA2DESU.DSC	ASCII	OSA/SF description file
IOAINSTS BIN	IOAINSTS.EXE	BIN	Front-end main SI/2
IOAIPII BIN	IOAIPII.DLL	BIN	More SI/2
IOAIPRCS BIN	IOAIPRCS.EXE	BIN	More SI/2
IOAIUPCK BIN	IOAIUPCK.EXE	BIN	More SI/2
IOAINENU BIN	IOAINENU.EXE	BIN	More SI/2
IOAIEXTS BIN	IOAIEXTS.DLL	BIN	More SI/2
IOAIHPLB BIN	IOAIHPLB.HLP	BIN	More SI/2
IOAIMSG BIN	IOAIMSG.MSG	BIN	More SI/2
IOAODLL PAKBIN	IOAODLL.BIN	BIN	OSA/SF .dll Files
IOAOEXE PAKBIN	IOAOEXE.BIN	BIN	OSA/SF .exe Files
IOAOHLP PAKBIN	IOAOHLP.BIN	BIN	OSA/SF .hlp Files
IOA2PKGJ BIN*	IOA2PKG.PKG	BIN	OSA/SF package file for SI/2 (Japanese version)

   Note: *If you are using an OS/2-J workstation, transfer IOA2PKGJ in place of IOA2PKGB, but transfer it as IOA2PKG.PKG on the workstation.

3. From an OS/2 window or full screen:

   Enter: **IOAINSTS**

   The Installation and Maintenance window is displayed.

4. Select **File** from the action bar, then select **Open catalog**, and then select **Drive**.

   The Open drive catalog window is displayed.

5. Enter the drive (letter) of where you installed the files in step 2
6. Under Catalog (filename:) enter the path used in step 2 and specify a filename of **IOACATE.ICF**. (For example: C:\subdir\IOACATE.ICF)
7. Select **Open** to return to the Maintenance and Installation window.
8. Select **Action** from the action bar.
9. Select **Install** to begin the OSA/SF GUI installation.

   When the installation is complete, continue at step 15 on page 80.

Customizing a Workstation Connection for the OSA/SF GUI

This section includes instructions and examples for setting up communications between an OS/2 workstation running the OSA/SF GUI and OSA/SF on the host. The connection is from the OSA/SF GUI to an *administrator* ID and then to the OSA/SF server virtual machine. The connection between the OSA/SF server and the administrators is set up during install using the program directory. These examples and instructions establish the connection between the GUI and an *administrator* ID.

The OSA/SF GUI supports any of these communication methods:

TCP/IP See “Setting Up TCP/IP”.

APPC See “Setting Up APPC” on page 86.

EHLLAPI See “Setting Up EHLLAPI (3270 Sessions) For OSA” on page 90.

Setting Up TCP/IP

Use these instructions to set up the TCP/IP communications between the OS/2 OSA/SF GUI and OSA/SF on the host. Also see, “An Alternative for Setting Up TCP/IP”.

1. Determine which *administrator* ID will be used for GUI to host communications and provide CP Privilege Class B authority for only that ID.
2. Verify that TCPMAINT 592 is accessed as the ’H’ disk.
3. Call **IOAXTSRV 2000** at the end of the PROFILE EXEC.

   This allows the *administrator* ID to connect to socket 2000.
4. Have the *administrator* ID autologged by the VM Management Resource of your installation.

An Alternative for Setting Up TCP/IP

As an alternative to the previous instructions, you can do the following:

1. Verify that **REXECD** is running on the host and the *administrator* ID has authorization.

   Default value for REXECD is to FORCE OFF the user if no screen activity occurs after 240 seconds. This value can be changed by the TCP/IP administrator by changing the startup profile for the REXECD server. Please consult your VM TCP/IP administrator or refer to the VM TCP/IP Planning and Customization documentation.
2. Enter the following from an OS/2 command line to start the server (*administrator* ID):

   REXEC *hostname* -L *administrator ID* **-P *password* IOAXTSRV 2000**

   When the command is entered, the *administrator* ID will be autologged and receive the IOAXTSRV 2000 command. This makes it ready to accept TCP/IP communications from the workstation.

   If the command is successful, the window where the command was entered will appear to be waiting for FORCE or LOGOFF of the *administrator* ID.
3. Continue with Creating the TCP/IP Host Icon on the GUI.

Creating the TCP/IP Host Icon on the GUI

Before Starting

Before you can use the OSA/SF GUI, the GUI must be set up using the program directory. The instructions are also in this book for your reference.
- "Setting Up an OSA/SF GUI on Windows" on page 78
- "Setting Up an OSA/SF GUI on OS/2" on page 79
- "Setting Up the OSA/SF GUI on OS/2 without Personal Communications/3270" on page 83.

1. Start the OSA/SF GUI, if not already started:
   a. **To start on Windows,** Click on **Start** in the lower left corner of the window and select **Programs.** Then click on **OSA/SF.**
   b. **To start on OS/2,** double-click on the **OSA/SF** folder on the OS/2 desktop. (The folder is created during "Setting Up an OSA/SF GUI on OS/2" on page 79.)
   c. Double-click on the **OSA/SF** icon in the folder.

      The first time the OSA/SF GUI is started a message will be displayed. Enter a valid drive and directory to store user data in.

      The **OSA/SF Hosts** window is displayed with a sample host icon when the GUI is first started.
2. From the OSA/SF GUI **OSA/SF Hosts** window, select **Help** from the menu bar at the top of the window.
3. Select **How to**.
4. Double-click on **Create another host icon** and follow the instructions to create a icon.
5. Enter **2000** or the number you specified in step 3 on page 85 on the IOAXTSRV command.

Starting the TCP/IP Connection

Do the following to see if the TCP/IP connection is working:

1. Double-click on the host icon that was created in "Creating the TCP/IP Host Icon on the GUI".
2. Enter the user ID and password for the *administrator*.
3. Select the Open pushbutton.

   If the connection is successful, a **Command Output** window and a **Channels View** window will be displayed.
4. To verify the connection between the host and workstation, use the NETSTAT and PING commands.

Setting Up APPC

This connection is for an Advanced Program to Program Communications (APPC) with a control point to control point (CP-to-CP) LU 6.2 independent logical unit (LU) protocol.

Notes:

1. All the setup for the *administrator* IDs is done at install time.
2. OSA/SF VM and CPIC/APPC GUI use a connection to a PRIVATE GATEWAY on the AVS machine. The security is set to PGM.

Before Starting

- AVS, VTAM, and OSA/SF are required on the host.
- Communications Manager is required on the workstation.
- If you are going to use the OSA as the communications controller, customize the OSA for SNA mode before continuing. See “Using REXX to Configure OSA-Express CHPIDs” on page 151.

Examples are shown to assist you with setting up VTAM, AVS, PCOMM and the OSA/SF GUI. These are only examples; modify the instructions for your installation. The examples are based on ACF/VTAM Version 4 Release 2 with the use of APPN.

The following tasks were done for our example:

1. Update VTAM definition files:
   - ATCSTRxx VTAMLST
   - ATCCONxx VTAMLST
   - OSA VTAMLST
   - AVS VTAMLST

   See “Updating VTAM Definition Files”.
2. Add the following to the AGWPROF GCS of your AVS machine: AGW ACTIVATE GATEWAY OSASFPRV PRIVATE
3. Update the PCOMM NDF file for the GUI.See “Adding or Changing the PCOMM Workstation NDF File” on page 88.
4. Activate PCOMM, VTAM, and AVS with the new definitions.
5. Establish an APPC connection between the GUI and OSA/SF at the host. See “Creating the CPIC Host Icon on the GUI” on page 89.
6. Verify the connection between the GUI and OSA/SF. See “Starting the APPC Connection” on page 90.

Updating VTAM Definition Files

ATCSTRxx VTAMLST Definition File: Specific to APPN and APPC are: NODETYPE=NN, CPCP=YES, DYNLU=YES

```
SSCPID=5555,
 CONFIG=xx,
 HOSTSA=555,
 HOSTPU=OSAPU,
 SSCPNAME=OSAxxM,
 NODETYPE=NN,
 CPCP=YES,
 NETID=NETA,
 TRACE,TYPE=VTAM,MODE=INT,SIZE=200,OPT=ALL,
 SUPP=INFO,
 DYNLU=YES,
 IOBUF=(600,240,12,F,16,16),LPBUF=70,CRPLBUF=700
```

Figure 40. ATCSTRxx VTAMLST Definition File

ATCCONxx VTAMLST Definition File: Includes the following.

```
COSAPPN,IBMTGPS,OSA,AVS
```

OSA VTAMLST Definition File:

```
OSA11XCA VBUILD TYPE=XCA
PRTOSA11 PORT  ADAPNO=0,CUADDR=yyy,MEDIUM=RING,SAPADDR=4,TIMER=60
* yyy=your OSA CUA address, select ADAPNO for the port in USE.
GRPOSA11 GROUP ANSWER=ON,CALL=INOUT,DIAL=YES,DYNPU=YES,DYNPUPFX=OS,
               ISTATUS=ACTIVE,AUTOGEN=(1,L,P)
```

Figure 41. OSA VTAMLST Definition File

AVS VTAMLST Definition File:

```
AVS      VBUILD TYPE=APPL
*
OSASFPRV APPL  AUTH=(ACQ,PASS),AUTHEXIT=YES,APPC=YES,SECACPT=ALREADYV, *
               VPACING=3,PARSESS=YES,SYNCLVL=SYNCPT,                   *
               DSESLIM=2,DMINWNL=2,DMINWNR=0,AUTOSES=1
```

Figure 42. AVS VTAMLST Definition File

Adding or Changing the PCOMM Workstation NDF File

```
DEFINE_LOCAL_CP  FQ_CP_NAME(NETA.OSAGUI11)
                   CP_ALIAS(OSAGUI)
                   NAU_ADDRESS(INDEPENDENT_LU)
                   NODE_TYPE(EN)
                   NODE_ID(X'05D00001')
                   FREE_UNUSED_SESSIONS(NO)
                   MAX_COMP_LEVEL(NONE)
                   MAX_COMP_TOKENS(0);

   DEFINE_LOGICAL_LINK  LINK_NAME(OSALNK01)
                        FQ_ADJACENT_CP_NAME(NETA.OSAxxM)
                        ADJACENT_NODE_TYPE(NN)
                        DLC_NAME(IBMTRNET)
                        ADAPTER_NUMBER(0)
                        DESTINATION_ADDRESS(X'your OSA mac address')
                        ETHERNET_FORMAT(NO)
                        CP_CP_SESSION_SUPPORT(YES)
                        SOLICIT_SSCP_SESSION(YES)
                        NODE_ID(X'05D00001')
                        ACTIVATE_AT_STARTUP(YES)
                        USE_PUNAME_AS_CPNAME(NO)
                        LIMITED_RESOURCE(NO)
                        LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
                        MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
                        EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
                        COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
                        COST_PER_BYTE(USE_ADAPTER_DEFINITION)
                        SECURITY(USE_ADAPTER_DEFINITION)
                        PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
                        USER_DEFINED_1(USE_ADAPTER_DEFINITION)
                        USER_DEFINED_2(USE_ADAPTER_DEFINITION)
                        USER_DEFINED_3(USE_ADAPTER_DEFINITION);
```

Figure 43. PCOMM Workstation NDF File (Part 1 of 2)

```
DEFINE_PARTNER_LU  FQ_PARTNER_LU_NAME(NETID.OSASFPRV)
                   PARTNER_LU_ALIAS(OSASFPRV)
                   PARTNER_LU_UNINTERPRETED_NAME(OSASFPRV)
                   MAX_MC_LL_SEND_SIZE(32767)
                   CONV_SECURITY_VERIFICATION(NO)
                   PARALLEL_SESSION_SUPPORT(YES);

DEFINE_DEFAULTS  IMPLICIT_INBOUND_PLU_SUPPORT(YES)
                 DEFAULT_MODE_NAME(BLANK)
                 MAX_MC_LL_SEND_SIZE(32767)
                 DIRECTORY_FOR_INBOUND_ATTACHES(*)
                 DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
                 DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
                 DEFAULT_TP_CONV_SECURITY_RQD(NO)
                 MAX_HELD_ALERTS(10);

DEFINE_CPIC_SIDE_INFO  SYMBOLIC_DESTINATION_NAME(OSASFPRV)
                       FQ_PARTNER_LU_NAME(NETA.OSASFPRV)
                       MODE_NAME(#INTER)
                       TP_NAME(IOAXCSRV);

START_ATTACH_MANAGER;
```

Figure 43. PCOMM Workstation NDF File (Part 2 of 2)

Note: IOAXCSRV is the program to be called by the HOST OSA Administrator userid after autolog occurs when the connection is attempted.

If APPN is not being used, the additional PCOMM definition is required:

```
DEFINE_PARTNER_LU_LOCATION  FQ_PARTNER_LU_NAME(NETA.OSASFPRV)
                              DESCRIPTION(Private AVS gateway)
                              WILDCARD_ENTRY(NO)
                              FQ_OWNING_CP_NAME(NETA.OSAxxM)
                              LOCAL_NODE_NN_SERVER(NO);
```

Figure 44. PCOMM Definition Required in .NDF File When APPN is Not Used

Creating the CPIC Host Icon on the GUI

Before Starting

Before you can use the OSA/SF GUI, the GUI must be set up using the program directory. The instructions are also in this book for your reference.

- “Setting Up an OSA/SF GUI on Windows” on page 78
- “Setting Up an OSA/SF GUI on OS/2” on page 79
- “Setting Up the OSA/SF GUI on OS/2 without Personal Communications/3270” on page 83

Note: The CPIC icon represents the APPC connection

1. Start the OSA/SF GUI, if not already started:
   a. **To start on Windows,** click on **Start** in the lower left corner of the window and select **Programs.** Then click on **OSA/SF.**
   b. **To start on OS/2,** double-click on the **OSA/SF** folder on the OS/2 desktop. (The folder is created during “Setting Up an OSA/SF GUI on OS/2” on page 79.)
   c. Double-click on the **OSA/SF** icon in the folder.

      The first time the OSA/SF GUI is started a message will be displayed. Enter a valid drive and directory to store user data in.

      The **OSA/SF Hosts** window is displayed with a sample host icon when the GUI is first started.

2. From the OSA/SF GUI **OSA/SF Hosts** window, select **Help** from the menu bar at the top of the window.
3. Select **How to**.
4. Double-click on **Create another host icon** and follow the instructions to create a CPIC host icon.
5. Enter **OSASFPRV** for the Symbolic destination name.

Starting the APPC Connection

Do the following to see if the APPC connection is working:

1. Double-click on the CPIC host icon that was created in “Creating the CPIC Host Icon on the GUI” on page 89.
2. Enter the User ID of one of the OSA *administrators*.
3. Enter the VM logon password for the *administrator* ID.
4. Select the Open pushbutton.

   If the connection is successful, a **Command Output** window and a **Channels View** window will be displayed.

Verifying the APPC Connection

Do the following if the APPC connection is not established between the OSA/SF GUI and OSA/SF on the host.

1. Verify a CNOS flow from the AVS machine to the workstation by issuing the following on the AVS machine:

   AGW CNOS OSASFPRV OSAGUI11 #INTER 8 4 4

   If the CNOS is established, the connection exists.

   If it fails, try the following:

   - Use VTAM Display MAJNODES to isolate and correct the problems. Other VTAM Display commands are available, see the VTAM documentation.
   - Use PCOMM Subsystem Management. You can verify states of your configuration to isolate the problems.

Setting Up EHLLAPI (3270 Sessions) For OSA

If the OS/2 workstation already has 3270 sessions available, see “Creating the EHLLAPI Host Icon on the GUI” on page 92.

Use this information when an OSA is the communications controller between the GUI and host.

The following tasks were done for our example:

1. Updated VTAM definition files:
   - ATCSTRxx VTAMLST
   - ATCCONxx VTAMLST
   - OSA11SWN VTAMLST
   - VSCS VTAMLST
   - OSA VTAMLST

   See “Examples of VTAM Definition Files for EHLLAPI” on page 91.
2. Update the PCOMM NDF file for the GUISee “Adding or Changing the PCOMM Workstation NDF File” on page 88.
3. Activate PCOMM and VTAM with the new definitions.

4. Establish an EHLLAPI connection between the GUI and OSA/SF at the host. See “Creating the EHLLAPI Host Icon on the GUI” on page 92.
5. Verify the connection between the GUI and OSA/SF. See “Starting the EHLLAPI Connection” on page 93.

Examples of VTAM Definition Files for EHLLAPI

These are examples to assist you with the VTAM definitions. Change the necessary information for your installation.

ATCSTRxx VTAMLST: Specific to APPN and APPC are: NODETYPE=NN, CPCP=YES, DYNLU=Y

```
SSCPID=5555,
CONFIG=xx,
HOSTSA=555,
HOSTPU=OSAPU,
SSCPNAME=OSAxxM,
NODETYPE=NN,
CPCP=YES,
NETID=NETA,
TRACE,TYPE=VTAM,MODE=INT,SIZE=200,OPT=ALL,
SUPP=INFO,
DYNLU=YES,
IOBUF=(600,240,12,F,16,16),LPBUF=70,CRPLBUF=700
```

Figure 45. ATCSTRxx VTAMLST

ATCCONxx VTAMLST:

```
COSAPPN,IBMTGPS,OSA,AVS,VSCS,OSA11SWN
```

OSA VTAMLST:

```
OSA11XCA VBUILD TYPE=XCA
 PRTOSA11 PORT  ADAPNO=0,CUADDR=yyy,MEDIUM=RING,SAPADDR=4,TIMER=60
 * yyy=your OSA CUA address, select ADAPNO for the port in USE.
 GRPOSA11 GROUP ANSWER=ON,CALL=INOUT,DIAL=YES,DYNPU=YES,DYNPUPFX=OS,
                ISTATUS=ACTIVE,AUTOGEN=(1,L,P)
```

Figure 46. OSA VTAMLST

OSA11SWN VTAMLST:

```
OSA11SWN VBUILD TYPE=SWNET,MAXGRP=1,MAXNO=1
PUOSA01  PU    ADDR=02,ANS=CONTINUE,CAPACITY=16M,CONNTYPE=APPN,        X
               CPCP=YES,DATMODE=HALF,DYNADJCP=YES,DYNLU=YES,           X
               IDBLK=05D,IDNUM=00001,                                  X
               ISTATUS=ACTIVE,MAXDATA=1929,                            X
               MAXOUT=4,MAXPATH=1,PACING=20,PASSLIM=1,PUTYPE=2,        X
               MODETAB=ISTINCLM,SSCPFM=FSS,DLOGMOD=CPSVCMSG,           X
               VPACING=20,LOGAPPL=VM
PAOSA11  PATH  DIALNO=01040004AC2043FE,                                X
               GRPNM=GRPOSA11,                                         X
               CALL=INOUT
*
* Note: The LOCADDR must match the definitions for 3270 sessions under
*       PCOMM 3270 Emulation, Logical Terminal LU LOCAL/NAU address
*
OSAGUIA  LU    LOCADDR=1,DLOGMOD=SNX32702
OSAGUIB  LU    LOCADDR=2,DLOGMOD=SNX32702
OSAGUIC  LU    LOCADDR=3,DLOGMOD=SNX32702
OSAGUID  LU    LOCADDR=4,DLOGMOD=SNX32702
OSAGUIE  LU    LOCADDR=5,DLOGMOD=SNX32702
OSAGUIF  LU    LOCADDR=6,DLOGMOD=SNX32702
OSAGUIG  LU    LOCADDR=7,DLOGMOD=SNX32702
OSAGUIH  LU    LOCADDR=8,DLOGMOD=SNX32702
```

Figure 47. OSA11SWN VTAMLST

VSCS VTAMLST:

```
VSCS VBUILD TYPE=APPL
*
* VM is the VSCS APPL statement
N2XXAVSC APPL AUTH=(ACQ,PASS),PARSESS=YES,
              PRTCT=VM,AUTHEXIT=YES,ACBNAME=VM
```

Figure 48. VSCS VTAMLST

Creating the EHLLAPI Host Icon on the GUI

Before Starting

Before you can use the OSA/SF GUI, the GUI must be set up using the program directory. The instructions are also in this book for your reference.

- “Setting Up an OSA/SF GUI on Windows” on page 78
- “Setting Up an OSA/SF GUI on OS/2” on page 79
- “Setting Up the OSA/SF GUI on OS/2 without Personal Communications/3270” on page 83

1. Log on to an *administrator* ID in a 3270 session.
2. Start the OSA/SF GUI, if not already started:
   a. **To start on Windows,** click on **Start** in the lower left corner of the window and select **Programs.** Then click on **OSA/SF.**
   b. **To start on OS/2,** double-click on the **OSA/SF** folder on the OS/2 desktop. (The folder is created during “Setting Up an OSA/SF GUI on OS/2” on page 79.)
   c. Double-click on the **OSA/SF** icon in the folder.

      The first time the OSA/SF GUI is started a message will be displayed. Enter a valid drive and directory to store user data in.

      The **OSA/SF Hosts** window is displayed with a sample host icon when the GUI is first started.

3. From the OSA/SF GUI **OSA/SF Hosts** window, select **Help** from the menu bar at the top of the window.
4. Select **How to**.
5. Double-click on **Create another host icon** and follow the instructions to create a EHLLAPI host icon.

Starting the EHLLAPI Connection

Do the following to see if the EHLLAPI connection is working:

1. Log on to an OSADMINx userid in the session specified to the GUI.
2. Verify the host session is at the CMS ready prompt.
3. Double-click on the host icon that was created in “Creating the EHLLAPI Host Icon on the GUI” on page 92.
4. Verify the host session ID is correct. Change it if necessary.
5. Select the Open pushbutton.
6. If the connection is successful, there will be activity in the 3270 session that was used to start this connection.

   If the connection is successful, a **Command Output** window and a **Channels View** window will be displayed.

VM Setup

Chapter 5. Setting Up OSA/SF on VSE/ESA

OSA/SF for VSE/ESA Version 2 Release 6 or later is required for this setup procedure.

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice. This chapter provides instructions for:

- Setting up OSA/SF on the server (VSE)
- Setting up a command interface (REXX EXEC - IOACMD)
- Installing and setting up a graphical user interface (OS/2 or Windows)

If you will be running OSA/SF in an OS/390 environment, go to Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43. For VM, go to Chapter 4, “Setting Up OSA/SF on z/VM and VM/ESA” on page 69.

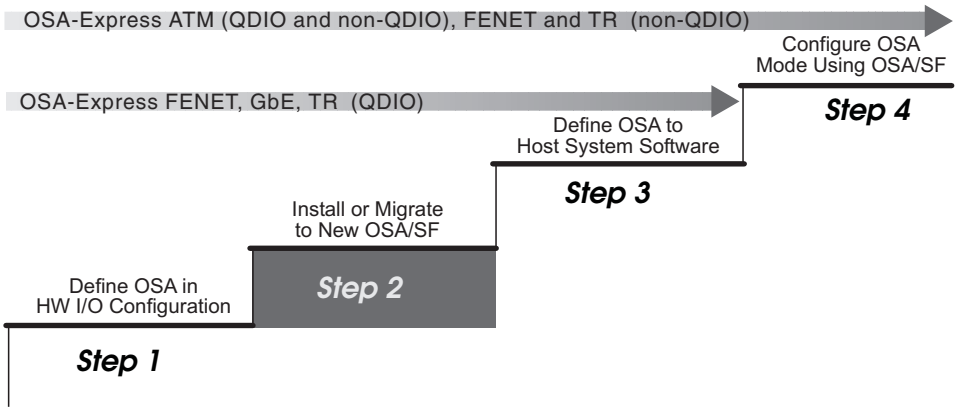


Figure 49. Step Two (VSE) in a Four-Step Process

Before You Begin

Determine which OSA mode or modes will be used for each OSA. This decision underlies all of the remaining setup tasks. OSA/SF is required for all OSA-Express ATM modes, all TR modes other than QDIO, and all FENET modes other than QDIO and TCP/IP Passthru using the default OAT.

Ensure the system pre- and co-requisites are met for hardware and software in a VSE environment. These are listed on page 24.

Setting Up OSA/SF

These are the high level tasks to set up OSA/SF. The detailed instructions follow the list.

1. Define the partitions for the three OSA/SF jobs.
2. Create a working sublibrary (PRD2.OSASF) for OSA/SF.
3. Submit the following jobs in this order: IOAINX, IOAMAIN, IOACMD.

Note: If VSE/ESA is running as a guest of VM, specify the RMCHINFO option in the VM OPTION Directory Control statement to allow OSA/SF to operate properly.

Defining the Partition for OSA/SF Jobs

The following three OSA/SF jobs will run in either a static or dynamic VSE/ESA partition.

1. Use the following as a guideline to define the partition for each job. Write down the partition for use later.
   - IOAMAIN Partition ____
   - IOACMD Partition ____
   - IOAHRUN Partition ____

The minimum sizes of the partitions are as follows:

OSA/SF Job	(VSE/ESA Partition) Allocate	Size	Comments
IOAMAIN	9.0MB	600KB	Depends on the number of OSAs installed. 9M should support a max configuration
IOACMD	8.5MB	1.1MB	Command EXEC
IOAHRUN	2.5MB	200KB	Started by the system when the GUI is started.

Figure 50. OSA/SF Jobs

You will copy the OSA/SF jobs in the following instructions. You do not have to create the job for IOAHRUN, but the partition class is required when the GUI is started and communicates to IOAMAIN. IOAHRUN is the job that runs for IOAXHSRV.

Creating the Working Sublibrary (PRD2.OSASF) for OSA/SF

Use the following sample job to create the PRD2.OSASF sublibrary.

```
* $$ JOB JNM=DEFINE,CLASS=0,DISP=D
// JOB DEFINE IBM SUGGESTED OSA/SF WORKING SUBLIBRARY
// EXEC LIBR
 DEFINE S=PRD2.OSASF  REUSE=IMMEDIATE
/*
/&
* $$ EOJ
```

Figure 51. Job to Create PRD2.OSASF

Copying the Skeleton Job for the Master Index (IOAINX)

1. Copy member **IOAINX** from ICCF library 59 into a private ICCF library.

   Note: A permanent copy of this member is stored in the installation library as member IOAINX.Z. The permanent copy is not an exact copy of the ICCF member and it cannot be used without modification. To use it, change all the statements that start with two periods as shown in the following example:

   These changes are done for you during installation for the library 59 members.

   ```
   ..$$  Change To  $$
   ../*    "     "  /*
   ../&    "     "  /&
   ```

2. If required, update the host sublibrary names that start in column 1 to match your specific environment. The names in the member must all start in column one. All the IOA_xxx must be in column 56.

   Note: Beginning with VSE/ESA Version 2 Release 4, the TCP/IP, SNA, and ATM images are located in PRD1.BASE rather than in PRD2.PROD.

```
* $$ JOB JNM=IOAINX,CLASS=0,DISP=D
// JOB IOAINX
* This JOB catalogs the OSA/SF Master Index into the OSA/SF Data
* library (PRD2.OSASF is assumed to be the OSA/SF Data library).
// EXEC LIBR
ACC S=PRD2.OSASF
CATALOG xxxxxx.IOAINX     EOD=/H          REPLACE=YES
*********************************************************************************
* <-- Start entries in columns 1 and 56... -->         *
*********************************************************************************
*        PRODUCT(00:TCP/IP Passthru V1R1M0)
*********************************************************************************
DD:PRD1.BASE(IOBNULL2.0)                                IOA_NULL_IMAGE1
*********************************************************************************
*        PRODUCT(50:SNA V1R1M0)
*********************************************************************************
DD:PRD1.BASE(IOBSNA2.0)                                 IOA_SNA_IMAGE1
DD:PRD1.BASE(IOBSNATM.0)                                IOA_SNA_IMAGEA
DD:PRD1.BASE(IOBSNAFE.0)                                IOA_SNA_IMAGEF
*********************************************************************************
*        PRODUCT(70:ATM LAN Emulation V1R1M0)
*********************************************************************************
DD:PRD1.BASE(IOAATMLE.0)                                IOA_ATMLE_IMAGE
DD:PRD1.BASE(IOAACDSF.0)                                IOA_ATM_VALFILE
/H
/*
/&
*$$ EOJ
```

Figure 52. Master Index

3. Store the member in PRD2.OSASF.xxxxx.IOAINX, replacing xxxxx with the member name you plan to specify in the next step.

Copying the Skeleton Job for IOAMAIN

1. Copy member **IOAMAIN** from ICCF library 59 into a private ICCF library.

   Note: Beginning with VSE/ESA Version 2 Release 4, the OSA/SF modules are located in PRD1.BASE rather than in PRD2.PROD.

```
* $$ JOB JNM=IOAMAIN,CLASS=x,DISP=L
// JOB IOAMAIN
* THIS JOB SAMPLE ASSUMES: OSA/SF CODE LIBRARY.. PRD1.BASE (PRD2.PROD in VSE 2.3)
*                          OSA/SF DATA LIBRARY.. PRD2.OSASF
*                          C-RUNTIME LIBRARY.... PRD2.SCEEBASE
*                          Netview.............. PRD1.BASE
* If this does not match your environment, please change the
* statements below accordingly.
// SETPFIX LIMIT=100K,PERM
// LIBDEF *,SEARCH=(PRD1.BASE,PRD2.SCEEBASE)
// EXEC PGM=IOAMAIN,SIZE=IOAMAIN,PARM='PRD2.OSASF(XXXXX)'
/*
/&
* $$ EOJ
```

Figure 53. IOAMAIN Job

2. Modify the JCL according to the comments in the job.

The EXEC statement must be modified to replace the ***XXXXX*** with a member name for the OSA/SF data sets. One choice for member name might be the LP name OSA/SF is running on. The member name you specify will become the prefix for members used by OSA/SF. Some of the members OSA/SF uses are the following:

- XXXXX.IOAINX - Master Index (See Figure 52 on page 97)
- XXXXX.IOACFG
- XXXXX.IOAMSGXX
- XXXXX.IOATYPE

Note: IOACFG, IOAMSGXX, and IOATYPE are set up and used by OSA/SF. You do not have to do anything with these members.

We suggest that you use **PRD2.OSASF** as the sublibrary. PRD2.OSASF will be used in the remainder of these instructions. Write down the member name you choose as the prefix for OSA/SF members.

PRD2.OSASF._____.*member type*

3. Submit the job to the VSE/POWER RDR queue. Do not release the job yet.

Copying the Skeleton Job for IOACMD

Job IOACMD is used to enter OSA/SF commands from JCL. If you plan to only use OS/2 (OSA/SF GUI), continue at “Moving the Jobs into the Power RDR Queue” on page 99.

1. Copy member **IOACMD** from ICCF library 59 into a private ICCF library.

   We recommend you set up the job as it is shown in the figure. Only one EXEC REXX=IOACMD line should be included. The other two lines that start with an asterisk are shown as an example of other ways to use the EXEC. Submitting the job as shown in the figure will always show you a list of OSA/SF commands and prompt you to enter one. This is the preferred method.

   This example will also store the IOACMD debug files into sublibrary PRD2.OSASF. The first parameter must specify a library and sublibrary for the debug files. If you choose to use a different location, write it down for future reference and change the JCL accordingly.

   Note: Beginning with VSE/ESA Version 2 Release 4, the OSA/SF modules are located in PRD1.BASE rather than in PRD2.PROD.

```
Sublibrary for IOACMD Debug Data _____________________________
```

```
// JOB IOACMD
// OPTION NODUMP
// LIBDEF *,SEARCH=(OSA.JMF,PRD2.PROD,PRD2.SCEEBASE)
// EXEC PROC=LIBDEF
*  LIBLIST PHASE,*     ,list where members are that its finding
*  EXEC REXX=IOACMD,PARM='OSA.JMF'               SIZE=1000K
*  EXEC REXX=IOACMD,PARM='OSA.JMF GET_OAT 78 osa.vse.joel.oat'
// EXEC REXX=IOACMD,PARM='OSA.JMF GET_OAT    FC                        C
               OSA.JMF.OAT.CHPFC'
*  Continuation chars MUST start in column 16
// EXEC LISTLOG
/*
/&
```

Figure 54. IOACMD Job

2. Submit the job to the VSE/POWER reader queue. Do not release the job yet.

Moving the Jobs into the Power RDR Queue

Run the jobs to set up and start OSA/SF. Release job IOAINX and then release job IOAMAIN. If you are not using the OSA/SF GUI, you will need to release job IOACMD as required.

What To Do Next

If you are going to use the OSA/SF GUI, continue at "Setting Up the GUI on OS/2". If you are not going to use the GUI, continue at "Using REXX to Configure OSA-Express CHPIDs" on page 151.

Stopping OSA/SF

Issue the following command from the VSE/ESA operator command line to stop OSA/SF:

```
CANCEL xx,NODUMP
```

Where xx is the VSE/ESA partition where OSASF (job IOAMAIN) is running.

Setting Up an OSA/SF GUI on Windows

Do the following to set up the OSA/SF GUI on Windows.

When to Use These Instructions

Use these instructions after you have:

- Installed OSA/SF using the Program Directory.
- Set up OSA/SF.

__ 1. At the server, transfer in binary the installation program, IOAWINST, from IOAWINST BIN E (OSASF 200 minidisk) to a temporary directory of your choice. Use any server to workstation transfer program. The file should be IOAWINST.EXE on the workstation.

__ 2. Start IOAWINST.EXE, either by double-clicking the IOAWINST object in Windows Explorer, or by entering `IOAWINST` at a command prompt. Follow the prompts.

When the install completes, click **Start** on the taskbar and select **Programs.** Look for an entry named **IBM OSA Support Facility**.

Setting Up the GUI on OS/2

Use these instructions to download the necessary files to set up the OSA/SF GUI on OS/2.

Files for a program named Software Installer/2 (SI/2) will be downloaded from the host (server) to your workstation and then SI/2 is started to install the OSA/SF GUI on OS/2.

Before Starting

You will require approximately 14MB of disk space, 9MB to run the GUI and an additional 5MB to download and transfer the files. You can reclaim about 4MB after this process is complete.

1. Create a directory on OS/2 for downloading the files. We suggest you create **C:\IBMIOA** because this is the default directory for service updates.

   Directory Name for OSA/SF GUI Files

   _____

2. Make sure that the 3270 emulator session is at the Ready prompt (F6=Escape).
3. Transfer **IOAGRECV** from the server to the workstation, but read the following Attention information first.

   IOAGRECV is located in sublibrary **PRD1.BASE** (**PRD2.PROD** in VSE/ESA Version 2 Release 3 and earlier). IOAGRECV was an improvement to automate the downloading of the files shown in Table 4. If IOAGRECV does not exist on the host (server), transfer all the files shown in Table 4 and then continue at step 5b on page 101.

   You can download the files using any 3270 emulator that supports binary transfers.

   For example, if you're using the RECEIVE command:

   ```
   RECEIVE C:\IBMIOA\IOAGRECV.CMD A: IOAGRECV W (FILE=LIB L=PRD1 S=BASE BINARY NOCRLF
   ```

   Receives the file, IOAGRECV W from the host emulator session A and stores it on the C drive, IBMIOA subdirectory with the name IOAGRECV.CMD.

Table 4. OSA/SF GUI FIles

VSE Member	OS/2 Name	Transfer Mode	Description
IOA2CATE.W	IOA2CATE.ICF	ASCII	OSA/SF catalog for SI/2
IOA2PKGB.W	IOA2PKG.PKG	ASCII	OSA/SF package file for SI/2
IOA2DESU.W	IOA2DESU.DSC	ASCII	OSA/SF description file
IOAINSTS.W	IOAINSTS.EXE	BIN	Front-end main SI/2
IOAIPII W	IOAIPII.DLL	BIN	More SI/2
IOAIPRCS.W	IOAIPRCS.EXE	BIN	More SI/2
IOAIUPCK.W	IOAIUPCK.EXE	BIN	More SI/2
IOAINENU.W	IOAINENU.EXE	BIN	More SI/2
IOAIEXTS.W	IOAIEXTS.DLL	BIN	More SI/2
IOAIHPLB.W	IOAIHPLB.HLP	BIN	More SI/2
IOAIMSG. W	IOAIMSG.MSG	BIN	More SI/2
IOAODLL W	IOAODLL.BIN	BIN	OSA/SF .dll Files
IOAOEXE W	IOAOEXE.BIN	BIN	OSA/SF .exe Files
IOAOHLP W	IOAOHLP.BIN	BIN	OSA/SF .hlp Files
IOA2PKGJ W*	IOA2PKG.PKG	BIN	OSA/SF package file for SI/2 (Japanese version)

4. If you are using an OS/2-J workstation, on the server in sublibrary PRD2.PROD erase IOA2PKGB.W and rename IOA2PKGJ.W to IOA2PKGB.W.
5. From an OS/2 window or full screen:
   a. If you downloaded IOAGRECV, enter **IOAGRECV** and follow the prompts. When complete, continue at step 6.

      Note: If you want to know more about how IOAGRECV, enter **IOAGRECV ?** and you will get help for the EXEC.

   b. If you did not use IOAGRECV, Enter: **IOAINSTS**

      The Installation and Maintenance window is displayed.
6. Select **File** from the action bar, then select **Open catalog**, and then select **Drive**.

   The Open drive catalog window is displayed.
7. Enter the drive (letter) of where you downloaded the files in step 1 on page 58
8. Under Catalog (filename:) enter the path used in step 1 on page 58 and specify a filename of **IOACATE.ICF**. (For example: C:\subdir\IOACATE.ICF)
9. Select **Open** to return to the Maintenance and Installation window.
10. Select **Action** from the action bar.
11. If you are applying a new service level (updating GUI), select **UPDATE**. If you are doing an initial install of OSA/SF GUI, select **Install**.
12. Select **OK** when you see the message that indicates successful completion.
13. To exit SI, double-click on the system icon or select **File** and then select **Exit**
14. You can erase the following packed GUI files if your workstation is not a server on the LAN and other workstations do not need updating. This will release approximately 4MB of the hard disk drive.

    IOAOCMD.BIN

    IOAOEXE.BIN

    IOAOHLP.BIN

    IOAODLL.BIN

Select one of the following for your installation:

1. If you installed OSA/SF GUI on a LAN server, each requester on the LAN that accesses OSA/SF must now be updated. Continue at “Updating a Requester Machine” on page 81.
2. If you did not install OSA/SF GUI on a LAN server *and* if you did not allow SI/2 to update the CONFIG.SYS file, you must update the CONFIG.SYS file now. Continue at “Updating the CONFIG.SYS File on a Non-Requester Machine” on page 80.
3. If you did not install OSA/SF GUI on a LAN server and you allowed software installer to update the CONFIG.SYS file, you will have to shut down your workstation and reboot it. The OSA/SF GUI install is complete. Continue at “Using the OSA/SF GUI” on page 109.

Updating the CONFIG.SYS File on a Non-Requester Machine

You must update your CONFIG.SYS file if you deselected the **Update CONFIG.SYS** option when you installed OSA/SF GUI on your machine *or* after you applied a service level to OSA/SF GUI that affects the values in the CONFIG.SYS file.

VSE Setup

1. Back up your current **CONFIG.SYS** file.
2. View the **CONFIG.ADD** file that was created during downloading and installing the OSA/SF GUI with software installer.

   The CONFIG.ADD file is a copy of your current CONFIG.SYS file with changes for OSA/SF.
3. Verify or change the drive and directory for OSA/SF in the following statements:
   - **SET PATH**
   - **SET HELP**
   - **LIBPATH**
4. Verify or change the drive and directory for the following statements that were added:
   - **SET IOAERR**=*drive*:*dir* (IOAERR is for trace logs and error logs)
   - **SET IOAWORK**=*drive*:*dir* (The drive you select for IOAWORK should have at least 1MB of free space. IOAWORK is the subdirectory from which the OSA/SF GUI creates other subdirectories and files.)
   - **SET IOAESIZE=2** (2 represents 2 KB of error log before wrapping.)
   - **SET HOSTPAGE**= *037* for English
   - **SET TMP**=*drive*:-*dir* (A temporary directory if one does not already exist)
5. After you verified or made the necessary changes in the CONFIG.ADD file, rename it to **CONFIG.SYS**.
6. Reboot your workstation.
7. Continue at “Using the OSA/SF GUI” on page 109.

Updating a Requester Machine

Requester machines are other workstations that will access the OSA/SF GUI files on the LAN server workstation.

When to update the requester machines

Update each requester machine after:
- OSA/SF GUI is installed on a LAN server and the CONFIG.SYS file was updated *and*
- After a service level has been applied to OSA/SF GUI on the LAN server that affects the values in the CONFIG.SYS file.

You can perform these tasks manually as described in “Updating a CONFIG.SYS File on a Requester Machine” on page 83 *or* using SI/2 as described in “Updating a Requester Machine Using SI” on page 81.

Updating a Requester Machine Using SI/2

First, verify that the following are complete::

OSA/SF GUI must be installed on the LAN server. To check:

1. Switch to (or create and switch to) another OS/2 window.
2. Change to the drive that contains OSA/SF
3. Enter **DIR** and note the OSA/SF subdirectory. (You will need it in step 7 on page 82 or step 8 on page 82.)

SI/2 must already have been installed on the LAN server. The default subdirectory was IBMIOA for the Software Installer. (Check with your LAN administrator.)

The requester machine must have SI/2 accessed from the LAN server.

The requester machine must have OSA/SF GUI accessed from the LAN server.

Note: The drive mapping that is used to access OSA/SF GUI must be the same drive for every access. The designated drive is the one that the CONFIG.SYS file will be updated with.

Then, follow these instructions::

1. Change to the directory in which SI/2 resides. The default was **C:\IBMIOA**.
2. To start SI/2, enter:

   IOAINSTS /S:IBMIOA

   Note: The default directory for OSA/SF was IBMIOA. If the default directory was not used during the install, change to the directory where SI/2 resides.

   *IOA***INSTS**, where *IOA* is the prefix of the product used to install SI.

   Follow with a blank and then **/S:**

   Conclude with the name of the OSA/SF subdirectory.

   For example, if you are using the OSA/SF subdirectory, enter **IOAINSTS /S:IBMIOA**
3. Select the **File** menu bar choice.
4. Select **Open catalog.**
5. Select **Drive...** to display the ***Open drive catalog*** window.
6. Select the drive to use. (It must have access to the OSA/SF GUI directory structure.)
7. If the OSA/SF subdirectory is IBMIOA, enter **\IBMIOA\USR\IOACATE.ICF** in the ***Filename*** field under the Catalog section.
8. If the OSA/SF subdirectory is *not* IBMIOA, enter **\xxx\USR\IOACATE.ICF** in the ***Filename*** field under the Catalog section, where *xxx* is the value of the OSA/SF subdirectory.
9. Select the **Open** push-button to get the selected catalog file from the LAN server to display the ***Installation and Maintenance*** window.
10. Select **OSA/SF LAN Requester Install.**
11. Select the **Action** menu bar choice.
12. Select **Install...** to display the **Install** window.
13. If you do not want SI/2 to update the CONFIG.SYS on your machine:
    a. Deselect the **Update CONFIG.SYS** option.
    b. Select the **OK** push-button.
    c. Reply to the warning message that tells you SI/2 will not update your CONFIG.SYS file.
    d. Select the **Yes** push-button.
14. Select the **OK** push-button to display the ***Install - directories*** window.
15. Accept the defaults or enter your own.
    - The **LAN REQUESTER** label must identify the drive and directory on the requester machine that will contain the files generated by OSA/SF GUI.
    - The **LAN SERVER** label must identify the drive and OSA/SF subdirectory that were used by the requester machine to access OSA/SF GUI from the server.
16. Select **Install...** to initiate processing. (A message is displayed when processing completes successfully.)

17. Select the **OK** push-button.
18. To exit SI/2, do one of the following:
    - Double-click on the system icon.
    - *Or* select ***File*** and then select **Exit.**
19. If you select to not have your CONFIG.SYS file updated, do the instructions in "Updating a CONFIG.SYS File on a Requester Machine" on page 83, or if the CONFIG.SYS file was updated, reboot the requester machine before you start OSA/SF GUI.
20. An OSA/SF folder has now been added to your OS/2 desktop to give you access to OSA/SF GUI.
21. Continue at "Using the OSA/SF GUI" on page 109.

Updating a CONFIG.SYS File on a Requester Machine

1. Back up your current **CONFIG.SYS** file.
2. View the **CONFIG.ADD** file that was created during downloading and installing the OSA/SF GUI with software installer.

   The CONFIG.ADD file is a copy of your current CONFIG.SYS file with changes for OSA/SF.
3. Verify or change the drive and directory for OSA/SF in the following statements:
   - **SET PATH**
   - **SET HELP**
   - **LIBPATH**
4. Verify or change the drive and directory for the following statements that were added:
   - **SET IOAERR**=*drive*:*dir* (IOAERR is for trace logs and error logs)
   - **SET IOAWORK**=*drive*:*dir* (The drive you select for IOAWORK should have at least 1MB of free space. IOAWORK is the subdirectory from which the OSA/SF GUI creates other subdirectories and files.)
   - **SET IOAESIZE=2** (2 represents 2 KB of error log before wrapping.)
   - **SET HOSTPAGE**= *037* for English
   - **SET TMP**=*drive*:*-dir* (A temporary directory if one does not already exist)
5. After you verified or made the necessary changes in the CONFIG.ADD file, rename it to **CONFIG.SYS**.
6. Reboot your workstation.
7. Continue at "Using the OSA/SF GUI" on page 109.

VSE/ESA Running as a Guest of VM/ESA

If VSE/ESA is running under VM, the support element (SE) functions of the hardware management console (HMC) are not required to reset the OSA if only the current logical partition has the OSA online. Use the following vary commands:

```
VARY OFFLINE CHPID nn FORCE
VARY ONLINE  CHPID nn
```

Consider the following precautions:

1. Stop all VTAM nets (XCA and SWNET) that pertain to the OSA if any are active.
2. Then **OFFLINE *cua*** for each device on the OSA (CHPID) from VSE/ESA.
3. Either **DET *cua*** from the guest for each device on the OSA (CHPID) or use the FORCE on the VM VARY OFFLINE command.
4. VARY OFFLINE CHPID nn FORCE ...the force option can only be used if VM is in a logical partition. If VM is native, the force option can lead to ghost virtual addresses; you must IPL VM to correct. If VM is native, do the following:

   a. **DET *cua1 - cuan*** from VSE guest.

   b. Vary offline ***cua1 - cuan***
   c. Vary offline Path nn All (nn=CHPID).
   d. Vary Offline CHPID nn.
5. VARY ONLINE CHPID nn (WAIT for devices to come online to VM.)
6. ATT cua TO vse_guest for each CUA (or ATT cua1-cuan to vse_guest)
7. Then **ONLINE *cua*** each and every cua from VSE/ESA
8. Restart VTAM nets.

VSE Setup

Chapter 6. Using the OSA/SF Interfaces

If you plan to configure and manage OSA-Express features using OSA/SF, you should take a moment to familiarize yourself with its organization. If you will be using the REXX interface, see “Using the IOACMD EXEC Interface” below. If you will use the GUI, see“Using the OSA/SF GUI” on page 109.

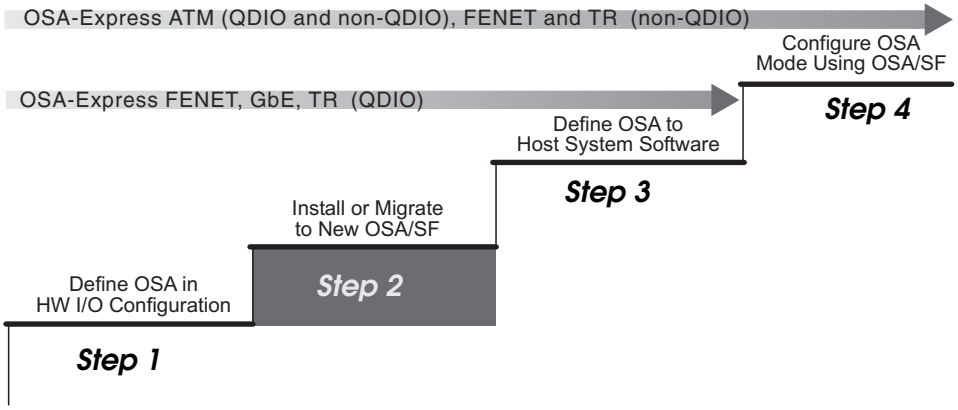


Figure 55. Step Two (for all operating systems) in a Four-Step Process

Using the IOACMD EXEC Interface

The IOACMD EXEC is provided for those users who prefer a command line interface to OSA/SF. IOACMD can be used with any operating system OSA/SF supports.

There are four ways to use the EXEC:

- Full prompting
- Command prompting by the IOACMD EXEC
- Entering parameters without prompting
- Starting the IOACMD EXEC and asking for help

Full Prompting

If you enter the following, the EXEC will show you a list of the OSA/SF commands and prompt you for the command and parameters.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' EXEC
```

In VM:

```
IOACMD
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF',SIZE=1100K
```

Command Prompting by the IOACMD EXEC

Enter the name of the EXEC and the OSA/SF command with no parameters. The EXEC then prompts for all the parameters needed. Help messages, when available for some of the parameters, are displayed.

After you enter the parameters, the EXEC processes the command and parameters. The data is used to generate the proper input needed by OSA/SF. The results are then put in the specified file or data set, and in some cases, displayed.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'GET_OSA_ADDRESS_TABLE' EXEC
```

In VM:

```
IOACMD GET_OSA_ADDRESS_TABLE
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OSA_ADDRESS_TABLE',SIZE=1100K
```

In this example you are requesting the OAT from an OSA. You then are prompted for the CHPID, dataset or filename, summary option, and replace indicator if needed.

Entering Parameters without Prompting

Enter the name of the exec followed by the OSA/SF command and parameters. Some commands require a data set name or filename to be specified. The results are put in the specified data set or file, and in some cases, displayed.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'GET_OSA_ADDRESS_TABLE 4b userid.getaddr' EXEC
```

In VM:

```
IOACMD GET_OSA_ADDRESS_TABLE 4b userid getaddr
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OSA_ADDRESS_TABLE 4b PRD2.OSASF.userid.getaddr',SIZE=1100K
```

where:

GET_OSA_ADDRESS_TABLE is the command
4b is the CHPID parameter
userid.getaddr is the dataset name parameter for OS/390, z/OS, z/OS.e, VSE
userid getaddr is the filename parameter for VM

Starting the IOACMD EXEC and Asking for Help

Enter the name of the EXEC followed by **HELP**. This displays a list of all the OSA/SF commands. You can then enter the name of the EXEC with the command name and the EXEC will prompt you for parameters.

You can also get help for a specific command by entering the command name.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'HELP QUERY' EXEC
```

In VM:

```
IOACMD HELP QUERY
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF HELP QUERY', SIZE=1100K
```

This example would show you the parameters for the Query command.

For More on IOACMD

To see how to change MAC addresses using IOACMD, see page 195.

To see how to use partial activation with IOACMD, see page 149.

For syntax and usage information on all IOACMD parameters, see Chapter 14, “OSA/SF Commands for REXX” on page 247.

Using the OSA/SF GUI

The OSA/SF graphical user interface (GUI) provides user-friendly windows that enable you to easily perform all tasks for one or many OSAs.

If you are familiar with IBM OS/2 or Microsoft Windows applications, you’ll find that OSA/SF objects, pull-downs, notebooks, and help functions are similarly designed. If you are not experienced with OS/2 or Windows, then you should use the appropriate tutorial to become familiar with the interface. The tutorial for OS/2 is located within the Information icon on the desktop. For Windows, click on the Start icon and select help. If you are willing to read help panels, you may be able to operate the OSA/SF GUI with very little OS/2 or Windows experience because help is included with the GUI. For details on the type of help available, see “Getting Help” on page 115.

When Starting the GUI for the First Time

The first time the GUI is started on either OS/2 or Windows, certain environmental variables must be set:

__ 1. A message is displayed requesting a valid drive and directory to store user data. Enter this information when prompted.

__ 2. The **OSA/SF Hosts** window is displayed with a sample host icon. To create your own host icon for communications between the GUI and OSA/SF:

   a. Select **Help** from the menu bar at the top of the **OSA/SF Hosts** window. See Figure 56 on page 110.

   b. Select **How to** and then double-click on **Create another host icon**. Follow the instructions.

> **Attention**
> The remainder of this chapter provides you an overview of the OSA/SF GUI, how to navigate, customize, and get help. If you leave this section, at a minimum, look at Figure 63 on page 117 and keep it nearby to help you navigate through the GUI while customizing the OSA.

Notes:

a. Help is available for all the windows and objects within the windows. To get help for an object within a window, select the object and press **F1** on the keyboard, or select the help pushbutton. If you need help for a pull-down item from the menu bar, use the arrow keys on the keyboard to highlight the item, then press F1.

b. When you’re done reading a help window, press **Esc** on the keyboard to close the help window.

The OSA/SF Hosts Window Is Displayed When You Start the GUI

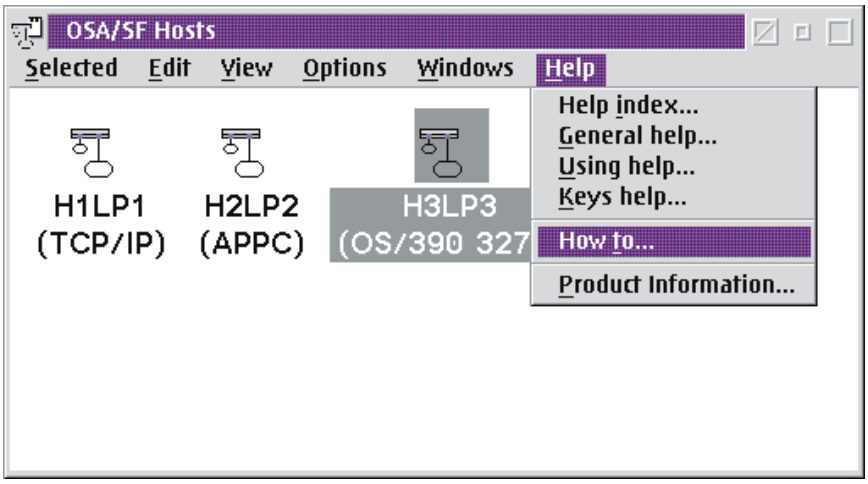


Figure 56. Example of an OSA/SF Hosts Window with Three Host Icons. When the OSA/SF GUI is first started, there is only one sample host icon. The sample disappears when you create another host icon. You can use the How To instructions to create additional host icons.

Each host icon in the example represents a host system running OSA/SF. For this example, an OSA/SF image is running in H1LP1, H2LP2, and H3LP3. The OSAs can be monitored, and managed from any of these S/390 hosts. H3LP3 is selected (highlighted) in the above example; therefore any tasks done for the OSAs would be managed by the OSA/SF image running in H3LP3.

Note: All OSA/SF GUI tasks start from the **OSA/SF Hosts** window.

This publication does not describe the purpose or function of every window because online help is available for all windows, and *OSA How To* instructions are provided for frequently done tasks.

Using the How To Instructions to Display the OSA Channels

To give you a better idea of how easy it is to use the GUI, do the following to display a view of the OSA channels:

__ 1. Click on **Help** at the menu bar.

__ 2. Click on **How to** from the pull-down list to see the panel shown in Figure 57 on page 111.

__ 3. Double-click on **Display the OSA channels** to display the instructions.

__ 4. Follow the instructions until the **OSA Channels View** is displayed. See Figure 58 on page 112.

There are two views of the OSA channels, **Tree View** and **Details View**. The default settings determine which of the views is displayed. See “How to Display the Other CHPIDs View” on page 118 to display the other channels view. See “How to Change the Default Settings for the CHPIDs View” on page 118 to change the default settings.

If you can't display a channels view window

If the **Sample** host is the only icon displayed on your **OSA/SF Hosts** window, use **Create another host icon** in the **How to** instructions from the **Help** selection on the menu bar.

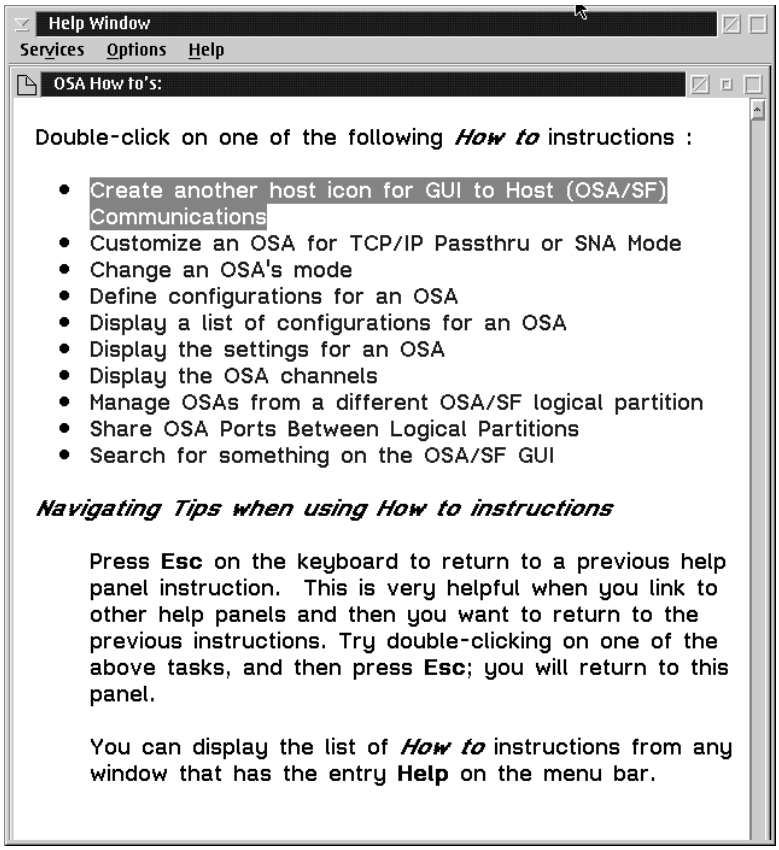


Figure 57. OSA How To Instructions. Double-click on any selection to display the instructions.

OSA Channels View from H3LP3

The **OSA Channels - Tree View** shows the OSAs installed on the S/390. A plus sign next to the CHPID number indicates that the OSA is online and there is more information to see. Click on the plus sign to the left of the CHPID number to see more information about the OSA.

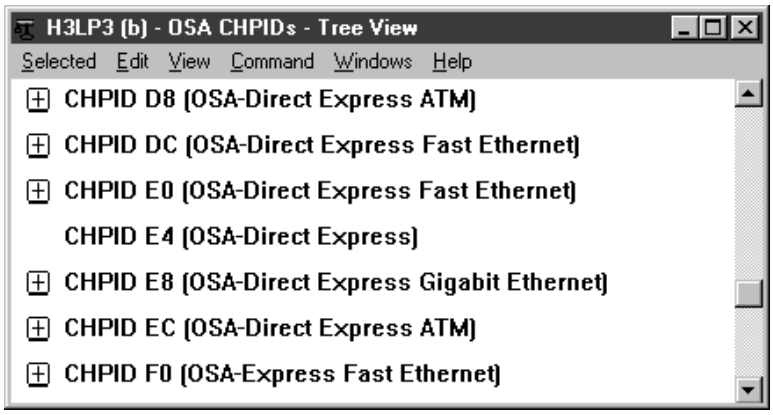


Figure 58. OSA Channels for H3LP3

CHPIDs labeled *OSA-Direct Express* are set up as OSD (QDIO) channels. Those labeled *OSA-Express* are set up as OSE (non-QDIO) channels.

OSA EC Expanded after Clicking on the Plus Sign Next to CHPID EC

You can expand the entry for any online OSA in the tree view by clicking on the plus sign. Once you expand an entry, you can look at the settings of an object by double-clicking on the object.

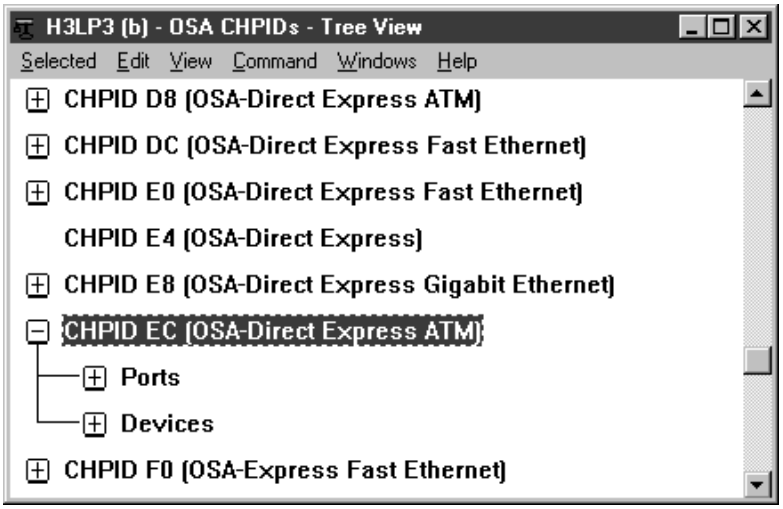


Figure 59. OSA Channels Tree View with CHPID EC Expanded

Ports Expanded after Clicking on the Plus Sign Next to Ports

To see the ports for an OSA, click on the plus next to Ports. To see the settings for a port, double-click on the port number.

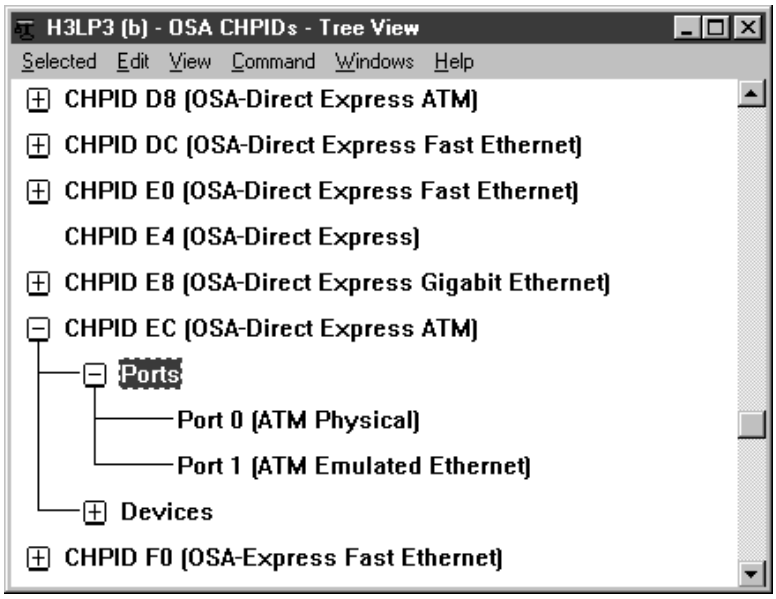


Figure 60. OSA Channels Tree View with CHPID EC and Ports Expanded

LAN Settings Displayed after Double-Clicking on Port 0

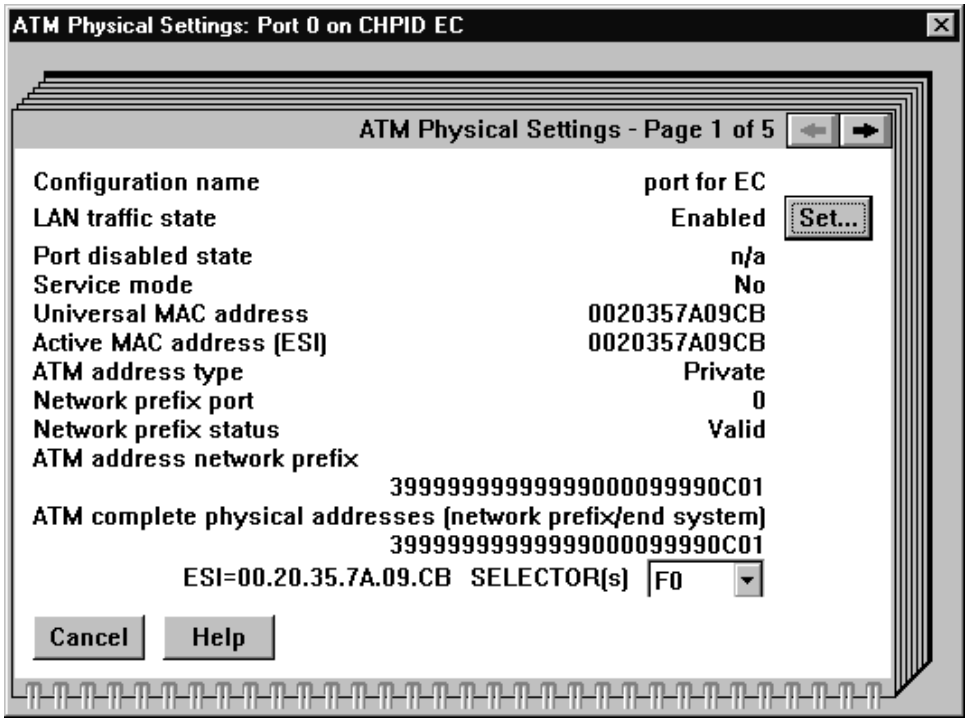


Figure 61. ATM Physical Settings for Port 0 on CHPID EC

The Six Main OSA/SF Windows

The OSA/SF GUI has five main windows that contain all other panels, notebooks, settings, and descriptions. The main windows are the:

- **OSA/SF Hosts** — Select a host from this window
- **Command Output** — Displays information returned from the host when a view is opened or a command is issued
- **OSA Channels View** — Displays, in detail or tree view, channel information from the selected host
- **Configuration List** displays all configurations created for selected OSA
- **Configuration for OSA** — Display for a selected OSA from Channels View
- **SNA Management** — Display for a selected OSA from Channels View

Using the OSA/SF Window List

Sometimes a window is hidden behind another window and you may want to determine which OSA/SF windows are open. Use the OSA/SF Window List.

1. Select **Windows** from any window's menu bar.
2. Select **Window List**.
3. Double-click on any window title in the list to activate the window.

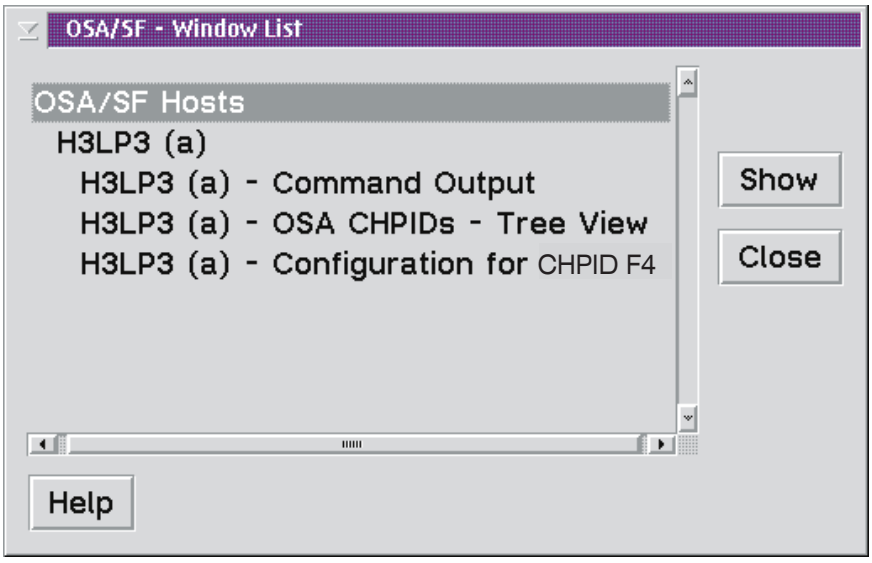


Figure 62. OSA/SF Window List. The window list shows the open windows for each host.

Opening OSA/SF Windows from Different OSA/SF Hosts

Your installation may have more than one host icon on the **OSA/SF Hosts** window for any of the following reasons:

- A second OSA/SF image for backup
- Different physical S/390s
- Nonshared logical partitions and OSAs for security reasons

Regardless of the number of OSA/SF host icons, you will only have one **OSA/SF Hosts** window, but you can open other windows for each OSA/SF host at the same time. For example: you can open a channels view window for each host icon. If you

open the same window from different host icons, it's a good idea to use the Window List to make sure you're looking at the correct host.

If you have more than one host icon, do the following to open two **Command Output** windows and two **Channel View** windows:

1. Select a host icon on the **OSA/SF Hosts** window.
2. Open an **OSA Channels View** window; use the How to instructions if necessary.
3. Select a different host icon and open an **OSA Channels View** window for this host.
4. Select **Windows** and **Window list** from the menu bar on any window.

A **Command Output** window and an **OSA Channels View** window appear on the window list for each host.

Getting Help

You can get help for all windows, menu bar selections, and entry fields. To get help for an object or entry field within a window, select the object and press **F1** on the keyboard.

There is also a **Help** selection on all menu bars that contains **General Help** and a **Help Index**.

How to Get Help for Menu Bar Choices on a Window

You will do most tasks by selecting an object from the menu bar of a window.

To get help for any menu bar choice on a window, do the following with the window displayed in the foreground:

__ 1. Press F10 on the keyboard. Notice that **Selected** is highlighted on the menu bar at the top of the window.

__ 2. Use the right and left arrow keys on the keyboard to highlight different choices on the menu bar. Use the up and down arrow keys to expand the choice and select other choices.

__ 3. Press F1 to get help for a highlighted choice.

Note: If you select a menu bar choice with the mouse and press F1, help is displayed for the first item in the pull-down list. If you need help for one of the items on the menu bar or within the pull-down list, use F10 and the arrow keys to highlight the item and then press F1.

Finding It on the GUI

If you have to find something on the OSA/SF GUI, but don't know where to look, do any of the following:

- See Figure 63 on page 117 for a visual flow of the GUI.
- Use the search option on the GUI.
  1. Select **Services** from the top of any *Help* window.
  2. Select **Search**.
  3. Enter the search string, select **All sections** and then **Search**.

     All the help information is searched for your request and a list of topics shown that matched your search string. Double-click on the topic you want to display. Most help information for an object also describes how to display the object.

- Use the index on the GUI.
  1. Select **Help** from the menu bar of any window.
  2. Select **Help index**.
  3. Page up and down or use the scroll bar to locate the object and then double-click on the object.

Determining Which OSA/SF Image is Managing the OSA

Do the following to determine which OSA/SF image and LP number is managing an OSA:

From the OSA Channels Tree View:

1. Double-click on the OSA number.
2. Click on the arrow at the upper right corner of the Settings notebook page to go to page 2.

From the OSA Channels Details View:

1. Select the OSA number.
2. Select **Selected** from the menu bar.
3. Select **Open as** and then **Channel settings**.
4. Click on the arrow at the upper right corner of the Settings notebook page to go to page 2.

Executing OSA/SF Commands from the GUI

Whenever the OSA CHPIDs Tree View or Details View is displayed, the Commands menu is available for pull-down on the menu bar. The commands displayed will depend on the type of OSA CHPID currently selected. Among the more commonly used are:

- OSA/SF
  - Clear debug
  - Get debug
- Query
  - CHPID information
  - ATM information
- Install
- Manage Channel
  - Start
  - Stop

These are the same commands that are executed through the REXX command line interface. See Chapter 14, “OSA/SF Commands for REXX” on page 247 for more information.

OSA/SF GUI Flow Quick Reference

The following flow shows the main OSA/SF GUI windows. Each **X** represents a required selection you choose from the window to advance to the next selection or window.

Note: There are two views of the OSA channels, **Tree View** and **Details View**. The menu choices in Details View differ slightly from those in Tree View. The default settings determine which of the views is displayed. See “How to Display the Other CHPIDs View” on page 118 to display the other channels

view. See “How to Change the Default Settings for the CHPIDs View” on page 118 to change the default settings.

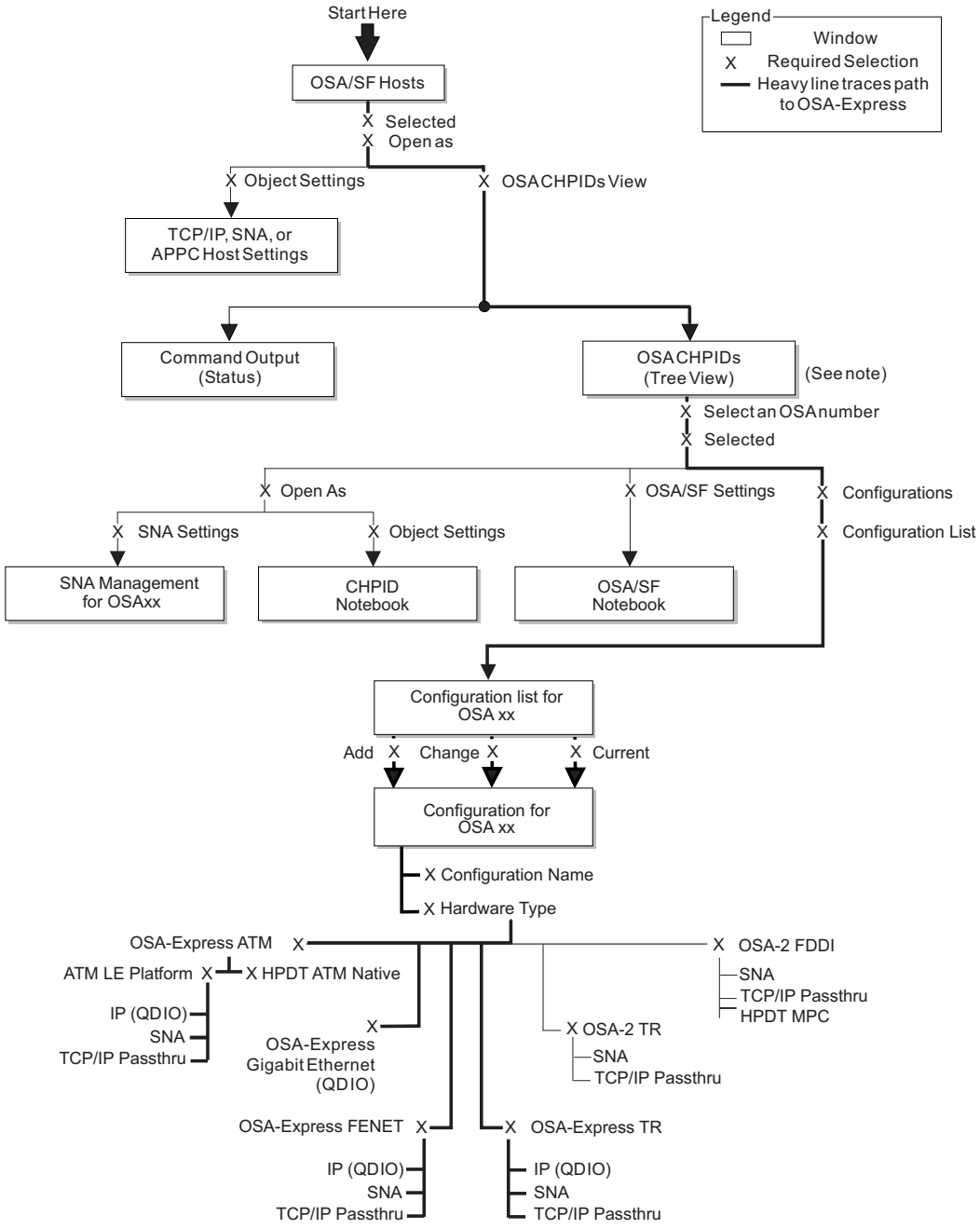


Figure 63. OSA/SF GUI Main Window Flow and Required Selections

How to Change the Default Settings for the CHPIDs View:

1. Display the **OSA/SF Hosts** window.
2. Select **Options**.
3. Select **OSA CHPIDs view window defaults**.

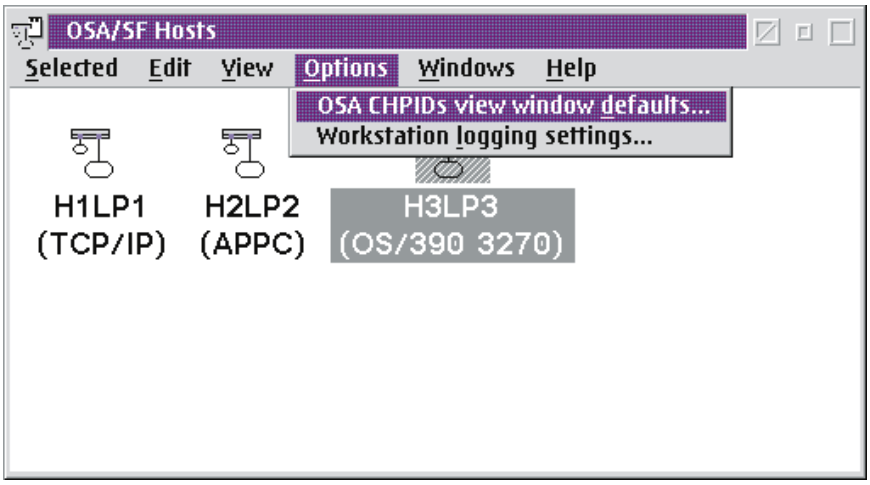


Figure 64. How to Display the CHPIDs View Window Defaults

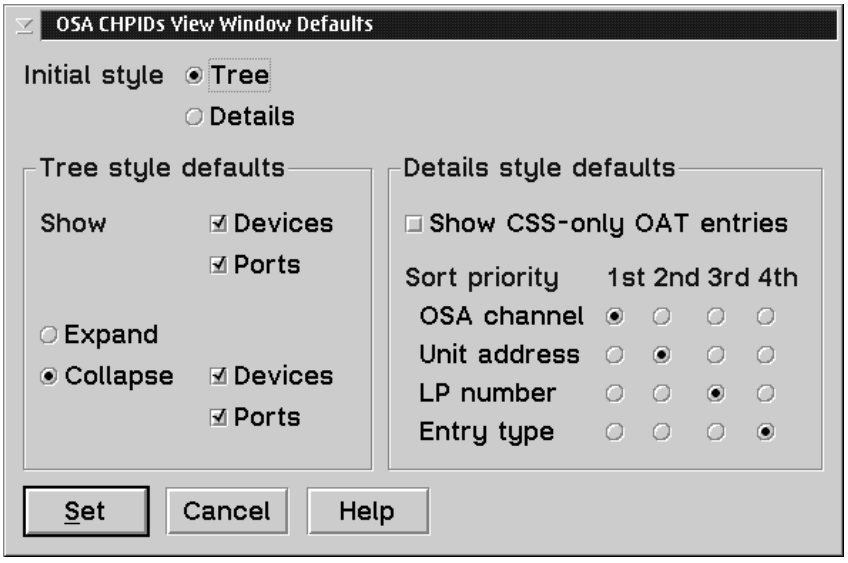


Figure 65. CHPIDs View Window Defaults

How to Display the Other CHPIDs View:

1. Select **View** from the **Tree View** or **Details View**.
2. Select **Style**.
3. Select **Tree** or **Details**.

How to Use the OSA CHPIDs - Tree View: Follow Figure 66 on page 119 to display OSA settings (characteristics). Although OSA-Express ATM information is shown in this example, the same selections are used for OSA-Express Gigabit Ethernet, TR, and FENET.

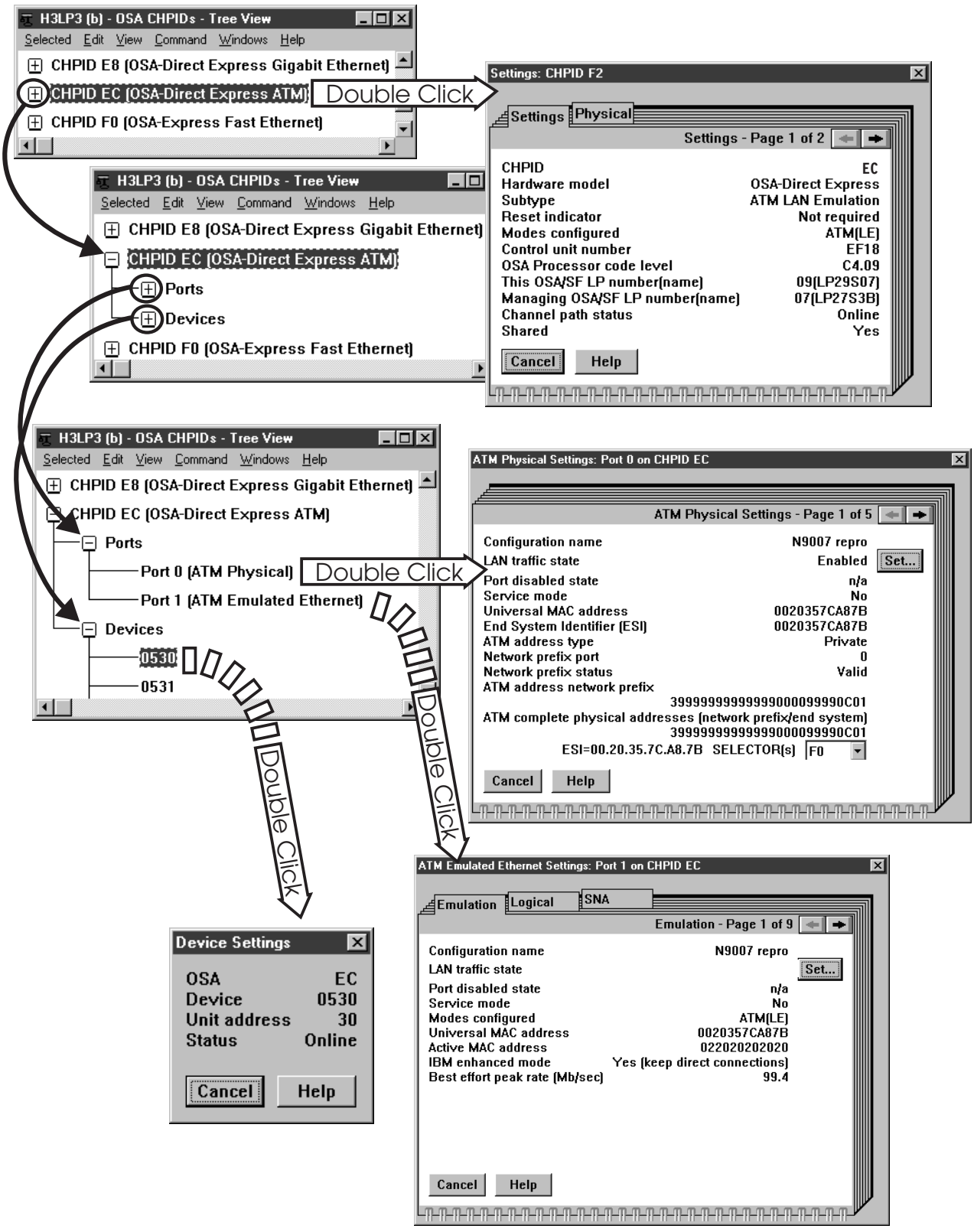


Figure 66. OSA CHPIDs Tree View

Notes on Tree View:

1. Each OSA can be expanded by clicking on the plus to see OSA ports and devices.
2. Double-click on any object to display that objects settings (characteristics).
3. Some settings are displayed in a notebook. To see other pages in the notebook, select one of the tabs on the right of the page.

How to Use the OSA CHPIDs - Details View: As Figure 67 on page 121 shows, the details view displays more data than the tree view. When using details view to display additional data, select the device. Then point to the menu bar and click on Selected → Open as, followed by the type of data you wish to display. Some modes, such as SNA, display more data than others.

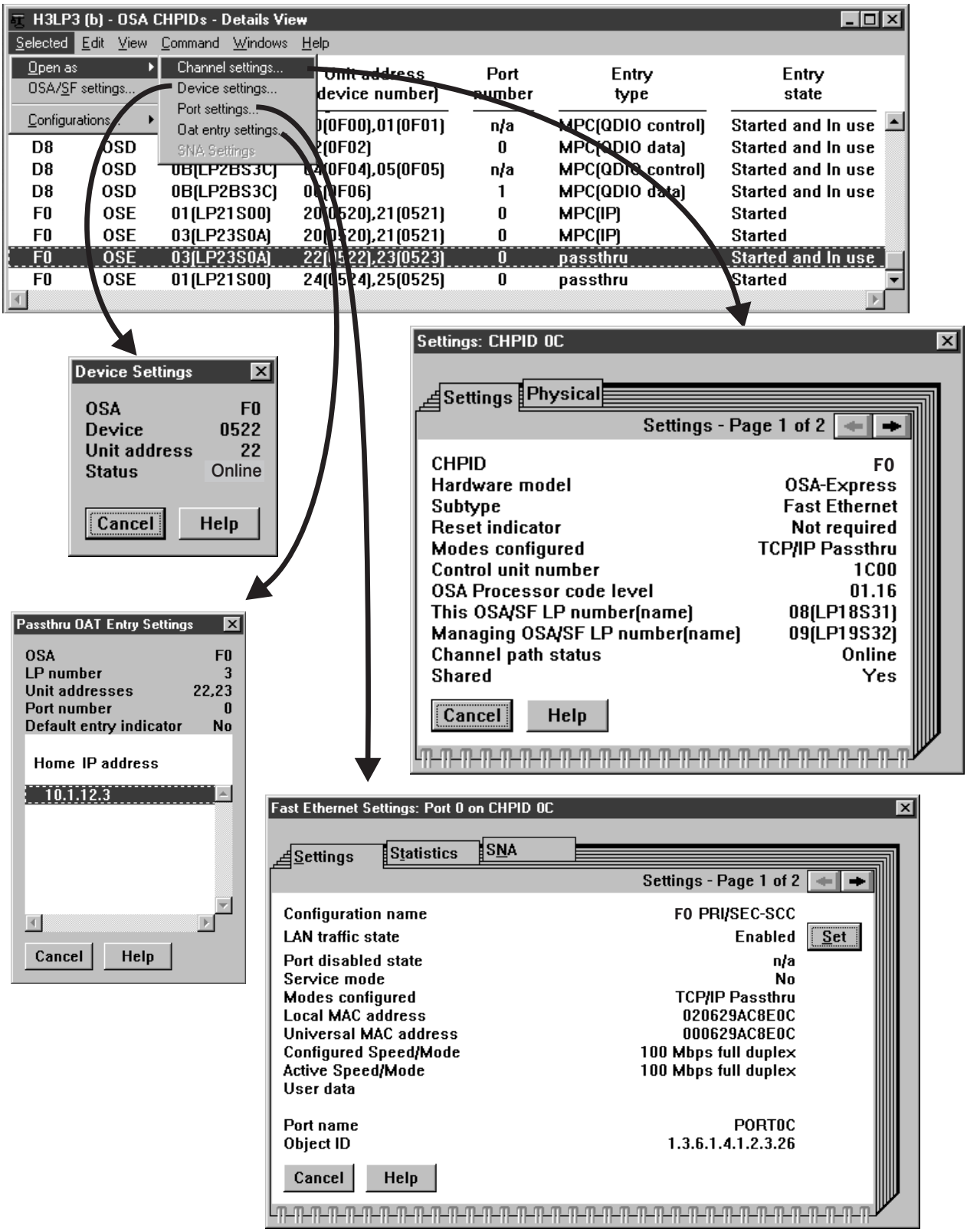


Figure 67. OSA CHPIDs Details View

Chapter 7. Host Program Setup

Each OSA-Express feature must be defined in the system software configuration using Communications Server for OS/390 or any other host program product, such as VTAM, installed on the server.

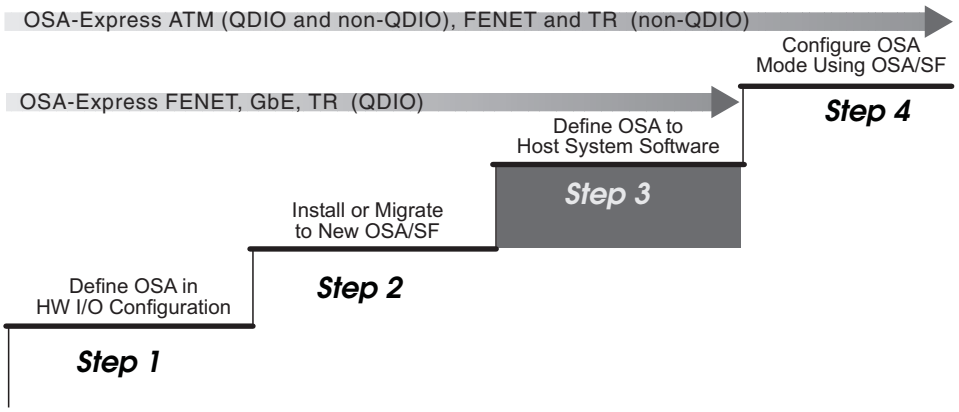


Figure 68. Step Three in a Four-Step Process

After you complete the QDIO tasks in this section, your OSA-Express Gigabit, TR, and FENET OSD CHPIDs are ready to go.

Overview

The host definitions required to set up your OSA-Express feature vary depending on:

- Operating System
- OSA-Express Feature Type
- OSA-Express Mode

At a minimum you will need to update a TCP/IP profile for Passthru mode.

This section provides detailed descriptions and examples of the host definition statements required for OSA-Express features on z/OS, z/OS.e, or OS/390. If you are creating host definitions for one of these operating systems, see “z/OS, z/OS.e, and OS/390” on page 124, which summarizes the requirements for each OSA-Express feature by operating mode, and directs you to the appropriate section in this document.

If you are creating host definitions for a VM environment, see “z/VM and VM/ESA” on page 125.

For VSE, see “VSE/ESA” on page 126.

For Linux, see Table 8 on page 127.

For TPF, refer to *Transaction Processing Facility: Transmission Control Protocol/Internet Protocol* or visit the www.s390.ibm.com/products/tpf/ web site.

Host Program Setup

z/OS, z/OS.e, and OS/390

Table 5. Host Program Definition Summary. See "Software Requirements" on page 25 for the host program version and release needed for each OSA feature/mode combination.

OSA Feature	Mode	VTAM Defs	TCP/IP DEV Type	TCP/IP LINK (or interface) Type	See Page
GbE	QDIO (IP)	TRL	MPCIPA (IPv4 only)	IPAQGNET, IPAQENET (IPv4), IPAQGNET6, IPAQENET6 (IPv6)	129
ATM (En LANE)	QDIO (IP)	TRL	MPCIPA	IPAQGNET, IPAQENET	129
ATM (TR or En LANE)	TCP/IP Passthru		LCS	ETHERNet, 802.3, ETHERor802.3, IBMTR	136
ATM (TR or En LANE)	SNA	XCA/SWNET			140
ATM (IP Traffic)	HPDT ATM Native		ATM	ATM	144
ATM (SNA Traffic)	HPDT ATM Native	XCA/SWNET			140
FENET	QDIO (IP)	TRL	MPCIPA (IPv4 only)	IPAQGNET, IPAQENET (IPv4), IPAQGNET6, IPAQENET6 (IPv6)	129
FENET	TCP/IP Passthru		LCS	ETHERNet, 802.3, ETHERor802.3	136
FENET	SNA	XCA/SWNET			140
TR	QDIO (IP)	TRL	MPCIPA	IPAQTR	129
TR	TCP/IP Passthru		LCS	IBMTR	136
TR	SNA	XCA/SWNET			140

The following publications from your IBM Communications Server library are useful resources:

z/OS Communications Server: IP Configuration Guide

z/OS Communications Server: SNA Resource Definition Reference

z/VM and VM/ESA

QDIO and IP Passthru modes require DEVICE and LINK statements in the TCP/IP profile. SNA mode requires that you build an External Communication Adapter (XCA) node for VTAM.

Table 6. Host Program Definition Summary. See "Software Requirements" on page 25 for the host program version and release needed for each OSA feature/mode combination.

OSA Feature	Mode	VTAM Defs	TCP/IP DEV Type	TCP/IP LINK Type
GbE	QDIO (IP)	TRL	OSD	QDIOETHERNET
ATM (En LANE)	QDIO (IP)	TRL	OSD	QDIOATM
ATM (TR or En LANE)	TCP/IP Passthru		LCS	ETHERNET, IBMTR
ATM (TR or En LANE)	SNA	XCA		
ATM (IP Traffic)	HPDT ATM Native		ATM	ATM
FENET	QDIO (IP)	TRL	OSD	QDIOETHERNET
FENET	TCP/IP Passthru		LCS	ETHERNET
FENET	SNA	XCA		
TR	QDIO (IP)	TRL	OSD	QDIOTR
TR	TCP/IP Passthru		LCS	IBMTR
TR	SNA	XCA		

The following publications provide detailed information:

TCP/IP Level 3A0 Planning and Customization

TCP/IP Level 3A0 User's Guide

or

TCP/IP Level FL320 Planning and Customization

TCP/IP FL320 User's Guide

and

VTAM V4R2 for MVS/ESA, VM/ESA, VSE/ESA Resource Definition Reference

VSE/ESA

The QDIO and IP Passthru modes require DEVICE and LINK statements in the TCP/IP profile.

Table 7. Host Program Definition Summary. See "Software Requirements" on page 25 for the host program version and release needed for each OSA feature/mode combination.

OSA Feature	Mode	VSE ADD Statement	VTAM Defs	TCP/IP DEFINE LINK Statement	TCP/IP DEFINE ADAPTER Statement
GbE	QDIO (IP)	OSAX		TYPE=OSAX	
ATM (En LANE)	QDIO (IP)	OSAX		TYPE=OSAX	
ATM (TR or En LANE)	TCP/IP Passthru	OSA		TYPE=OSA	TYPE=ETHERNET or TYPE=Token_Ring
FENET	QDIO (IP)	OSAX		TYPE=OSAX	
FENET	TCP/IP Passthru	OSA		TYPE=OSA	TYPE=ETHERNET
TR	QDIO (IP)	OSAX		TYPE=OSAX	
TR	TCP/IP Passthru	OSA		TYPE=OSA	TYPE=Token_Ring

Refer to the following publications for more information.

TCP/IP for VSE V1R4.0 User's Guide

VTAM V4R2 for MVS/ESA, VM/ESA, VSE/ESA Resource Definition Reference

Linux

The Linux kernel version 2.2.16 network driver supports the following OSA-Express feature/mode combinations:

- OSA-Express ATM (logical port 0 only), FENET, and GbE features in QDIO mode
- FENET feature running TCP/IP Passthru (using LCS device type)

The Linux kernel version 2.4 network driver adds support for the OSA-Express Token Ring feature and for the second logical port (port 1) for an OSA-Express ATM feature in QDIO mode.

Linux kernel version 2.4.14 adds IPv6 support for OSA-Express GbE and FENET features in QDIO mode.

Table 8. Host Program Definition Summary. See "Software Requirements" on page 25 for the host program version and release needed for each OSA feature/mode combination.

OSA Feature	Mode	Device Driver	Interface Name Prefix
GbE	QDIO (IP)	QETH	eth*n*
ATM (En LANE)	QDIO (IP)	QETH	eth*n*
FENET	QDIO (IP)	QETH	eth*n*
FENET	TCP/IP Passthru	LCS	eth*n*
TR	QDIO (IP)	QETH	tr*n*

Although a thorough discussion of Linux networking is beyond the scope of this document, the following steps briefly describe commands that can be used for OSA-Express configuration. Other methods may be available, depending on the Linux distribution.

Step 1: Configure OSA-Express devices (QDIO only)

Use the **add_parms** channel devices layer command to assign a portname to a range of device addresses and to define these addresses for a particular device type, for example,

```
add_parms,0x10,0xAA00,0xAA02,portname:QDIO4
```

where 0x10 defines addresses 0xAA00 through 0xAA02 as QDIO devices and the portname ″QDIO4″ is assigned to these devices. There are many other options that can be included on this line, but these are the minimum required options that will allow Linux to use a QDIO OSA CHPID.

Step 2: Configure OSA-Express devices

Identify the device driver, specify an interface number (if desired), and define the read, write, and data devices to be used by Linux. For example, for any OSA-Express CHPID in QDIO mode:

```
qeth3,0xAA00,0xAA01,0xAA02
```

where the 3 in qeth3 specifies that the number 3 is to be used in the interface name resulting from this command. This number is appended to either the *eth* or *tr* interface name prefix (see Table 8.) In this case, the interface name would either be eth3 or tr3, depending on the type of CHPID being used and on the alias defined in /etc/modules.conf. (In this example, if -1 was used instead of 3, then the next available interface number would have been assigned to this interface.)

For OSA-Express FENET running TCP/IP Passthru mode:

```
lcs-1,0x7c00,0x7c01
```

specifies that the next available interface number be appended to the *eth* prefix to create the interface name, and that 7c00 be used for the read address and 7c01 the write address for this device.

Step 3: Load modules

For OSA-Express features running in QDIO mode:

```
insmod qdio
insmod qeth
```

For OSA-Express FENET in TCP/IP Passthru mode:

```
insmod lcs
```

This may be done automatically, depending on your configuration.

Step 4: Configure IP addresses

Use the ifconfig command to configure the IP addresses and activate the interface:

```
ifconfig eth0 192.168.10.20 netmask 255.255.255.0 up
```

For More Information

For complete information about device driver setup for OSA-Express, see *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml

For general information on Linux, see

www.linux.org/docs

QDIO Definitions for Channel Type OSD on z/OS, z/OS.e, or OS/390

Use these directions to set up all OSA-Express features running in QDIO mode. See “Gigabit Ethernet Configuration Examples” on page 381 for more sample definitions.

Setting Up a TRLE Statement for QDIO

Follow these instructions for each logical partition planned to use the OSA.

A TRLE (transport resource list) statement is required for the OSA-Express to transfer data using TCP/IP.

To define a transport resource list major node, include the following definition statements:

- One VBUILD definition statement to begin the transport resource list major node.
- One transport resource list element (TRLE) definition statement for each OSA-Express feature.

For additional examples showing the TRLE along with the TCP/IP profile and HCD input, see Figure 129 on page 381 and Figure 131 on page 383.

For specific details about a TRLE, see *z/OS Communications Server: SNA Resource Definition Reference*.

Use the following example as a reference.

```
TRL      VBUILD TYPE=TRL
*********************************************************************************
*                   TRLE STMT DEFINES THE OSA
*
* PORTNAME MUST MATCH THE DEVICE NAME IN THE TCP/IP DEVICE and LINK Statement
*
*********************************************************************************
***
***  DEFINITION USING CHPID(F8) DEVICES = 590-592
***
TRL36F8A  TRLE LNCTL=MPC,
               READ=590,
               WRITE=591,
               DATAPATH=(592),
               PORTNAME=OSDPORT1,
               MPCLEVEL=QDIO
```

Figure 69. Sample VTAMLST member TRL36F8 for OSD CHPIDs

1. Specify a TRL name of your choice in place of TRL36F8A. Observe the following rules to avoid naming conflicts:
   a. The TRL name (also known as the OSANAME) **must not match** the VTAMLST member name of the TRLE statement containing this transport resource list major node definition. (In Figure 69, TRL name TRL36F8A is defined in member TRL36F8.)
   b. Each TRL defined for a single OSA-Express port must use the same PORTNAME across all LPs.
   c. In a given LP, each active TRL must have a unique TRL name defined in its TRLE statement.
   d. In a given LP, only one TRL can be activated for a single OSA-Express port.
2. **TRLE** and **LNCTL=MPC** are required.

3. Specify one number for the READ device, one for the WRITE, and one DATAPATH device number for each instance of TCP/IP in the logical partition. For example, if you wanted three instances of TCP/IP in the partition to be able to access the OSA-Express port in Figure 69 on page 129 instead of only one as shown, you would code the DATAPATH operand as follows:

   ```
   DATAPATH=(592,593,594),
   ```

   or

   ```
   DATAPATH=(592-594),
   ```

   These device numbers must be defined in the hardware configuration.
4. Enter a *PORTNAME* that is unique in your network environment. This must be the same for all users. A port name is required for QDIO reqardless of the operating system. This port name must match the device name specified for all TCP/IP stacks using this CHPID.

   Note: When configuring LEC port 1 on the ATM feature, you must explicitly define the port number with the portname, for example,

   ```
   PORTNAME=(OSDPORT1,1)
   ```

   This port number is not required for Gigabit Ethernet, TR, and FENET because they only use port 0, which is the default.

   Write the name down because you will use it in the device and link statements of the TCP/IP profile.

   PORTNAME _____
5. **MPCLEVEL=QDIO** is a required entry.
6. Activate the TRL deck which contains the TRLE definition.

   Example: **V NET,ACT,ID=*trl36f8***

What to do next

Continue at “Updating the TCP/IP Profile for QDIO” below.

Updating the TCP/IP Profile for QDIO

TCP/IP uses the OSA as a multipath channel (MPC) device.

Note: MPC devices respond to the IOS VARY ON and IOS VARY OFF commands regardless of whether these resources are allocated.

This requires you to define a device statement, link statement, and home statement in the TCP/IP profile. The following instructions provide the minimum details for updating the TCP/IP profile. Suggestions for additional profile specifications are listed in “Recommendations” on page 134. If you require additional information about the TCP/IP profile, see *z/OS Communications Server: IP Configuration Guide*.

Follow these instructions for each logical partition planned for use with the OSA.

__ 1. Edit the TCP/IP profile. Within the ***Hardware Definitions*** section of the profile, add a device statement and a link statement using the following instructions. Figure 70 on page 131 shows an example.

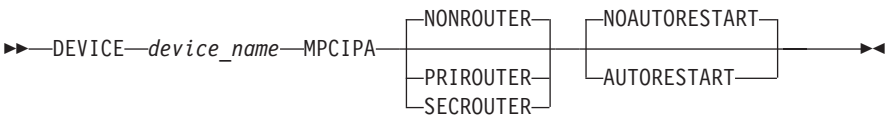
```
; Hardware definitions:
; OSA-Express CHPID F8
DEVICE OSDPORT1 MPCIPA NONRouter
LINK OSD1 IPAQGNET OSDPORT1

; Token Ring LINK statement is
; LINK OSD1 IPAQTR OSDPORT1 NONCANONICAL ALLRINGSBCAST

; HOME Internet addresses of each link in the host.
HOME
10.10.11.161     OSD1

; IP Routing information for the host.  All static IP routes should be added here.
;
GATEWAY
; Direct Routes - Routes that are directly connected to my interfaces.
;
; Network  First hop   Driver   Packet size  Subnet mask  Subnet value

; OSA-Express OSD
  10           =        OSD1       1492       0
.
.
.
; Start all the defined devices.
  START OSDPORT1
```

Figure 70. Hardware Definitions in the TCP/IP Profile for OSA-Express Features in QDIO Mode. See the following descriptions for various options and requirements.

The definitions would be similar for any OSA-Express feature set up as an OSD channel for QDIO mode in IPv4.

__ 2. Define each OSA-Express port using the appropriate statement: for IPv4, create a DEVICE, LINK, and HOME statements as shown in steps 2a through 2c on page 133. For IPv6, create an INTERFACE statement as shown in step 2d on page 133. When configuring a single device for both IPv4 and IPv6, use DEVICE/LINK/HOME for the IPv4 definition and INTERFACE for the IPv6 definition."Sample TCP/IP Profile (IPv4 and IPv6)" on page 395 contains examples of both statements.

a. For IPv4, define one DEVICE statement for the OSA-Express port.



device_name
Specify a device name. The name must be the same name that you specified for the PORTNAME in the TRLE statement (step number 4 on page 130).

MPCIPA
Specifies that the device belongs to the multipath channel (MPC) family of interfaces and uses the IP assist based interface.

NONROUTER
When this is specified, OSA-Express features will not forward unknown packets in QDIO mode.

PRIROUTER
Primary router for unknown packets from the LAN. If a datagram is received at this device for an unknown IP address, the datagram will

be routed to this TCP/IP instance. Only one primary router may be specified for a single port across all TCP/IP instances.

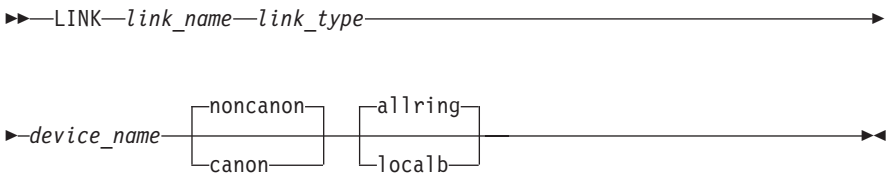
When running the OSA-Express feature dedicated to one LPAR, the primary router flag must be specified if the dedicated LPAR is to be used as a router. When the primary router flag is set, the OSA-Express feature will forward all IP packets received that do not contain a destination IP address registered with the feature. The HOME IP statements in each TCP/IP stack are the addresses registered to the OSA Express feature. If the primary router flag is NOT specified, then all packets received by the OSA-Express feature without a registered IP address are dropped. This includes all packets to be routed through the dedicated LPAR that is serving as a router to other networks.

SECROUTER
Secondary router for unknown packets from the LAN when the primary router is not available. If a datagram is received at this device for an unknown IP address and there is not an active TCP/IP instance defined as PRIROUTER, then the datagram will be routed to this TCP/IP instance. Multiple secondary routers may be specified for an OSA-Express GbE or FENET port running in QDIO mode, but only one secondary router may be specified for any other OSA-Express port.

NOAUTORESTART
For most device failures, specifying NOAUTORESTART indicates that the TCP/IP address space will not attempt to reactivate these devices.

AUTORESTART
In the event of a device failure, the TCP/IP address space will attempt to reactivate the device.

b. Define one LINK statement for the IPv4 OSA-Express port.



link_name
Specify a name for this link. The maximum length is 16 characters. This name is also used in the home statement.

link_type
Required indicating that the link uses the IP Assist interface. For OSA-Express ATM, FENET, and Gigabit Ethernet features set up as OSD channels to run in QDIO mode, specify **IPAQGNET**. For These OSA-Express features, you may specify a LINK type of **IPAQENET** instead of IPAQGNET when Communications Server for OS/390 R10 or later is used.

For OSA-Express Token Ring features set up as OSD channels to run QDIO mode, specify **IPAQTR**.

device_name
Specify the same name you used in the device statement and for the PORTNAME in the TRLE statement. See 4 on page 130.

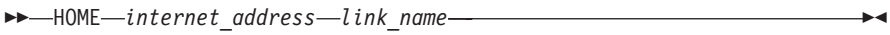
CANONical (For IPAQTR LINK type only)
MAC addresses in Address Resolution Protocol (ARP) packets are in canonical IEEE 802.5 form. See "Canonical vs. Noncanonical Format" on page 193.

NONCANONical (For IPAQTR LINK type only)
MAC addresses in Address Resolution Protocol (ARP) packets are in non-canonical form. This is the default for the IPAQTR LINK type. See "Canonical vs. Noncanonical Format" on page 193.

ALLRINGsbcast (For IPAQTR LINK type only)
All IP and ARP broadcasts are sent as all-rings broadcasts, which are propagated through token ring bridges. This is the default.

LOCALBcast (For IPAQTR LINK type only)
All IP and ARP broadcasts are sent only on the local ring and are not propagated through token ring bridges.

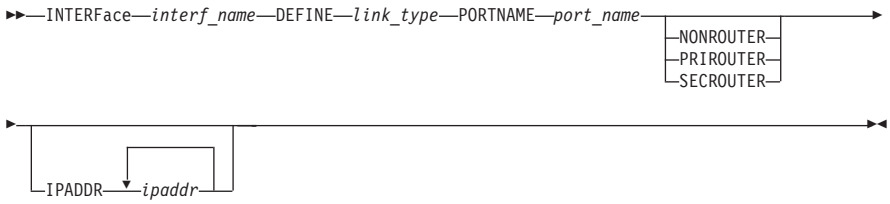
c. Define the Home IP address for each IPv4 link.



internet_address
Specify an IP address for this link in the form x.x.x.x.

link_name
Specify the link name you choose in the link statement.

d. For IPv6 only, define one INTERFACE statement for the GbE or FENET OSA-Express port.



intf_name
Specify a name for the interface no more than 16 characters in length.

link_type
Must be IPAQENET6 or IPQAGNET6.

port_name
The PORT name specified in the TRLE definition for the QDIO interface.

NONROUTER
When this is specified, OSA-Express features will not forward unknown packets in QDIO mode.

PRIROUTER
Primary router for unknown packets from the LAN. If a datagram is received at this device for an unknown IP address, the datagram will

be routed to this TCP/IP instance. Only one primary router may be specified for a single port across all TCP/IP instances.

SECROUTER
Secondary router for unknown packets from the LAN when the primary router is not available. If a datagram is received at this device for an unknown IP address and there is not an active TCP/IP instance defined as PRIROUTER, then the datagram will be routed to this TCP/IP instance. Multiple secondary routers may be specified for an OSA-Express GbE or FENET port running in QDIO mode, but only one secondary router may be specified for any other OSA-Express port.

IPADDR
Optional for link types IPAQENET6 and IPAQGNET6. If not specified, TCP/IP will enable autoconfiguration for the interface.

ipaddr
One or more prefixes or full IPv6 addresses.

See "Sample TCP/IP Profile (IPv4 and IPv6)" on page 395 for an example. Additional parameters must be defined in this statement for VIPA. See *z/OS Communications Server: IP Configuration Guide* and *z/OS Communications Server: IP Configuration Reference* for more information.

__ 3. Define the routes using direct (static) routes through the GATEWAY statement or use the RouteD router daemon to do it dynamically.

__ 4. Define one START command for each OSA device.

Note: If you do not want to start using the OSA at this time, do not include the START command. You can issue

```
VARY TCPIP,,START,GIGPORT1
```

to start a device.

Figure 70 on page 131 shows an example of hardware definitions in a TCP/IP profile.

After the TCP/IP profile is updated and started you can check that the devices were started. The following command checks the read, write and data devices (assuming device numbers 590−592).

d u,,,590

If all is OK, you will see for the read, write, and data devices, respectively:

```
590    A-BSY
591    A
592    A-BSY
```

Recommendations

Although the following TCP/IP profile parameters are not required for OSA-Express, we suggest that you consider adding them. Refer to *z/OS Communications Server: IP Configuration Guide* for details.

MTU The maximum transmission unit (MTU) size controls the maximum packet size that the IP layer can transmit onto a Network Interface. The value for the MTU size is dependent upon the network configuration. The OSA-Express Gigabit Ethernet feature supports multiple MTU settings, each of which is used for different network configurations.

If your network contains all Ethernet DIX clients, then set the MTU in your GATEWAY statement or OMPROUTE configuration to a maximum of 1500. This is the maximum IP packet which can be transmitted in a ″pure″ Ethernet DIX configuration.

If your network contains any IEEE 802.3 clients to which the OSA-Express adapter will communicate, set the MTU in your GATEWAY statement or OMPROUTE configuration to a maximum of 1492. This is the maximum IP packet which can be transmitted in an 802.3 Ethernet configuration. This MTU size is 8 bytes less than the Ethernet DIX format due to the 3 byte LLC and 5 byte SNAP headers which are used in the 802.3 environment. When using the 1492 MTU size, you can communicate to either Ethernet DIX or 802.3 clients through the same OSA-Express Ethernet adapter.

The OSA-Express Gigabit Ethernet feature also supports the Jumbo Frames feature. This feature can only be used if all the clients and Ethernet switches in the network to be connected through the OSA-Express Gigabit adapter also support the Jumbo Frames feature. When using this feature, set the MTU in your GATEWAY statement or OMPROUTE configuration to the maximum of 8992.

See *IP Configuration* for more details on 802.3 and DIX. For a thorough discussion of MTU size, see the Appendix in *z/OS Communications Server: IP Diagnosis*.

DATAGRAMFWD
Add this parameter to the IPCONFIG statement to enable the transfer of data between networks.

; NOFWD
Make sure that the NOFWD parameter is **NOT** specified in the ASSORTEDPARMS statement, or is commented out. It prevents transfer of data between networks.

PATHMTUDISCOVERY
Add this parameter to the IPCONFIG statement to prevent fragmentation of datagrams.

Setting the Missing Interrupt Handler for QDIO

On MPCIPA devices, there is no need to specify MIH values for the READ and DATAPATH devices. For the WRITE device, a value from 15 to 30 seconds is recommended. A value of 30 seconds may be appropriate when channel extenders are used, or when the operating system is running as a guest. 15 seconds should be sufficient in all other cases.

Do not disable the MIH for the WRITE device by specifying a value of 0.

__ 1. Enter: **SETIOS MIH,DEV=(*devnum*),TIME=00:15** Where ***devnum*** can be a three or four digit device number. Use a comma to separate more than one device number and use a hyphen to specify a range of device numbers.

The SETIOS MIH command resets the missing interrupt handler until the next system IPL. Doing the next step will permanently reset it after the next system IPL.

__ 2. Edit the IECIOSxx member of SYS1.PARMLIB and add the following for the TCP/IP WRITE devices:

MIH TIME=00:15,DEV=*devnum*

Enter: **SET IOS=*xx*** where ***xx*** is the last two characters in IECIOS***xx***. The next IPL will use these values if the ***xx*** value matches the IOS= parameter in IEASYS***yy*** member.

Setting Up Priority Queuing

All OSA-Express features operating in QDIO mode (channel type OSD) support priority queuing, which allows the definition of four priority levels based on *service differentiation*: the way in which you define different traffic types to Communications Server. Once you have defined your traffic types, you can assign them priority levels by defining for each a *service level policy*. You define service differentiation and service level policy to the OS/390 UNIX Service Policy Agent through a policy configuration file.

When you activate the OS/390 UNIX Policy Agent, it reads the policy configuration file containing the control statements defining service differentiation and service level policy. Priority queuing can be defined in three control statements:

SetSubnetPrioTosMask statement
Defines as many as eight unique 8−bit Type of Service (TOS) identifiers and assigns each a priority level.

ServiceCategories statement
Correlates the TOS identifier and priority with an IP traffic characteristic.

ServicePolicyRules statement
Defines the transmission conditions for each category of IP traffic.

There are additional control statements you can specify in the policy control configuration file that are beyond the scope of this discussion.

Refer to *z/OS Communications Server: IP Configuration Guide* for a detailed description of how to set up the OS/390 UNIX Services Policy Agent.

Appendix C, “Examples and Notes from Our Test Team” on page 353 contains a description of how priority queuing was set up in our test environment.

IP Modes for Channel Type OSE (non-QDIO) on z/OS, z/OS.e, or OS/390

An OSA-Express FENET can be run in TCP/IP Passthru mode exclusively or concurrently with SNA mode.

An OSA-Express TR can be run in TCP/IP Passthru mode exclusively or concurrently with SNA mode.

An OSA-Express ATM can run TCP/IP Passthru or SNA, or both, while emulating Ethernet or token ring.

In the OS/390, z/OS, and z/OS.e environments, an ATM OSA-Express can be run in the HPDT ATM Native mode to support the Communications Server high speed networking for IP networks (RFC 1577). The ATM feature cannot run in any other mode concurrently with ATM Native.

For VM/ESA 2.4.0 and z/VM, an ATM OSA-Express can be run in the HPDT ATM Native mode to support the TCP/IP 2.4 function of VM.

Disabling the Missing Interrupt Handler for TCP/IP Passthru

If you are customizing an OSA-Express to run in TCP/IP Passthru mode, you must disable the missing interrupt handler when using OS/390 V1R3 or V2R4 (TCP/IP V3R2 or earlier). Disabling the missing interrupt handler is unnecessary for newer versions of TCP/IP, which are included with CS for OS/390 V2R5 and later.

From an OS/390, z/OS, or z/OS.e console, do the following to disable the missing interrupt handler for all TCP/IP passthru devices.

__ 1. Enter: **SETIOS MIH,DEV=(*devnum*),TIME=00:00** Where ***devnum*** can be a three or four digit device number. Use a comma to separate more than one device number and use a hyphen to specify a range of device numbers.

   The SETIOS MIH command disables the missing interrupt handler until the next system IPL. Doing the next step will permanently disable it after the next system IPL.

__ 2. Edit the IECIOSxx member of SYS1.PARMLIB and add the following for the TCP/IP passthru devices:

   MIH TIME=00:00,DEV=*devnum*

   or

   MIH TIME=00:00,DEV=(*lowdevnum-highdevnum*)

   Enter: **SET IOS=*xx*** where ***xx*** is the last two characters in IECIOS***xx***. The next IPL will use these values if the ***xx*** value matches the IOS= parameter in IEASYS***yy*** member.

TCP/IP Definition Requirements for OSE CHPID IP Modes

In this book, only the simplest forms of TCP/IP profile statements are used. The following discussion is meant to put OSA-related parameters into the context of the host server program, but it is beyond the scope of this book to describe TCP/IP statements fully. For more information, refer to the TCP/IP books and CS for OS/390 books listed in the bibliography (page xv).

An OSA running in the TCP/IP Passthru mode is viewed as a LAN channel station (LCS) device by the TCP/IP, which uses the device pair required by the IP duplex protocol to establish the data path to the OSA port. You must therefore define the lower device number of the pair (the READ device) in the IP program's Device statement as the LCS address. And, you must define the OSA port number as the link number in the corresponding Link statement.

To transfer an IP packet across an OSA, two data paths must be defined: one inbound data path for IP packets whose destination is a Home IP address, and one outbound data path for IP packets whose destination is a network IP address. Each data path requires an entry in the OSA address table (OAT). To specify data paths for IP packets through an OSA, Passthru OAT entries are used in the TCP/IP Passthru mode, and MPC entries are used in the HPDT ATM Native mode. Before proceeding to a discussion of these types of OAT entries, consider the following points.

To send an inbound IP packet to an S/390 program, a LAN client first sends an ARP broadcast. If an OSA adapter or the S/390 server has the target IP address in the ARP as one of its HOME addresses, an ARP response is sent back to the sending station. The ARP response contains the MAC address of the OSA port that has the connection to the specified IP address.

To send an outbound IP packet to a network client, the GATEWAY statement must define the IP networks and the corresponding LINK out of which packets destined for these networks should be sent. The DEFAULTNET parameter can also be specified to handle IP traffic destined for any network not explicitly routed.

OSA supports IP unicast and IP broadcast destination addresses in all the modes for OSE CHPIDs in which IP data packets are transferred. (IP broadcast is also supported on OSD CHPIDs beginning with Linux kernel version 2.4.14, z/OS V1R4, and z/VM V4R3.)

OSA supports IP multicast destination addresses only when running in QDIO mode or TCP/IP Passthru mode, and only in a CS for OS/390 environment. You can use OSA/SF to display the IP multicast addresses of the registered members of the multicast group for a selected OSA.

These definitions are shown in Figure 71, which uses the TCP/IP as an example. A triangle depicts the device number. A trapezoid depicts the port number. Traffic paths are simplified to avoid cluttering the figure. Two logical partitions (LPs) are shown: LPLEFT and LPRIGHT.

Notes:

1. If an ATM OSA-Express is being used, its LAN emulation client (LEC), or logical, ports are defined in the TCP/IP Passthru mode (OSE channels only).
2. A MAC address is shown for the port. A MAC address is significant in TCP/IP Passthru mode to identify the port on a directly-attached LAN or ATM emulated LAN.
3. You must also specify the Home IP address of the LP associated with an inbound Passthru OAT entry if access to the OSA port is to be shared. You can specify more than one Home IP address to provide redundant pathing.

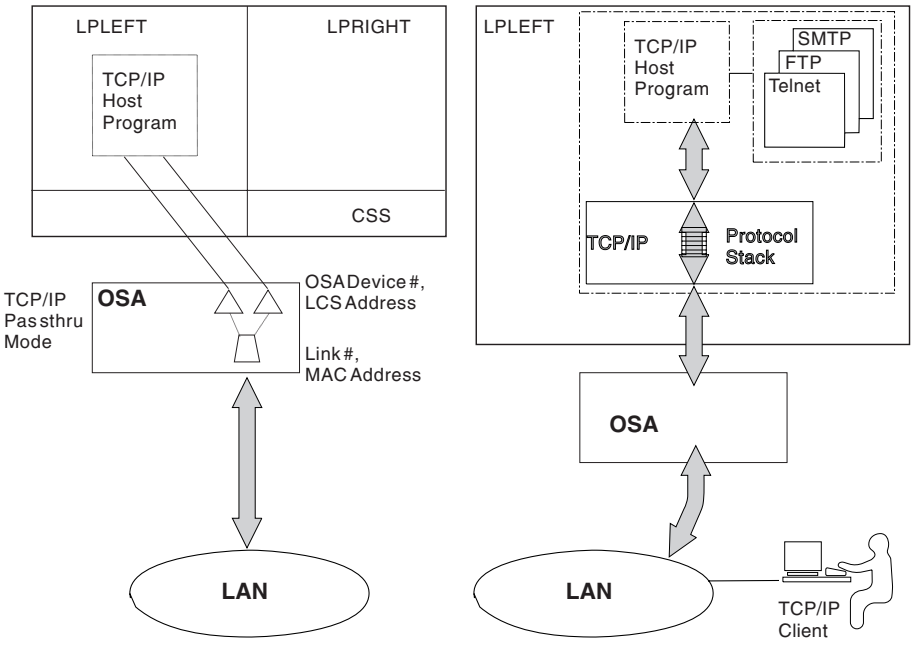


Figure 71. TCP/IP Passthru Mode

For the Device Statement

Note that the LCS address is the even-numbered device number that you want to associate with the port number. Following the format:

DEVICE ***device_name*** **LCS** ***lcs_address***

For LPLEFT (LP 1), one statement is needed for port 0 and one for port 1. For example,

```
DEVICE OSEATM0 LCS E90
DEVICE OSEATM1 LCS E92
```

For LPRIGHT (LP 2), one statement is needed for port 1. For example,

```
DEVICE OSEATM1  LCS E92
```

For the Link Statement

Note that the TCP/IP link number is the same as the OSA port number.

LINK ***link_name network_protocol link_number device_name***

For LPLEFT, one LINK statement is needed for port 0 and one for port 1. For example,

```
LINK ATM0 802.3 0 OSEATM0
LINK ATM1 802.3 1 OSEATM1
```

For LPRIGHT, one statement is needed for port 1. For example,

```
LINK ATM1 802.3 1 OSEATM1
```

For the Home Statement

HOME ***tcpip_instance_ip_address***
link_name

For LPLEFT (LP 1), two statements are needed. For example,

```
HOME
  128.40.200.191 ATM0
  128.40.202.192 ATM1
```

For LPRIGHT (LP 2), one statement is needed. For example,

```
HOME     128.40.202.192 ATM1
```

For the Gateway Statement

Notes:

1. If there is a hop, associate it with the network address and the link name.
2. In these examples, there is no hop so '=' is used to specify that the data is routed directly to destinations on that network.
3. The most specific form of the network address, the client IP address, is used in these examples.

GATEWAY*network*
first_hop link_name max_packet_size subnet_mask

For LPLEFT, two statements are needed. For example,

```
GATEWAY
  128.40.200.58 = ATM0 DEFAULTSIZE 0
  128.40.200.68 = ATM1 DEFAULTSIZE 0
```

For LPRIGHT, one statement is needed. For example,

```
GATEWAY
   128.40.200.68 = ATM1 DEFAULTSIZE 0
```

For the Start Statement

START ***device_name***

For LPLEFT, for example,

```
START ATM0
START ATM1
```

For LPRIGHT, for example,

```
START ATM1
```

For a complete configuration example of IP Passthru for an OSA-Express ATM feature operating in LAN emulation mode, see page 366.

SNA Modes for Channel Type OSE on z/OS, z/OS.e, or OS/390

In this section, the OSA-related VTAM statements for SNA mode are described. For more information on these VTAM macros, refer to the VTAM books listed in the bibliography. For information on the OS/390 Communications Server SNA, also refer to the books listed in the bibliography.

Notes:

1. Define each OSA port in the XCA mode to provide APPN-to-APPN communications via an OSA.

   An OSA port can be used to connect a composite network node or an end node or a network node with any other type of APPN node.
2. Define each OSA port in the XCA mode and each peripheral device in the SWNET node to provide peripheral support.

   Peripheral support attaches VTAM to peripheral nodes connected to the directly-attached LAN or emulated LAN (ELAN).
3. Define each OSA port in the XCA mode and each subarea connection in the SWNET to provide subarea support.

   Subarea support attaches VTAM to a subarea node that is connected to the LAN or ELAN.
4. Specify the maximum number of stations, or PUs, for each port. A maximum of 4096 PUs can be specified for an OSA-Express CHPID. When running LAN emulation on the ATM feature, the maximum 4096 PUs can be distributed in any way across the CHPID's two emulation client ports. See page 141 and the SNA mode requirements for each operating system in the earlier chapters.

   Note also that once a PU is activated within an XCA for a given OSA port, it cannot become available for another instance of VTAM.
5. For parameter values needed for HPR over XCA support, refer to the VTAM books listed in the bibliography (page xviii).

External Communication Adapter (XCA) Major Node for SNA

Associate one XCA major node for each OSA port that will be used. Define:

1. The node type in the VBUILD Definition statement
2. The OSA port used in the PORT Definition statement
3. The switched peripheral nodes that are attached to the LAN or ELAN through the OSA port in the GROUP, LINE, and PU Definition statements.

If you have both subarea nodes (type 4 and type 5 nodes) and peripheral nodes (type 1, type 2, type 2.1, and subarea nodes that appear as type 2.1 nodes) attached to the LAN or ELAN, you must code two GROUP definition statements in this XCA major node (one for the peripheral devices, and one for the subareas).

VBUILD Definition Statement for SNA

Specify one VBUILD Definition statement for each OSA port, that is, for each connection between VTAM and the LAN, ELAN, or SNA network management service.

name **VBUILD TYPE=XCA**

name
Specify the unique name for this major node.

PORT Definition Statement for SNA

Specify one PORT Definition statement for each VBUILD statement to define the OSA port number and port type as well as the device address (OSA device number) for VTAM to use.

name **PORT ADAPNO=*adapter_number*, CUADDR=*device_address*, MEDIUM=*medium_type*, SAPADDR=*address*, TIMER=*timeout_value***

name
Specify the VTAM name you want to associate with the OSA port.

adapter_number
Specify the OSA port number for data transfer (0 or 1).

device_address
Specify the device address to be used by VTAM. This value is the OSA device number. In the device address, the unit address defaults to the last 2 digits of the device number.

medium_type
Define the type of LAN (or ELAN) connected to this OSA port. Specify RING for token ring, CSMACD for Ethernet.

SAP address
Specify the service access point (SAP) address for the connection to a LAN attached through an OSA that is defined by this XCA major node. This value must be a multiple of 4 and must be unique for each VTAM that is sharing an OSA port.

timer
Specify a value that exceeds (T1 * 9). If you accept the default T1 value of 2 seconds, the default XCA timeout value of 30 seconds meets this requirement. The T1 value is described on page 178.

GROUP Definition Statement for SNA

Specify a line group for type 2 or 2.1 nodes attached through OSA. You also need to define LINE and PU statements for each switched line and each peripheral node with which VTAM will communicate.

You must set a maximum PU limit for each OSA-Express port.

name **GROUP AUTOGEN=(*number_of_autogens, line_seed_char, pu_seed_char*) DIAL=*dial_value***

name
Specify the minor node name of the line group.

number_of_autogens
Specify the number of VTAM generated LINE and PU statements.

line_seed_char
Define the first character to be used by VTAM to create a name for the generated LINE statements.

pu_seed_char
Define the first character to be used by VTAM to create a name for the generated PU statements.

LINE and PU Definition Statements for SNA

Either specify them separately or let them be generated automatically with the AUTOGEN parameter on the GROUP definition statement.

Switched Network (SWNET) Major Node for SNA

Define one SWNET major node for the switched connections to the peripheral nodes that are attached to the LAN or ELAN connected to the OSA port.

- Define the node type in the VBUILD Definition statement.
- For each PU, define its associated logical units (LUs).
- Optionally, you define a path in the Path Definition statement.

VBUILD Definition Statement for SNA

Define one SWNET major node for any peripheral devices connected to the LAN defined by the associated XCA major node.

name **VBUILD TYPE=SWNET MAXNO=*max_number* MAXGRP=*max_group***

name
Specify the name for this major node.

max_number
Specify the number of unique numbers that are defined in the DIALNO operand of all PATH definition statements with the switched major node.

max_group
Specify the number of unique path groups (group names) that are defined in the GRPNM operand of all PATH definition statements within the switched major node.

PU Definition Statement for SNA

Define one PU for each physical unit that is connected to the LAN defined by the associated XCA major node.

name **PU ADDR=*link_station_address* CPNAME=*control_point_name***
PUTYPE=*pu_type*

name
Specify the minor node name of the physical unit represented by this definition statement.

link_station_address
Specify the hexadecimal station address for the physical unit.

control_point_name
Specify the control point name of a type 2.1 peripheral node. A type 2.1 node requires the CPNAME of both IDBLK and IDNUM on the PU definition statement.

pu_type
Specify the PU type for this peripheral. Specify 2 for PU type 2 or 2.1.

PATH Definition Statement for SNA

Define a path to a physical unit (PU) in a switched major node.

name **PATH DIALNO=*number* GRPNM=*group_number***

name
Specify the name for the Path definition statement.

number
The 1st byte is a placeholder (usually 01). The 2nd byte is the SAP address, and the 3rd through 8th bytes are the MAC address of the peripheral (attached workstation).

If an Ethernet LAN station, or PU, is connected across a LAN bridge to a non-Ethernet LAN, the destination MAC address must be coded differently in the DIALNO. Because the LAN bridge flips the bits in every byte of the MAC address, the MAC address should be coded in the inverted (noncanonical) order in the DIALNO parameter. (See the notes on MAC addresses on page 192.)

group_name
Specify this name as the name of the logical group definition of the associated XCA major node.

LU Definition Statement for SNA

Define one LU for each logical unit associated with a type 1 or 2 PU within a switched major node.

name **LU LOCADDR=*loc_address***

name
Specify the minor node name of the logical unit represented by this definition statement.

loc_address
Specify the logical unit's local address at the physical unit.

At the Physical Unit (PU)

- Configure the unit to support the SNA protocol.
- Specify the CPNAME or the IDBLK/IDNUM pair. This must match the information specified on the PU definition statement under the switched major node.
- Define the MAC address of the OSA port that should be used to connect to VTAM. An OSA port's MAC address can be set to a local MAC address (page 192) to help you avoid reconfiguring existing units.

ATM Native Mode on z/OS, z/OS.e, or OS/390

The OSA-Express ATM feature defined as an OSE channel and operating in ATM Native mode, can be configured for Classical IP or SNA traffic, or both.

Classical IP (IP Traffic Over ATM Native Network)

The OSA-Express ATM feature can be configured to run IP traffic in ATM Native mode. This requires VTAM TRLE and TCP/IP definition statements. Page 364 contains an example of a classical IP configuration.

VTAM TRLE Definition Requirement for Classical IP

The following shows the minimum TRLE definition. See *CS SNA Resource Definition Reference* (page xvi) for complete syntax.

```
name VBUILD TYPE=TRL
name TRLE LNCTL=MPC ,READ=channel_unit_address,WRITE=channel_unit_address,
PORTNAME=port_name,STORAGE=ECSA,MPCLEVEL=HPDT,
MAXREADS=number_of_available_buffers,MAXBFRU=number_of_buffers
```

For example,

```
TRL VBUILD TYPE=TRL
CHPTRLF4 TRLE LNCTL=MPC,READ=9C4,WRITE=9C5,PORTNAME=F4,STORAGE=ECSA,
MPCLEVEL=HPDT,MAXREADS=8,MAXBFRU=16
```

A single TRLE statement can be used for both IP and SNA traffic, allowing both types of traffic to be run simultaneously.

TCP/IP Definition Requirements for Classical IP

Virtual Circuit Definitions: The ATMLIS statement is required for an SVC. This statement specifies the characteristics of the ATM logical IP subnet (LIS) as follows:

ATMLIS ***lis_name subnet_value subnet_mask***

For example,

```
ATMLIS LIS1 10.11.0.0 255.255.0.0
```

The ATMPVC statement is needed only for a PVC. Its format is:

ATMPVC ***PVC_name link_name***

For example,

```
ATMPVC F4PVCIP ATMNATX4
```

The ATMARPSV statement is required if an ATMARP server is used to resolve ATM addresses when establishing SVCs. Although the ATMARPSV is used only for establishing SVCs, the virtual circuit to the ATMARP server can be an SVC or a PVC. As an alternative to resolving ATM addresses with the ATMARPSV statement, you may hard code ATM-IP address resolution using a TRANSLATE definition.

For a PVC, the format is:

ATMARPSV ***arpsrv_name lis_name PVC_name link_name***

For example,

```
ATMARPSV ARPVS1 LIS1 F4PVCIP ATMNATX4
```

For an SVC, the format is:

ATMARPSV ***arpsrv_name lis_name*** **SVC** ***ip_address*** **NSAP**
physical_address

For example,

```
ATMARPSV ARPVS1 LIS1 SVC 10.11.1.40 NSAP 39999999999999000000999 90C030004ACAD54C100
```

In summary:

Required for SVCs	Required for PVCs
ATM DEVICE	ATM DEVICE
LINK	LINK
ATMLIS	ATMPVC
ATMARPSV or TRANSLATE	

OSA Data Path Definitions: ***The Device statement*** associates the CS for OS/390 IP device name with the ATM OSA-Express physical port as follows.

DEVICE ***device_name*** **ATM PORTNAME** ***port_name***

For example,

```
DEVICE CHPTRLF4 ATM PORTNAME PORTF4 ENABLEIN
```

The Link statement defines the network interface link associated with the ATM device. The ***LIS*** parameter is used to specify the logical IP subnet for this link. This parameter is only required if the link is to be used for SVC connections.

LINK ***link_name*** **ATM** ***device_name*** **LIS** ***lis_name***

For example,

```
LINK ATMNATF4 ATM CHPTRLF4 LIS LIS1
```

The Gateway statement:

GATEWAY ***network first_hop link_name max_packet_size subnet_mask***

For example,

```
10.11.1.105 = ATMNATX4 9180 HOST
```

Notes:

1. If there is a hop, associate it with the network address and the link name.
2. In these examples, there is no hop so '=' is used to specify that the data is routed directly to destinations on that network.
3. The most specific form of the network address, the client IP address, is used in these examples.

The Home statement:

HOME ***tcpip_instance_ip_address link_name***

For example,

```
10.11.91.200 ATMNATF4
```

The Start statement:

START ***device_name***

For example,

```
START CHPTRLF4
```

SNA Traffic over ATM Native Network

The OSA-Express ATM feature requires the following VTAM definitions in order to handle SNA traffic in ATM Native mode.

- TRLE statement
- XCA major node
- Switched major node

Because the OSA-Express ATM is viewed as an external communications adapter, define:

- The ATM OSA-Express's single physical port number which is always 0, in the XCA macro.
- The VTAM's link to the ATM OSA-Express channel path in the TRL macro.

Additionally, the VTAM values that you enter can influence the throughput of data packet transfer in this mode. The maximum RU size and the Capacity parameter are discussed in the following subsections. For more information on:

- VTAM HPR, including factors such as window sizes and COS tables, refer to "Defining ATM Native Connections to VTAM" in the chapter on "Connecting an APPN Node to VTAM" in the VTAM Network Implementation Guides listed in the bibliography (page xviii). Other factors fall outside the scope of this book.
- In the HPDT ATM Native mode, define an SVC to VTAM or the SNA function of CS for OS/390 for SNA data transfer. Because an SVC is allocated dynamically, you do not define it to the OSA, but you must define it to VTAM. The number of SVCs that you can define depends on whether you define PVCs as well and for how many virtual circuits you reserve bandwidth. These factors are discussed on page 161.
- API crossing size for a VTAM application, refer to the books on the application or in the VTAM Resource Definition books listed in the bibliography.
- The SNA function of CS for OS/390, refer to the CS for OS/390 books listed in the bibliography (page xvi).

Maximum RU size for SNA in ATM Native Mode

The maximum RU size is correlated with the size of the maximum PDU size that you specify for a virtual circuit. Take note of the following points.

- An ATM OSA-Express supports a *minimum value* for maximum RU size of 1024 bytes. However, it is strongly recommended that you specify a maximum RU size in the VTAM logmode table of either 8192 or 16384 bytes.
- A maximum RU size greater than 16K bytes can reduce CPU utilization, but at some expense in throughput.
- A maximum RU size less than 8K bytes can have a negative impact on achieving the rated speeds. Therefore, you should specify a maximum RU size smaller than 8K only if some non-ATM medium is in the path and that medium does not support a frame size of 8K bytes. This could be the case, for example, if traffic is bridged to a legacy LAN in the ATM network.
- The maximum RU size is specified in the VTAM logmode table. Because the example in this book does not show that table, the maximum RU size is also not shown in the example.
- For more information, refer to *VTAM Resource Definition Reference,* which is listed in the bibliography on page xviii.

Capacity Parameter for SNA in ATM Native Mode

Specify 1 capacity value for each virtual circuit, not for each direction, and specify that value explicitly to VTAM. Do not assume the default Capacity value.

- For an SVC, specify the capacity parameter value in the SWNET PU statement.
- For a PVC, specify the capacity parameter value in the XCA PU statement.
- You can specify a value up to the line speed. Since an ATM OSA-Express supports a line speed of 155 Mbps, you can specify a maximum capacity value of 155M.
- Round the capacity value down to the next lower integer. For example, round down 151.6 Mbps to 151M as the capacity parameter value.
- Capacity statements for the same virtual circuit should have the same value at both end points.
- For a BE virtual circuit:
  - Specify the maximum capacity value (155M) if you also specify the maximum peak cell rate (353,207 cells/second).
  - Otherwise, specify a capacity value that is 10 times greater than the peak cell rate. If you specify a different peak cell rate for each direction, use the larger peak rate as the base.
- For an RB virtual circuit, specify a capacity value that is 10 times greater than the sustained cell rate. If you specify a different sustained cell rate for each direction, use the larger sustained rate as the base.

For example, suppose you specify a sustained cell rate for an RB PVC of 20,833 cells/second,

```
1 cell * 48 (payload bytes) * 8 (bits) = 384
20833 * 384 * 10 = 79,998,720 = 79M
```

XCA VBUILD and PORT Statement Examples

```
XCAOSA VBUILD TYPE=XCA
XCA18 PORT MEDIUM=ATM,PORTNAME=C18TOC5C
```

XCA GROUP Statement Examples

For the SVC:

```
OSA18GR1  GROUP DIAL=YES,CALL=INOUT,DYNPU=YES
LN1A2A    LINE
P1A2A     PU
LN1A2B    LINE
P1A2B     PU
```

Figure 72. XCA GROUP Statement Example for SVC

For the two PVCs:

```
OSA18GR2  GROUP DIAL=NO
LN2A2AP0  LINE  PVCNAME=BE18PVC1
P2A2AP0   PU    CAPACITY=155M
LN1A2AP0  LINE  PVCNAME=RB18PVC1
P1A2AP0   PU    CAPACITY=79M
```

Figure 73. XCA GROUP Statement Example for Two PVCs

SWNET VBUILD Statement Example

```
SWXCA1A VBUILD TYPE=SWNET
```

SWNET PU and PATH Statement Examples

Note: Although the PATH DLCADDR operand 61 statement is listed in the example, you do not have to specify it if the maximum PDU sizes = 8448 bytes, which is the default for an SVC. If a PATH DLCADDR operand 8 statement is defined, note that ATM OSA-Express supports QoS class 0 only. So, set QoS=0.

For the BE SVC:

```
SW1A2B  PU    CPNAME=A02N,CPCP=YES,HPR=YES,CONNTYPE=APPN,ADDR=01    X
              PUTYPE=2,CAPACITY=155M
PATH1B  PATH  DLCADDR=(1,C,ATMSVC,EXCLUSIVE),                       X
              DLCADDR=(7,BCD,00,01,00353207,00353207),              X
              DLCADDR=(21,X,0002,39999999999999999999980101315045,  X
              5354360),                                             X
              DLCADDR=(61,BCD,00,05,00008448,00008448),             X
              GRPNM=OSA18GR1
```

Figure 74. SWNET PU and PATH Statement Example for BE SVC

For the RB SVC:

```
SW1A2A  PU    CPNAME=A02N,CPCP=YES,HPR=YES,CONNTYPE=APPN,ADDR=01    X
              PUTYPE=2,CAPACITY=79M
PATH1A  PATH  DLCADDR=(1,C,ATMSVC,EXCLUSIVE),                       X
              DLCADDR=(7,BCD,00,00,00027706,00020832,00000176,00    X
              00002770,00002083,00000176,00),                       X
              DLCADDR=(21,X,0002,39999999999999999999980101315045,  X
              5354360),                                             X
              DLCADDR=(61,BCD,00,05,00008448,00008448),             X
              GRPNM=OSA18GR1
```

Figure 75. SWNET PU and PATH Statement Example for RB SVC

TRLE Statement

A single TRLE statement can be used for both IP and SNA traffic, allowing both types of traffic to be run simultaneously.

For example,

```
TRLOSA VBUILD TYPE=TRL
OSA18  TRLE LNCTL=MPC ,READ=1808,WRITE=1809,
       PORTNAME=C18TOC5C,STORAGE=ECSA,MPCLEVEL=HPDT,
       MAXREADS=8,MAXBFRU=16
```

Chapter 8. Configuring OSA-Express Modes

Follow the instructions in this chapter to configure ***all operating modes on OSA-Express ATM features***, and ***non-QDIO operating modes on FENET and TR features***. The Gigabit Ethernet feature, which uses channel type OSD exclusively, requires only HCD definitions and host program setup; no mode configuration tasks covered in this section are needed.

For OSA-Express TR, FENET and ATM features defined as OSE channels, you must define the physical port, LAN emulation ports (when running LANE on ATM), and create an OAT to set up the data paths between the OSA and the S/390 programs. For OSA-Express ATM features defined as OSD channels, you need only define the physical and LAN emulation ports.

The REXX IOACMD EXEC procedure begins on page 151. See Chapter 12, “OAT Templates and Sample Configuration Files” on page 221 for a look at the OAT templates and sample configuration files provided for use with the REXX procedure.

The GUI procedure, which includes detailed explanations of all required parameters, begins on page 154.

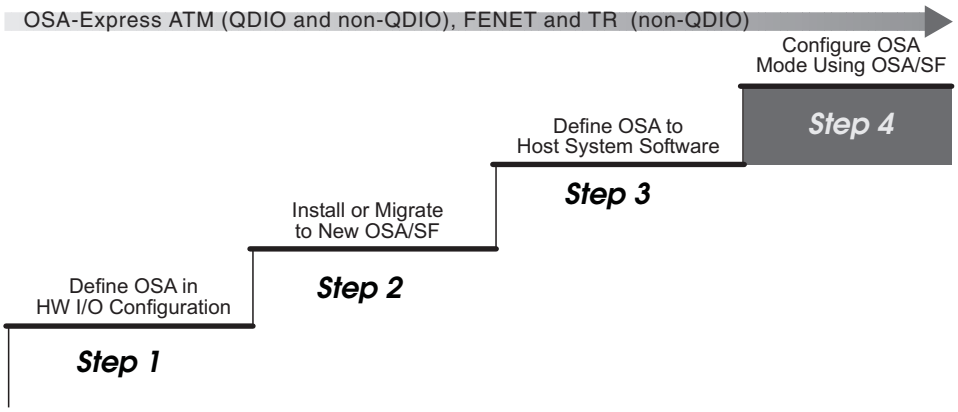


Figure 76. Step Four in a Four-Step Process

Once you have defined both the hardware and software definitions, the data path between any OSA-Express feature defined as an OSD channel and the S/390 programs with which it communicates are automatically set up in an OSA Address Table (OAT).

Partial Activation

A new option called *partial activation* eliminates the need to stop all traffic on the OSA-Express ATM feature when activating only one emulated port. This option allows you to change the configuration on one emulated port without affecting the other emulated port.

Unlike a physical port, which provides a cable connection, an *emulated* port is a virtual connection provided by the OSA-Express ATM feature between the server and another ATM LAN client or an existing Ethernet or token ring network. The purpose of an emulated port is to allow interoperability between software applications on an ATM-attached server and those on traditional LAN networks.

Configuring OSA-Express Modes

Because the OSA-Express ATM feature allows two emulated ports to be configured, the CHPID can handle two different kinds of network traffic.

As an example, suppose you have emulated ports 0 and 1 configured to run SNA traffic, and have decided to change the SNA timer settings for port 1. In the past, you would have had to activate both ports, thereby stopping all traffic. With partial activation, you can now update the timer values for port 1 and activate the configuration for only port 1. Port 0 continues to transfer data, uninterrupted.

Partial activation does not apply to the physical port on the OSA-Express ATM feature. Although partial activation can be selected for the native port, which provides a virtual connection to an ATM network, any configuration change affecting that port will require that **all ATM Native traffic** be interrupted in any case, since only one native port is supported. Therefore, when changing from an ATM Native port configuration to an emulated port configuration, or vice versa, partial activation is not applicable.

For Partial Activation Using the GUI

1. Add or change a configuration only for the port that you want changed in your ATM LEC Port configuration notebook. Be sure that **Yes** is selected for ″Use this port for the configuration″ in the notebook for the port you are changing.
2. Select **No** for ″Use this port for the configuration″ in the notebooks for the other ports. If you use the same notebook that you used for originally configuring the OSA, all port data is saved. Selecting **No** does not cause any port data to be erased.
3. Save this data.
4. Before activating a configuration change that removes devices from the configuration, vary off those devices from the operating system.

   From the pulldown menu, select **Configurations** → **Partial activate**.
5. Refresh the view (F5) when complete.
6. If any configuration change resulted in the removal of devices from the OSA Address Table (OAT), be sure to vary off these devices from the operating system. If any changes added devices to the OAT, vary these devices online. Devices for which an OAT was changed must be varied off, then on again.

   When a configuration change results in the removal of a device, and if that device was online, that device may display a status of *Offline and Boxed* (F-BOX) or *Online and Boxed* (O-BOX) until it is redefined in the configuration, or until an IPL of the operating system. ″Permanent Error″ messages may also appear on the operator console for those devices.

For Partial Activation Using REXX

1. Update the file containing the configuration information. For REXX, you can leave all the other data for ports you are not reconfiguring in the file.
2. Issue the Configure OSA command (see “CONFIG_OSA” on page 252) and select the proper options.

   Before activating a configuration change that removes devices from the configuration, vary off those devices from the operating system.
3. When prompted for ″Activate″, ″Activate, No install″ or ″Activate partial,″ choose ″Activate Partial.″ You will then be given a choice of port(s) on which to perform partial activation based on your configuration file data.
4. If any configuration change resulted in the removal of devices from the OSA Address Table (OAT), be sure to vary off these devices from the operating

system. If any changes added devices to the OAT, vary these devices online. Devices for which an OAT was changed must be varied off, then on again.

When a configuration change results in the removal of a device, and if that device was online, that device may display a status of *Offline and Boxed* (F-BOX) or *Online and Boxed* (O-BOX) until it is redefined in the configuration, or until an IPL of the operating system. ″Permanent Error″ messages may also appear on the operator console for those devices.

Using REXX to Configure OSA-Express CHPIDs

Use these instructions to customize OSA-Express TR, ATM and FENET features, without the use of an OSA/SF GUI. References to more detailed information are included when necessary.

Attention: Before Starting

__ 1. If you are not familiar with the OSA address table (OAT) and you need more information than is provided here, see Chapter 13, “About the OSA Address Table (OAT)” on page 239.

__ 2. Make sure the hardware configuration (IOCDS) is complete. See Chapter 2, “OSA-Express Hardware Configuration” on page 31.

__ 3. Make sure OSA/SF is running on the server.

__ 4. Make sure the OSA (CHPID) is configured online and that the OSAD device is online.

These instruction include the following tasks:

“1) Getting and Modifying a Configuration File”.

“2) Getting an OAT Template” on page 152.

“3) Modifying the OAT Template” on page 153.

“4) Activating the Configuration” on page 153.

“5) Verifying the Configuration” on page 154.

OAT templates and sample configuration files are shown in Chapter 12, “OAT Templates and Sample Configuration Files” on page 221.

1) Getting and Modifying a Configuration File

A configuration file is required for each OSA-Express FENET and ATM CHPID.

1. Copy and modify the appropriate member from IOA.SIOASAMP or the E (200) minidisk on VM.
   - For an OSA-Express ATM feature, copy IOAATME
   - For an OSA-Express FENET feature, copy IOAFENET
   - For an OSA-Express TR feature, copy IOATR

   These files contain the input parameters and instructions for modification. You can find detailed explanations of the parameters in “Using the GUI to Configure OSA-Express CHPIDs” on page 154.

   Write down the new name of the file that you copied. It will be used as input with IOACMD.

   `New name of the copied configuration file _____`
2. Modify the copy of the configuration file for your installation. The instructions appear in the header of each configuration file. See “Configuration Files” on page 225.

2) Getting an OAT Template

Note: There are no OAT templates for OSA-Express features defined as OSD channels.

There are two ways to get a template for making an OAT:

- Use the sample templates listed in Table 9.
- For FENET or TR, use the Get OAT command to get the OAT that is currently on the OSA. A new OSA ships with a default OAT.

  The default OAT contains entries for all logical partitions and ports. Because so many entries are included in a default OAT, you might find it easier to use the samples provided. The samples include only a few entries, which you can use as templates for making your own OAT. The instructions that follow show both methods of getting a template.

Using Samples

The following templates are samples. There is not a sample for every situation. Most configurations are shown in IOAOSHRA. Use the instructions in the template to add and delete information as required.

__ 1. Copy one of the following templates based on the OSA mode and type of OAT you want to install on the OSA:

```
New data set or filename
the copied OAT template  _____________________________________
```

Table 9. OAT Samples for OSA-Express ATM, TR, and FENET Features

OSA Mode	Name in IOA.SIOASAMP (OS/390) or on E (200) Disk on VM or PRD1.BASE on VSE	Where to See the Template	Type of Template
TCP/IP Only	IOAOSHRT	Page 221	Ports Shared Between LPs
SNA Only	IOAOSHRS	Page 222	Ports Shared Between LPs
HPDT ATM Native	IOAOMPC	Page 225	Ports Shared Between LPs
TCP/IP and SNA	IOAOSHRA	Page 223	Both Modes With Ports Shared Between LPs

__ 2. Continue at “3) Modifying the OAT Template” on page 153.

Using the Get OAT Command Instead of Samples

1. Enter the following to get a copy of an existing OAT.

   For OS/390, z/OS, or z/OS.e,

   EX ’IOACMD.EXEC’ ’GET_OAT’ EXEC

   For VM,

   IOACMD GET_OAT

   When prompted, enter the CHPID (OSA number) and the data set or filename of where you want to store the OAT.
2. Continue at “3) Modifying the OAT Template” on page 153.

3) Modifying the OAT Template

Note: There are no OAT templates for OSA-Express features defined as OSD channels.

The format of the OAT varies according to how you got the OAT.

- If you used the samples from IOA.SIOASAMP or the E (200) minidisk, follow the instructions included in the template.
- If you used the Get OAT command, see the legend at the bottom of the OAT.

4) Activating the Configuration

Before activating a configuration change that removes devices from the configuration, vary off those devices from the operating system.

1. Enter the following to configure the OSA.

   For OS/390, z/OS, or z/OS.e:

   EX 'IOACMD.EXEC' EXEC

   For VM:

   IOACMD

   For VSE:

   // EXEC REXX=IOACMD PARM='PRD2.OSASF',SIZE=1100K

   A list of commands will be displayed. Select **CONFIGURE OSA CHPID**.

2. **Follow the prompts**. You will be asked to choose several options and to specify the CHPID number, as well as the names of the configuration file and the OAT. At the end of the procedure, you will be asked to select one of the following:

   Activate
   Select this when configuring TR or FENET, or when configuring an ATM physical port for the first time, or when changing an ATM native to emulated or vice versa. You cannot activate an ATM physical port without configuring either an ATM Native port or ATM LEC port as well.

   Activate partial
   Select this when you have made changes to an ATM emulated port. Traffic on any other port will not be interrupted.

   Activate (no install)
   Select this if you want to defer the install until later. At such time you can complete the install as follows:

   Using REXX on OS/390, z/OS, or z/OS.e Enter: **EX 'IOACMD.EXEC' 'INSTALL *xx* EXEC**

   Using REXX on VM Enter: **IOACMD INSTALL *xx***

   Where ***xx*** is the OSA number (CHPID).

   The activation takes a few minutes; monitor the command output window and the console.

   If any configuration change resulted in the removal of devices from the OSA Address Table (OAT), be sure to vary off these devices from the operating

system. If any changes added devices to the OAT, vary these devices online. Devices for which an OAT was changed must be varied off, then on again.

When a configuration change results in the removal of a device, and if that device was online, that device may display a status of *Offline and Boxed* (F-BOX) or *Online and Boxed* (O-BOX) until it is redefined in the configuration, or until an IPL of the operating system. ″Permanent Error″ messages may also appear on the operator console for those devices.

To set or change a Local MAC address, Group MAC addresses, or User Data, see “MAC Addresses and ESIs” on page 192.

5) Verifying the Configuration

Run the QUERY command to verify your configuration entries. See “QUERY” on page 265.

Using the GUI to Configure OSA-Express CHPIDs

OSA/SF GUI configuration notebooks make it easy to configure OSA-Express features. The OSA feature type and operating mode determine where to enter data. Figure 77 on page 155 is a roadmap showing the path for each feature-mode combination.

Because mode configuration data for all OSA-Express features defined as OSD channels is automatically acquired from HCD and Communications Server definitions, no configuration notebook entries are required for Gigabit Ethernet, TR, and FENET features in QDIO mode. For the ATM features defined as OSD channels, however, the configuration notebook entries for LAN emulation Ethernet settings are required.

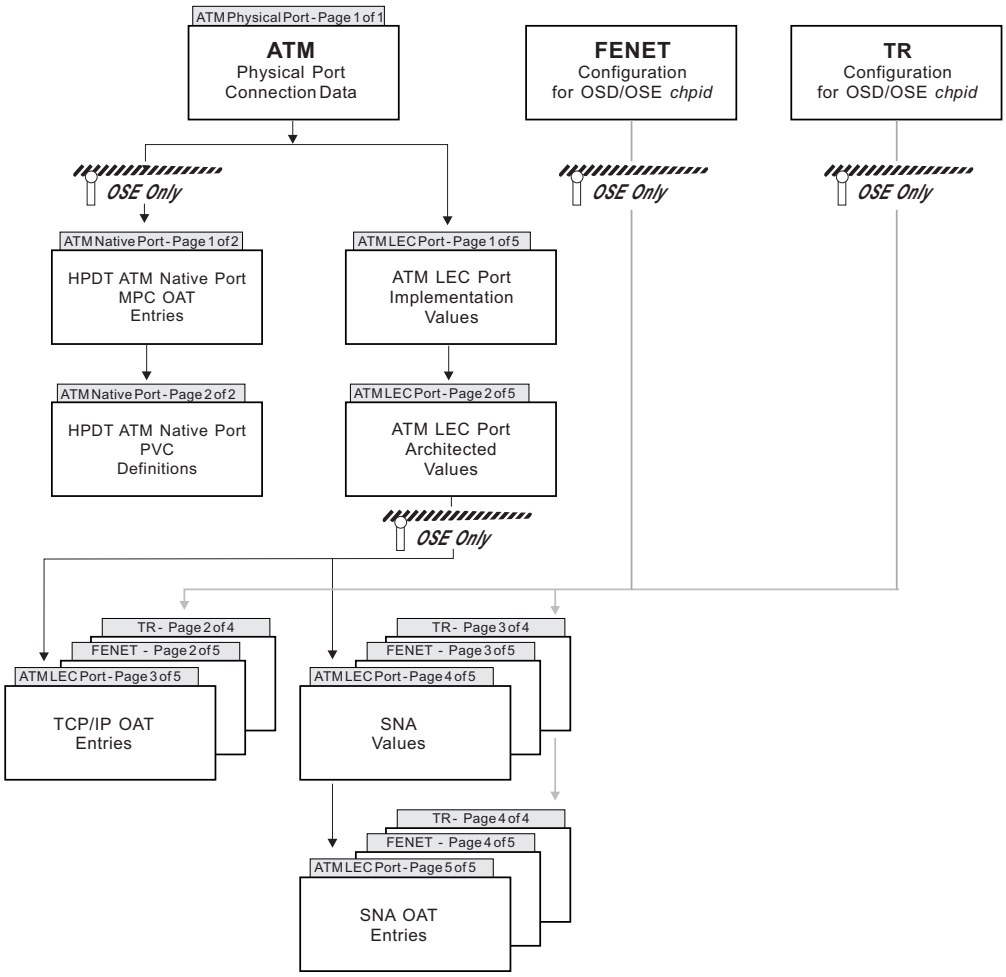


Figure 77. Feature Type, Channel Type, and Mode Determine Which Notebook Pages to Fill Out

The OSA/SF GUI enables you to define and save configurations by name so that you can change or activate different modes of operation for any TR, ATM or FENET OSA-Express feature.

Start OSA Management

From the OSA/SF GUI, do the following to start managing the OSA:

Note: If the OSA feature hardware is not yet installed, do *not* do this step. You will have to do the Start Managing after the OSA feature is installed.

1. From the **OSA/SF Hosts** window, select the host icon (OSA/SF image) that you want to use to manage the OSA.
2. Display the **OSA Channels - Tree View** or **Details View** window. If you need instructions, select **Help** from the menu bar, then select **How to**, and then double-click on **Display the OSA channels**.
3. Select the OSA number on the channels view window.
4. Select **Command** from the menu bar.
5. Select **Manage channel** from the pulldown.
6. Select **Start**, **No force**, and **Ok**. If another LP was managing OS/390 (z/OS, or z/OS.e) or the OSA, use **force**. When another LP is managing the OSA on VM, you must first issue the Stop Managing command on that partition.

Display the Configuration Notebook

Display the configuration notebook as follows.

1. Display the **OSA Channels - Tree View**. If you need help displaying this window, see the **How To** instructions under the Help selection on the menu bar.
2. Select the OSA number.
3. Click on **Selected** on the menu bar and then select **Configurations**, followed by **Configuration List**. A window similar to the one in Figure 78 appears. If you are setting up the OSA for the first time, no entries are listed. Click on **Add**.

   If other configurations are listed, you can select one to **Copy**, **Change**, or **Delete**. The **Current** button creates a new configuration based on the current CHPID settings. You can create and save configurations for both OSD and OSE channel types for a single CHPID.

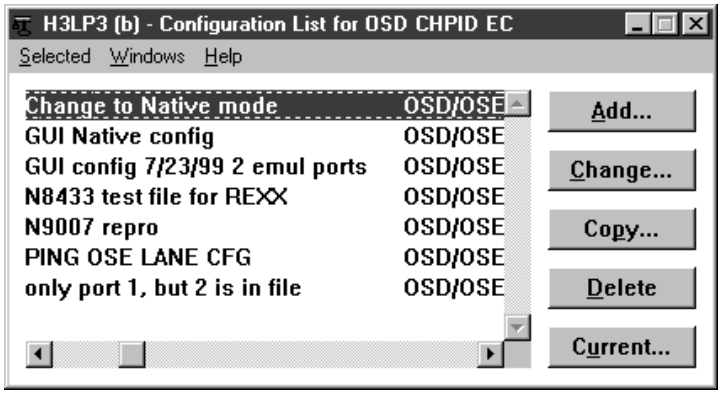


Figure 78. Configuration List and Available Options

What to do next

No configuration entries are required for an OSA-Express FENET or TR feature defined as an OSD channel unless you wish to set local or group MAC addresses, or select a LAN speed.

If you are configuring an OSA-Express FENET feature, go to “FENET Configuration Data” on page 171.

If you are configuring an OSA-Express TR feature, go to “Token Ring Configuration Data” on page 174.

For the ATM feature, continue with ATM Physical Port Connection Data below.

ATM Physical Port Connection Data

The ATM physical port notebook page (Figure 79 on page 157) must be filled in whether you are configuring the ATM Native or an ATM LEC mode. If you are creating a new configuration, enter a **Configuration name** at the top of the notebook page. This is name under which the configuration data will be saved.

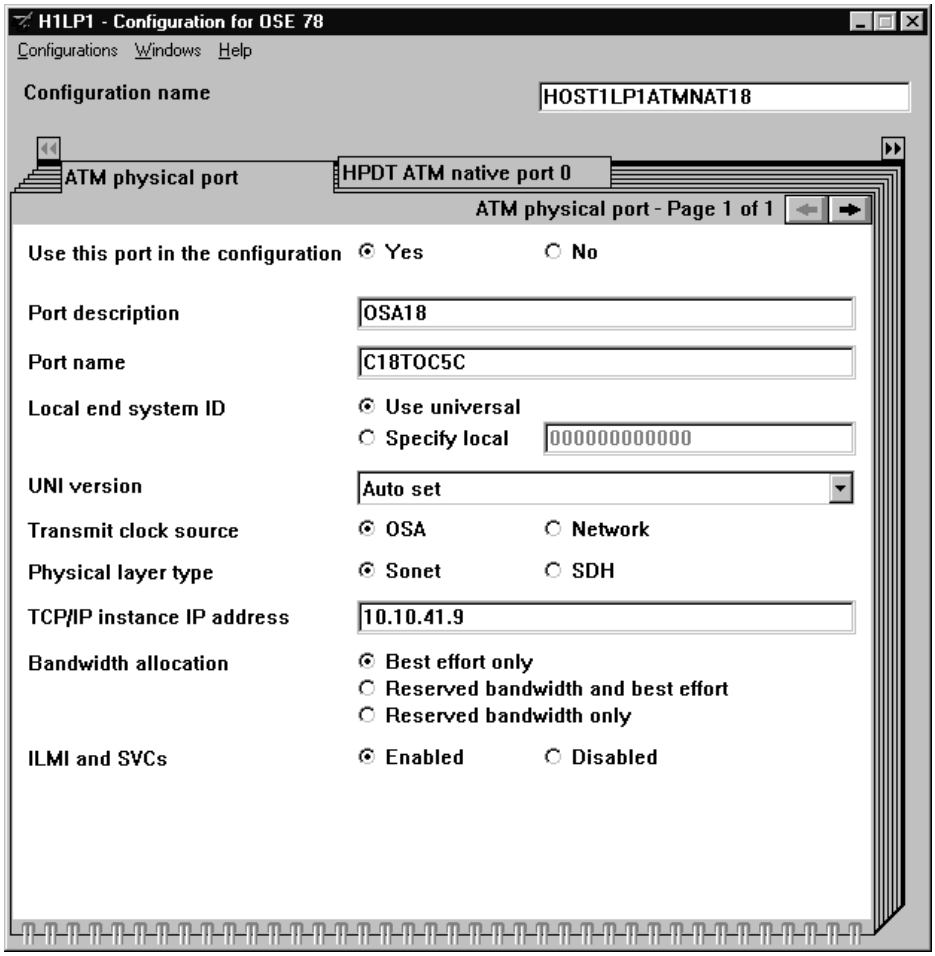


Figure 79. The ATM Physical Notebook Page is Required for Both ATM Native and ATM LEC Modes

Use this port in the configuration

Select Yes unless you are configuring for partial activation on an OSA-Express ATM feature with ports previously configured. In that case, select No, since you are not changing the physical port.

Port description

This field is available for any useful information you want to enter.

Port name

For OSE CHPIDs it must match the name you define in the TCP/IP profile DEVICE and LINK statements for SNMP. If you are not using SNMP, this field is ignored and can be used for additional information for your installation. Must conform to the following rules:

- Specify 1 through 8 of any of the following characters: A through Z in upper case, @, #, $ and, starting with the second character, 0 through 9.
- For OSE CHPIDs using SNMP, this must match the name you defined in the TCP/IP profile DEVICE and LINK statements.
- Do not duplicate a port name across OSA ATM features that are to be used in the same mode in the same logical partition.
- Do not specify identical names for the port name and the OSA name of the same ATM OSA.
- For ATM Native, you must also specify the port name in the XCA Port statement and the TRL TRLE statement.

Local end system ID
Allow this parameter to be set to the universal MAC address of the OSA-Express, or specify a local MAC address.

UNI version
This parameter is settable only if the **ILMI and SVCs** field is enabled. Check the documentation of the ATM switch to which this ATM OSA-Express is attached.

- Accept the default of Autoset if the ATM switch specifies either UNI 3.0 or UNI 3.1.
- Select UNI 3.0 or UNI 3.1 if the ATM switch specifies Autoset.

Transmit clock source
Either setting should be acceptable to most ATM switches, but you should generally accept the default. The SONET/SDH protocols accommodate differences in clocking by adjusting the pointers in the SONET/SDH frame. OSA synchronizes its transmit clock to the derived receive clock. If the received data stream is lost, OSA reverts to its locally-generated clock.

- Accept the default of OSA if the ATM OSA-Express generates the transmit clock.
- Select Network if the source of the transmit clock comes from the ATM network.

Physical layer type

Check with the documentation of the ATM switch or the network provider to see which type of physical layer is used to provide, through a framing structure, the payload envelope necessary for the transport of ATM cells.

- Accept the default of SONET if the network uses the Synchronous Optical Network (SONET) physical layer.
- Select SDH if the network uses the Synchronous Data Hierarchy physical layer. SDH is recommended by ITU as the counterpart to SONET.

TCP/IP instance IP address
IP address of SNMP management application.

To set up the ATM Native mode, continue with **Bandwidth allocation**.

To set up ATM LAN emulation, go to “ATM LEC Port Page 1 of 5 (Implementation Values)” on page 167.

For ATM Native Only

The remaining two parameters are required only for ATM Native mode.

Bandwidth allocation

- You can reserve bandwidth on an ATM OSA-Express for the virtual circuits that you define for the HPDT **ATM Native mode**. Note that VTAM and the SNA functions of Communications Server utilize reserved bandwidth, but the TCP/IP function of Communications Server does not. For a general discussion in this book on bandwidth, see page 161.
- Specify **Best Effort Only** if you define only BE SVCs and BE PVCs in this mode for this ATM OSA-Express and do not reserve any bandwidth.
  - You can specify up to 4,096 BE virtual circuits.
  - You can define up to 256 PVCs as long as the total number of virtual circuits does not exceed 4,096.

  - The number of SVCs that you can define is the remainder from subtracting the number of PVCs from 4,096.
  - For each virtual circuit that you define, specify a peak cell rate only, not a sustained cell rate.

    The default and maximum peak cell rate for an ATM OSA-Express is 353,207 ATM cells/second, which is approximately 149.76 Mbps including the cell headers or 135.63 Mbps calculating the 48 bytes/cell payload only.

- Specify **Reserved Bandwidth Only** if you reserve bandwidth for each virtual circuit that you define in this mode for this ATM OSA-Express and do not define any BE virtual circuits.
  - Reserving bandwidth is not meaningful if you are defining for the transfer of IP packets because the TCP/IP function of CS for OS/390 and the TCP/IP function of network Communications Server do not utilize reserved bandwidth.
  - The aggregate amount of bandwidth that you can reserve across the ATM OSA-Express port is:
    - 4.5 MBps (36 Mbps) for both the outbound and inbound data traffic through the port.

      ```
      4,500,000 / 48 (payload bytes/cell) = 93,750 ATM cells/sec.
      4,500,000 / 53 (payload+cell header bytes/cell) = 84,906 ATM cells/sec.
      ```

    - 3 MBps (24 Mbps) for either the outbound or inbound data traffic through the port as long as the maximum for both directions is not exceeded.

      ```
      3,000,000 / 48 (payload bytes/cell) = 62,500 ATM cells/sec.
      3,000,000 / 53 (payload+cell header bytes/cell) = 56,604 ATM cells/sec.
      ```

  - You can define up to 400 virtual circuits if you reserve bandwidth for all of them.
  - Of these virtual circuits, 256 can be PVCs.
  - Define a sustained cell rate for each virtual circuit. This cell rate, or bandwidth, will be reserved for the specified virtual circuit, when it is active.
  - If the specifications of the ATM switch and network provider allow it, you can also specify a peak cell rate and the size of the cell burst to be sent at the peak cell rate (page 165).

- Specify **Best Effort and Reserved Bandwidth** if you reserve bandwidth for some, but not all, of the virtual circuits that you defined in this mode for this ATM OSA-Express.
  - The aggregate amount of bandwidth that you can reserve is the same as if you reserve all the bandwidth: 4.5 MBps (36 Mbps) for data traffic across the OSA port in both directions; 3 MBps (24 Mbps) for data traffic that is either outbound from, or inbound to, the OSA port.
  - You can reserve bandwidth in any combination of SVCs and PVCs for up to 200 of the virtual circuits that you define as long as you do not exceed the aggregate amount of bandwidth available. Reserving bandwidth is meaningful for a virtual circuit whose zSeries or S/390 endpoint is VTAM or a Communications Server SNA application. For a Communications Server IP application, it has no effect.
  - You can define a total of 4,096 virtual circuits.
  - You can define up to 256 PVCs as long as you do not exceed the total of 4,096 virtual circuits.

– The number of SVCs that you can define is the remainder left from subtracting the number of PVCs from 4,096.

ILMI and SVCs

Check the documentation of the ATM switch to which the ATM OSA-Express is attached.

- Accept the default of Yes if the ATM switch supports the Interim Local Management Interface (ILMI) protocol. If you accept Yes, you must also select a value for the UNI version parameter.

  ILMI is required for signaling, which is required for SVCs. With ILMI, the ATM switch can provide the ATM 13-byte network prefix for this ATM OSA-Express's complete physical address, which is used for SVCs and is listed in the ATM OSA-Express port notebook.
- Specify No if the ATM switch does not support ILMI and SVCs. The UNI version parameter will then not be displayed on this panel and OSA/SF GUI lists it in the ATM OSA-Express port notebook as "Unused".

Configuring ATM Native

The High Performance Data Transfer (HPDT) ATM Native mode requires the exclusive use of the OSA-Express. You can specify that the ATM OSA-Express transfers data across both permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) by defining these parameters in the ATM Native Port notebook pages.

If you are unfamiliar with PVC and cell rate concepts, you may find the following information helpful. If you have experience configuring ATM Native networks, proceed to page 162.

Permanent Virtual Circuits (PVCs)

A permanent virtual circuit (PVC) is identified by pre-arrangement and is supported in the HPDT ATM Native mode. For data traffic across a PVC, the forward direction is outbound from the OSA. The reverse, or backward, direction is inbound to the OSA.

In addition to defining a PVC to the ATM OSA-Express (using IOACMD or the OSA/SF GUI procedure that follows), you must define it as a transmission group (TG) to the VTAM XCA node (page 146.)

In HPDT ATM Native mode, you can define up to 256 PVCs. The total number of virtual circuits that you can define depends on how much bandwidth you reserve and across how many virtual circuits, as discussed on pages 158–160.

Virtual Path and Virtual Channel Identifiers (VPIs and VCIs)

Each virtual circuit is uniquely identified by a virtual path identifier (VPI) and a virtual channel identifier (VCI) within that virtual path.

- A *virtual channel* is a concept to describe the transport of ATM cells identified by a common and unique identifier (VCI) across a virtual circuit (ATM connection).
- A *virtual path* is a number of virtual channels that are bundled into the hierarchically greater unit of virtual path. A virtual path is a concept of transport of ATM cells that belong to the virtual channels that are associated by a common virtual path identifier (VPI) value.

ATM Cell Rates

By specifying the ATM cell rates, you set the forward and backward, or reverse, bounds of ATM cell transmission between the ATM OSA-Express and the ATM device to which it is attached.

In the HPDT ATM Native mode, you specify cell rates in ATM cells/second. An ATM OSA-Express supports a line speed of 155 Mbps. Of this, up to 149.76 Mbps are available for ATM cells including the cell headers or 135.63 Mbps for ATM cells excluding the cell headers, that is, only the 48 payload bytes/cell.

Determine the amount of bandwidth to reserve for a defined virtual circuit

- Although you can reserve bandwidth for IP data transfer in this mode, note that the TCP/IP function of Communications Server that serves as the zSeries or S/390 endpoint does not utilize reserved bandwidth.
- For a reserved bandwidth (RB) virtual circuit, you must define the following:
  - An acceptable sustained cell rate if you want that bandwidth to be reserved for that virtual circuit.
  - An acceptable cell burst size if you specify a sustained cell rate. If you specify a 0 (zero) cell burst size, the peak cell rate is ignored.
  - An acceptable peak cell rate if you either do not specify a sustained cell rate or if you specify a sustained cell rate with a non-zero burst size.
- If you do not reserve bandwidth for a virtual circuit in the HPDT ATM Native mode, that virtual circuit is called a best-effort (BE) virtual circuit.

  For a BE virtual circuit, the ATM OSA-Express makes its best effort at allocating the traffic characteristics for the virtual circuit given the traffic characteristics of the other active virtual circuits. The traffic characteristics are not continuously available for a BE virtual circuit, and it is therefore recommended that you specify a peak cell rate at the maximum speed that the OSA accepts, which is 353,207 ATM cells.

If you are assessing the achieved rates, you should take the following factors into account:

- Whether large volumes of data traffic are flowing in both directions between two endpoints. See the discussion in the next section.
- The Capacity parameter value (page 147).
- The average CPU utilization. If it exceeds 80%, the effects of resource contention can show non-linear characteristics in throughput.
- The available storage, including real storage, ECSA, private storage, CSM, and so on, should be sufficient. The effects of insufficient storage, such as paging, can increase the CPU requirements or reduce the maximum achievable throughput, or cause both conditions to occur.

Fully bi-directional virtual circuits are allowed to be specified with sustained cell rates. A fully bi-directional virtual circuit is one that carries equal volumes of traffic outbound from and inbound to the ATM OSA-Express port. If large volumes of traffic are required in both directions between two endpoints, however, it is strongly recommended that you divide the traffic flow over two virtual circuits to achieve the rated throughput. Each virtual circuit carries the bulk of traffic in one direction only, as shown in Figure 80 on page 162.

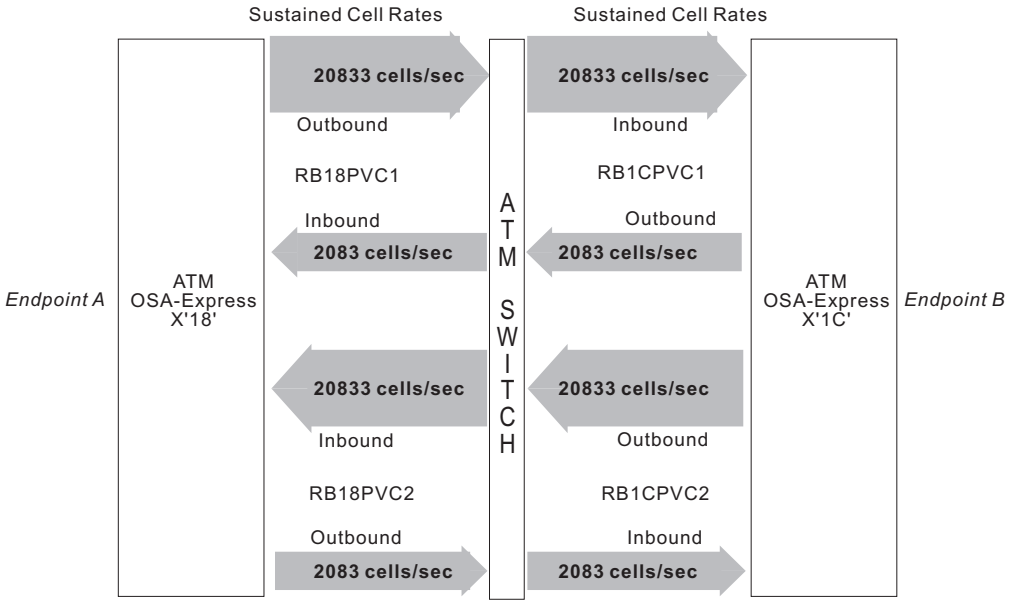


Figure 80. Two Virtual Circuits with One Inbound and One Outbound

Notes:

1. The traffic values shown are payload values, for example,

   ```
   1 MBps / 48 (payload bytes/cell) = 20833 ATM cells/sec.
   ```

2. Two PVCs are defined and named RB18PVC1 and RB18PVC2.

   Between ATM OSA-Express X'18' and the ATM switch, the PVC named RB18PVC1 is defined with a sustained cell rate of 20833 cells/second outbound: a much smaller volume, 2083 cells/second inbound.

   The PVC named RB18PVC2 is defined with a 2083 cells/second outbound and 20833 cells/second inbound.

3. Between ATM OSA-Express X'1C' and the ATM switch, the PVC named RB1CPVC1 carries the bulk of the inbound traffic and RB1CPVC2 carries the bulk of the outbound traffic.

ATM Native Port Page 1 of 2 (MPC OAT Entries)

Click the ATM Native port 0 tab at the top of the notebook page to display ATM Native page 1 of 2.

Set **Include in this configuration** to Yes unless you are using partial configuration for an LEC port. In that case, select No on this page.

Set **Enable LAN traffic** to Yes if you are using this port.

Click **Add** to specify an MPC OAT entry for this mode as shown in the format that is presented by OSA/SF GUI in Figure 81 on page 163.

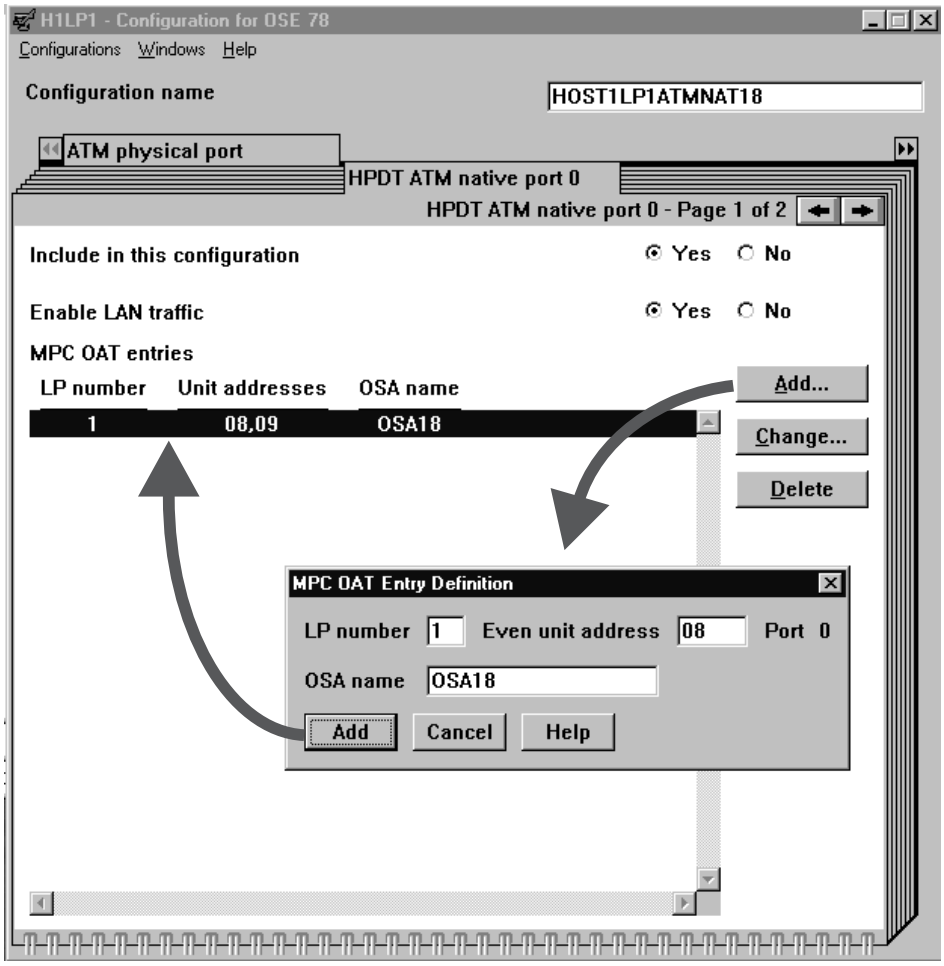


Figure 81. Define OAT Entries in ATM Native Notebook Page 1

LP number

If the OSA CHPID is defined as shared in the hardware I/O configuration (IOCDS), specify the LP number of the LP in which the instance of VTAM is running to which this OAT entry applies.

Otherwise, specify 0.

Even unit address

In “Define OSA Devices” on page 38, you specified one or more sets of device numbers for each mode this OSA uses. In this space, specify the lower, even number unit address that corresponds to the device number that starts this series for this mode.

OSA name

The OSA name specified in the TRL macro (page 144).

- Specify 1 through 8 of the following characters: A through Z in upper case, @, #, $, and, starting with the second character, 0 through 9.
- Do not use the same OSA name for ATM OSA-Express features that will be configured for ATM Native mode in the same logical partition.
- Do not give an ATM OSA-Express the same OSA name that was used for Port name. Do not use the same name that was specified for any of the PVC names.

If you are adding more than one entry, select **Add** after each entry and then type over the previous information. When you are finished adding entries, select **Cancel**.

Click the right arrow next to the notebook page number to display ATM Native Port Page 2 of 2.

ATM Native Port Page 2 of 2 (PVC Definitions)

ATM Native Port page 2 of 2 allows you to create permanent virtual circuit (PVC) definitions.

Creating a PVC Definition:

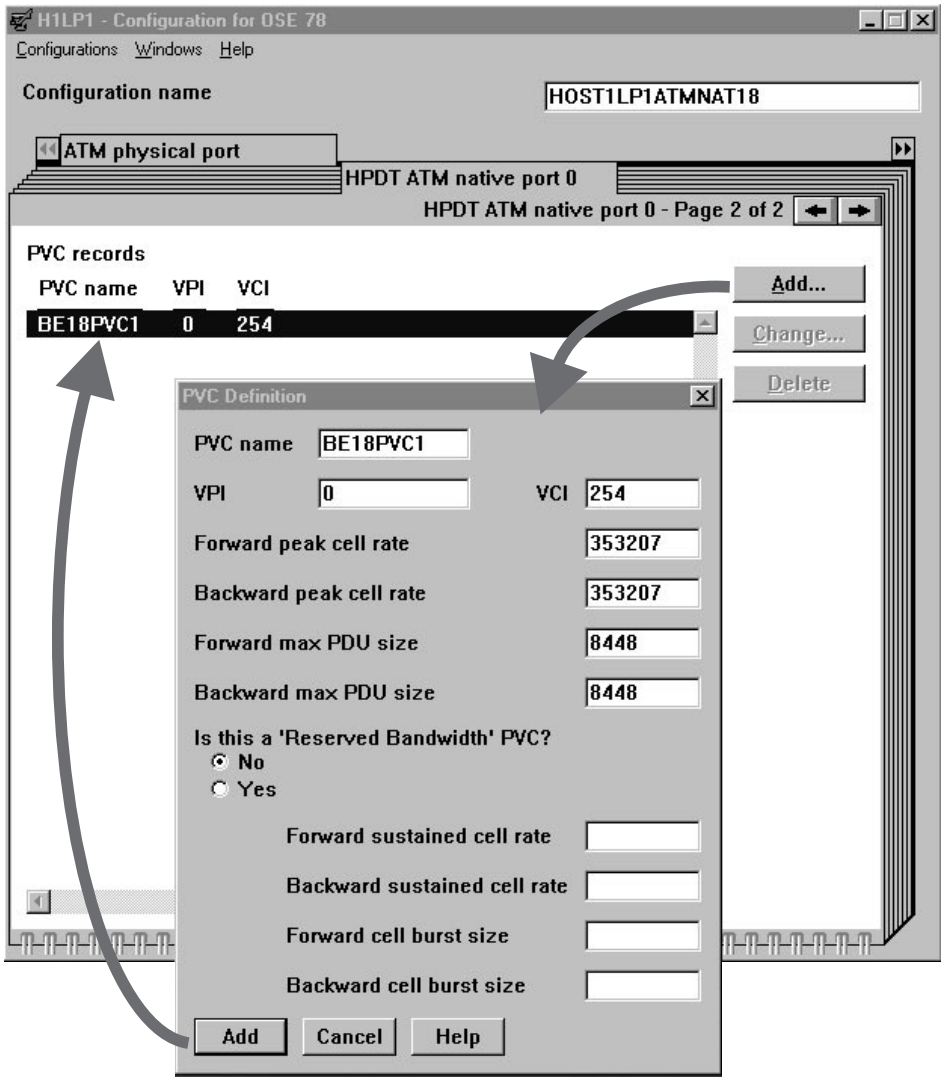


Figure 82. PVC Definitions Dialog for ATM Native Notebook Page 2

Click **Add** to specify a PVC definition.

PVC name

- Provide a name for each PVC. In the example, the PVC is named BE18PVC1.
- Specify 1 through 8 of the following characters: A through Z in uppercase, @, #, $, and, starting with the second character, 0 through 9.

- Also specify the PVC name to VTAM on the LINE statement for the PVC group in the XCA macro.

VPI

- Identify each PVC with a unique (VPI/VCI) value.
- The VPI *value* can be 0 through 15.

VCI

For each PVC, specify a VCI *value* from 32 through 8191.

Forward and backward peak cell rate

- You must specify a peak cell rate for each direction, but do not exceed 353207 ATM cells/second.

  ```
  353,207 * 48 (payload bytes/cell) * 8 (bits) = about 135.63 Mbps.
  ```

- For a BE virtual circuit, it is recommended that you specify the highest peak cell rate that is acceptable to both endpoints.
- If you also specify a sustained cell rate and a non-zero cell burst size, note that some practical results indicate that a peak cell rate at 33% higher than the sustained cell rate can help to achieve a sustained rate over an extended period of time.
- If you also specify a sustained cell rate and a 0 (zero) cell burst size, the peak cell rate is ignored.

Forward and backward max PDU size

Specify the maximum protocol data unit (PDU) size for each direction in a PVC. The maximum PDU size is equal to the size of one frame that can be processed in that direction for the ATM AAL5 SDU layer.

For either SNA or IP data transfer. specify a number from 64 through 9188. There is no default.

For SNA data transfer, correlate the maximum PDU size with the maximum RU size that you specify in the VTAM logmode table as stated below. The same guidelines apply to the maximum PDU size that you specify for an SVC in the SWNET major node.

- If the maximum RU size is 8192 bytes or greater, set the maximum PDU size at 8448 bytes (8192 + 256).
- If the maximum RU size is 1024 bytes, set the maximum PDU size at 1280 bytes (1024 + 256).
- If the maximum RU size is greater than 1024 bytes and less than 8192 bytes, set the maximum PDU size at (maximum_RU_size + 256) bytes.
- For an SVC, you do not have to specify a maximum PDU size of 8448 bytes. If you specify a different maximum PDU size, you must specify this value on the PATH DLCADDR with operand 61 statement in the SWNET macro.
- For a PVC, you specify the maximum PDU size on the OSA/SF GUI ***PVC Definition*** dialog.
- For more information on maximum RU sizes, see the *VTAM Resource Definition Reference,* which is listed in the bibliography (page xviii).

For IP data packet transfer,

- The maximum PDU size must be at least equal to the size of the TCP/IP MTU plus 8 bytes.

- If you accept the default MTU size in the IP ATM LIS statement of 9180 bytes, specify a maximum PDU size of 9188 (9180 + 8). Note that you can change the TCP/IP MTU in the ATM LIS statement. For that information, see the IP Configuration books listed in the bibliography (page xvi).

Is this a 'Reserved Bandwidth' PVC?

If you have not already done so, check the documentation of the ATM switch and network provider to make sure the cell rates and cell burst sizes that you specify are allowed at both endpoints. For more information, see page 161.

- Classical IP (IP over a Native ATM network) only supports Best Effort traffic.
- If you are not reserving bandwidth for this PVC, accept the default of No. You are finished defining this BE PVC.
- If you are reserving bandwidth for this PVC, select Yes and specify the sustained cell rates.

Forward and backward sustained cell rates

For information on how much bandwidth you can reserve, refer to pages 158–160.

Forward and backward cell burst size

- You may specify a cell burst size if you also specify a sustained cell rate.
- You cannot specify a cell burst size if you do not specify a sustained cell rate.
- Specify 0 if you want to negate the peak cell rate. You are finished defining this virtual circuit.
- Specify a non-zero number if you want cell bursts of this size to be transferred at the peak cell rate when the peak cell rate is being used.

  Results indicate that it is advisable to specify a cell burst size that equates with the maximum PDU size, for example:

  ```
  8448 (bytes) divided by 48 (payload bytes/cell) = 176 (cells)
  ```

What Next: Go to "Activating the OSA Configuration" on page 186.

Configuring ATM LAN Emulation

OSA-Express supports the ATM Forum's LAN Emulation 1.0 specification (see "Where to Find More Information" on page xv.

ATM LAN emulation (LANE) is a service that allows various ATM end-stations to communicate as if they were attached via a traditional Ethernet or token ring network. When the OSA-Express ATM feature is defined as an OSD channel, only Ethernet LAN emulation can be run.

When using ATM LAN Emulation

- All the S/390 definitions for OSA-Express are made as if it contained traditional ethernet or token ring network interfaces. OSA-Express can concurrently support TCP/IP passthru and SNA device definitions.
- In the TCP/IP Passthru and SNA modes, all the virtual circuits are SVCs. A maximum number of 4096 SVCs per physical port can be distributed in any way across the CHPIDs two emulation client (LEC) ports. You do not define SVCs to OSA through OSA/SF, but you do define peak cell rates.

- OSA-Express can interoperate with other ATM end-stations, bridges, and routers conforming to the LANE specification to support any traditional LAN application.

The LANE 1.0 specification defines the major components in the LANE service: the LAN Emulation Server (LES), Broadcast Unknown Server (BUS), LAN Emulation Configuration Server (LECS), and LAN Emulation Client (LE Client, or LEC).

The end-stations are each represented by LE Clients. The LES, BUS, and LECS are generally network supplied services. Each LES/BUS pair represents an Emulated LAN (ELAN). There can be any number of ELANs operating on an ATM network. The LECS is an optional component which provides configuration data for the LE Clients and directs them to join specific ELANs. Without an LECS, it is necessary to manually configure each LE Client to assign it to a given ELAN with the correct configuration parameters.

OSA-Express is an end-station capable of supporting 2 LE Clients, which can each be configured either as an Ethernet or token ring adapter. The two LE Clients cannot be assigned to the same ELAN.

ATM LEC Port Page 1 of 5 (Implementation Values)

Click on the HPDT ATM LEC port 0 (or port 1) tab to display page 1 of the ATM LEC port configuration notebook. If the ATM LEC tabs are not visible, click on the double arrows at the upper right corner of the notebook.

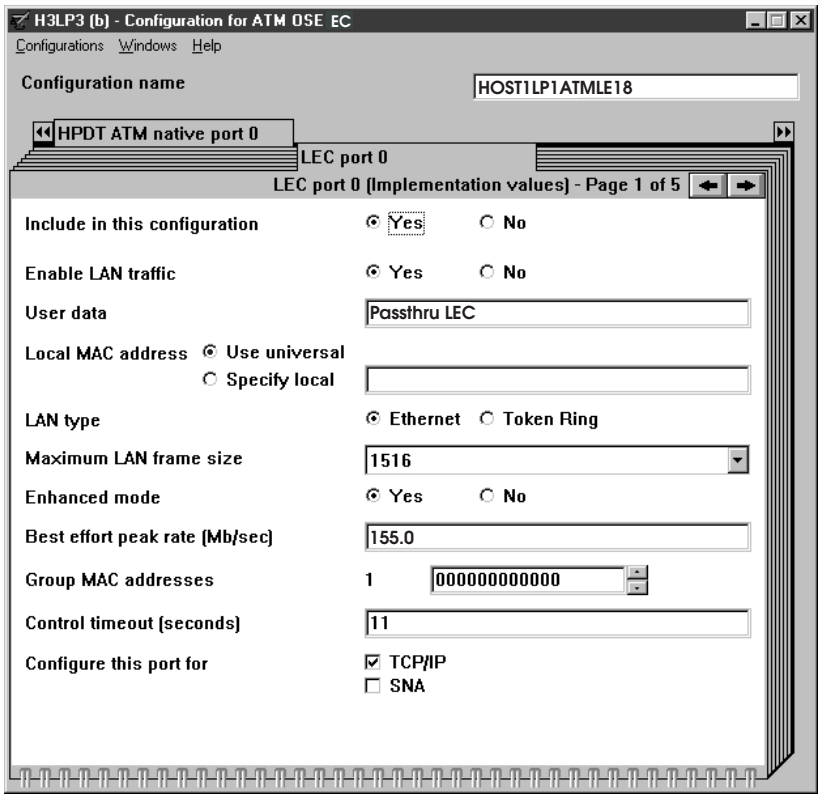


Figure 83. ATM LEC Notebook Page 1 (Implementation Values)

Include in this configuration

Select Yes unless you are configuring for partial activation and you are ***not changing*** this port.

Configure ATM, TR, and FENET Using the GUI

Enable LAN traffic
Select Yes to run traffic on this port.

User Data
Enter up to 32 characters of descriptive information about this port.

Local MAC address

If you override the default of the universal media access control (MAC) address that was IBM-supplied for this LEC port, specify a locally administered one that is valid for the emulated LAN to which the LEC port will be attached.

A LEC port can be logically attached to either an emulated token ring LAN or an emulated Ethernet LAN. Each LAN type has its own requirements for a locally administered MAC address.

LAN type
Select Ethernet or token ring.

Maximum LAN frame size

Specify one of the following values for any of the emulated LAN types for the maximum AAL5 SDU (PDU) size that includes both the header and the payload in the frame.

1516 bytes, which is the default for an Ethernet LAN.
4544 bytes, which is the default for a 4Mbps token ring LAN.
9234 bytes, which is a standard in *LAN Emulation Over ATM,* published by the ATM Forum.
18190 bytes, which is the default for a 16 Mbps token ring LAN.

Enhanced mode

- Select No if you want the LEC port to drop its data direct connections to other LECs if and when it loses its connection with its LAN emulation server (LES).
- Select Yes if you want this LEC port to keep its data direct connections to other LECs if its LES connection is lost and until that LES connection is regained. (The value for aging time is ignored in this interim period.)

  Note that this choice is not compliant with the ATM specification. Also, the LEC port cannot establish a new data direct connection until it regains its LES connection.

Best effort peak rate (Mb/sec)

The IBM-supplied default value is 155.0 Mbps, which is the maximum live speed supported by an ATM OSA-Express.

- Only best effort switched virtual circuits (BE SVCs) are supported in TCP/IP Passthru and SNA modes operating on the LEC platform.

  For a BE virtual circuit, the ATM OSA-Express makes its best effort to allocate the traffic characteristics for the virtual circuit given the traffic characteristics of the other active virtual circuits. The traffic characteristics are not continuously available for a BE virtual circuit, and it is therefore recommended that you specify a peak cell rate at the maximum speed that the OSA accepts, which is 353,207 ATM cells.
- Make sure that the peak cell rate is acceptable to the ATM switch to which the ATM OSA-Express is attached.
- Make sure the peak cell rate is acceptable to the clients on the LAN. Generally, it is advisable to set the peak cell rate on the LEC platform to the peak rate that is acceptable to the slowest LEC on the emulated LAN.

If you set a value that is greater than the slowest LEC, make sure that communications can handle overruns from any LEC that is slower than the peak cell rate set on the LEC platform.

- If you set the peak cell rate, specify to no more than one decimal place. In other words, you can set the value to 99.0 or 99.1 Mbps, but not to 99.05 Mbps.

Group MAC addresses

Enter the MAC address of any destination group for which you want this port to receive frames. Multiple addresses can be entered, and changed, by clicking the arrows to the right.

Configure this port for

Select the emulation mode for this port.

Click the right arrow at the upper right corner of the notebook page to go to ATM LEC page 2 of 5.

ATM LEC Port Page 2 of 5 (Architected Values)

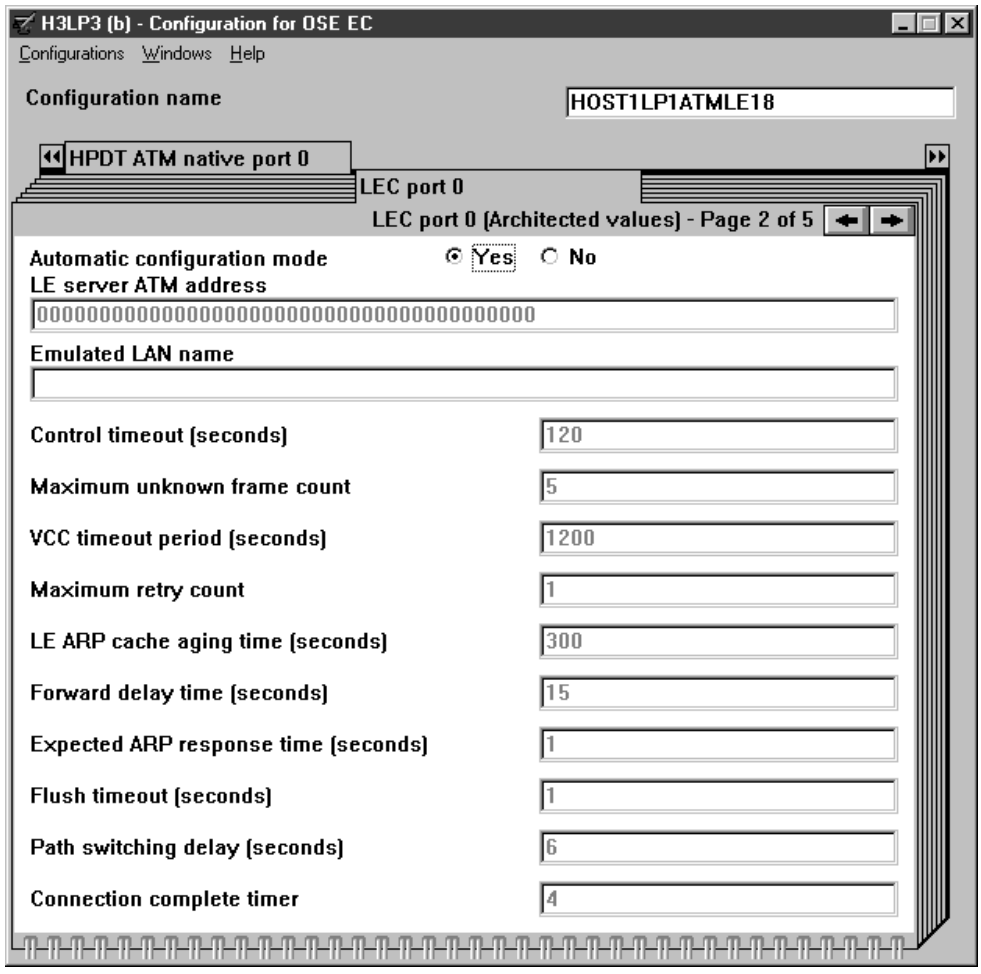


Figure 84. ATM LEC Notebook Page 2 (Architected Values)

Configure ATM, TR, and FENET Using the GUI

Automatic configuration mode
lets you take advantage of the automatic configuration of the LEC port by the LAN emulation configuration server (LECS) when a LECS is available in the ATM network.
- Accept the Auto default to use the LECS, but make sure that this optional element is available on the ATM network.
- Select Manual if you want to enter the following ATM LEC parameters manually or you want to override the LECS automatic configuration.

LE server ATM address
is required only if you are configuring the LEC port manually. Then, specify this 40-hexadecimal-digit address, which you should be able to get from your ATM network administrator. Because the two LEC ports on an ATM OSA-Express cannot join the same emulated LAN concurrently, you cannot specify the same LES ATM address for both LEC ports.

Emulated LAN name
is the name of the emulated LAN (ELAN) of this LEC port. You only have to specify the ELAN name if you are entering the LEC parameters manually. When automatic configuration mode is selected the emulated LAN name will be acquired when the packet size is matched. If the LES supports a default ELAN name, you can enter a null character to specify that default ELAN name.

Specify the name (identity) in up to 32 ASCII characters. Note that some ATM switches, for example, the 8260, are case-sensitive. Ask your ATM network administrator for the name of the emulated LAN that this LEC port will join. (The two LEC ports on an ATM OSA-Express cannot join the same emulated LAN concurrently.)

Control time-out
specifies the time-out period in seconds for most request/response control frame interactions. Accept the default of 120 seconds or specify a number from 10 through 300.

Maximum unknown frame count
specifies the maximum number of frames for a given unicast MAC address (this LEC port) that can be sent to the Broadcast and Unknown Server (BUS) within the time interval specified by the Maximum unknown frame time parameter.

Accept the default of 5 frames or specify a number from 1 through 10. The Maximum unknown frame time interval is not settable. (A BUS handles data sent by a LEC to a broadcast MAC address.)

VCC timeout period (seconds)
specifies the activity time-out for data direct VCCs in seconds, that is, the time the LEC port (station) will maintain an inactive data connection. The default is 1200 seconds (20 minutes). You can specify a value from 1 through 2,147,483,648.

Maximum retry count
indicates the maximum times that an LAN emulation address resolution protocol (LE_ARP) request can be retried. Accept the default of 1 retry or specify 0, 1, or 2.

LE_ARP cache aging time (seconds)
is a verification timer for the LE_ARP cache entries. Accept the default of 300 seconds or specify a number from 10 through 300.

Forward delay time (seconds)
is a verification timer for non-local (destinations on the other side of a bridge from this ATM OSA-Express) LE_ARP cache entries when the topology is changing in the non-local area. Accept the default of 15 seconds or specify a number from 4 through 30.

Expected ARP response time (seconds)
is the time-out period for LE_ARP request/response exchanges. Accept the default of 1 second or specify a number from 1 through 30.

Flush time-out (seconds)
is the time-out period for Flush request/response exchanges. Accept the default of 1 second or specify a number from 1 through 4.

Path switching delay (seconds)
is the maximum time that frames sent to the BUS will take to be delivered. This parameter can be used to bypass flush control. Accept the default of 6 seconds or specify a number from 1 through 8.

Connection-complete timer
is the time-out period in which data or a READY_IND message is expected from a calling party. Accept the default of 4 seconds or specify a number from 1 through 10.

What Next: For Ethernet emulation using channel type OSD, this configuration is now complete. Save it and enter additional configurations, if desired, or go to "Activating the OSA Configuration" on page 186.

For channel type OSE, enter the remaining configuration data for the mode of your choice:

TCP/IP
Continue at "The TCP/IP OAT Entries Page" on page 176.

SNA Continue at "The SNA Settings Page" on page 178.

FENET Configuration Data

If the OSA-Express FENET feature is set up as channel type OSD (using QDIO architecture), only the Configuration window is displayed (Figure 85 on page 172) and no entries are required. You can specify local and group MAC addresses, and make port speed selections on this window if you wish.

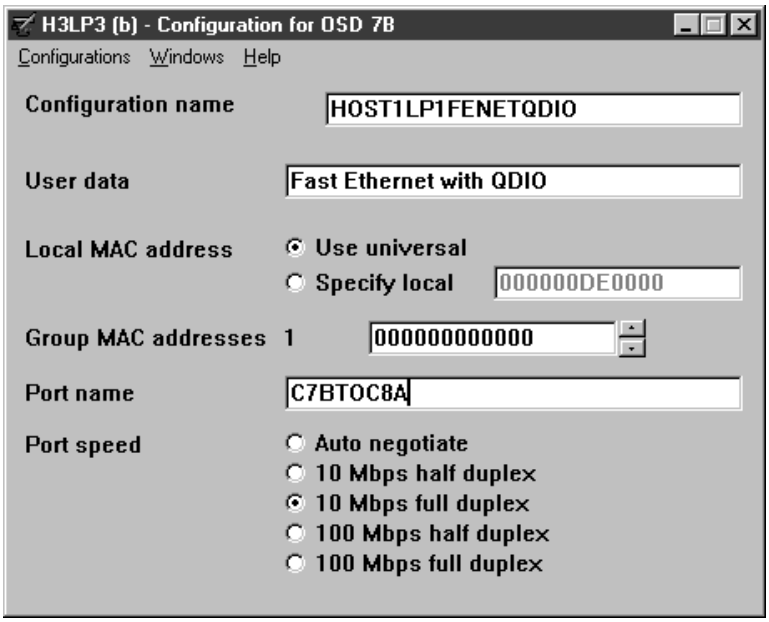


Figure 85. FENET Configuration for OSD Channel

This window differs only slightly from the first configuration notebook page displayed when configuring an OSA-Express FENET as an OSE channel (Figure 86). All parameters defined below appear in both the OSD and OSE windows except the checkboxes for TCP/IP, SNA, and MPC, which are not configurable on an OSD channel.

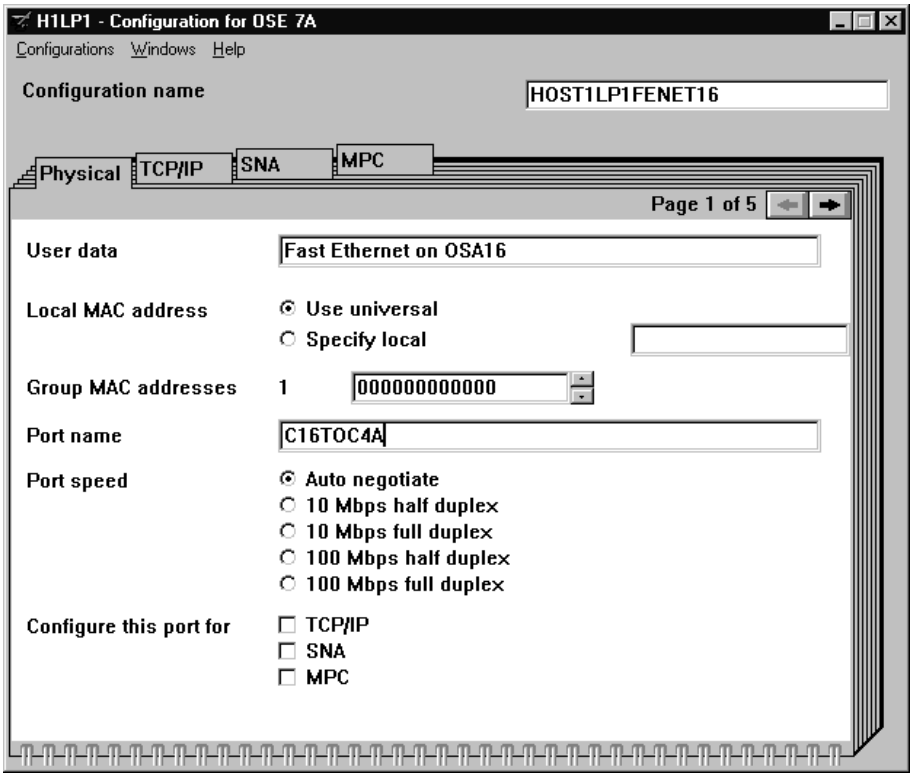


Figure 86. FENET Physical Connection Data for OSE Channel

User Data
Enter up to 32 characters of descriptive information about this port.

Local MAC address
If you override the default of the universal media access control (MAC) address that was IBM-supplied for this FENET port, specify a locally administered one that is valid for the LAN to which the FENET port will be attached.

Group MAC addresses
Enter the MAC address of any destination group for which you want this port to receive frames. Multiple addresses can be entered, and changed, by clicking the arrows to the right.

Port name
For OSE CHPIDs using SNMP, this must match the name you defined in the TCP/IP profile DEVICE and LINK statements. If you are not using SNMP, this field is ignored and can be used for additional information for your installation.

Port speed
Auto-negotiate is the IBM-supplied default for the OSA-Express FENET feature.

In auto-negotiate mode, the FENET OSA-Express exchanges data with the connected device and establishes the best possible mode of operation. If the Ethernet hub, router, or switch to which the FENET OSA-Express port is attached does not support auto-negotiation, the speed and duplex mode should be set manually at both ends of the link. If auto-negotiate is left enabled, the negotiation process will fail and the FENET OSA-Express will attempt to enter the LAN at the default speed of 100 Mbps in half-duplex mode.

If you set the LAN speed or duplex mode, those settings override the auto-negotiate default. Make sure both ends of the link are set the same.

In order for any change to the port speed, duplex setting, or both, to be implemented, the port must be disabled and then enabled for LAN traffic. This is automatically done when making these changes using OSA/SF. If you change these settings using the System Element, you must disable and enable the port manually.

For OSD Only:
If you made any changes in this window, the configuration is now complete. Save it and define additional configurations, if desired, or go to “Activating the OSA Configuration” on page 186.

Configure this port for (OSE only)
Select the mode you want to configure. Then tab to the corresponding notebook page.

TCP/IP
Continue at “The TCP/IP OAT Entries Page” on page 176.

SNA Continue at “The SNA Settings Page” on page 178.

MPC Not applicable for zSeries OSA-Express FENET.

Token Ring Configuration Data

If the OSA-Express TR feature is set up as channel type OSD (using QDIO architecture), only the Configuration window is displayed (Figure 87) and no entries are required. You can specify local and group MAC addresses, and make port speed selections on this window if you wish.

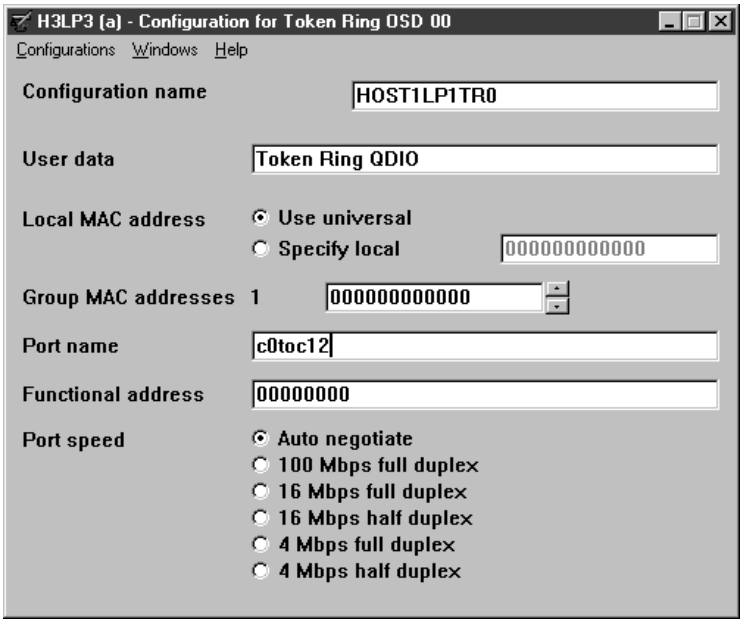


Figure 87. TR Configuration for OSD Channel

This window differs only slightly from the first configuration notebook page displayed when configuring an OSA-Express TR as an OSE channel (Figure 88). All parameters defined below appear in both the OSD and OSE windows except the checkboxes for TCP/IP and SNA, which are not configurable on an OSD channel.

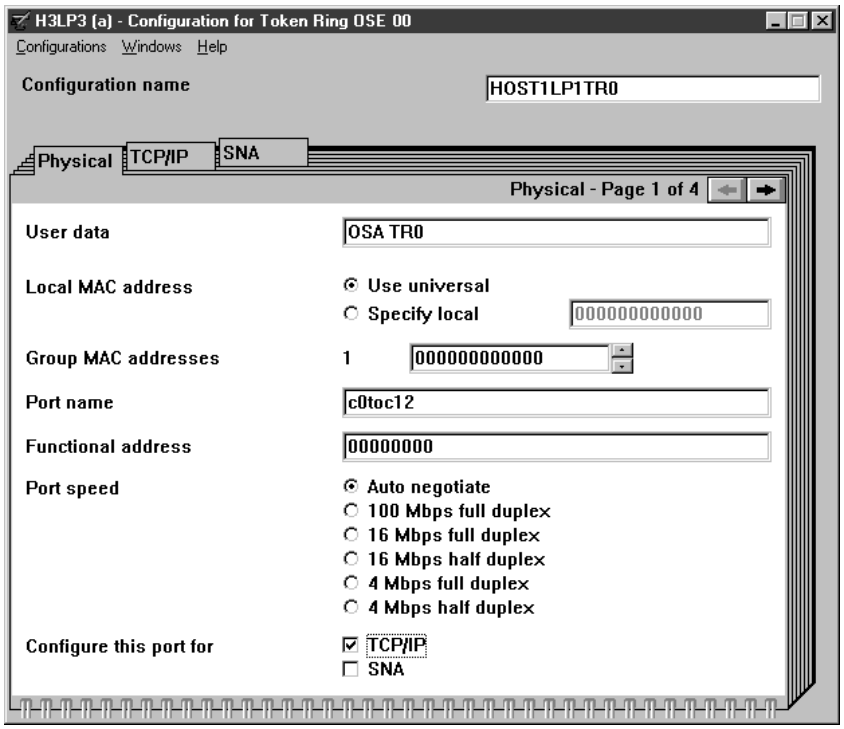


Figure 88. TR Physical Connection Data for OSE Channel

User Data
Enter up to 32 characters of descriptive information about this port.

Local MAC address
If you override the default of the universal media access control (MAC) address that was IBM-supplied for this TR port, specify a locally administered one that is valid for the LAN to which the TR port will be attached.

Group MAC addresses
Enter the MAC address of any destination group for which you want this port to receive frames. Multiple addresses can be entered, and changed, by clicking the arrows to the right.

Port name
This parameter is ignored and available for user information.

Port speed

- Autosense is the IBM-supplied default.

  If you allow the LAN speed to default to autosense, the OSA-Express Token Ring feature will sense the speed of the switch, MAU, or whatever device it connects to, and insert into the LAN at the appropriate speed. If the OSA-Express is the first station on the LAN, it will default to a speed of 16 Mbps and will attempt to open in full duplex mode. If unsuccessful, it will default to 16 Mbps half duplex mode.
- If you set the LAN speed or duplex mode, the OSA-Express will first attempt to attach to the LAN at the specified speed/mode. If it cannot successfully do so, it will convert to auto-negotiate and attach to the LAN at the speed/mode that is already in use.
- In order for any change to the port speed, duplex setting, or both, to be implemented, the port must be disabled and then enabled for LAN traffic.

This is automatically done when making these changes using OSA/SF. If you change these settings using the Support Element, you must disable and enable the port manually.

Functional Address

The bit mask of all token ring functional addresses for which this port will accept frames. This should be 8 non-blank hex (0 through F) characters.

Bits 1–31 of this address are compared to bits 0–30 of the functional address of the incoming frame. If at least one pair of matching bits is 1, the port receives the frame.

For OSD Only:

If you made any changes in this window, the configuration is now complete. Save it and define additional configurations, if desired, or go to “Activating the OSA Configuration” on page 186.

Configure this port for (OSE only)

Select the mode you want to configure. Then tab to the corresponding notebook page.

TCP/IP

Continue at “The TCP/IP OAT Entries Page”.

SNA Continue at “The SNA Settings Page” on page 178.

The TCP/IP OAT Entries Page

Define TCP/IP OAT entries on ATM LEC Page 3 of 5 , TR Page 2 of 4, or FENET Page 2 of 5.

Click the arrows at the upper right corner of the notebook until the correct page is displayed. Then click **Add** to display the dialog shown in Figure 89 on page 177.

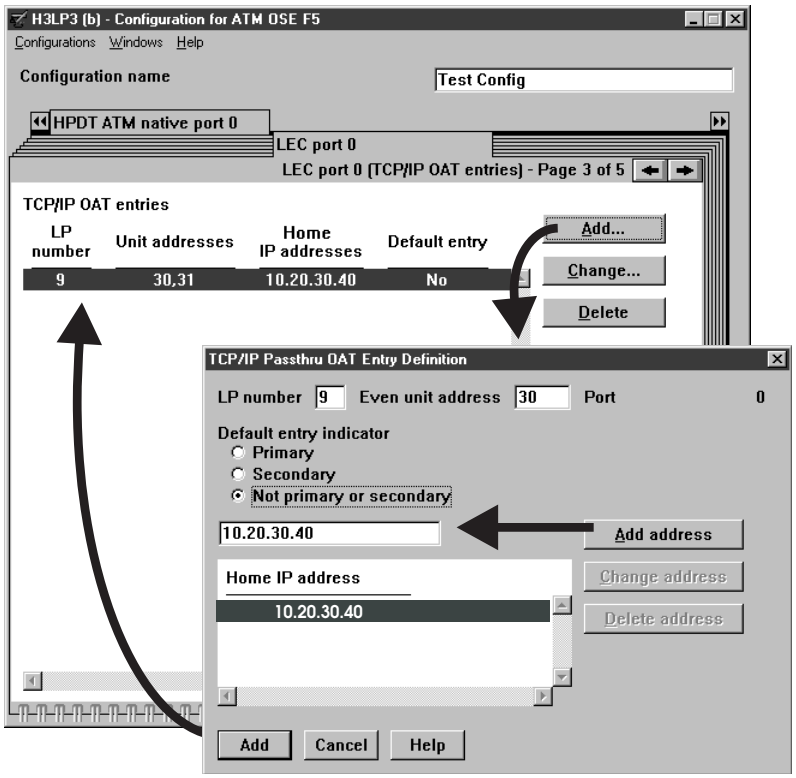


Figure 89. TCP/IP OAT Entry Definition Notebook Page

LP #

If the OSA is defined to be shared, specify the LP number with which you want to associate the datapath specified by this OAT entry. If the OSA is not defined to be shared, enter 0.

Even unit address

In “Define OSA Devices” on page 38, you specified one or more sets of device numbers for each mode this OSA uses. In this space, specify the lower, even number unit address that corresponds to the device number that starts this series for this mode.

Port

The port number (0 for a FENET or TR OSA-Express; 0 or 1 for an LEC port on an ATM OSA-Express) is displayed. This is preset and cannot be changed.

Home IP address

Specify the Home IP address of the IP stack of the LP that is specified in this Passthru OAT entry if

- The device pair used in this mode for the OSA is defined in the system hardware I/O configuration as shared and you want more than one IP stack to have concurrent access to this OSA port. When defining an OAT for OSA-Express port sharing in TCP/IP Passthru mode, you can have a maximum of 512 IP addresses per port, distributed over multiple OAT entries. If you are running two LEC ports through an OSA-Express ATM feature, you can have up 512 IP addresses on each LEC port. You cannot, however, exceed 8 IP addresses per OAT entry for any OSA-Express feature.

- You are configuring the OSA to run concurrently in another mode.

Default entry indicator

You can override the default (Not primary or secondary) to specify this Passthru entry as the primary, or only, inbound default data path to be used in this mode. The OSA will send each IP data packet with an unknown address across the data path specified by this OAT entry.

You can also specify this as the secondary default data path to be used should the primary be unavailable.

Note: If you are adding more than one entry, select **Add** after each entry and then type over the previous information. When you are done adding entries, select **Cancel**.

What Next

Define additional configurations, if desired. For SNA, continue below. When all modes are set, go to “Activating the OSA Configuration” on page 186.

To set or change a Local MAC address, Group MAC addresses, or User Data, see “MAC Addresses and ESIs” on page 192.

The SNA Settings Page

Specify SNA Timer Values on ATM LEC Port Page 4 of 5, TR Page 3 of 4, or FENET Page 3 of 5. Click the arrow at the upper right corner of the notebook until the correct page is displayed. The following panel values are shown in their initialized states.

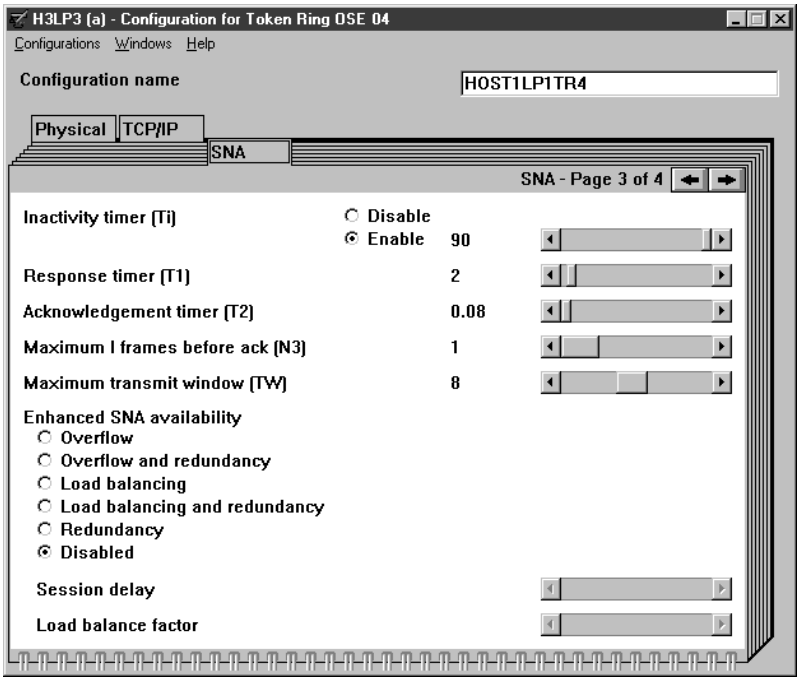


Figure 90. SNA Values Notebook Page. Selections for Enhanced SNA availability display only for token ring CHPIDs. See “SNA Session Availability Options for Token Ring” on page 181.

Inactivity timer (Ti)

For an ATM, TR, or FENET OSA-Express port, the Ti timer is initialized to be enabled and set to its maximum value of 90 seconds.

- You can disable or enable the Ti timer.
- If the Ti timer is enabled, you can set its timeout value in increments of 0.12 seconds from 0.24 to 90.00 seconds.

An enabled inactivity timer (Ti) periodically tests the viability of the network media. The timer setting applies to all the clients on the target LAN, not to individual clients. The timer interval indicates how quickly a failure of the network media can be detected when the connection is quiescent.

- If the Ti timer times out, a supervisory poll frame is sent over the connection. The T1 response, or reply, timer clocks the supervisory poll.
- If the T1 timer times out, the supervisory poll is retransmitted. OSA can retransmit a supervisory poll up to 8 times.
- If no response is received after the last retransmission, the link is declared inoperative, and the S/390 program issues a message.

If you set the Ti timer, make sure its interval exceeds the T1 timer limit. Consider setting the Ti timer to a value that is at least 5 times greater than the T1 timer.

If you set the Ti timer using the REXX interface and you do not specify the increment properly, OSA/SF rounds the value up to the nearest increment.

Response timer (T1)

The T1 timer clocks link events that require responses from clients on the network. These link events include SABME / UA exchanges, I-frame link protocol data unit (LPDU) transmissions, and supervisory polls.

T1 timer is initialized to 2 seconds and can be set to a timeout value from 0.20 up to 51.00 seconds in increments of 0.20 seconds. Set the T1 timer to a value not less than the average round-trip transit time from the OSA to the clients and back.

If the round-trip transit time is small, consider setting the T1 timer to a relatively low value because recovery will be initiated more quickly when an I frame is dropped. Further, a T1 timer interval that exceeds 2 seconds can result in noticeable delays to those responses that must be retransmitted. However, retransmissions should occur infrequently and only during bursts of peak activity on the network.

Check the timer parameter value that is specified in the XCA Port Definition statement. Make sure the XCA timer is set to a value that is greater than (N2+1)*T1. Since N2=8 (retransmissions) for OSA, set the timer to a value that is greater than (9*T1). N2 = the maximum number of retransmissions.

If you set the T1 timer using the REXX interface and you do not specify a multiple of 0.20 seconds, OSA/SF rounds the value up to the nearest increment of 0.20 seconds to a maximum of 51 seconds.

Acknowledgment timer (T2)

An OSA starts the T2 timer when it receives an I-format LPDU and stops when it sends an acknowledgment. An acknowledgment is sent either when an outgoing I frame is sent, which acts as the acknowledgment, or when N3 number of I-format LPDUs has been received. If the T2 timer times out, the OSA must send an acknowledgment.

If the N3 Maximum I frames before ack setting = 1, which means only one I frame can be received before an acknowledgment is sent, the T2 timer is disabled.

If N3>1, this allows a maximum of N3 I-format link protocol data unit (LPDU) frames to be received before the OSA-Express sends an acknowledgment.

If you set the T2 timer, bear the following in mind.

- Set it to a value from 0.08 seconds up to 20.40 seconds in increments of 0.08 seconds.
- Set it to a value that is less than the T1 interval to ensure that the remote link station receives the delayed acknowledgment before the T1 timer expires. A typical value for the T2 timer is 0.08 seconds.
- Set it to a value that depends on the media speed and the maximum latency that can be tolerated to complete a transaction. This latency will be realized when a transaction contains a number of packets that is not divisible by the N3 value.

If you set the T2 timer using the REXX interface and you do not specify a multiple of 0.08 seconds, OSA/SF rounds the value up to the nearest increment of 0.08 seconds to a maximum of 20.40 seconds.

Maximum I frames before ack (N3)

When determining the maximum I-frames that can be sent before an acknowledgment is sent (N3 count) and the maximum number of outstanding I-format link protocol data units (LPDUs) (TW count), consider the N3 and TW counts that are set at the clients as well.

The N3 count is initialized to 1. For an ATM, TR, or FENET OSA-Express you can set the N3 count as an integer from 1–4.

The maximum number of I-format link protocol data units (LPDUs) that can be received by an OSA before it sends an acknowledgment (N3 count) is also called the receive window count.

For an ATM, TR, or FENET OSA-Express set N3>1 only if you want to reduce the number of acknowledgment frames sent by the OSA. Bear in mind that N3>1 can result in increased latency.

Do not set the N3 count to a value that is greater than the TW count set any of the clients. Otherwise, network response can be severely degraded.

Maximum transmit window (TW)

The TW count is initialized to 8. You can set it only for an ATM, TR, or FENET OSA-Express. Set it as an integer from 1–16.

The maximum number of outstanding I-format link protocol data units (LPDUs) (TW count) is also called the maximum transmit window count or the maximum window out count.

The TW count allows the sender to transmit frames before that sender is forced to halt and wait for an acknowledgment. Therefore, the receiver should be able to absorb that number of frames, either in its service access point (SAP) buffers or within the buffers in workstation memory.

A small TW count reduces the risk that frames will be retransmitted owing to buffer congestion at the receiver.

In Summary:	ATM, TR, and FENET OSA-Express
Ti and T1 LLC timers	Settable
T2 LLC timer	Settable if N3>1
N3 count	Settable (N3=1–4)
TW count	Settable (TW=1–16)

Notes:

1. The maximum number of SAPs that can be opened is one for each application in each logical partition (LP).

   This number of SAPs excludes the null SAP.
2. For the SNA availability options (page 181), only one SAP can be opened per port with the exception of the Redundancy option for an ATM OSA-Express LEC port (page 184).

If you are not configuring an ATM feature for token ring LAN emulation, proceed to “The SNA OAT Entries Page” on page 185.

SNA Session Availability Options for Token Ring

When configuring an OSA-Express Token Ring feature or an OSA-Express ATM feature for token ring LAN emulation, several options appear on this page for enhancing the availability of SNA sessions for your TR or LEC ports.

Do not open more than one SAP unless you are using the Redundancy option.

Overflow: This option causes the specified port to stop responding to connection requests when it reaches its maximum station count, or PU limit. The maximum PU limit, which is defined for the port to VTAM or the SNA function of Communications Server, defines that port’s overflow threshold. Once the OSA port is in an overflow condition, it stops responding to connection requests.

Note that OSA makes no attempt to ensure even distribution of the clients across the participating OSA ports. If more than one port is responding to connection requests, the first response that the client receives typically determines which OSA port is selected for the connection. However, other factors can affect this selection. Therefore, the exact distribution of connections across the OSA ports depends on delays in the network and the implementation of the clients.

For example, assume the following configuration and current state.

Port	Option	Max PU limit	Current session count	Status
A	Overflow	347	347	Online (Note 1)
B	Overflow	300	183	Online (Note 2)
C	Overflow	347	27	Online (Note 2)

Notes:

1. With the current session count equal to the maximum PU limit, port A has reached its overflow threshold and stopped responding to connection requests.
2. Whether port B or port C is selected for a connection is governed by delays in the network.

Overflow and Redundancy: This option, together with the session-delay time that you define for the port, prescribes that the specified port delay its response to a connection request by that amount of time. This delay allows the port to provide a backup, or redundant, path for a port for which the overflow option is specified.

For example, assume the following configuration and current state.

Port	Option	Session delay	Max PU limit	Current session count	Status
A	Overflow	N/A	347	0	Failed
B	Overflow	N/A	300	300	Online (Note 1)
C	Overflow and Redundancy	0.32 sec	347	5	Online (Note 2)
D	Overflow and Redundancy	0.32 sec	300	62	Online (Note 2)

Notes:

1. With its current session count equal to its maximum PU limit, port B has reached its overflow threshold and stopped responding to connection requests.
2. Ports C and D will respond after their specified session delays, which is 0.32 seconds in this example. Additional connections will be established to ports C and D in an order that depends on delays in the network. The first port that reaches its maximum PU limit will stop responding, and any remaining connection requests will be logged onto the other port.

   For instance, suppose there are more connection requests and port D reaches its maximum PU limit first. Now, port C will respond to the remaining connection requests until it reaches its overflow threshold.

   In this example, a satisfactory redundant configuration is represented for up to 647 connections assuming that it was intended to accommodate the simultaneous failure of both ports A and B.

Load Balancing: With this option, you allow two or more ports to balance their connection requests. Load balancing is only related to the *number* of connections (PUs); it is not related to either the traffic volume or the workload across those connections.

For example, assume the following configuration and current state.

Port	Option	Load balance factor	Max PU limit	Current session count	Status
A	Load balancing	0.08 sec	256	256	Online (Note 1)
B	Load balancing	0.08 sec	480	256	Online (Note 2)
C	Load balancing	0.08 sec	1024	238	Online (Note 2)

Notes:

1. Port A has a maximum PU limit that is much lower (256) than the limit for ports B (480) and C (1024). Because port A has reached its maximum PU limit, it has stopped responding to connection requests.
2. The current session count for port B is 256 and for port C it is 238 sessions. Both ports will respond to connection requests.

Because the load balancing option has been specified for both of them, the delay for each port is proportional to the number of connections it has before the response to the next connection request is issued.

To calculate the total delay for the next connection request for each port, obtain the multiplier factor from the table on page 184.

- With a current session count of 256 sessions, port B's total delay time = 0.08 * 6 = 0.48 seconds.
- With a current session count of 238 sessions, port C's total delay time = 0.08 * 5 = 0.40 seconds.

Port C would therefore respond to a new connection request before port B. Hence, a connection would be established for port C, which would bring its session count up to 239. Although, typically the first response that a client receives determines which OSA port is selected for the connection, note that other factors can affect this selection.

Load Balancing and Redundancy: This option allows you to specify redundant paths for the ports for which you specified the load-balancing option.

For example, assume this configuration and current state.

Port	Option	Load balance factor	Session delay	Max PU limit	Current session count	Status
A	Load balancing	0.08 sec	N/A	1000	324	Online (Note 1)
B	Load balancing	0.08 sec	N/A	1000	362	Online (Note 1)
C	Load balancing and redundancy	0.08 sec	0.80 sec (Note 2)	1000	0	Online
D	Load balancing and redundancy	0.08 sec	0.80 sec (Note 2)	1000	0	Online

Notes:

1. As you can see from the table on page 184, the multiplier factor is 6 for both ports A and B. Since ports C and D have a 0 current session count, it is currently 0 for these ports.

   In the current state, the total delay for ports A and B is 0.48 seconds (0.08 * 6), so the port that acquires the next connection will be determined by delays in the network. When either port A or port B reaches 384 connections, its delay will be 0.54 seconds (0.08 * 7). At that time, the other port will respond 0.08 seconds sooner until its total connection count reaches 384.
2. When deciding on the session delay time for the two redundant ports C and D, look at the maximum delay that can occur for the primary ports, which are ports A and B in this example.

   In this example, the maximum delay for the primary load-balancing ports (A and B) cannot exceed 0.72 seconds (0.08 * 9), and is reached when 1000 connections are logged onto either of these two ports.

To prevent any traffic from being established on the redundant ports C and D while ports A and B are still responding to connection requests, set the session delay for the redundant ports (C and D) to a value that at least equals the longest potential delay for the primary ports (A and B). Since a connection request for port A or B can be delayed by 0.72 seconds, 0.80 seconds was chosen for the session delay time for the two redundant ports (C and D).

Redundancy: This option allows you to open more than one SAP for a primary path and a secondary path by disallowing an overflow of connections between the two paths.

This option requires that you specify the Redundancy option for the secondary path and the Disabled option for the primary path. For example, assume the following configuration and current state.

Port	Option	Max PU limit	Session delay	SAPs open	Max connections	Current session count	Status
A	Disabled	1000	N/A	SAP 04 SAP 08 SAP 0C	256 511 324	424	Online: responding
B	Redundancy	1000	0.32 sec	SAP 04 SAP 08 SAP 0C	256 511 324	0	Online

Disabled: When each OSA-Express is shipped, its SNA session availability option is initialized to the Disabled option. In this context, Disabled means that none of the other SNA session availability enhancement options are active for this port.

Note: If you specify the Redundancy option for an ATM OSA-Express LEC port, that port can provide a secondary path. You must, however, specify the Disabled option for the primary path, which must also be an ATM OSA-Express LEC port.

Session Delay (0.4–15.00 Seconds) for Redundancy: When each OSA-Express is shipped, its session delay is initialized to 0 seconds. For the Redundancy, Load balancing and Redundancy, and Overflow and Redundancy options:

- Specify a nonzero delay time in increments of 0.04 seconds up to 15 seconds.

  Base the value on the longest delay time that can be incurred by the non-redundant members of the set for which the port is a backup. For example, you could specify a session delay of 10 seconds.
- To calculate the total delay time for a port if you specify the Load balancing and Redundancy option, add the session delay time to the delay that you calculated for the load balancing option.

Load Balance Factor (0.4-1.00 Seconds): The load balance factor is initialized to 0 seconds. For the two options, Load balancing and Load balancing and Redundancy, specify a nonzero factor in 0.04-second increments up to 1 second.

In general, the load balancing factor should be set to the same value for all the ports configured for load balancing. Although the optimal setting depends on the network configuration, a reasonably high degree of balance can be obtained with a small load balance factor. For most networks, a load balance factor of .08 seconds is suitable. You should set the same load balance factor for all the ports in the set for which you specify this option.

To calculate the total delay time for a session, multiply the load balance factor by a multiplier factor (*m*). For the Load balancing and Redundancy option, add the session delay time to this result. As the following table shows, *m* is a function of the number of sessions that are logged on to the port.

Current Session Count	Multiplier factor *m*	Current Session Count	Multiplier factor *m*	Current Session Count	Multiplier factor *m*
0–15	0	256–383	6	2048–2559	12
16–31	1	384–511	7	2560–3071	13
32–47	2	512–767	8	3072–3583	14
48–63	3	768–1023	9	3584–4095	15
64–127	4	1024–1535	10	4096	16
128–255	5	1536–2047	11		

For the Load Balancing option: the total delay is not just the load balance factor. For example, assume that you specified a load balance factor of 0.08 seconds. There is no delay for the first 15 sessions logged on to a port (0 * 0.08); the 16th through the 31st sessions are delayed by 0.08 seconds (1 * 0.08); the 32nd through 47th session are delayed by 0.16 seconds (2 * 0.08), and so on.

For the Load Balancing and Redundancy option: add the session delay time to the delay that you would calculate for load balancing. Continuing with the example, assume that you had specified a session delay of 1.2 seconds in addition to the load balance factor of 0.08 seconds for the redundant ports for which you select the Load balance and redundancy option.

- The total delay for each of the first 15 connections is 0.12 seconds (0 * 0.08 + 1.2).
- The delays for connections 16 through 31 is 1.28 seconds by 1.28 seconds (1 * 0.08 + 1.2).
- The delays for connections 32 through 47 is 1.36 seconds (2 * 0.08 + 1.2), and so on.

Continue with the SNA OAT entries on page 185.

The SNA OAT Entries Page

SNA OAT Entries are defined on ATM LEC Port Page 5 of 5, TR page 4 of 4, or FENET Page 4 of 5. Click the right arrow in the upper right corner of the notebook until the correct page is displayed.

Click **Add** and specify an SNA OAT entry for this mode as shown in the format that is presented by OSA/SF GUI in Figure 91 on page 186.

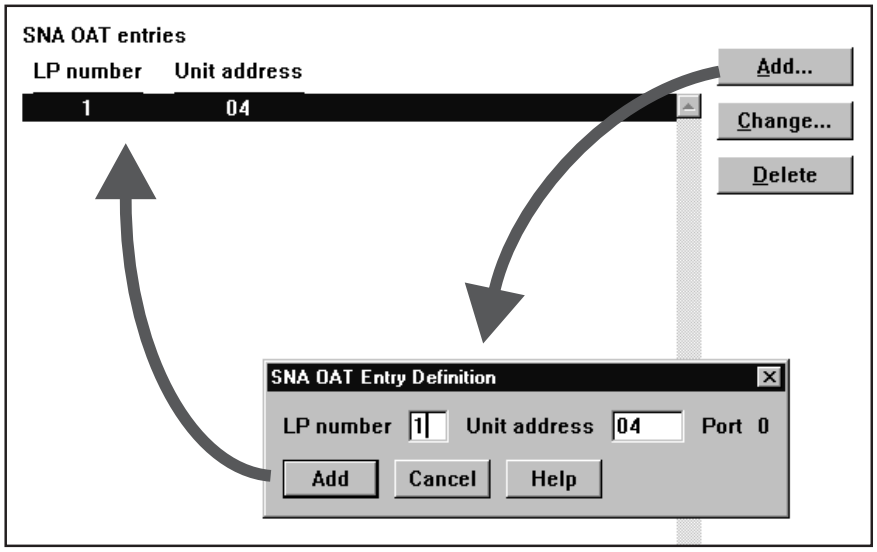


Figure 91. SNA OAT Entry Definition Notebook Page

LP number
If the OSA CHPID is defined as shared in the hardware I/O configuration (IOCDS), specify the LP number of the LP in which the instance of VTAM is running to which this OAT entry applies. Otherwise, specify 0.

Unit address
In "Define OSA Devices" on page 38, you specified one or more sets of device numbers for each mode this OSA uses. In this space, specify the lower, even number unit address that corresponds to the device number that starts this series for this mode.

If you are adding more than one entry, select **Add** after each entry and then type over the previous information. When you are done adding entries, select **Cancel**.

What Next
Define additional configurations, if desired. When all modes are set, go to "Activating the OSA Configuration".

To set or change a Local MAC address, Group MAC addresses, or User Data, see "MAC Addresses and ESIs" on page 192.

Activating the OSA Configuration

1. From the pulldown menu, select **Configurations** ↠ **Save**.
2. Before activating a configuration change that removes devices from the configuration, vary off those devices from the operating system. If the devices are online at the time the configuration change removes them, you may see ″Permanent Error″ messages on the operator console, and the devices may become BOXED.

   From the pulldown menu, select **Configurations** followed by **Activate**, **Partial activate** (see page "Partial Activation" on page 149), or **Activate (no install)**.

   Activate (no install) prevents disrupting an OSA that is already running with a different configuration. You can defer the install to a more appropriate time, then complete the install as follows. From the OSA/SF GUI **OSA Channels-Tree View** window: Select the OSA number, then select **Command** from the menu bar, select **Install**, **force** and then **Ok**.

3. Refresh the view (F5) when complete.
4. If any configuration change resulted in the removal of devices from the OSA Address Table (OAT), be sure to vary off these devices from the operating system. Devices for which an OAT was changed must be varied off, then on again.

   When a configuration change results in the removal of a device, and if that device is online, that device displays a status of *Offline and Boxed* (F-BOX) until it is redefined in the configuration, or until an IPL of the operating system. ″Permanent Error″ messages appear on the operator console for those devices.

Configure ATM, TR, and FENET Using the GUI

Part 2. OSA-Express Reference

Part 2 contains information to which you may refer when setting up the OSA or when questions arise in the normal course of operation. Service, problem determination, and a command reference section are also located here.

Chapter 9. OSA Port Management

An OSA port is used to transfer data between the S/390 platform and the network attached to the port. The physical characteristics of the OSA ports are discussed in Chapter 1.

Enabling and Disabling Ports

You can use IOACMD REXX commands or the OSA/SF GUI to enable and disable the LAN traffic state on a port.

Using the GUI

From the OSA Tree View:

1. Expand the CHPID display by clicking the **+** to the left of the object.
2. Expand the ports display under the CHPID in the same way.
3. Double click on the port you want to enable or disable.
4. In the window displayed for the port is one of the following settable fields:

   LAN traffic state
   displayed for OSA-Express features

   Hardware state
   displayed for OSA-2 features

   Click on **Set** to the right of this field.
5. Select the desired state and click on **Set**, followed by **OK**.

From the OSA Details View:

1. Select the OSA CHPID port by device number.
2. Pull down the **Selected** menu, followed by **Open as→Port settings**.
3. In the window displayed for the port is one of the following settable fields:

   LAN traffic state
   displayed for OSA-Express features

   Hardware state
   displayed for OSA-2 features

   Click on **Set** to the right of this field.
4. Select the desired state and click on Set, followed by **OK**.

Using IOACMD

Use the IOACMD SET_PARAMETERS command to specify the enable or disable parameter for the port on a specific type of OSA-Express feature. For example, on OS/390:

```
EX 'IOACMD.EXEC' 'SET_PARMS 54 0 GIGA_ENABLE_lan_traffic_physical_port'
```

This would enable LAN traffic on Gigabit physical port 0 on CHPID 54.

When using the SET_PARMS command, you can substitute a numeric value for the text version of the parameter:

```
EX 'IOACMD.EXEC' 'SET_PARMS 54 0 390'
```

would accomplish the same task.

The VM version of the command is:

```
IOACMD SET_PARMS 54 0 GIGA_ENABLE_lan_traffic_physical_port
```

or

```
IOACMD SET_PARMS 54 0 390
```

To disable the same port, specify the `GIGA_DISABLE_lan_traffic_physical_port` parameter or `391`.

Refer to the SET_PARAMETERS command on page 268 for a complete list of parameters.

Using the Support Element

If you have system programmer authority, you can use the Support Element of the S/390 to enable and disable ports.

1. Under the **Support Element Workplace**, go to the **CHPIDs Work Area** view that shows all of the CHPID icons. To get to this view, double-click on the **Groups** icon and then on the **CPC** icon. Then right click on the **PCI01A** icon and then left click on **CHPIDS**.
2. Click on the desired CHPID's icon to select it.
3. Double Click on **Advanced Facilities** to the right of the CHPID icons. Advanced Facilities is under the CHPID operations menu. You can use the arrows at the bottom right-hand corner of the window to circulate through the different menus.
4. Click on the radio button for **Card specific advanced facilities...** and click on **OK**.
5. Highlight **Enable or disable ports..**. and click on OK.
6. Click on the desired radio buttons and then click on **Apply**.
7. After the command is complete, click on **OK** to close the job completion confirmation window. Then click **Cancel** on each of the subsequent windows (2) to close them if you are finished making changes.
8. If the CHPID icon is still highlighted, click on it to deselect that CHPID.

MAC Addresses and ESIs

A media access control (MAC) address uniquely identifies a port that is either physically attached to a LAN or, if it is an ATM LAN emulation client (LEC) port, logically attached to a LAN. Therefore, each port on a FENET OSA-Express, and each LEC port on an ATM OSA-Express, is shipped with its unique, or universal, MAC address.

You can set a local MAC address and specify that a port receives frames for a group destination MAC address as discussed in the following sections. Use OSA/SF or, except for an ATM OSA-Express, use either the support element (SE) or single object operations via the hardware management console.

A 6-byte end system identifier (ESI) uniquely identifies the physical port of an ATM OSA-Express to its attached ATM device or switch. See the 20-byte ATM physical address (page 156).

Because an ESI serves an analogous function in an ATM network as a MAC address does in a LAN context, the two terms are sometimes equated with each

other. On the OSA/SF physical port settings notebook page 1, which is shown on page 156, the ESI is equated with the MAC address for consistency of the display. However, only a LEC port uses a MAC address. Because this port is not recognized by the support element or single object operations via the hardware management console, you can not set a MAC address for an ATM OSA-Express through these facilities.

To summarize:

- An ATM OSA-Express is shipped with 1 ESI for its physical port.
- An ATM OSA-Express is shipped with 1 universal MAC address used for each LAN emulation client (LEC), or logical, port. The LEC ports are used in the TCP/IP Passthru and SNA modes.
- An FENET OSA-Express is shipped with 1 universal MAC address for its port.

Local MAC Address

Under the following conditions, you can or must set a locally-administered MAC address for an OSA LAN port and should consider doing so for the following reasons:

- A local MAC address can be easier to identify by network personnel because it conforms to the network's or site's naming convention.
- A local MAC address would not need to be changed if the OSA is physically replaced. A replaced OSA, of course, brings its own universal MAC addresses with it.

A local MAC address must be unique within the network in which it is used and administered by a local authority. It is therefore a unicast MAC address.

You can set a local MAC address for any port with the Local end System ID parameter in the ATM Physical notebook page, or the Local MAC address parameter of any OSA-Express by following one of the procedures in "Setting MAC Addresses and User Data" on page 194. You can also set a local MAC address for a port on a FENET OSA-Express using the support element (SE) or single object operations via the hardware management console. For procedural information, refer to the operator's guide for the hardware platform.

For a local MAC address to take effect, the OSA channel must be configured offline from, and then back online to, all the partitions to which the OSA feature is defined.

Canonical vs. Noncanonical Format

Set a MAC address for an Ethernet or emulated Ethernet connection in the *canonical* format as shown in the following table.

Set a MAC address for a Token Ring or emulated Token Ring connection in the *noncanonical* format as shown in the following table.

The difference between a canonical and noncanonical address is that in non-canonical the bits within each byte are transposed (swapped). In the canonical format of an Ethernet MAC address, bit 6 indicates whether the address is an individual (0) or group (1) address; bit 7 indicates whether the MAC address is universal (0) or local (1). In the noncanonical format of a Token Ring MAC address, bit 0 indicates whether the MAC address is an individual (0) or group (1) address, and bit 1 indicates whether the MAC address is universal (0) or local (1).

For these types of LANs and ports	Specify as shown
For an Ethernet Connection as follows: • For an ATM LEC port when it is defined for an emulated Ethernet LAN, or • A FENET port:	• Set bit 6=1 and bit 7=0 • Set bits 0–5 and 8– 47 to the 46-bit local MAC address If an Ethernet LAN station is connected across a bridge to a non-Ethernet LAN, the destination MAC address in the VTAM PATH Definition statement may need to be coded differently (page 143).
For a token ring connection as follows: • For a Token Ring port • For an ATM LEC port when it is defined for an emulated Token Ring LAN	• Set bit 0=0 and bit 1=1 • Set bits 2 through 47 to the 46-bit local MAC address

Group MAC Address

A group MAC address allows the port to receive frames with that group's destination MAC address. You can assign a group MAC address as a 48-bit unsigned integer using OSA/SF.

You can assign a group MAC address of all zeros, but not an address of all X'FF'. For a nonzero group MAC address:

- Set bit 7 to 1 for an Ethernet LAN or emulated Ethernet LAN connection.
- Set bit 0 to 1 for an emulated token ring LAN connection.

You can view a Local and Group MAC addresses in the OSA-Express Port Setting pages, shown below. You can set these addresses as follows:

Setting MAC Addresses and User Data

Using the OSA/SF GUI (OS/2 or Windows)

To configure a Local MAC Address, Group MAC Addresses, and User Data for an OSA-Express, do the following.

__ 1. Start the OSA/SF GUI program.
__ 2. Display the **OSA Channels - Tree View**. If you need help displaying this window, see the **How To** instructions under the **Help** selection on the menu bar.
__ 3. Select the CHPID number.
__ 4. Select **Selected** from the menu bar and then select **Configurations**, followed by **Configuration List**.
__ 5. Select the configuration containing the data you wish to modify, then click on **Change** (or **Add** to create a new configuration).
__ 6. Enter new configuration data.
__ 7. Select **Configurations** from the menu bar and then select **Save**.
__ 8. Ensure that no traffic is flowing across any OSA device.
__ 9. After you enter and save the configuration parameters, select **Configuration** from the menu bar and then select **Activate**.
__ 10. Restart applications.

Using the REXX EXEC (IOACMD)

To configure a Local MAC Address and Group MAC Addresses for the OSA-Express using the IOACMD exec, do the following:

1. Edit and customize the configuration file, following the instructions in the header. You can use the samples (**IOAGIGA**, **IOFENET**, and **IOAATME**) from **IOA.SIOASAMP** on OS/390, z/OS, or z/OS.e, or the E (200) minidisk on VM. Alternatively, at the command line, enter: **EX 'IOACMD.EXEC' EXEC** (or just **IOACMD** on VM) and then select **Get Configuration File**. If you need assistance using IOACMD, see Chapter 14, "OSA/SF Commands for REXX" on page 247.
2. At the command line, enter: **EX 'IOACMD.EXEC'** (**IOACMD** on VM) and then select **Configure OSA CHPID**.

Using the Hardware Consoles (HMC or SE)

If you have access to either the Hardware Management Console or the Support Element of the S/390, you can use the following instructions to do OSA-specific tasks. If OSA/SF is not installed and you want to use a Local MAC address, do the following.

1. From the HMC or SE, select (double-click) CPC Group from the Groups Work Area.
2. Select the CPC that has the OSA.
3. Select CHPIDs.
4. Select the OSA icon.
5. Scroll down the right side of the display and look for CHPID Operations.
6. Select CHPID Operations and then Advanced Facilities.
7. Select Standard Channel Advanced Facilities.

   At this point, you can access OSA-specific facilities in addition to setting up and doing traces for IBM service.

Attention: If you changed the local MAC address, the associated CHPID must be reset in order for the change to take effect. To do so, first vary all devices offline from *every* logical partition that has the CHPID online. Configure the CHPID offline from *every* logical partition that has the CHPID online. Then configure the CHPID back online to any partitions that will use it and vary the devices back online.

Querying and Purging the ARP Cache (z/OS and Linux)

The Address Resolution Protocol (ARP) cache resides on the OSA-Express feature. When TCP/IP is started in QDIO mode, it downloads all the home IP addresses in the stack and stores them in the ARP cache. When running OSA-Express features in QDIO mode in a z/OS V1R4 or Linux environment, you can query and purge the contents of the ARP cache.

Communications Server for z/OS V1R4 adds support for querying and purging the ARP cache using the following commands:

To purge the ARP cache on z/OS

VARY TCPIP,,PURGEcache,*linkname* for example,

```
v tcpip,,purge,link4
```

To query the ARP cache on z/OS

DISPLAY TCPIP,,NETSTAT,ARP,*ip_addr* for example,

```
d tcpip,,net,arp,10.11.91.200
```

or

TSO NETSTAT command, for example,

```
netstat arp all tcp tcpip
```

See *z/OS Communications Server: IP System Administrator's Commands* for complete syntax and usage information.

The Linux qetharp utility is available to query or purge the contents of the ARP cache, for example:

```
qetharp -q eth0
```

shows all ARP entries for OSA-Express interface eth0, while

```
qetharp -p eth0
```

removes all entries from the ARP cache for OSA-Express port eth0. See *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, for a complete description of this command.

OSA-Express Direct SNMP Support

The OSA-Express direct SNMP subagent provides access to OSA-Express management information bases (MIBs) without OSA/SF, which is required when accessing OSA SNMP data through the Communications Server TCP/IP subagent. If you are running z/OS V1R4 or Linux, you can access the OSA-Express direct SNMP subagent by following the steps below. The OSA-Express direct SNMP subagent only communicates with OSD (QDIO) CHPIDs. For OSA-Express features defined as OSE (non-QDIO) CHPIDs, use the CS TCP/IP SNMP subagent described in "Setting up the Communications Server SNMP TCP/IP subagent" on page 51. For earlier releases of z/OS or for OS/390, the CS TCP/IP SNMP subagent provides the only access to OSA-Express MIBs.

The OSA-Express MIB support consists of:

- OSA-Express Channel and Performance tables and PE (Product Engineering) MIB values for OSA-Express Gigabit Ethernet, Fast Ethernet, Token Ring, and ATM155 adapters
- OSA-Express Ethernet Port tables for OSA-Express Gigabit Ethernet and Fast Ethernet adapters
- OSA-Express Token Ring Port tables
- ATM LAN emulation tables for OSA-Express ATM155 adapters running emulated Ethernet

Requirements

- OSA-Express feature running in QDIO mode
- OSA-Express Licensed Internal Code at level 3.0A or higher
- For z/OS
  - Communications Server for z/OS V1R4
- For Linux
  - ucd-snmp package 4.2.x (4.2.3 or higher recommended)
  - Linux OSA-Express feature qeth device driver version 1.245

Setting up OSA-Express Direct SNMP Support for z/OS

In order for the SNMP management application to receive OSA-Express MIB data, the Communications Server for z/OS SNMP master agent, OSNMPD, must be running. OSNMPD runs in a separate address space that executes load module EZASNMPD. OSNMPD can be started with or without parameters. For more information about OSNMPD, including details on optional parameters, see *z/OS Communications Server: IP Configuration Reference*.

Once the SNMP master agent, OSNMPD, is running, you can start the OSA-Express direct SNMP subagent with the IOBSNMP procedure. IOBSNMP has four optional parameters shown in Figure 92, the sample JCL procedure provided.

```
//IOBSNMP  PROC P='-s TCPIP'
//*
//*   START OSA direct SNMP subagent
//*
//IOBSNMP  EXEC PGM=IOBSNMP,TIME=1440,REGION=4096K,DYNAMNBR=5,
//         PARM='&P.'
//*
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//*
//* The options available for the PARMS referenced by P are
//* -d level   - turn on specified debugging
//*              0 - no tracing
//*              1 - minimal tracing
//*              2 - maximum tracing
//*             >2 - maximum tracing plus SNMP traces
//* -c community   - use specified community name
//* -p port number - use specified port number
//* -s stack       - send request to specified stack
//*
//* Defaults:  -d 0 -c public  -p 161  -s Default_stack
```

Figure 92. Sample Procedure (Member IOBSNMP)

Update cataloged procedure IOBSNMP by copying the sample in hlq.SEZAINST(IOBSNMP) to your system or recognized PROCLIB. Change the data set names as required to suit your local configuration. The IOBSNMP address space requires access to the IBM C/370 Library during execution.

IOBSNMP must have certain RACF authorities set up in order to function properly. See member hlq.SEZAINST(EZARACF) for security product considerations for started tasks.

Additional Resources

Refer to *z/OS Communications Server: IP Configuration Guide* for information on configuring SNMP.

The MIB that matches your server's MCL can be installed by either:

- Selecting **Advanced Functions** on the Support Element

or

- Downloading from http://www.ibm.com/servers/resourcelink.
  - After logging in, select **Library**
  - Under ″Library shortcuts″ on the right side of the screen, select **Open System Adapter (OSA) Library**
  - Select ″OSA-Express SNMP Direct MIB Module″ for a description, or click on ″TXT″ for the module

- Save the MIB file to the location required by your SNMP management application

See your SNMP application product information for management commands and procedures.

Setting up OSA-Express Direct SNMP Support for Linux

The OSA-Express direct SNMP subagent extends the capabilities of the ucd-snmp master agent (snmpd), which is required, and can retrieve SNMP management data from any OSA-Express feature defined as CHPID type OSD, running in QDIO mode. For the OSA-Express ATM feature, this means that only Ethernet LAN emulation, which requires OSA/SF on a connected host for port configuration, is supported. In order for the subagent to obtain management data, the OSA-Express feature must be active and must be defined in the appropriate files for the Linux distribution, for example, /etc/modules.conf and /etc/chandev.conf.

Starting the OSA-Express Direct SNMP Subagent

Use the osasnmpd command to start the subagent:

```
# osasnmpd options

options:
-h              Displays this usage message
-v              Version information
-l LOGFILE      Print warnings/messages to LOGFILE
                (By default LOGFILE=/var/log/osasnmpd.log)
-A              Append to the logfile rather than truncating it
-L              Print warnings/messages to stdout/err
-f              Do not fork() from the calling shell
-P PIDFILE      Save the process ID of the subagent in PIDFILE
```

How to Stop the Subagent: Stop the OSA-Express direct SNMP subagent issuing either a SIGINT or SIGTERM command to the main thread, for example:

```
killall osasnmpd
kill PID_of_subagent_main_thread
```

Note: Do not use kill -9 or kill -SIGKILL to stop the subagent under normal circumstances. This will prevent the OSA-Express MIB objects from being unregistered by the SNMP master agent and may cause problems when restarting the subagent.

Additional Resources

Refer to *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml, for more information.

The MIB that matches your server's MCL can be installed by either:

- Selecting **Advanced Functions** on the Support Element

or

- Downloading from http://www.ibm.com/servers/resourcelink.
  - After logging in, select **Library**
  - Under ″Library shortcuts″ on the right side of the screen, select **Open System Adapter (OSA) Library**
  - Select ″OSA-Express SNMP Direct MIB Module″ for a description, or click on ″TXT″ for the module

– Save the MIB file to the location required by your SNMP management application

For ucd-snmp downloads and information, see http://net-snmp.sourceforge.net/.

See your SNMP application product information for management commands and procedures.

For more on Linux, see

www10.software.ibm.com/developerworks/opensource/linux390/index.shtml

and

www.linux.org/docs.

Displaying OSA-Express Port Settings

The OSA-Express port settings notebook pages display all port configuration parameter settings, and allow you to enable or disable the port's LAN traffic state.

Although the following figures are not intended to reflect true operational values, they show the wealth of information contained in the port notebooks.

You can also use the QUERY command ("QUERY" on page 265) to display port settings.

Displaying ATM Physical Port Settings

Expand the ATM CHPID and ports, then double-click the physical port, as shown in Figure 93.

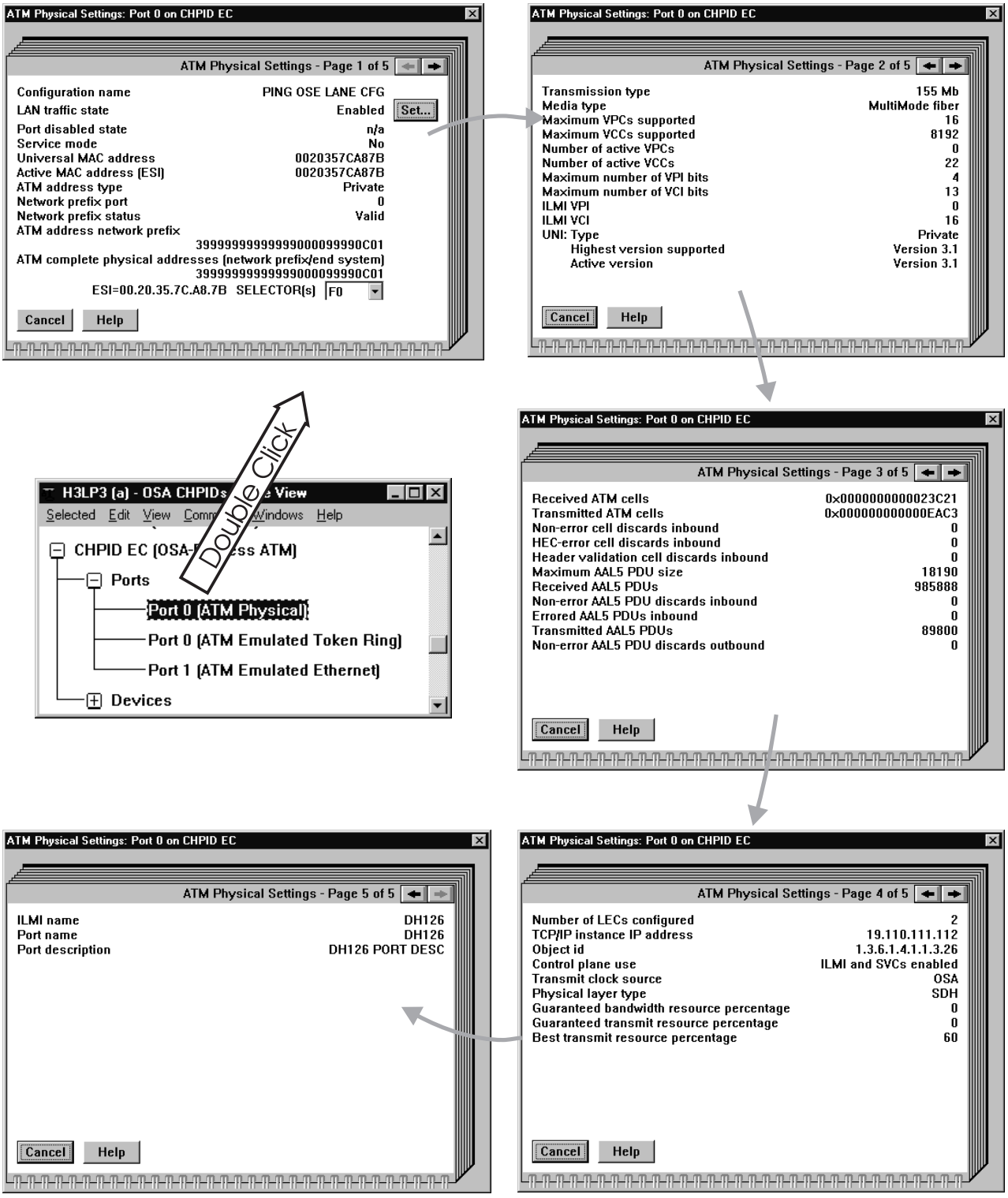


Figure 93. OSA-Express ATM Physical Settings

Displaying ATM Emulated Port Settings

Using the GUI tree view, expand the ATM CHPID and ports, then double-click the emulated port, as shown in Figure 94.

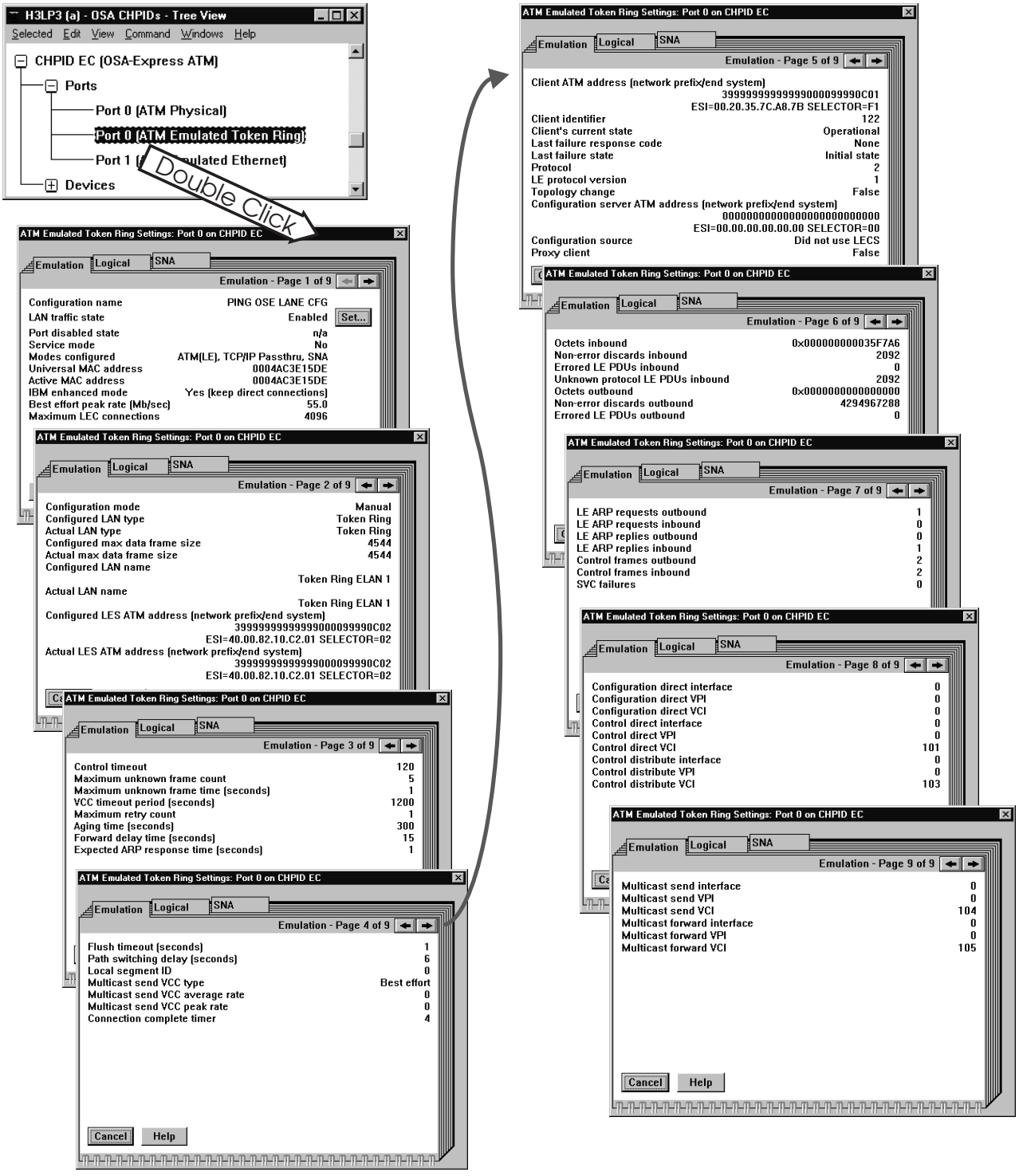


Figure 94. OSA-Express ATM Emulation Settings. This figure shows token ring settings. You can display Ethernet settings using the same technique.

Port Management

By clicking the tabs atop the notebook pages, or paging through the notebook with the arrows at the upper right, you can view the logical port settings and the SNA settings pages, displayed in Figure 95.

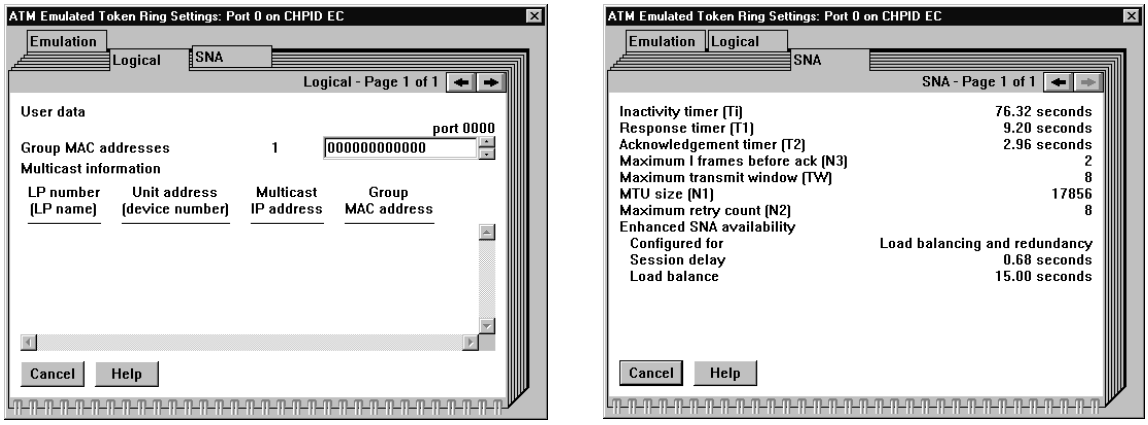


Figure 95. OSA-Express ATM Logical Port and SNA Settings (OSE). For an OSD CHPID, the TCP port name is also displayed on the logical page. When SNA is not configured on an OSE CHPID, a message at the top of the SNA page tells you so. If you display the SNA page for an OSD CHPID, a message at the top reminds you that SNA is not supported on this channel type.

Displaying FENET Port Settings

Using the GUI tree view, expand the FENET CHPID and ports, then double-click the Fast Ethernet port, as shown in Figure 96.

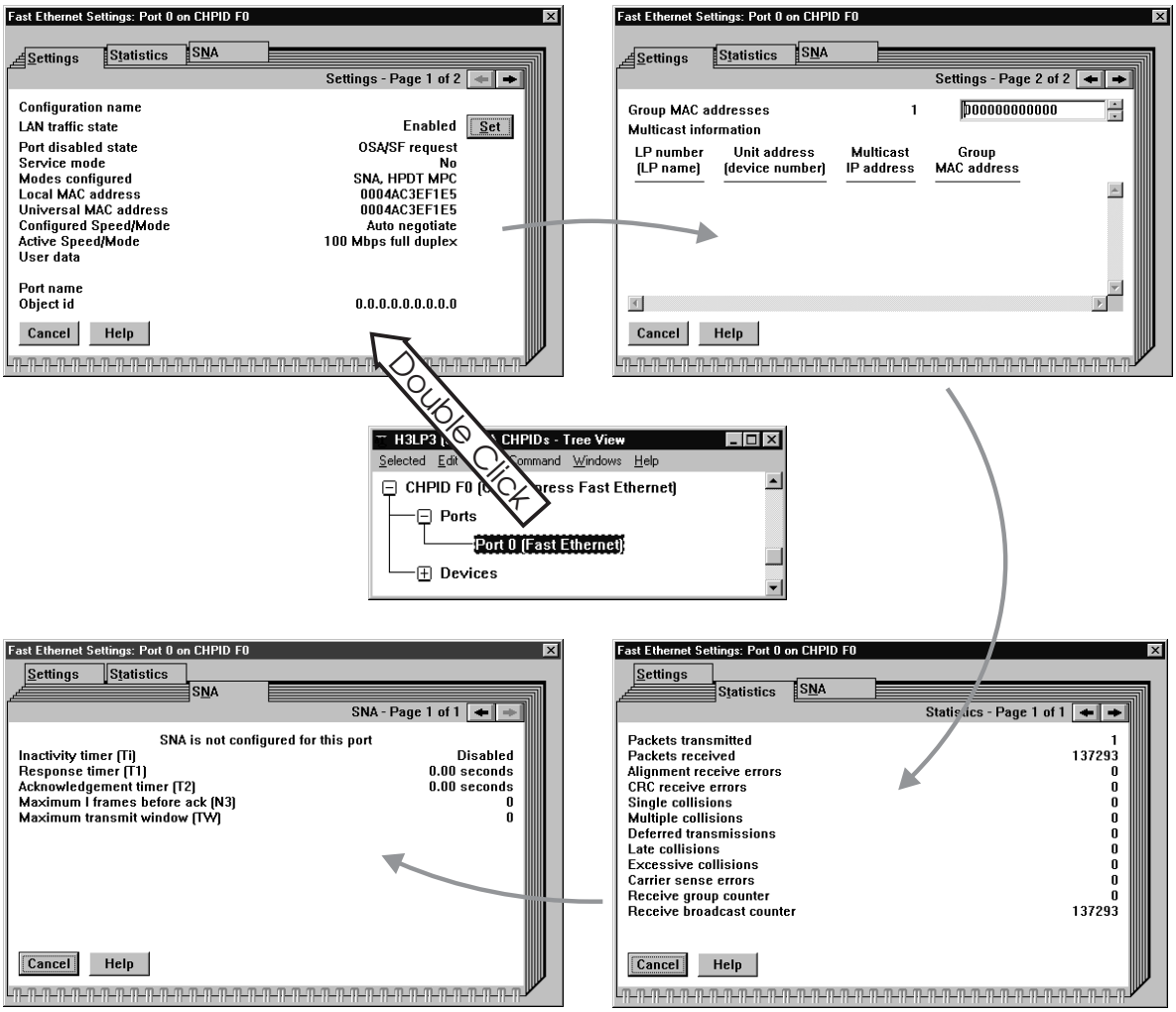


Figure 96. OSA-Express Fast Ethernet Settings (OSE). The SNA page for an OSD CHPID displays a message to remind you that SNA is not supported on this channel type.

Displaying Token Ring Port Settings

Using the GUI tree view, expand the TR CHPID and ports, then double-click the token ring port, as shown in Figure 97 on page 204.

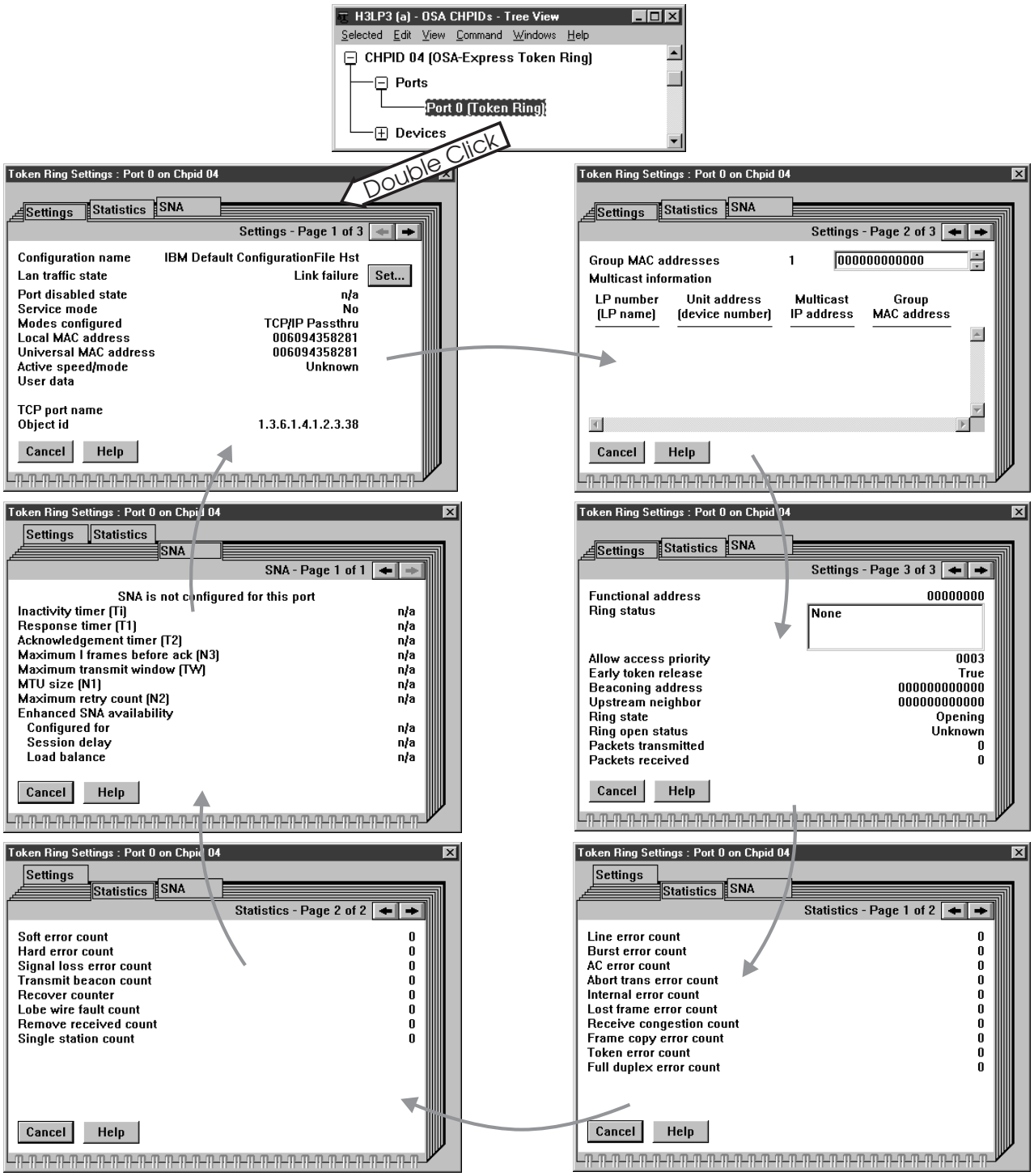


Figure 97. OSA-Express Token Ring (OSE). The SNA page for an OSD CHPID displays a message to remind you that SNA is not supported on this channel type.

Displaying Gigabit Ethernet Port Settings

Using the GUI tree view, expand the Gigabit Ethernet CHPID and ports, then double-click the Gigabit Ethernet port, as shown in Figure 98.

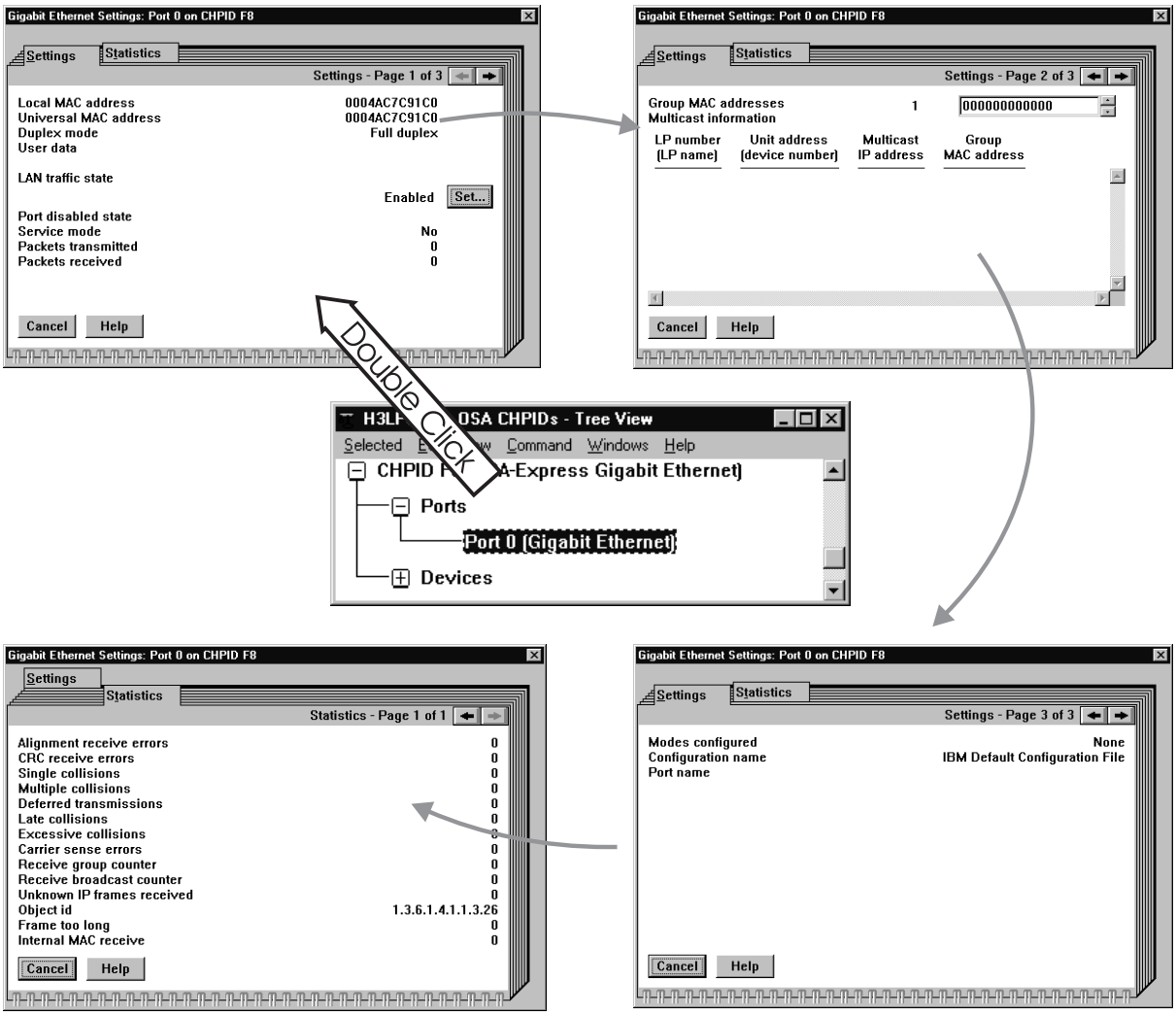


Figure 98. OSA-Express Gigabit Ethernet Settings

Chapter 10. Problem Determination Aids

You must have OSA/SF installed in order to use OSA problem determination aids. OSA/SF problem determination aids include:

- Messages from OSA/SF (see Chapter 15, “OSA/SF Messages and Codes” on page 275)
- Messages from OSA/SF GUI (IOAGxxxx)
- “OSA/SF Message Log”
- “OSA/SF Trace Log” on page 208
- “OSA/SF Dump” on page 209
- “IOACMD Debug Data Sets” on page 209
- “OSA/SF GUI Trace and Dump Facility” on page 209

Using OSA/SF Problem Determination Aids

OSA/SF Message Log

OSA/SF has a message log that contains a record of all OSA/SF commands issued, responses, and error messages. All error messages are logged, even when multiple failures occur that cause only one message to be displayed.

You can look at the message log and send the log to the IBM support center. Each OSA/SF image has a message log.

If the OSA/SF message log becomes full, a new message log is started and the log that is full is stored for your reference. A message is displayed indicating that the log is full and then another message displays the name of where the message log is stored. Both of these messages are put in the new message log.

The name of the message log is specified in the Startup Profile. The message log that becomes full is stored with the name specified in the Startup Profile with the Julian date appended to the end of the name.

If there is more than one OSA/SF running, to determine what OSA/SF was managing the OSAs, see “Determining which OSA/SF Image Is Managing an OSA” on page 210. If you know which OSA/SF message log you want, you can get the log by using the OSA/SF GUI or an OSA/SF command. See the following:

Using OSA/SF GUI to Get the Message Log

1. Double-click on the host icon from the **OSA/SF Hosts** window and **Open** a channels view window.
2. Select **Command** from the menu bar at the top.
3. Select **OSA/SF**.
4. Select **Get debug**.
5. Select **Message log**.
6. Enter the **File name** for the host or workstation.
7. Select the **Send** pushbutton.

Entering an OSA/SF Command to Get the Message Log

See “GET_DEBUG” on page 255.

```
IOAC101I OSA Support Facility initialization started 01/21/1999 09:12:37
IOAC100I OSA Support Facility version V2R1M0 BASE
IOAC153I Processing of OSA/SF startup profile started
IOAC152I Finished OSA/SF startup profile processing
IOAC150I 09:13:10 Interrupt handler component started
IOAK999I Configuration mode for CHPID 00 is TCP/IP Passthru
IOAK326I CHPID 00 is currently managed by partition 0A
    .      .
    .      .
    .      .
IOAA002E Device 9EF is offline
IOAC145W 09:14:08 Only 5 of 12 OSA devices initialized
IOAC141I 09:14:08 API APPC component started
IOAC174I 09:14:08 AutoLog component started
IOAC102I OSA Support Facility initialization completed 01/21/1999 09:12:43
******************************** Bottom of Data
```

Figure 99. Example of a Message Log

OSA/SF Trace Log

The trace log contains, in a format for IBM internal use, the 8000 most recent trace records generated during program execution. When the trace log is full, the oldest entries are overwritten.

You may be requested by the IBM support center to provide a trace log for OSA/SF. Each OSA/SF image has its own trace log.

To determine what OSA/SF image was managing the OSAs, see “Determining which OSA/SF Image Is Managing an OSA” on page 210.

If you know which OSA/SF trace log you want, you can get the trace log by using the OSA/SF GUI or an OSA/SF command. See the following:

How to Get the OSA/SF Trace Log Using the GUI

1. Double-click on the host icon from the **OSA/SF Hosts** window and **Open** a channels view window.
2. Select **Command** from the menu bar at the top.
3. Select **OSA/SF**.
4. Select **Get debug**.
5. Select **Trace log**.
6. Select **All** (default).
7. Enter the **File name** of where you want the file stored on the host. (On VM, the file is sent to the OSAMAINT reader.)
8. Select the **Send** pushbutton.

Getting the OSA/SF Trace Log Using OSA/SF Command (GET_DEBUG)

See “GET_DEBUG” on page 255.

OSA/SF Dump

If OSA/SF on OS/390, z/OS, or z/OS.e abends, the OSA/SF dump is sent to a dump data set, SYS1.DUMPxx. After an abend, OSA/SF must be restarted.

On VM, a non-formatted IPCS dump is sent to the OSAMAINT userid’s reader. If possible, OSA/SF then shuts down, cleans up its resources, and logs off the OSA/SF virtual machine. Reinitialization occurs upon receipt of the next OSA/SF command.

OSA/SF has a unique dump title that contains the abend code for the failure, the failing module, and the recovery routine that sent the dump:

```
ABEND aaa IN bbbbbbbb, COMPID=5688-008, ISSUER=cccccccc
```

where:

aaa
Is the abend code.

bbbbbbbb
Is the failing control section (CSECT) name.

cccccccc
Is the recovery routine that sent the dump.

IOACMD Debug Data Sets

Whenever you run the IOACMD exec, two data sets are produced for use in debugging. One contains the data sent to the main OSA/SF address space (input), and the other contains the data returned from the OSA/SF address space (output) when the command completes, whether or not it was successful.

In OS/390 these data sets have the names, **USERID.IOACMD.INPUT.*command_name*** and **USERID.IOACMD.OUTPUT.*command_name***.

In VM they are named **IOACMDIN *command_name*** and **IOACMDOT *command_name*** on the A-disk of the user who issued the command.

In VSE they are named ***library.sublibrary*.IOACMDIN.*command_name*** and ***library.sublibrary*.IOACMDOT.*command_name***, and are located where OSASF was started.

By default, IOACMD assigns the value of the USERID issuing the command as the high level qualifier in the data set name. This is how IOACMD.EXEC worked before APAR OW21887. To prepend USERID with a new high level qualifier that takes a different value, edit the IOACMD EXEC and find the line where `hlq=""` appears. Specify your value (up to 8 valid MVS characters are allowed) between the quotation marks. For example, to name the debug data sets **SYS1.USERID.IOACMD.INPUT.*command_name***, edit the line to `hlq = "SYS1"`.

OSA/SF GUI Trace and Dump Facility

The OSA/SF GUI Trace and Dump Facility is available for use, at the direction of IBM Support, in the event of GUI failure when the problem is not obvious.

Problem Determination

The GUI trace and dump options are accessed from the OSA/SF Hosts window. This is the first window displayed when OSA/SF is started. Select **Options** → **Workstation logging settings**. A panel similar to Figure 100 is shown.

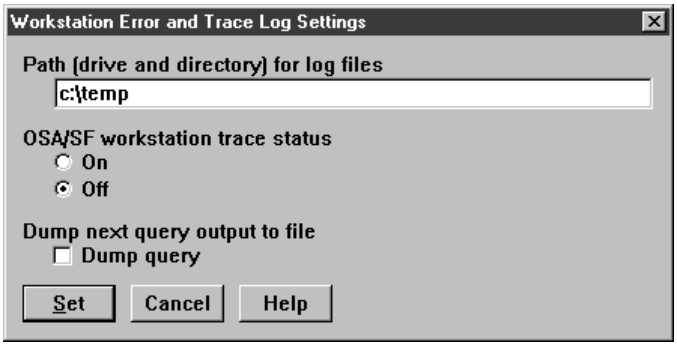


Figure 100. Specify GUI Trace and Dump Options

Path (drive and directory for log files)
Set this to a predefined directory of your choice.

OSA/SF workstation trace status
Normally **Off**. Select **On** before executing a GUI command that fails. The trace log gathers operational data about the command process.

Dump next query output to file
Select **Dump query** when you want to write the contents of storage after the next GUI command is executed.

Note: Never turn the trace option on unless you have been asked to do so. The trace facility will seriously impact system performance. Similarly, allowing the Dump option to remain on will take up large amounts of disk space.

The trace output is written to a file named IOATRAC2.LOG in your specified directory.

The dump output is written to the same directory in two files named IOADxxx.BIN (binary) and IOADxxx.DMP (ASCII), where xxx reflects the command for which the dump was collected:

MNG Start or Stop Managing

SET Set Parameters

QRY Query

INS Install

OAT Get OATs

DBG Get debug

CFG Get config

CLR Clear debug

Determining which OSA/SF Image Is Managing an OSA

If more than one OSA/SF image is running on the S/390 and you want to determine which image is managing an OSA, do the following.

1. Double-click on one of the host icons from the **OSA/SF Hosts** window to **Open** a channel view window.

If the **OSA Channels - Details view** is displayed, select **View** from the menu bar, select **style** and then **Tree view**.
2. Double-click on the OSA number you want to see.
3. Look for **Settings Page 2 of 2**.

You can also use REXX to issue the QUERY command (page 265).

CHPID Problems

- As an I/O channel with associated devices, an OSA is subject to the same problem determination procedures that apply to any other type of S/390 channel. For information on hardware procedures, refer to S/390 books listed in the bibliography.

  Although the high availability with which OSA has been designed makes channel failure unlikely, such a possibility should be considered in the planning of your general management of an OSA in its network traffic.

  For example, by designing alternate connections for server-to-network and server-to-client traffic, you can prevent the OSA features in your enterprise from being candidates for a single point of failure.
- If an OSA memory dump or trace is required for the resolution of a problem, you will be directed by support personnel to obtain this information using the Get Debug command. This is described in the Commands section of the Appendix.
- An OSA LAN port can be managed by the LAN management tools available to the LAN administrator.
- If port diagnostics must be run, remember that an OSA is a S/390 channel type. The OSA CHPID must be configured online, and then LAN traffic to the port must be stopped.

  If OSA/SF is managing the OSA, the associated entries in its OSA address table, or OAT, are useful when determining the status of the devices associated with the port. On the GUIs, see the Channels Details View, and from the command interface, IOACMD, use the Get OAT or Query command.
- Some hardware failures are disruptive only to the port, and you would prefer to disable the port without configuring the channel off. You can do this using OSA/SF, the hardware support element or single object operations via the hardware management console.

Performance Data

OSA-Express performance data is displayed on page 2 of the Channel Settings notebook using the OSA/SF GUI:

PCI bus utilization (by CHPID)
: The average, over the indicated time interval, of the percentage of time that the PCI bus was used to transfer data. This does not include idle time or time used by routine maintenance tasks.

Processor utilization (by CHPID)
: The average, over the indicated time interval, of the percentage of time that the CHPID processor was used to transfer data. This does not include idle time or time used by routine maintenance tasks.

KBs read (by LP)
: The average number bytes read during the indicated time interval, expressed in KB/s.

KBs written (by LP)
The average number bytes written during the indicated time interval, expressed in KB/s.

Processor utilization (by LP)
The average percentage of processor resource usage during the indicated time interval.

All values displayed on this notebook page are set to zero when the CHPID is reset.

As Figure 101 shows, this performance data is averaged over three time intervals. If you display this notebook page before sufficient time has elapsed since the CHPID reset, no data will be displayed in the columns for the longer time intervals.

Performance data is also available through Resource Measurement Facility.

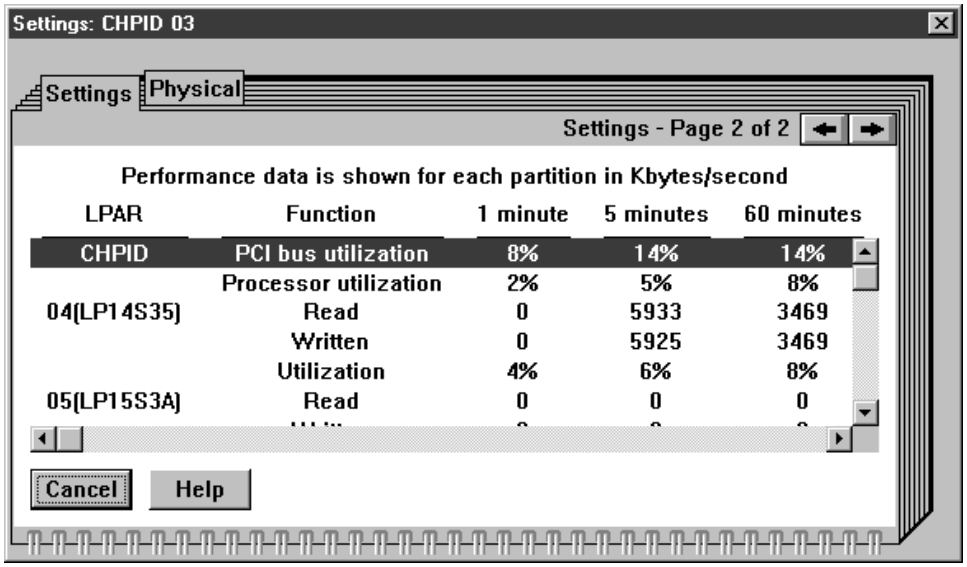


Figure 101. CHPID Performance Data in Channel Settings Notebook

Resource Measurement Facility

Resource Measurement Facility (RMF), a feature of OS/390, z/OS, and z/OS.e, measures and reports on the performance and availability of such system resources as processors, channel paths, devices, and storage. RMF can be set to issue reports about performance problems as they occur, so that your installation can take action before problems become critical. Your installation can also obtain long-term measurements of system performance that can be used for system tuning and capacity planning.

One of the RMF reports available is the *Channel Path Activity* report. For OSA-Express CHPIDs only, the Channel Path Activity report includes an *extended measurement mode* with five new fields, highlighted in Figure 102 on page 213. These fields aid in the performance analysis of the multipath channel connection used by OSA-Express, which consists of one logical device for READ, one for WRITE, and another for data transfer (DATAPATH).

CHANNEL PATH ACTIVITY PAGE 3

OS/390 REL. 02.07.00 SYSTEM ID S31 RPT VERSION 2.7.0 DATE 02/30/1999 TIME 14:24:17 INTERVAL 00.10.073 CYCLE 1,000 SECONDS

IODF = 71 CR-DATE: 03/25/99 CR-TIME: 07:21:32 ACT: ACTIVATE MODE: LPAR CPMP: EXTENDED MODE

CHANNEL ID	PATH TYPE	SHR	UTILIZATION(%) PART	TOTAL	READ (MS/SEC) BUS	PART	TOTAL	WRITE (MB/SEC) PART	TOTAL	CHANNEL ID	PATH TYPE	SHR	UTILIZATION(%) PART	TOTAL	READ (MS/SEC) BUS	PART	TOTAL	WRITE (MB/SEC) PART	TOTAL
C8	OSD	Y	32.44	32.44	42.50	35.28	35.28	35.60	35.60	CE	OSD		OFFLINE						
C9	OSD	Y	12.90	12.90	25.34	16.44	16.44	66.32	66.32	CF	OSD		OFFLINE						
CA	OSD	Y	85.30	85.30	96.12	78.60	78.60	85.55	85.55										
CB	OSD		OFFLINE																
CD	OSD		OFFLINE																

Figure 102. RMF Channel Path Activity Report

The leftmost field in the shaded area represents the percentage of bus cycles that are busy, relative to the theoretical limit.

You may see utilization values other than zero due to broadcast traffic on the LAN.

Under the READ heading, the PART value is the data transfer rate from the OSA-Express to the channel for this logical partition. The value under Total represents the data transfer rate from the OSA-Express to the channel for the entire system.

Under the WRITE heading, the PART value is the data transfer rate from the channel to the OSA-Express for this logical partition. The value under Total represents the data transfer rate from the channel to the OSA-Express for the entire system.

The reported data transfer rate is the total number of bytes handled for a given connection. When running ATM Native mode on an OSE ATM CHPID, padding occurs during the READ connection, which may result in higher reported numbers than the actual user data throughput.

OSA-Express CHPIDs (device types OSD and OSE) may appear in the RMF Device Activity Report with messages reporting “NO H/W DATA” or “NO TIMING FACILITY”. It is also possible for zeroes to appear for these devices.

For these device types the data reported is not meaningful in the Device Activity Report and you may want to remove them from your specification list of devices. For data useful in tuning and capacity planning, see the RMF Channel Activity Report.

See *OS/390 RMF User’s Guide*, SC28-1949, and *OS/390 RMF Report Analysis*, SC28-1950, for more information.

Reporting OSA/SF Problems to IBM

If you cannot correct a problem using the problem determination information provided, report the problem to the IBM support center. Use the following checklist for the call:

__ 1. Have your account name, license number, and other customer identification available.

__ 2. Have the following product-related information available:

- __ a. FMID:
  H0GI300 for Version 2 Release 1 base program
- __ b. PUT Level: ID of the latest program update tape installed

__ c. Service Level:

See report headings and output data sets of the OSA/SF Main Menu for the OSA/SF service level.

__ 3. Have information available on any recent system definitions, or installed products that could be relevant.

__ 4. Have your record of service and updates to OSA/SF available.

__ 5. Report any OSA/SF service that has been bypassed.

__ 6. Have information available relevant to the type of problem.

In general, you will need to provide:

__ a. A description of the problem

__ b. The sequence of events leading to the problem; for example, the command being processed and the operands specified

__ c. A list of the relevant messages, including both their identifiers and text

__ d. An indication of how many times the error occurred and any other symptoms that appear relevant.

Chapter 11. Servicing OSA-Express and OSA/SF

Use these instructions after an OSA device is replaced or when a PTF is installed for OSA/SF.

Service for an OSA Hardware Replacement

Do the following whenever an OSA feature must be replaced and the new OSA will operate in the same OSA mode as the previous OSA. If you want to change the OSA mode of the new feature, you must customize the OSA mode from the beginning. See Chapter 8, “Configuring OSA-Express Modes” on page 149.

Instructions are provided for using REXX from the operator console, or the OSA/SF GUI.

__ 1. Stop the affected host products for the OSA modes installed on the OSA.
   - If the OSA is configured for SNA mode, stop the use of OSA with VTAM.
   - If the OSA is configured for TCP/IP mode, stop the use of OSA with TCP/IP on the host.
   - If the OSA is configured for HPDT ATM Native mode, stop the use of OSA with VTAM.

__ 2. Vary off the OSA devices and then configure the OSA (CHPID) offline from all logical partitions that can use or share the CHPID.

__ 3. Service personnel installs the new OSA device.

__ 4. Configure the CHPID back online to the appropriate logical partitions. This starts the base code just loaded onto the OSA.

__ 5. Vary the OSA devices online.

Installing a PTF for OSA/SF

If the PTF affects the OSA/SF OS/2 GUI, see “Updating the OSA/SF GUI on OS/2” on page 217.

If the PTF affects the Microsoft Windows GUI, see “Updating the OSA/SF GUI on Windows” on page 216.

If the PTF affects OSA/SF, install the PTF using SMP/E (OS/390, z/OS, or z/OS.e) or SES (VM), stop OSA/SF, then restart OSA/SF. If the PTF affects VSE, follow the PTF install steps for IUI Install IBM Service, IUI Fastpath 1422/1423. Then restart the GUI.

Note: The description for the PTF will identify what is affected.

Migrating to a New Version or Release of OSA/SF on VM

When migrating to a new version or release of OSA/SF on VM, use the VMSES/E procedure as instructed in the program directory.

To update the OSA/SF GUI for Windows, follow the procedure in “Updating the OSA/SF GUI on Windows” on page 216.

To update the OSA/SF GUI for OS/2, follow the procedure in “Updating the OSA/SF GUI on OS/2” on page 217.

Migrating to a New Version or Release of OSA/SF on OS/390 z/OS, or z/OS.e

If a previous version or release of OSA/SF is installed, use the following to migrate to the new version or release.

__ 1. Follow the program directory instructions to install OSA/SF.

__ 2. Use the same startup profile that was setup for the previous OSA/SF. The default data set name was **IOA.STARTUP.PROFILE**. Do not change any of the data set names in the startup profile. These data set names will allow you to use configurations created by the previous version of OSA/SF.

Note: Some rules were changed for the startup profile for V2R1. **CECNAME** is required and **SYSNAME** is optional. If you want to review the changes, see page 46.

__ 3. Replace the existing command EXEC (**IOACMD.EXEC**) with the new one from **IOA.SIOASAMP** member **IOACMD**.

__ 4. Do one of the following:

- If you plan to continue using OS/2 for the OSA/SF GUI and there is 3270 emulator support to transfer files, continue at “Updating the OSA/SF GUI on OS/2” on page 217.
- If you plan to continue using OS/2 and there is no 3270 emulator support, follow steps 1 through 7 in “Setting Up the OSA/SF GUI on OS/2 without a 3270 Emulator” on page 58. When you get to step 8, select **Update** instead of **Install**.
- If you want to use Windows for the OSA/SF GUI, continue at “Updating the OSA/SF GUI on Windows”.

Migrating to a New Version or Release of OSA/SF on VSE

When migrating to a new release of VSE, do not use any IOAxxx reader files created during a previous OSA/SF installation.

After installing a new release of VSE, follow the instructions in “Setting Up OSA/SF” on page 95 to move all the necessary JCL from ICCF library 59 to your reader.

If any of the OSA/SF REXX procedures require service with a PTF, they will be included in IOAOCMD.O in your library.

To make these fixes active, delete the old IOACMD.PROC and rename the .O member to .PROC.

To update the OSA/SF GUI for Windows, follow the procedure in “Updating the OSA/SF GUI on Windows”.

To update the OSA/SF GUI for OS/2, follow the procedure in “Updating the OSA/SF GUI on OS/2” on page 217.

Updating the OSA/SF GUI on Windows

Follow these instructions after installing a new release of OSA/SF or whenever the Windows OSA/SF GUI requires updating. These instructions will update the OSA/SF GUI on the Windows workstation.

__ 1. Verify that the current OSA/SF GUI is *not* running. All OSA/SF GUI windows should be closed.

__ 2. Transfer in binary the installation program to a temporary directory of your choice on the workstation.

OS/390, z/OS, or z/OS.e	IOAWINST.EXE from library member IOA.SIOAWIN
VM	From IOAWINST BIN E
VSE	IOAWINST.EXE from library member IOAWINST.W

__ 3. Start **IOAWINST.EXE**, either by double-clicking the IOAWINST object in Windows Explorer, or by entering `IOAWINST` at a command prompt. Follow the prompts.

When the EXE completes, Click **Start** on the Taskbar and select **Programs**. Look for an entry named **IBM OSA Support Facility**.

You can erase IOAWINST.EXE to save disk space. It is only used to install the program.

Updating the OSA/SF GUI on OS/2

Follow these instructions after installing a new release of OSA/SF or whenever the OS/2 OSA/SF GUI requires updating. These instructions will update the OSA/SF GUI on the OS/2 workstation. Some steps differ, where noted, depending on the host operating system you are downloading from. Not all steps are required for all operating systems.

1. Verify that the current OSA/SF GUI is *not running*. All OSA/SF GUI windows should be closed.
2. Establish a host session on the OS/2 workstation for downloading. You may have to start Personal Communications/3270 if no host sessions are started. If you are using some other means of transferring the files, start SI as directed in step 6 when the transfer is complete.
3. Logon to the host:

OS/390, z/OS, or z/OS.e	Logon to a TSO User ID that can access the **IOA.SIOAWEUI** data set containing the OSA/SF files.
VM	Logon to one of the ***administrator*** IDs that can access the disk where the GUI files are stored (the same disk where IOAO* PAKBIN, IOACATE BIN, and IOAPKGB BIN files reside).

4. Ready your 3270 emulator program and clear any system messages displayed:

OS/390, z/OS, or z/OS.e	Position the TSO session at the READY prompt, or select **COMMAND** from the ISPF Primary Option Menu
VM	Ensure that the ***administrator*** ID is at the READY prompt
VSE	Ensure that the emulator session is at the READY prompt (F6=Escape)

5. From OS/2, if you are not accessing the directory in which SI resides, change to it. SI is installed in OSA/SF's subdirectory. The default is **C:\IBMIOA2**.
6. VSE only

VSE

   a. Transfer IOAGRECV from the host to the workstation.

b. Run IOAGRECV on the workstation to download the OSA/SF GUI files and start installation. See Table 4 on page 100for a list of files that IOAGRECV downloads.
c. Continue at step 8.

OS/390, z/OS, z/OS.e, VM
To start SI, enter: **`IOAINSTS`**. For OS/390, z/OS, or z/OS.e, follow with a blank and then **/S:** and conclude with the name of the data set or filename. See Table 1 on page 58 for a list of files to download from OS/390, z/OS, and z/OS.e, or Table 3 on page 84 for VM.

7. Select **OSA Support Facility** on the **Installation and Maintenance** window.
8. Define the installation parameters:
   OS/390, z/OS, or z/OS.e
   a. Select **File** from the action bar, then select **Open Catalog**, and then select **Host**.
   b. Select the host session ID where the TSO session is running.
   c. Select t **Open**. This should display the Installation and Maintenance window.

   VM
   a. Select **File** from the action bar, then select **Open Catalog**, and then select **Host**.
   b. Select the host session ID where the ***administrator*** ID is running.
   c. Select **VM** as the host operating system, and then select **Open**. This should display the Installation and Maintenance window.

   VSE
   a. Select **File** from the action bar, then select **Open Catalog**, and then select **Drive**.
   b. Select the drive (letter) where the files were downloaded.
   c. Under Catalog (filename:) enter the path used in step6 on page 217 and specify a filename of **IOACATE.ICF**.
9. Select the **Action** menu bar choice.
10. Select **Update...** to display the **Update** window.
11. If you are updating on a LAN server or if you want to update the CONFIG.SYS file manually on your machine:
    a. Deselect the **Update CONFIG.SYS** option.
    b. Select the **Update** pushbutton.
    c. Reply to the warning message that tells you SI will not update your CONFIG.SYS file.
    d. Select the **Update** pushbutton on the Update window to begin the update process.
12. Select the **OK** pushbutton after you see a message that indicates downloading has completed successfully.
13. To exit SI, do one of the following:
    - Double click on the system icon.
    - *Or* select **File** and then select **Exit**

Complete the following for your installation:

1. If you updated the OSA/SF GUI on a LAN server, each requester on the LAN that accesses OSA/SF must now be updated. Continue at “Updating a Requester Machine” on page 81.
2. If you did not update OSA/SF GUI on a LAN server *and* you deselected the ***Update CONFIG.SYS*** option in step 11a on page 218, you must update your CONFIG.SYS file. Continue at “Updating the CONFIG.SYS File on a Non-Requester Machine” on page 80.
3. If you did not update OSA/SF GUI on a LAN server and you allowed software installer to update the CONFIG.SYS file, you will have to shut down your workstation and reboot it. The OSA/SF GUI service update is complete.

Chapter 12. OAT Templates and Sample Configuration Files

OAT Templates

IOAOSHRT Template for TCP/IP with Port Sharing

```
* This OAT template is a sample for setting up TCP/IP passthru mode
*   with port sharing between LPs.
* LP 5 and LP 7 are sharing ports 0 and 1.
* Each OAT entry has more than one IP address associated with it.
* To use this template, do the following:
*
* 1) Change the LP numbers to match your installation.
*    The LP number must precede all entries for that LP.
* 2) Change the unit addresses. UAs must be even numbers for passthru.
*    The odd entries will automatically be added by the CHPID.
* 3) Passthru is required in the mode field.
* 4) Change the port number of the OSA if necessary.
* 5) Specify if the LP should be the default entry (No, PRI, or SEC).
*    Only one entry per port can be the PRImary default entry.
*    Only one entry per port can be the SECondary default entry.
* 6) Change the IP addresses. They are required for TCP/IP when
*    sharing a port.  You can have up to 8 IP addresses per OAT entry.
*    You can have up to 16 IP addresses per port for OSA-2 CHPIDs.
*    You can have up to 512 IP addresses per port for OSA-Express CHPIDs.
* 7) Add additional entries as required.
******************************************************
*UA  Mode     Port   Default      IP Address
******************************************************
                        LP 5
00  passthru   00       PRI      105.000.005.005
                                 105.000.005.015
02  passthru   01       SEC      105.001.006.006
                                 105.001.006.016
                                 105.001.006.026

                        LP 7
00  passthru   00       no       107.000.075.075
                                 107.000.075.085
02  passthru   01       PRI      107.001.076.076
                                 107.001.086.086
```

Figure 103. OAT Template For TCP/IP With Ports Shared Between LPs (IOAOSHRT)

IOAOSHRS Template for SNA with Port Sharing

```
* This OAT template is a sample for setting up SNA mode with port
 * sharing between LPs.
 * LP 5 and LP 7 are sharing port 0.
 * To use this template, do the following:
 *
 * 1) Change the LP numbers to match your installation.
 *    The LP number must precede all entries for that LP.
 * 2) Change the unit addresses. UAs can be odd or even for SNA.
 * 3) SNA is required in the mode field.
 * 4) Change the port number of the OSA if necessary.
 * 5) Add additional entries as required.
 ********************************************
 *UA  Mode  Port     Entry specific information
 ********************************************
                LP 5
0A   sna    00

               LP 7
0A   sna    00
```

Figure 104. OAT Template for SNA with Ports Shared Between LPs (IOAOSHRS)

IOAOSHRA Template for TCP/IP, SNA, and MPC with Ports Sharing

```
* This OAT template is a sample for setting up TCP/IP, SNA, and MPC on
* two partitions (LPs) as well as sharing one port by 2 TCP/IP stacks
* on the same LP.
*
* It can also be used for other combinations of modes by following
* the instructions below.  There are four cases where you MUST
* have an IP address on your passthru entries to allow all the
* defined modes to operate properly.
* 1) There is TCP/IP traffic to different LPs
* 2) TCP/IP and SNA traffic are sharing a port
* 3) TCP/IP and MPC traffic are in use on the CHPID
* 4) There is more than 1 TCP/IP stack using a port
*
* In this example, LP 5 and LP 7 are sharing ports 0 & 1.
* Port 1 is also being shared by 2 TCP/IP stacks on the same partition.
* To use this template, do the following:
*
* 1) Change the LP numbers to match your installation.
*    The LP number must precede all entries for that LP.
* 2) Change the unit addresses. UAs must be even numbers for passthru
*    and MPC. The odd entries are automatically added by the CHPID.
* 3) The mode must be passthru, sna, or mpc (for this example).
* 4) The port number must be 00 for all single-port CHPIDs.
*    For multiple physical port CHPIDs, use the physical port number.
*    For ATM LAN Emulation, use the logical port number.
* 5) If you are not using MPC, delete all MPC OAT entries and continue
*      at (6) below.
*    Otherwise, specify the OSA name for all MPC entries.  It is a
*      required field.  The following rules for OSA name apply:
*    a) a-z, 0-9, @, #, $ are valid
*    b) 0-9 not valid 1st character
* 6) If you are not using TCP/IP, delete all passthru OAT entries and
*      continue at (7) below.
*    Otherwise, change the IP addresses. They are required for TCP/IP
*      when sharing a port.
*    You can have up to 8 IP addresses per OAT entry.
*    You can have up to 16 IP addresses per port spread over multiple
*      OAT entries for OSA-2 CHPIDs.
*    You can have up to 512 IP addresses per port spread over multiple
*      OAT entries for OSA-Express CHPIDs.
*    An IP address of 0.0.0.0 indicates no port sharing.
*    You CANNOT have a mixture of zero and non-zero IP addresses in
*      the same OAT.
*    Specify if the LP is the default entry (No, PRI, or SEC).
*    Only one entry per port can be the PRImary default entry.
*    Only one entry per port can be the SECondary default entry.
```

Figure 105. OAT Template for TCP/IP, SNA, and MPC With Ports Shared Between LPs (IOAOSHRA) (Part 1 of 2). The Beginning of the template contains the instructions to modify the template shown at the End.

```
* 7) If you are not using SNA, delete all SNA OAT entries and continue
*      at (8) below.
*    If you are not using the SNA network management, delete all SNA
*      OAT entries having a port number of FF.
*    Otherwise, specify the VTAM IDNUM and a port number of FF for the
*      SNA network management entry.
*    SNA network management is only valid for OSA-2 FDDI and ENTR CHPIDs.
* 8) Add additional entries as required for each mode you are
*      configuring.
************************************************************
*UA  Mode      Port  Default LP      OSA Name  IP Address
************************************************************
                                LP 5
00  passthru   00     PRI                      105.000.005.005
                                               105.000.005.015
                                               105.000.005.025
                                               105.000.005.035
02  passthru   01     no                       100.100.100.100
12  passthru   01     no                       200.200.200.200
0A  sna        00
0B  sna        FF     123FD
08  mpc        00                  OSANAME1 (IP traffic)
************************************************************
                                LP 7
00  passthru   01     no                       107.100.075.075
                                               107.100.075.085
02  passthru   00     SEC                      105.000.005.044
0A  sna        00
```

Figure 105. OAT Template for TCP/IP, SNA, and MPC With Ports Shared Between LPs (IOAOSHRA) (Part 2 of 2). The Beginning of the template contains the instructions to modify the template shown at the End.

IOAOMPC Template for HPDT ATM Native

```
* This OAT template is a sample for setting up HPDT ATM Native on an
* OSA-Express ATM CHPID.
*
* 1) Change the LP numbers to match your installation.
*    The LP number must precede all entries for that LP.
* 2) Change the unit addresses. UAs must be even numbers for MPC entries.
*    The odd entries are automatically added by the CHPID.
* 3) The mode must be mpc (for this example).
* 4) The port number must be 00 for the HPDT ATM Native.
* 5) Specify the OSA name for all MPC entries.  It is a
*      required field. The following rules for OSA name apply:
*    a) a-z, 0-9, @, #, $ are valid
*    b) 0-9 not valid 1st character
* 8) Add additional MPC entries as required for each LP you are
*     configuring.
*********************************************************************
*UA  Mode     Port        OSA Name
*********************************************************************
                               LP 5
00  mpc      00          OSANAME1
*********************************************************************
                               LP 7
00  mpc      00          OSANAME2
02  mpc      00          NAMEOSA3
```

Figure 106. OAT Template For HPDT ATM Native (IOAOMPC)

Configuration Files

Sample configuration files are provided for all OSA-Express features in:

IOA.SIOASAMP on z/OS and OS/390

E (200) disk on VM/ESA and z/VM.

PRD1.BASE on VSE/ESA

These sample configuration files have the following names:

“IOAATME - Sample ATM Configuration File” on page 226

“IOAFENET - Sample FENET Configuration File” on page 232

“IOAGIGA - Sample GbE Configuration File” on page 234

“IOATR - Sample Token Ring Configuration File” on page 236

IOAATME - Sample ATM Configuration File

```
/*********************************************************************
/* Input file for configuring an OSA-Express ATM CHPID
/*
/* This file contains the required input parameters to customize an
/* OSA-Express ATM CHPID.  Follow the instructions to modify the data
/* and then run IOACMD, specifying the 'Configure OSA CHPID
/* (CONFIG_OSA)' command, to put the parameters on the OSA (CHPID).
/*
/* Notes: 1) This should be a copy of the sample file (IOAATME).
/*        2) Lines that start with a slash asterisk (/*) are comments.
/*        3) The file is not case sensitive.
/*
/* Instructions:
/*
/* 1) An OSA must have a physical port defined as well as 1 or 2
/*    emulated or 1 native port.  You define these ports using the
/*    sections shown below.  Each 'section' contains the parameters
/*    needed for the particular port type.  i.e. - All the physical
/*    parameters start with "PHY".  The emulated ports start with
/*    "EMUL" and the native port wth "NAT".  OSD (QDIO) CHPIDs can
/*    only have PHY and EMUL sections.
/*
/* 2) All parameters except PVC have 2 indices.  The first specifies the
/*    port the parameter is associated with.  The second indicates which
/*    parameter.  A brief description of the parameter is in the
/*    comment field at the end of the line.  The following sample line
/*    phy.0.5  = auto               /* Port UNI version (AUTO, 30 or 31)
/*    is for parameter 5 on physical port 0, which corresponds to the
/*    UNI version setting which can be either AUTO, uni 3.0 or uni 3.1.
/*
/*    PVC entries have 3 indices.  The first specifies the port the
/*    parameter is associated with.  The second indicates the PVC number
/*    (you can have 1-255 PVCs). The third indicates the parameter.
/*    If you have no PVCs, omit all the PVC entries.
/*
/* 3) To configure SNA on an emulated port, you must use the SNA
/*    section parameters and you must have an emulated port defined.
/*    If you are not configuring SNA, omit all the SNA entries.
/*    SNA is only valid for OSE (non-QDIO) CHPIDs.
```

Figure 107. Sample Configuration IOAATME (Part 1 of 6)

```
/* 4) You must have all the parameters to configure an OSA in one file.
/*    The following rules must be followed:
/*    a) You cannot have native and emulated ports configured at the
/*       same time.
/*    b) You cannot configure SNA for Native mode.
/*    c) You cannot configure SNA for OSD (QDIO) CHPIDs.
/*    d) To configure SNA, you must have the corresponding emulated
/*       (EMUL) port(s) defined.
/*    e) To configure PVC entries, you must have the corresponding
/*       native (NAT) port defined.
/*
/*    Change the sample values to match your installation.
/*    Omit or add ports (physical, native, emulated) as needed.
/*    Remove all sections that are not valid (including SNA and/or PVC).
/* 5) When you issue the Configure OSA command, you can select one
/*    of the following actions to be taken with this data:
/*
/*    a) Activate - Configures the OSA exactly as described in the input
/*       data.  All ports currently defined on the OSA but not in the
/*       input data are removed.
/*
/*    b) Activate no install - Same as 'activate', but the data is not
/*       sent to the OSA.  Only the OSA/SF files needed to configure
/*       the OSA are built.  To have the parameters configured on the
/*       OSA, you must issue the Install command at a later time.
/*       This is useful if you want to prepare the OSA to be configured,
/*       make sure all your parameters are correct, but do not want to
/*       disrupt traffic until a later time.
/*
/*    c) Activate partial - This allows you to change the parameters
/*       for a port that is already configured.  Any other ports that
/*       are configured (and possibly transferring data) are not
/*       affected.  IOACMD determines which ports are contained in the
/*       input data and prompts you to select which one(s) to change.
/*       This allows you to maintain one input file, and just change
/*       the parameters for that particular port.
/*
/* 6) The second parameter in each emulated or native port section is
/*    to enable LAN traffic.  If you set this parameter to 'no', the
/*    port parameters you specify will be configured on the OSA,
/*    but the port will be placed in a 'disabled' state so no traffic
/*    can flow.  You may later enable the port for traffic using the
/*    'Enable emulated/native port' parameter on the Set Parameters
/*    command from IOACMD.  This can be useful for checking out
/*    parameters on one port without disrupting traffic on other ports.
/*
/* 7) The following parameters are for your use only.  These fields
/*    are not used by the OSA but are good places to keep data you
/*    can associate to the specified fields.
/*    a) Configuration name
/*    b) Port description
/*    c) User data
```

Figure 107. Sample Configuration IOAATME (Part 2 of 6)

```
/* 8) MAC addresses - Change these to the local MAC address you desire.
/*    To use the universal, burned in MAC address, set the parm to 0.
/*    The format of a MAC address is 12 hex digits, e.g.- 4034567890AB
/*    with the following guidelines for each LAN type:
/*    A token ring MAC address must have the following format
/*      Bit  0 must be 0
/*      Bit  1 must be 1
/*      Bits 2 through 47 can be anything
/*
/*    An Ethernet MAC address must have the following format
/*    (Ethernet MAC addresses use canonical notation)
/*      Bits 0 through 5 can be anything
/*      Bit  6 must be 1
/*      Bit  7 must be 0
/*      Bits 8 through 47 can be anything
/*
/* 9) The ATM physical local ESI (phy.0.4) can have any 48 bits set

/* 10)When configuring an OSA-Express ATM CHPID for OSE (non-QDIO)
/*    traffic, you must set up the OAT that corresponds to what mode(s)
/*    you are configuring in this file.
/*    The following table shows what OAT entry type(s) are allowed
/*    for each mode found in this file.
/*      Mode       Variable       Entry type
/*    Emulation     emul.p     Passthru or SNA
/*    SNA           sna.p      SNA
/*    ATM Native    nat.p      MPC
/*
/*    For OSD (QDIO) CHPIDs, no OAT is required or asked for by IOACMD.

/* 11) Port name - For OSE CHIPDs it must match the name you define in
/*    the TCP/IP profile DEVICE and LINK statements for SNMP.  If you
/*    are not using SNMP, this field is ignored and can be used for
/*    additional information for your installation.
/*====================================================================
/* Parameters for physical port 0
/*====================================================================
phy.0.1  = config file name       /* Configuration name (32-char max)
phy.0.2  = port description       /* Port description (16-char max)
phy.0.3  = Port name              /* Port name (8-char max)
phy.0.4  = 000000000000           /* Local End System ID (12 hex digits)
phy.0.5  = auto                   /* Port UNI version (AUTO, 30 or 31)
phy.0.6  = 0                      /* Control plane use
                                  /*  0 - ILMI & SVC enabled
                                  /*  3 - ILMI & SVC disabled
phy.0.7  = 0                      /* Transmit clock source
                                  /*  0 - OSA generated
                                  /*  1 - Network generated
phy.0.8  = 0                      /* Physical layer type
                                  /*  0 - Sonet
                                  /*  1 - SDH
phy.0.9  = 0.0.0.0                /* TCP/IP instance IP address
phy.0.10 = 1                      /* Bandwidth allocation
                                  /*  1 - Best effort only
                                  /*  2 - Reserve bandwidth
                                  /*      & best effort
                                  /*  3 - Reserved bandwidth
```

Figure 107. Sample Configuration IOAATME (Part 3 of 6)

```
/*====================================================================
/* Parameters for Native port 0 - Valid only for OSE (non-QDIO) CHPIDs
nat.0.1  = configuration name     /* Configuration name (32-char max)
nat.0.2  = Yes                    /* Enable LAN traffic (Yes, No)
/*====================================================================
/* This portion of the file contains the required input parameters
/* to configure the PVC entries for ATM Native.
/*
/* You can have a maximum of 256 PVC entries per OSA.
/*
/* PVC parameters are in the format 'pvc.port.entry.parameter' where
/*  'pvc' is the keyword indicating this is a PVC entry
/*  'port' is the port number
/*  'entry' is the PVC entry this parameter is for
/*  'parameter' is the number corresponding to the parameter
/*  For example, pvc.0.1.4 is parameter 4 for PVC entry 1 on port 0.
/*
/* PVC entry 1 for port 0 starts here
pvc.0.1.1 = PVC name              /* PVC name (8-char max)
pvc.0.1.2 = 353207                /* Forward peak cell rate (0-353207)
pvc.0.1.3 = 353207                /* Backward peak cell rate(0-353207)
pvc.0.1.4 = 0                     /* VPI for this PVC entry (0-255)
pvc.0.1.5 = 35                    /* VCI for this PVC entry (32-65535)
/*====================================================================
/* The forward and backward PDU value should be the same for both
/* pvc.p.n.6 and pvc.p.n.7.  Do not set them with different values.
pvc.0.1.6 = 8448                  /* Forward Max PDU size (64-9188)
pvc.0.1.7 = 8448                  /* Backward Max PDU size(64-9188)
/*====================================================================
/* To specify a reserved bandwidth PVC, set field pvc.p.n.8 to 1.
/* To use the defaults, set pvc.p.n.8 to 0.
pvc.0.1.8 = 0                     /* Reserved bandwidth
                                  /*  0 - Use defaults
                                  /*  1 - Specify parameters 9-12
/*====================================================================
/* If pvc.p.n.8 is 1, then the values in pvc.p.n.9-pvc.p.n.12 are used
/* If pvc.p.n.8 is 0, you must include pvc.p.n.9 to pvc.p.n.12, but
/* the values are ignored.
/*====================================================================
pvc.0.1.9 = 353207                /* Forward sustain cell rate (0-353207)
pvc.0.1.10= 353207                /* Backward sustain cell rate(0-353207)
pvc.0.1.11= 353207                /* Forward cell burst rate (0-353207)
pvc.0.1.12= 353207                /* Backward cell burst rate(0-353207)
/*====================================================================
/* Parameters for emulated port p
/*/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
```

Figure 107. Sample Configuration IOAATME (Part 4 of 6)

```
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*
/* Emulated token ring is valid only for OSE (non-QDIO) CHPIDs.
/*====================================================================
emul.0.1  = configuration name    /* Configuration name (32-char max)
emul.0.2  = Yes                   /* Enable LAN traffic (Yes, No)
emul.0.3  = 1                     /* Emulated port type
                                  /*  1 - Ethernet
                                  /*  2 - Token ring
emul.0.4  = user data             /* User data (32-char max)
emul.0.5  = ELAN name             /* ELAN name (32-char max)
emul.0.6  = 000000000000          /* Local MAC address (12 hex digits)
emul.0.7  = 155.0                 /* Best effort peak rate (1-155)
                                  /*  in 0.1 increments
emul.0.8  = 0                     /* IBM Enhanced mode
                                  /*  0 - drop direct connect
                                  /*  Not 0 - keep connections
/*
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
/*====================================================================
emul.0.9  = 1516                  /* Max LAN frame size
emul.0.10 = 1                     /* LEC auto configure
                                  /*  0 - disable auto config
                                  /*    parms 11-21 are valid
                                  /*  1 - enable auto config
                                  /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
/*====================================================================
emul.0.11 = 120                   /* Control timeout (10-300)
emul.0.12 = 1200                  /* VCC timeout
emul.0.13 = 300                   /* Aging time (10-300)
                                  /* LES ATM address (40 hex digits)
emul.0.14 = 11223344556677889900112233445566778899 00
emul.0.15 = 10                    /* Max unknown frame count (1-10)
emul.0.16 = 1                     /* Max retry count (0-2)
emul.0.17 = 15                    /* Forward time delay (4-30)
emul.0.18 = 1                     /* LE ARP timeout (1-30)
emul.0.19 = 1                     /* Flush timeout (1-4)
emul.0.20 = 6                     /* Path switching delay (1-8)
emul.0.21 = 4                     /* Connection complete timeout (1-10)
emul.0.22.1 = 000000000000        /* Group address 1 (12 hex digits)
emul.0.22.5 = 000000000000        /* Group address 5
```

Figure 107. Sample Configuration IOAATME (Part 5 of 6)

```
/*====================================================================
/* SNA parameters - Valid only for OSE (non-QDIO) CHPIDs
/*
/* The ti, t1 and t2 timers can be set as indicated below.  The values
/* shown are in seconds.  Any values entered that are not multiples of
/* the indicated increment will be rounded to the next highest
/* incremental value.
/* For the inactivity timer (ti), a value of 0 will disable the timer.
/*====================================================================
sna.0.1  = Configuration name     /* Configuration name (32-char max)
sna.0.2  = 90.00                  /* Inactivity timer (ti)
                                  /*   .24-90 in increments of .12
                                  /*   0 disables the inactivity timer
sna.0.3  = 2.00                   /* Response timer (t1)
                                  /*   .20-51 in increments of .20
sna.0.4  = 0.08                   /* Acknowledgement timer (t2)
                                  /*   .08-20.4 in increments of .08
sna.0.5  = 1                      /* N3 (1-4)
sna.0.6  = 8                      /* TW (1-16)
/*
/* The following table shows the values to configure the SNA
/* enhanced availability for a token ring port.  The columns 'type',
/* 'load balance', and 'session delay' correspond to parameters
/* sna.port.7, sna.port.8, and sna.port.9 respectively.  The load
/* balancing (sna.port.8) and session delay (sna.port.9) values
/* must be multiples of .04 seconds.  If they are not, they will be
/* rounded up to the next .04 multiple.
/*
/* These values are ignored for an ethernet port; or you can omit
/* them from the input.
/* If omitted for token ring, enhanced availability will be disabled.
/*
/* Type of availability     Type     Load     Session
/*                                  Balance    Delay
/* Overflow                   1       N/A      N/A
/* Redundant overflow         2       N/A      0-15
/* Load balancing             3       0-1      N/A
/* Redundant load balancing   4       0-1      0-15
/* Redundant only             5       N/A      0-15
/* Disabled                   6       N/A      N/A
/*====================================================================
sna.0.7  = 6                      /* Enhanced availability type
sna.0.8  = 0.00                   /* Load balance factor (0-1)
sna.0.9  = 0.00                   /* Session delay (0-15)
```

Figure 107. Sample Configuration IOAATME (Part 6 of 6)

IOAFENET - Sample FENET Configuration File

```
/*********************************************************************
/* Input file for configuring an OSA-Express Fast Ethernet CHPID
/*
/* This file contains the required input parameters to customize an
/* OSA-Express fast Ethernet CHPID.  Follow the instructions to modify
/* the data and then run IOACMD, specifying the 'Configure OSA CHPID
/* (CONFIG_OSA)' command, to put the parameters on the OSA (CHPID).
/*
/* Notes: 1) This should be a copy of the sample file (IOAFENET)
/*        2) Lines that start with a slash asterisk (/*) are comments.
/*        3) The file is not case sensitive.
/*
/* Instructions:
/*
/* 1) All parameters have 2 indices.  The first specifies the port
/*    the parameter is associated with.  The second indicates which
/*    parameter.  A brief description of the parameter is in the
/*    comment field at the end of the line.  The following sample line
/*    fenet.0.4 = 1234567890AB    /* Local MAC address (12 hex digits)
/*    is for parameter 4, which corresponds to the local MAC address
/*    you can use to override the universal MAC address.
/*
/* 2) You must have the base information that starts with 'fenet'.
/*    The SNA information is optional.  If you choose to configure SNA
/*    parameters, they must start with 'sna.p', where 'p' is the port
/*    number.  Otherwise remove all the SNA entries from the input.
/*    SNA is only valid for OSE (non-QDIO) CHPIDs.
/*
/* 3) Change the sample values to match your installation.
/*
/* 4) The following parameters are for your use only.  These fields
/*    are not used by the OSA but are good places to keep data you
/*    can associate to the specified fields.
/*    a) Configuration name
/*    b) User data
/*
/* 5) MAC address - You can have the OSA use a local MAC address by
/*    changing parameter fenet.0.4 to match your installation.
/*    To use the universal, burned in MAC address, set the parm to 0.
/*    The format of a MAC address is 12 hex digits, e.g.-1234567890AB
/*    with the following guideline:
/*
/*    A fast Ethernet MAC address must have the following format:
/*    (Ethernet MAC addresses use canonical notation)
/*      Bits 0 through 5 can be anything
/*      Bit  6 must be 1
/*      Bit  7 must be 0
/*      Bits 8 through 47 can be anything
```

Figure 108. Sample Configuration IOAFENET (Part 1 of 2)

```
/* 6) For OSD (QDIO) CHPIDs, no OAT file is required or asked for by
/*    IOACMD.
/*
/* 7) Port name - For OSE CHIPDs it must match the name you define in
/*    the TCP/IP profile DEVICE and LINK statements for SNMP.  If you
/*    are not using SNMP, this field is ignored and can be used for
/*    additional information for your installation.
/*
/*====================================================================
/* Fast Ethernet parameters
/*====================================================================
fenet.0.1 = config file name      /* Configuration name (32-char max)
fenet.0.2 = user data             /* User data (32-char max)
fenet.0.3 = portname              /* Port name (8-char max)
                                  /*  Data ignored for OSD CHPIDs
fenet.0.4 = 000000000000          /* Local MAC address (12 hex digits)
fenet.0.5 = auto                  /* Speed/mode
                                  /*  Auto - auto negotiate
                                  /*  10H  - 10  Mb, half duplex
                                  /*  10F  - 10  Mb, full duplex
                                  /*  100H - 100 Mb, half duplex
                                  /*  100F - 100 Mb, full duplex
/*====================================================================
/* Parameters fenet.0.6.1 to fenet.0.6.32 are used to specify group
/* addresses.  You can have up to 32 assigned per OSA.
/* The last digit specifies which group address you are setting.
/* As an example, fenet.0.6.4 is used to set group address 4.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper fenet.0.6.y entry.
/* To omit a group address, set fenet.0.6.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*====================================================================
fenet.0.6.1 = 000000000000        /* Group address 1 (12 hex digits)
fenet.0.6.5 = 000000000000        /* Group address 5
/*====================================================================
/* SNA parameters - Valid only for OSE (non-QDIO) CHPIDs
/*
/* The ti, t1 and t2 timers can be set as indicated below.  The values
/* shown are in seconds.  Any values entered that are not multiples of
/* the indicated increment will be rounded to the next highest
/* incremental value.
/* For the inactivity timer (ti), a value of 0 will disable the timer.
/*====================================================================
sna.0.1  = Configuration name     /* Configuration name (32-char max)
sna.0.2  = 90.00                  /* Inactivity timer (ti)
                                  /*   .24-90 in increments of .12
                                  /*   0 disables the inactivity timer
sna.0.3  = 2.00                   /* Response timer (t1)
                                  /*   .20-51 in increments of .20
sna.0.4  = 0.08                   /* Acknowledgement timer (t2)
                                  /*   .08-20.4 in increments of .08
sna.0.5  = 1                      /* N3 (1-4)
sna.0.6  = 8                      /* TW (1-16)
```

Figure 108. Sample Configuration IOAFENET (Part 2 of 2)

IOAGIGA - Sample GbE Configuration File

```
/*********************************************************************
/* Input file for configuring an OSA-Express gigabit ethernet CHPID
/*
/* This file contains the required input parameters to customize an
/* OSA-Express gigabit ethernet CHPID.  You cannot fully configure
/* this type of CHPID using OSA/SF.  To run traffic through this CHPID,
/* you must use the OS/390 eNetwork Communications Server product.
/* Use OSA/SF only if you want to specify user-defined data, a local
/* MAC address, or up to 32 group addresses.
/*
/* Follow the instructions to modify this file and then use IOACMD,
/* specifying the Configure OSA CHPID (CONFIG_OSA) command, to put
/* the parameters on the OSA (CHPID).
/*
/* Notes: 1) This should be a copy of the sample file (IOAGIGA).
/*        2) Lines that start with a slash asterisk (/*) are comments.
/*        3) The file is not case sensitive.
/*
/* Instructions:
/*
/* 1) Modify the first line (osd.1) to whatever name you want assigned
/*    to this configuration.  There is a 32-character maximum.
/*    This field is not used by the OSA but is a good place to keep
/*    a name you can associate this configuration to.
/*
/* 2) Modify the next line (osd.2) to whatever user-defined data you
/*    want on the CHPID.  There is a 32-character maximum.
/*    This field is not used by the OSA but is a good place to keep
/*    data associated with this CHPID.
/*
/* 3) Modify the next line (osd.3) with the local MAC address you desire.
/*    To use the universal, burned-in MAC address, set osd.3 to 0.
/*    The format of this parameter is 12 hex digits; i.e., 1234567890AB
/*
/*    An ethernet MAC address must have the following format:
/*    (Ethernet MAC addresses use canonical notation)
/*      Bits 0 through 5 can be anything
/*      Bit  6 must be 1
/*      Bit  7 must be 0
/*      Bits 8 through 47 can be anything
```

Figure 109. Sample Configuration IOAGIGA (Part 1 of 2)

```
/* 4) Parameter osd.4 is used to specify the group addresses.  You can
/*    have up to 32 assigned per OSA.  The format of this parameter
/*    is 12 hex digits; i.e., 1234567890AB
/*    The index for each group address is part of the osd.4 entry.
/*    For example, group address 5 would be osd.4.5
/*
/*    To specify a group address, modify the proper osd.4.n entry.
/*    To omit a group address, either set the osd.4.n data to 0 or
/*    delete the entry from this file.  If you do not want any group
/*    addresses, omit all the osd.4 entries.
/*====================================================================
osd.1 = configuration_name            /* configuration name(32-char max)
osd.2 = user_data                     /* User data (32-char max)
osd.3 = mac_address                   /* Local MAC address
osd.4.1 = 000000000000                /* Group address 1
osd.4.2 = 000000000000                /* Group address 2
osd.4.3 = 000000000000                /* Group address 3
osd.4.4 = 000000000000                /* Group address 4
osd.4.5 = 000000000000                /* Group address 5
osd.4.6 = 000000000000                /* Group address 6
osd.4.7 = 000000000000                /* Group address 7
osd.4.8 = 000000000000                /* Group address 8
osd.4.9 = 000000000000                /* Group address 9
osd.4.10= 000000000000                /* Group address 10
osd.4.11= 000000000000                /* Group address 11
osd.4.12= 000000000000                /* Group address 12
osd.4.13= 000000000000                /* Group address 13
osd.4.14= 000000000000                /* Group address 14
osd.4.15= 000000000000                /* Group address 15
osd.4.16= 000000000000                /* Group address 16
osd.4.17= 000000000000                /* Group address 17
osd.4.18= 000000000000                /* Group address 18
osd.4.19= 000000000000                /* Group address 19
osd.4.20= 000000000000                /* Group address 20
osd.4.21= 000000000000                /* Group address 21
osd.4.22= 000000000000                /* Group address 22
osd.4.23= 000000000000                /* Group address 23
osd.4.24= 000000000000                /* Group address 24
osd.4.25= 000000000000                /* Group address 25
osd.4.26= 000000000000                /* Group address 26
osd.4.27= 000000000000                /* Group address 27
osd.4.28= 000000000000                /* Group address 28
osd.4.29= 000000000000                /* Group address 29
osd.4.30= 000000000000                /* Group address 30
osd.4.31= 000000000000                /* Group address 31
osd.4.32= 000000000000                /* Group address 32
/********************************************************************
```

Figure 109. Sample Configuration IOAGIGA (Part 2 of 2)

IOATR - Sample Token Ring Configuration File

```
/* Input file for configuring an OSA-Express Token Ring CHPID
/* This file contains the required input parameters to customize an
/* OSA-Express token ring CHPID.  Follow the instructions to modify
/* the data and then run IOACMD, specifying the 'Configure OSA CHPID
/* (CONFIG_OSA)' command, to put the parameters on the OSA (CHPID).
/* Notes: 1) This should be a copy of the sample file (IOATR)
/*        2) Lines that start with a slash asterisk (/*) are comments.
/*        3) The file is not case sensitive.
/* Instructions:
/* 1) All parameters have 2 indices.  The first specifies the port
/*    the parameter is associated with.  The second indicates which
/*    parameter.  A brief description of the parameter is in the
/*    comment field at the end of the line.  The following sample line
/*    tr.0.4 = 1234567890AB    /* Local MAC address (12 hex digits)
/*    is for parameter 4, which corresponds to the local MAC address
/*    you can use to override the universal MAC address.
/* 2) You must have the base information that starts with 'tr'.
/*    The SNA information is optional.  If you choose to configure SNA
/*    parameters, they must start with 'sna.p', where 'p' is the port
/*    number.  Otherwise remove all the SNA entries from the input.
/*    SNA is only valid for OSE (non-QDIO) CHPIDs.
/* 3) Change the sample values to match your installation.
/* 4) The following parameters are for your use only.  These fields
/*    are not used by the OSA but are good places to keep data you
/*    can associate to the specified fields.
/*    a) Configuration name
/*    b) User data
/* 5) MAC address - You can have the OSA use a local MAC address by
/*    changing parameter tr.0.4 to match your installation.
/*    To use the universal, burned in MAC address, set the parm to 0.
/*    The format of a MAC address is 12 hex digits, e.g.-1234567890AB
/*    with the following guideline:
/*    A token ring MAC address must have the following format:
/*      Bit  0 can be anything
/*      Bit  1 must be 1
/*      Bits 2 through 47 can be anything
/* 6) For OSD (QDIO) CHPIDs, no OAT file is required or asked for by
/*    IOACMD.
/* 7) Port name - For OSE CHIPDs it must match the name you define in
/*    the TCP/IP profile DEVICE and LINK statements for SNMP.  If you
/*    are not using SNMP, this field is ignored and can be used for
/*    additional information for your installation.
/*====================================================================
/* Token ring parameters
/*====================================================================
tr.0.1 = config file name      /* Configuration name (32-char max)
tr.0.2 = user data             /* User data (32-char max)
tr.0.3 = portname              /* Port name (8-char max)
                               /*  Data ignored for OSD CHPIDs
tr.0.4 = 000000000000          /* Local MAC address (12 hex digits)
tr.0.5 = 00000000              /* Functional address (8 hex digits)
tr.0.6 = Auto                  /* Speed/mode
                               /*  Auto - Auto sense from the ring
```

Figure 110. Sample Configuration IOATR (Part 1 of 2)

```
                                /*    4H -   4 Mbs Half duplex
                                /*    4F -   4 Mbs Full duplex
                                /*   16H -  16 Mbs Half duplex
                                /*   16F -  16 Mbs Full duplex
                                /*   100 - 100 Mbs Full duplex
/*====================================================================
/* Parameters tr.0.7.1 to tr.0.7.6 are used to specify group
/* addresses.  You can have up to 6 assigned per OSA.
/* The last digit specifies which group address you are setting.
/* As an example, tr.0.7.4 is used to set group address 4.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper tr.0.7.y entry.
/* To omit a group address, set tr.0.7.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
tr.0.7.1 = 000000000000        /* Group address 1 (12 hex digits)
tr.0.7.5 = 000000000000        /* Group address 5
/*====================================================================
/* SNA parameters - Valid only for OSE (non-QDIO) CHPIDs
/*
/* The ti, t1 and t2 timers can be set as indicated below.  The values
/* shown are in seconds.  Any values entered that are not multiples of
/* the indicated increment will be rounded to the next highest
/* incremental value.
/* For the inactivity timer (ti), a value of 0 will disable the timer.
/*====================================================================
sna.0.1  = Configuration name  /* Configuration name (32-char max)
sna.0.2  = 90.00               /* Inactivity timer (ti)
                               /*   .24-90 in increments of .12
                               /*   0 disables the inactivity timer
sna.0.3  = 2.00                /* Response timer (t1)
                               /*   .20-51 in increments of .20
sna.0.4  = 0.08                /* Acknowledgement timer (t2)
                               /*   .08-20.4 in increments of .08
sna.0.5  = 1                   /* N3 (1-4)
sna.0.6  = 8                   /* TW (1-16)
/*====================================================================
/* The following table shows the values to configure SNA enhanced
/* availability for a token ring port.  The columns 'type',
/* 'load balance', and 'session delay' correspond to parameters
/* sna.port.7, sna.port.8, and sna.port.9 respectively.  The load
/* balancing (sna.port.8) and session delay (sna.port.9) values
/* must be multiples of .04 seconds.  If they are not, they will be
/* rounded up to the next .04 multiple.
/* If these parms are omitted, enhanced availability will be disabled.
/* Type of availability     Type     Load     Session
/*                                  Balance    Delay
/* Overflow                   1       N/A      N/A
/* Redundant overflow         2       N/A      0-15
/* Load balancing             3       0-1      N/A
/* Redundant load balancing   4       0-1      0-15
/* Redundant only             5       N/A      0-15
/* Disabled                   6       N/A      N/A
/*====================================================================
sna.0.7  = 6                    /* Enhanced availability type
sna.0.8  = 0.00                 /* Load balance factor (0-1)
sna.0.9  = 0.00                 /* Session delay (0-15)
```

Figure 110. Sample Configuration IOATR (Part 2 of 2)

Chapter 13. About the OSA Address Table (OAT)

Why read this section?

- **If you are installing OSA-Express feature(s) to run only as an channel type OSD (QDIO mode)**, the correct OAT entries are automatically created from I/O hardware configuration data and Communications Server. You cannot create or modify the OAT but you may find it helpful to look at the examples and understand how the OAT works.
- **If you are using the OSA/SF GUI to customize any OSA feature other than channel type OSD**, configuration windows organize the OAT and provide an easy method for creating and changing entries. You do not have to know the details of the OAT format as described in this section, although you might like to know what the OAT looks like.
- **If you are installing any OSA feature other than channel type OSD and you are not using the OSA/SF GUI**, this section is for you.

Each OSA has its own OAT. Each OAT contains one or more *entries*, or collections of parameters that identify one data path through the OSA. The OAT is stored in the OSA in non-volatile storage. There are two methods commonly used for manually creating an OAT using REXX:

- The Get OAT Command
- Sample Templates in IOA.SIOASAMP (OS/390 or z/OS) and on the E (200) minidisk (VM)

There are advantages to both methods. If you already have the OAT completed and installed on the OSA and you want to make a change, use the Get OAT command. If you are creating an OAT for the first time, the templates are easier to use. Instructions for changing the templates are included in the legend appended to each template.

The hardware configuration (IOCDS) has input to the OAT and must be defined before an OSA can transfer data. See “Using HCD for Hardware I/O Configuration” on page 31.

The OAT Format

An OAT entry always contains one logical partition line and one OAT definition line. It may optionally contain additional OAT lines.

Logical Partition Line

For all OAT entry types, the first non-comment line in the OAT entry indicates the partition to which the following OAT entry lines refer. It always includes the same parameters, separated by one or more spaces:

LP *n (hostname)*

where

LP
is a keyword signaling the beginning of all OAT entries associated with the specified logical partition.

n is a 1-digit hex logical partition number.

(hostname)
is an optional, descriptive, partition name ignored by the program.

OAT Definition Line

The content of the OAT definition line differs according to the type of entry. Parameters are separated by one or more spaces.

For TCP/IP

In an OAT entry for TCP/IP, the OAT definition line includes the following:

ua* passthru *port_number default_entry Home_IP Net_mask

where

ua is a 1 or 2−digit unit address number, either alone (0A, for example) or concatenated to a device address, as in 0A(023A). The device address is ignored.

passthru
identifies the type of entry.

port_number
specifies the port number.

default_entry
indicates whether this entry forwards unknown IP addresses, and is set to one of the following:

NO specifies that this is not a default entry.

PRI specifies a primary default entry.

SEC specifies a secondary default entry to be used when the primary is not available.

Home_IP
is the home IP address in standard w.x.y.z format, with values ranging from 0 to 255 in each position. This can be left blank when port sharing is not used, or when you do not want an address assigned to this OAT entry. You cannot have both zero and non-zero addresses in the same OAT.

Net_mask
is the netmask to be used with the Home IP address ***only*** for ATM IP forwarding on OSA-2 running on OS/390 or z/OS. This can be left blank for no IP forwarding. It is also in the format of w.x.y.z where each one has a range of 0 to 255. If you specify a net_mask, you must specify the home IP address.

To specify more than 1 IP address for a passthru OAT entry, add a line following the initial 'passthru line'. This line must start with the home IP address. For IP forwarding, you must also include the netmask. All other parameters are ignored.

For SNA

In an OAT entry for SNA, the OAT definition line includes the following:

ua* sna *port_number VTAM_id_num

where

ua is a 1 or 2−digit unit address number, either alone (0A, for example) or concatenated to a device address as in 0A(023A).

sna
identifies the type of entry.

port_number
specifies the port number

VTAM_id_num
is used only for SNA Network Management for OSA-2 FDDI and ENTR features.

For MPC

In an OAT entry for MPC, the OAT definition line includes the following:

ua* mpc *port_number default_entry osa_name (MPC_type)

where

ua is a 1 or 2−digit unit address number, either alone (0A, for example) or concatenated to a device address as in 0A(023A).

mpc
identifies the type of entry.

port_number
specifies the port number. **N/A** is specified for QDIO control.

default_entry
for QDIO data only, indicates whether this entry forwards unknown IP addresses, and is set to one of the following:

NO specifies that this is not a default entry.

PRI specifies the primary default entry.

SEC specifies the secondary default entry to be used when the primary is not available.

osa_name
for HPDT ATM Native and QDIO entries only. This is a maximum of 8 characters. This parameter must ***not*** begin with 0-9, but can contain the characters a-z, 0-9, @, #, $ in all other positions.

(MPC_type)
is set to one of the following:

(QDIO Data)

(QDIO Control)

This parameter is not specified for ATM Native.

To Remove an OAT Entry

Replace the entry type of an existing OAT entry with the keyword **unassigned** or **N/A** to remove it from the OSA configuration.

Additional OAT Lines

When modifying OAT entries returned from the Get OAT command, you may see additional lines for certain TCP/IP and MPC entries. For MPC entries, a home IP address may be shown. This value cannot be set through OSA/SF. If it occurs in the input file, it is ignored.

The Default OAT

The OSA-Express FENET and Token Ring features ship with an IBM-supplied default OAT for use in non-QDIO modes only, that contains one pair of Passthru entries per logical partition for each port through the OSA. These Passthru OAT entries, therefore, allow the OSA to be run in the TCP/IP Passthru mode either with or without the services of OSA/SF.

- Because the FENET and Token Ring features each have one port per CHPID, their OATs have 32 default Passthru entries.

- Because an ATM feature uses its LAN emulation client (LEC) ports in the TCP/IP Passthru mode, which must be defined by user input to OSA/SF, this OSA is not shipped with a default OAT.
- Because the Gigabit Ethernet feature only runs in QDIO mode, it does not use a default OAT.

To define a FENET or TR OSA for a default TCP/IP Passthru mode configuration, that is, a configuration in the TCP/IP Passthru mode without customization through OSA/SF, you only have to define the OSA channel path with its pairs of associated device numbers and unit addresses in the system hardware I/O configuration (IOCDS), **but you must specify 00 as the starting unit address**. Use the same commands or programs that you would use for any channel path (CHPID).

There is no default configuration for QDIO mode.You need only define the OSA channel path in the system hardware I/O configuration. The OAT is then automatically built for QDIO architecture.

Although the services of OSA/SF are not required for a default configuration, they are still recommended. Even in a default configuration, OSA/SF can still be used to obtain data that can assist you in determining the cause of OSA-related problems. In fact, OSA/SF even lets you reinstate an OSA's default OAT and then displays these default OAT settings for you.

If you use SNMP with an OSA-Express OSE CHPID, you must install OSA/SF, and the port name in your configuration must match the port name in the TCP/IP profile. If you are running z/OS V1R4 or Linux kernel 2.4.14 or above with an OSA-Express feature in QDIO mode, the OSA-Express MIB is directly accessible through an OSA-Express SNMP subagent. See "Support for Simple Network Management Protocol" on page 16 for more information.

There are four situations in which you must have an IP address on your passthru entries in order for all the defined modes to operate properly in port sharing mode:

- Different LPs use the port for TCP/IP traffic
- TCP/IP and SNA traffic share the port
- TCP/IP and MPC traffic are in use on the CHPID
- More than one TCP/IP stack uses the port

If any of these descriptions apply, you cannot use the default OAT. You must use OSA/SF to customize the OAT.

Guidelines for Changing an OAT

An OAT entry defines the data path between a port and a logical partition and unit address.

- Port sharing is defined as:
  - One port enabled for traffic of more than one kind, for example passthru and SNA

  or
  - One type of traffic for more than one LP
- Multiple partition/unit address pairs can be associated with a single port only if the IP addresses are unique. If a port is being shared and IP traffic is flowing, each passthru OAT entry must have an IP address assigned to it.
- Any OSA-Express feature can have up to 512 IP addresses specified per port, however, LCS devices are limited to a maximum of 8 IP addresses per OAT

entry. (For OSA-2, the same limit of 8 IP addresses per OAT entry exists, but no more than 16 IP addresses per port can be distributed over multiple OAT entries.)

- If the port is not shared between logical partitions, all IP addresses should be set to a value of 0.0.0.0.
- When changing an existing entry, any operation currently executing may be interrupted if you use the FORCE option. See “PUT_OSA_ADDRESS_TABLE | PUT_OAT | PUT_OSA | PUT_TABLE” on page 262 for details. (The PUT_OAT command does not apply to OSA-Express features.)
- Make sure that an entry for each partition is defined when sharing a specific port.

OAT Examples

TCP/IP Passthru with No Port Sharing

This OAT manages TCP/IP traffic through an OSA CHPID operating in basic mode. Only one partition is defined.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                             LP 0 (PARTNAME)
02(0402) passthru   00  no  000.000.000.000                  SIU    ALL
```

Figure 111. Example of OAT for TCP/IP Passthru with No Port Sharing in Basic Mode

TCP/IP with Port Sharing Between LPs

This OAT manages TCP/IP traffic through an OSA CHPID communicating with two logical partitions.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                             LP 1 (LPLEFT)
00(0400) passthru   01  pri 009.112.018.017                  SIU    ALL
                             LP 2 (LPRIGHT)
04(0404) passthru   01  no  009.112.012.016                  SIU    ALL
```

Figure 112. Example of OAT for TCP/IP with Port Sharing

TCP/IP and SNA Port Sharing

This OAT manages TCP/IP and SNA traffic through an OSA CHPID in basic mode.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                             LP 0 (LPLEFT)
00(0400) passthru   01  pri 009.112.018.017                  SIU    ALL
0A(040A) sna        01                                       SIU    ALL
```

Figure 113. Example of OAT for TCP/IP and SNA with Port Sharing in Basic Mode

TCP/IP with Multiple IP Addresses

This OAT manages TCP/IP traffic through an OSA CHPID with one logical partition for which three different IP addresses are defined.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                             LP 1 (LPLEFT)
00(0400)  passthru   00  PRI 010.200.035.158                 SIU    ALL
                             002.003.035.158
                             018.019.019.030
```

Figure 114. Example of OAT for TCP/IP with Multiple IP Addresses

SNA

This OAT manages SNA traffic through the OSA CHPID.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                             LP 1 (LPLEFT)
00(0100) sna        0                                        SIU    ALL
```

Figure 115. Example of OAT for One SNA Entry

QDIO

This OAT manages QDIO traffic through the OSA-Express CHPID. The QDIO OAT is generated automatically, not through OSA/SF.

```
/*************************************************************************
/* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
/*************************************************************************
                             LP 4 (fortytwo)
10(5000) MPC        N/A     OSAname2   (QDIO control)        SIU    ALL
12(5002) MPC        00  PRI OSAname2   (QDIO data)           SIU    ALL
                            010.009.009.001
                            010.102.111.002
```

Figure 116. Example of OAT for One OSA-Express OSD CHPID

Chapter 14. OSA/SF Commands for REXX

This section provides information for using a General-use programming interface.

Enter OSA/SF commands from a OS/390, z/OS, or z/OS.e Ready prompt or TSO command line, or from CMS in a VM environment. For VSE, submit an IOACMD job for each command. All OSA/SF commands are also available from the OSA/SF GUI, and from the following menu, displayed when you enter **IOACMD** without parameters:

```
IOACMD:0-End IOACMD
IOACMD:1-Clear Debug
IOACMD:2-Configure OSA CHPID
IOACMD:3-Convert OAT
IOACMD:4-Get Configuration File
IOACMD:5-Get Debug
IOACMD:6-Get OSA Address Table
IOACMD:7-Install
IOACMD:8-Put OSA Address Table (OSA-2 only)
IOACMD:9-Query
IOACMD:10-Set Parameter
IOACMD:11-Shutdown (VM only)
IOACMD:12-Start Managing
IOACMD:13-Stop Managing
IOACMD:14-Synchronize (OSA-2 only)
```

Attention

Enter **IOACMD.EXEC** (or, for VM, **IOACMD**) with all OSA/SF commands.

- See step 1a on page 52 for the fully-qualified OS/390, z/OS, or z/OS.e dataset name that was used to set up IOACMD.EXEC
- “The OSA/SF GUI (OS/2 or Windows) vs. the IOACMD EXEC” on page 72 discusses the interfaces in a VM environment.
- “Copying the Skeleton Job for IOACMD” on page 98 describes the JCL used in VSE.

Example:
For OS/390, z/OS, or z/OS.e:

EX ’IOACMD.EXEC’ ’CLEAR_DEBUG’ EXEC

For VM:

IOACMD CLEAR_DEBUG

For VSE:

// EXEC REXX=IOACMD PARM=’PRD2.OSASF CLEAR_DEBUG’, SIZE=1100K

To have the EXEC prompt you for the commands, just enter:

EX ’IOACMD.EXEC’ EXEC

For VM:

IOACMD

For VSE:

// EXEC REXX=IOACMD PARM=’PRD2.OSASF’, SIZE=1100K

How to read syntax diagrams

This section describes how to read syntax diagrams. It defines syntax diagram symbols, items that may be contained within the diagrams (keywords, variables, delimiters, operators, fragment references, operands) and provides syntax examples that contain these items.

Syntax diagrams pictorially display the order and parts (options and arguments) that comprise a command statement. They are read from left to right and from top to bottom, following the main path of the horizontal line.

Symbols

The following symbols may be displayed in syntax diagrams:

Symbol	Definition
▸▸——	Indicates the beginning of the syntax diagram.
——▸	Indicates that the syntax diagram is continued to the next line.
▸——	Indicates that the syntax is continued from the previous line.
——▸◂	Indicates the end of the syntax diagram.

Syntax items

Syntax diagrams contain many different items. Syntax items include:

- Keywords - a command name or any other literal information.
- Variables - variables are italicized, appear in lowercase and represent the name of values you can supply.
- Delimiters - delimiters indicate the start or end of keywords, variables, or operators. For example, a left parenthesis is a delimiter.
- Operators - operators include add (+), subtract (-), multiply (*), divide (/), equal (=), and other mathematical operations that may need to be performed.
- Fragment references - a part of a syntax diagram, separated from the diagram to show greater detail.
- Separators - a separator separates keywords, variables or operators. For example, a comma (,) is a separator.

Keywords, variables, and operators may be displayed as required, optional, or default. Fragments, separators, and delimiters may be displayed as required or optional.

Item type	Definition
Required	Required items are displayed on the main path of the horizontal line.
Optional	Optional items are displayed below the main path of the horizontal line.
Default	Default items are displayed above the main path of the horizontal line.

Syntax examples

The following table provides syntax examples.

Table 10. Syntax examples

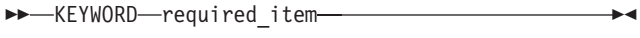
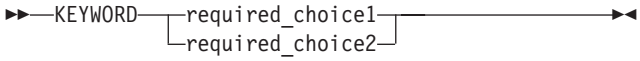
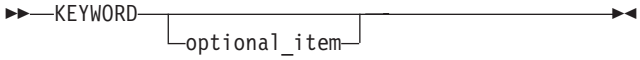
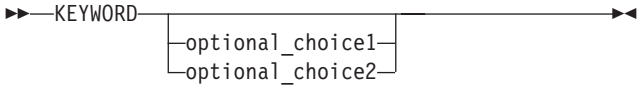
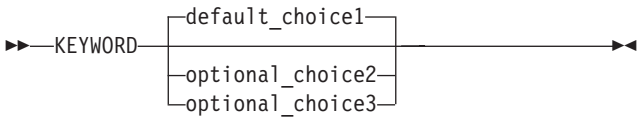
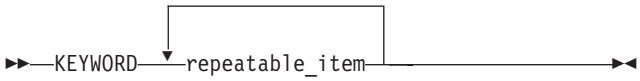
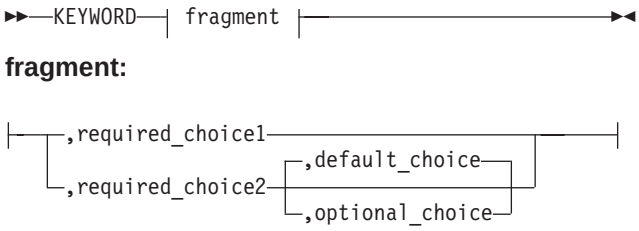
Item	Syntax example
Required item. Required items appear on the main path of the horizontal line. You must specify these items.	
Required choice. A required choice (two or more items) appears in a vertical stack on the main path of the horizontal line. You must choose one of the items in the stack.	
Optional item. Optional items appear below the main path of the horizontal line.	
Optional choice. A optional choice (two or more items) appear in a vertical stack below the main path of the horizontal line. You may choose one of the items in the stack.	
Default. Default items appear above the main path of the horizontal line. The remaining items (required or optional) appear on (required) or below (optional) the main path of the horizontal line. The following example displays a default with optional items.	
Variable. Variables appear in lowercase italics. They represent names or values.	
Repeatable item. An arrow returning to the left above the main path of the horizontal line indicates an item that can be repeated. An arrow returning to the left above a group of repeatable items indicates that one of the items can be selected, or a single item can be repeated.	

Table 10. Syntax examples (continued)

Item	Syntax example
Fragment. The ┤ fragment ├ symbol indicates that a labelled group is described below the main syntax diagram. Syntax is occasionally broken into fragments if the inclusion of the fragment would overly complicate the main syntax diagram.	

CLEAR_DEBUG | CLR | CLR_DEBUG | CLEAR

Purpose

The Clear Debug command clears the contents of the current message log maintained by the OSA/SF. The message log contains a history of all commands issued, responses generated, informational messages, and any errors that have occurred since the Clear Debug command was last issued.

Note: IBM Service may require the contents of the message log to perform problem isolation; therefore, do not use this command unless you are sure you want to clear the current contents of the message log.

Syntax

Operands

None
This command requires no parameters.

Results

None
No response is displayed from the command.

Limitations

If RACF is installed, Clear Debug requires a minimum of CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

This command does not require an OSA (CHPID) number to be entered; therefore it does not matter what OSA/SF image is managing the OSAs.

Examples

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'CLEAR_DEBUG' EXEC**

For VM: **IOACMD CLEAR_DEBUG**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF CLEAR_DEBUG', SIZE=1100K**

Clears the OSA/SF message log.

CONFIG_OSA

Purpose

Use the Configure OSA command to customize an OSA-2 or OSA-Express feature.

A configuration file ***and*** an OAT are required for:

- OSA-Express ATM CHPIDs defined as channel type OSE
- FENET CHPIDs defined as channel type OSE
- Token Ring CHPIDs defined as channel type OSE
- OSA-2 ATM CHPIDs

Only a configuration file is required for any OSA-Express CHPID defined as channel type OSD (QDIO mode).

Only an OAT is required for:

- OSA-2 FDDI CHPIDs
- OSA-2 TR CHPIDs

Syntax

Operands

None
This command requires no parameters. It will prompt you for input.

Results

Prompting
The command prompts you for input based on the task you want to do.

Limitations

Configure OSA calls a number of other OSA/SF routines. If RACF is installed, Configure OSA requires CONTROL authority to execute all of these routines.

Examples

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'CONFIG_OSA' EXEC**

For VM: **IOACMD CONFIG_OSA**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF CONFIG_OSA', SIZE=1100K**

The command will prompt you for the required input based on the OSA-2 or OSA-Express feature and the mode of operation you want to install.

CONVERTOAT

Purpose

This command works only for OSA address tables for SNA, passthru, and MPC created in detailed format in OSA/SF releases prior to V2R1. It converts an OAT file created in detailed format to the summary OAT format in the specified output file. The output file can be changed and used as input with the CONFIGURE OSA or PUT OAT command.

Syntax

Operands

input_file_name
Name of a valid detailed OAT file.

output_file_name
Name of the new summary format OAT file.

Results

The detailed OAT file is converted to summary format. The new format can now be used with the PUT OAT or CONFIGURE OSA command.

Limitations

This command is only for use with OSA address tables for SNA, passthru, and MPC created in detailed format in OSA/SF releases prior to V2R1.

Examples

Execute the IOACMD command, select `Convert OAT`, and follow the prompts.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'CONVERTOAT osa8.sna osa8.snanew' EXEC**

For VM: **IOACMD CONVERTOAT osa8 sna osa8s snanew**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF CONVERTOAT', SIZE=1100K**

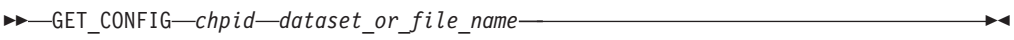
If the IOACMD job was set up as recommended, submit the job, select `Convert OAT`, and follow the prompts.

GET_CONFIG

Purpose

Use the Get Config command to get the configuration file for an OSA-2 ATM or OSA-Express feature in a format that can be used as input with the Configure OSA command. This is helpful when you have an existing OSA that you want to modify or copy to a new OSA.

Syntax



Operands

chpid
Value that indicates the hexadecimal OSA number for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

This field is required.

dataset_or_file_name
The name of the data set or file used to store the command's results.

Results

The current configuration file for the specified CHPID is stored in the specified data set.

Limitations

If RACF is installed, Get Config requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in "Controlling Access to OSA/SF" on page 52 for OS/390, and on page 76 for VM.

Examples

Execute the IOACMD command, select `Get Configuration File`, and follow the prompts.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'GET_CONFIG 40** dataset1.config' EXEC

For VM: **IOACMD GET_CONFIG 40 dataset1 config**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_CONFIG 44 PRD2.OSASF.CFG.CHP44', SIZE=1100K**

GET_DEBUG

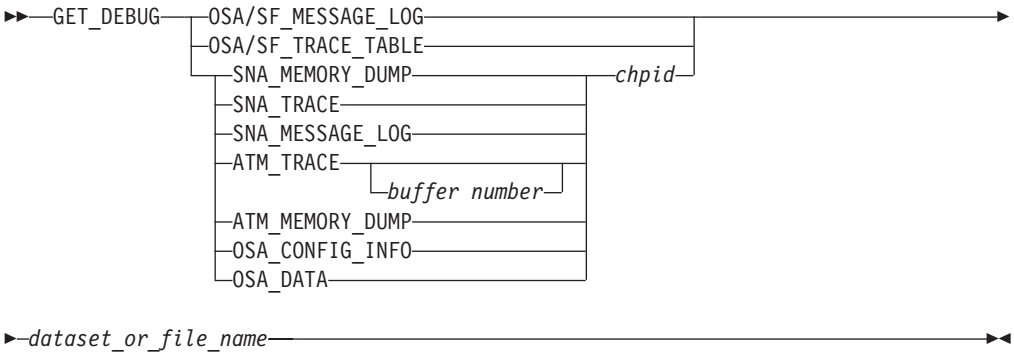
Purpose

Use this command at the direction of IBM support to gather information to debug OSA or OSA/SF problems that are reported. You will be instructed to issue this command by IBM support personnel when appropriate. Most of the information returned is not in a readable format.

A data set or file name must be specified. For OS/390, z/OS, or z/OS.e, only sequential data sets can be used but they need not be pre-allocated.

If an error occurs, no data is returned and a failing message is displayed.

Syntax



Operands

OSA/SF_MESSAGE_LOG
The OSA/SF message log contains information on every command issued, command returned, informational messages, and any errors that occurred since the last Clear Debug command was issued that cleared the message log.

OSA/SF_TRACE_TABLE
The OSA/SF trace table contains up to the last 8000 trace points that the OSA/SF code executed. When the table is full the oldest entries are overwritten.

SNA_MEMORY_DUMP
The OSA memory dump contains the image of storage on the (OSA–2 only) device. Specify the CHPID (OSA) number with this parameter.

SNA_TRACE
The SNA trace buffer is read from the OSA device when the OSA is configured for SNA mode. Specify the CHPID (OSA) number with this parameter.

SNA_MESSAGE_LOG
The SNA message log is read from the OSA device when the OSA is configured for SNA mode. Specify the CHPID (OSA) number with this parameter.

ATM_TRACE
The ATM trace buffer is read from the OSA device when the OSA is configured for Passthru or SNA with ATM. Specify the CHPID (OSA) number with this parameter. The buffer number is not required and will default to zero. There are 16 buffers, 0-15, for OSA-Express. For OSA-2 there are 8, 0-7.

ATM_MEMORY_DUMP
This is supported on OSA-2 only. The ATM memory dump is read from an OSA, approximately 2 Mb when the OSA is configured for passthru or SNA with ATM. Specify the CHPID (OSA) number with this parameter.

OSA_CONFIG_INFO
The output will be the entire configuration file read from the OSA. This can be used by IBM for failure analysis.

OSA_DATA
The OAT and port parameters will be read from the OSA. This can be used by IBM for failure analysis.

chpid
Represents the OSA number.

dataset_or_file_name
The name of the data set or file where you want to store the returned data.

Results

The Get Debug command returns either the contents of the OSA/SF message log or trace table, the OSA SNA trace or message log, or the OSA ATM trace or memory dump. These commands are also available on the OSA/SF GUI.

On VM the resulting file is sent to the OSAMAINT userid's reader.

Limitations

If RACF is installed, Get Debug requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in "Controlling Access to OSA/SF" on page 52 for OS/390, and on page 76 for VM.

Examples

1. Get the OSA/SF trace table and put it in DATASET1.TRACE (DATASET1 TRACE on VM) (PRD2.OSASF.DATASET1.TRACE on VSE).

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'GET_DEBUG OSA/SF_TRACE_TABLE DATASET1.TRACE' EXEC**

   For VM: **IOACMD GET_DEBUG OSA/SF_TRACE_TABLE DATASET1 TRACE**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_DEBUG OSA/SF_TRACE_TABLE PRD2.OSASF.DATASET1.TRACE', SIZE=1100K**
2. Get the OSA/SF message log and put it in DATASET2.LOG on OS/390 z/OS, or z/OS.e (DATASET2 LOG on VM) (PRD2.OSASF.MSG.LOG for VSE).

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'GET_DEBUG OSA/SF_MESSAGE_LOG DATASET2.LOG' EXEC**

   Or, for VM: **IOACMD GET_DEBUG OSA/SF_MESSAGE_LOG DATASET2 LOG**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_DEBUG MESSAGE_LOG PRD2.OSASF.MSG.LOG', SIZE=1100K**
3. Get the OSA Address Table and port parameters for the OSA and put them in DATASET3.PARMS on OS/390 z/OS, or z/OS.e (DATASET3 PARMS on VM) (PRD2.OSASF.DATASET3.PARMS for VSE).

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'GET_DEBUG OSA_DATA DATASET3.PARMS' EXEC**

   Or, for VM: **IOACMD GET_DEBUG OSA_DATA DATASET3 PARMS**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_DEBUG OSA_DATA PRD2.OSASF.DATASET3.PARMS', SIZE=1100K**

GET_OSA_ADDRESS_TABLE | GET_OAT | GET_OSA | GET_TABLE

Purpose

Use the Get OSA Address Table command to obtain the OSA address table for the specified CHPID (OSA) number. The output returned can be modified and used (for OSA−2 CHPIDs only) as input for the Put OAT Address Table command. See Chapter 13, “About the OSA Address Table (OAT)” on page 239 for examples of the OAT entries.

Syntax

Operands

chpid
Value that indicates the hexadecimal OSA number for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

This field is required.

dataset_or_file_name
This specifies the data set name where the OSA address table is to be stored.

Note: Only sequential data sets can be used but they do not need to be preallocated by the user.

This field is required.

Results

The **GET_OAT** command gets the OSA address table for the CHPID specified. A data set **must** be specified. The address table returned is placed into this data set. The data set created, along with an explanation of all the fields, is shown in Chapter 13, “About the OSA Address Table (OAT)” on page 239.

Limitations

If RACF is installed, this command requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

The copy of OSA/SF issuing this command does NOT need to be managing the CHPID specified.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’GET_OAT 4C CHAN4C.DAT’ EXEC**

Or, on VM: **IOACMD GET_OAT 4C CHAN4C DAT**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF GET_OAT 4C PRD2.OSASF.CHAN4C.DAT’, SIZE=1100K**

Gets the OSA address table for CHPID 4C and puts it into CHAN4C.DAT (CHAN4C DAT on VM) (PRD2.OSASF.CHAN4C.DAT on VSE).

INSTALL

Purpose

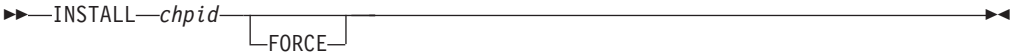
Use the Install command to load an existing configuration onto an OSA only when replacing the OSA feature, not for initial installation. To perform initial configuration, use the Configure OSA (REXX) or Activate (GUI) command.

The Install command sets up the OAT, OSA mode, and port parameters on the specified OSA (CHPID) depending on the OSA feature type:

- For all OSA-2 features, the OAT, OSA mode (image), and port configuration are installed on the CHPID.
- For OSA-Express features defined as OSE (non-QDIO) CHPIDs, the OAT and port configuration are installed on the CHPID.
- For OSA-Express features defined as OSD (QDIO) CHPIDs, only the port configuration is installed on the CHPID.

The Install task is disruptive to all devices using the OSA (CHPID). The names of the files to be installed are contained in the IOACFG data set specified in the STARTUP.PROFILE. See step 3 on page 48 for the setup and name of the configuration data set.

Syntax



Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

FORCE (OSA-2 only)
Causes the OSA mode (image) to be loaded, even if it already exists on the feature.

Results

The Install command returns a successful completion status if all the data sets were installed properly, the OAT was successfully set, and the CHPID is operational.

If any configuration data could not be installed properly, or if any of the OAT entries fails, a list of failures is returned.

Limitations

If RACF is installed, this command requires CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

This command must be entered from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'INSTALL 7C' EXEC**

On VM: **IOACMD INSTALL 7C**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF INSTALL 7C', SIZE=1100K**

Installs the specified files and OSA mode (image) onto CHPID 7C.

PUT_OSA_ADDRESS_TABLE | PUT_OAT | PUT_OSA | PUT_TABLE

Purpose

For OSA-2 only. Use the Put OSA Address Table command to change the current OAT settings on the specified OSA-2 (CHPID). The input data should be in the same format that was returned from the Get OSA Address Table command. See Chapter 13, “About the OSA Address Table (OAT)” on page 239 for examples of the OAT entries.

Note: This command cannot be used for any OSA-Express features.

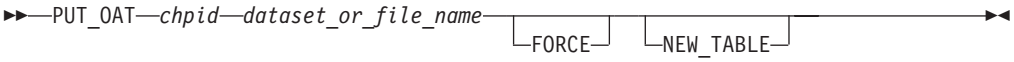
When you issue the Put OAT command, you will be asked if the input data should replace all the current entries. Use the following as a guideline to determine how to answer the question:

- No — If you are adding only a few entries and your input data set contains only these new entries. The current OAT entries remain on the OSA plus the new entries in the input data set will be added (current and updates).
- Yes — If your input data set contains all the entries (current, new, or some were deleted) that are required for your configuration for this OSA. The OAT entries on the OSA will be completely replaced with the entries from the input data set (full replace).

Attention

To activate a new OAT for OSA-2, you must configure the OSA–2 (CHPID) offline and then online to all logical partitions regardless of the operating system running in the logical partition.

Syntax



Operands

chpid

Value that indicates the hexadecimal CHPID (OSA) for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

This is a required field.

dataset_or_file_name

Name of the data set or file containing the new address table entries. This data set must be available to the user ID issuing the command. Any entries that match those already on the OSA are ignored, only new entries are written.

This is a required field.

FORCE

This indicator is used in Passthru mode when all the changes to the address table **must** be done. This means that if an entry is in use when this command is issued, the entry will be updated even if it stops data transfer.

Notes:

1. Use the FORCE option with caution because unpredictable results may occur.
2. In all modes except Passthru, this indicator is ignored if the CHPID is in use.

This is an optional field.

NEW_TABLE
This causes *all* the current entries to be replaced on the OSA.

Attention

Use this option only if your input data set contains all the entries (current, new, or some were deleted) that are required for your configuration for this OSA. The OAT on the OSA will be completely replaced with the entries from the input data set (full replace).

Results

When the **Put OAT ADDRESS TABLE** command completes successfully, all the address table entries contained in the input file have been successfully set up on the OSA.

For OSA-2 Only
The OSA–2 (CHPID) must be configured offline and online to activate the new OSA.

When the command is not successful, a display showing the results (success or failure) for each address table entry attempted is shown.

Limitations

If RACF is installed, this command requires UPDATE authority. If the FORCE indicator is set, this command requires CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

You must enter this command from the OSA/SF image managing the OSA.

Examples

1. Put the address table entries specified in the input, CHAN4A.DAT, to OSA CHPID 4A. Any entries that are found in CHAN4A.DAT and are active on the OSA are not replaced.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’PUT_OAT 4A CHAN4A.DAT’ EXEC**

   Or, for VM: **IOACMD PUT_OAT 4A CHAN4A DAT**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF PUT_OAT 4A PRD2.OSASF.CHAN4A.DAT’, SIZE=1100K**
2. Put the address table entries specified in the input, CHAN24.DAT, to the OSA for CHPID 24. Any Passthru entries that are found to be active on the OSA are

stopped and the address table entry is updated. You should then re-start any applications that were running on the changed address table entries.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'PUT_OAT 24 CHAN24.DAT FORCE' EXEC**

Or, for VM: **IOACMD PUT_OAT 24 CHAN24 DAT FORCE**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF PUT_OAT 24 PRD2.OSASF.CHAN24.DAT FORCE', SIZE=1100K**

3. Replace all entries in the OAT for OSA 74 with the entries in CHPID74.OAT.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'PUT_OAT 74 CHPID74.OAT NEW_TABLE' EXEC**

   Or, for VM: **IOACMD PUT_OAT 74 CHPID74 OAT NEW_TABLE**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF PUT_OAT 74 PRD2.OSASF.CHPID74.DAT NEW_TABLE', SIZE=1100K**

QUERY

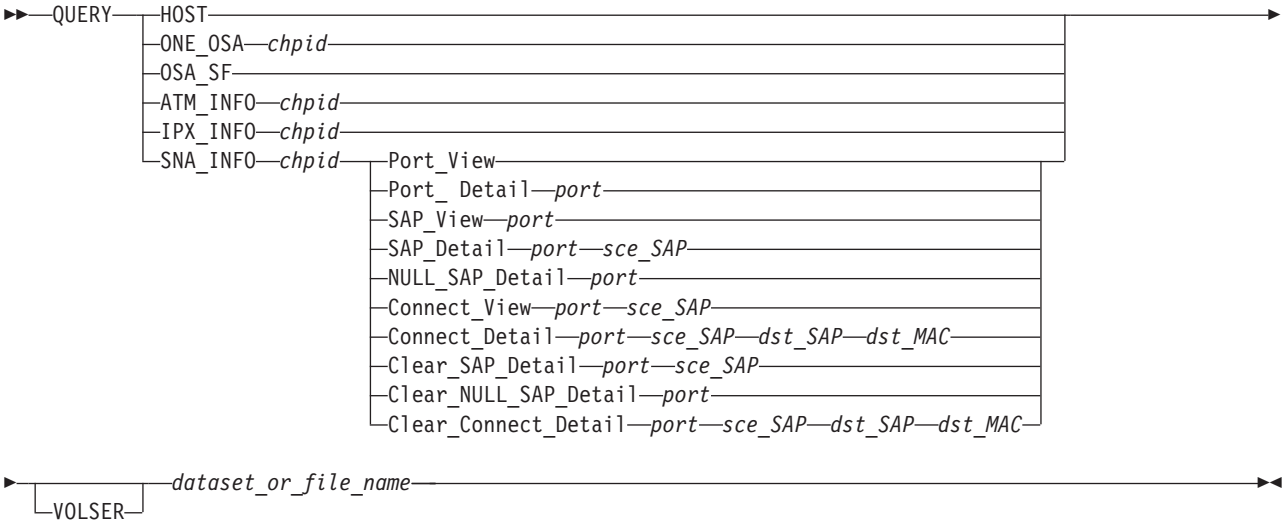
Purpose

Use the Query command to obtain information about all or parts of the OSA, Open Systems Adapter/Support Facility, and OSA modes running on the OSA.

Syntax

Attention: The following abbreviations are used in the syntax diagram:

- port - port number
- sce - source
- dst - destination



Operands

Host
Returns all information about OSA/SF, CHPIDs, ports, OSA modes, and devices.

ONE_OSA
Returns information related to one CHPID (OSA). You must enter **ONE_OSA** with the CHPID number.

OSA_SF
Returns only information related to OSA/SF.

SNA_INFO
Used for SNA network management information. See the examples at the end of this section.

ATM_INFO
Use this option to query the ATM connection data. Specify a CHPID and a data set name with this option.

IPX_INFO
Use this option to query the IPX connection data. Specify a CHPID and a data set name with this option.

chpid
This value indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

VOLSER
You can specify the volume serial number. If nothing is specified, the system default is used. If the data set already exists, the VOLSER is ignored. The format is VOLSER or VOLSER(UNIT).

dataset_or_file_name
The name of the data set or file where the requested information is to be stored. This is required.

Limitations

If RACF is installed, Query requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

Examples

1. Query the port view for CHPID 64 and put it in data set ″USER4.QUERY.OUTPUT″ (USER4 QUERY file on VM) (PRD2.USER4.QUERY.OUTPUT on VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 64 PORT_VIEW USER4.QUERY.OUTPUT’ EXEC**

   Or, for VM: **IOACMD QUERY SNA_INFO 64 PORT_VIEW USER4 QUERY**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 64 PORT_VIEW PRD2.OSASF.USER4.QUERY.OUTPUT’, SIZE=1100K**
2. Query the port details for CHPID 7C and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C PORT_DETAIL 0’ EXEC**

   For VM: **IOACMD QUERY SNA_INFO 7C PORT_DETAIL 0**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C PORT_DETAIL 0’, SIZE=1100K**
3. Query the SAP view for CHPID 7C, port 1 and put the data set in ″USER4.QUERY.OUTPUT″ (USER4 QUERY file on VM) (PRD2.USER4.QUERY.OUTPUT on VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C SAP_VIEW 1 USER4.QUERY.OUTPUT’ EXEC**

   For VM: **IOACMD QUERY SNA_INFO 7C SAP_VIEW 1 USER4 QUERY**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C SAP_VIEW PRD2.OSASF.USER4.QUERY.OUTPUT’, SIZE=1100K**
4. Query the SAP details for CHPID 7C, port 1, SAP C and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C SAP_DETAIL 1 C’**

   For VM: **IOACMD QUERY SNA_INFO 7C SAP_DETAIL 1 C**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C SAP_DETAIL 1 C’, SIZE=1100K**
5. Query the NULL SAP details for CHPID 38, port 1 and show the data on the display.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 38 NULL_SAP_DETAIL 1'**

For VM: **IOACMD QUERY SNA_INFO 38 NULL_SAP_DETAIL 1**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 38 NULL_SAP_DETAIL 1', SIZE=1100K**

6. Query the connection view for CHPID 7C, port 1, SAP 8 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 7C CONNECT_VIEW 1 8'**

   For VM: **IOACMD QUERY SNA_INFO 7C CONNECT_VIEW 1 8**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 7C CONNECT_VIEW 1 8', SIZE=1100K**

7. Query the connection details for CHPID 7C, port 1, source SAP 8, destination SAP 14, destination MAC 123456789012 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012'**

   For VM: **IOACMD QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012', SIZE=1100K**

8. Clear the SAP details for CHPID 68, port 1, SAP 4.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4'**

   For VM: **IOACMD QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4', SIZE=1100K**

9. Clear the connection details for CHPID 20, port 0, source SAP 4, destination SAP 1C, destination MAC 123456789012 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012'**

   For VM: **IOACMD QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012**

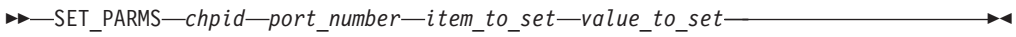
   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012', SIZE=1100K**

SET_PARAMETERS | SET_PARM | SET_PARMS

Purpose

Use the Set Parameters command to set information for one of the ports on an OSA (CHPID). One parameter is set each time the command is entered. Multiple parameters cannot be set with one Set Parameters command.

Syntax



Operands

chpid
Value that indicates the hexadecimal CHPID (OSA) for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

port_number
Port on the specified OSA (chpid) that is to be changed.

item_to_set
For a list of items that can be specified here, use the HELP command as follows:

For OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'HELP SET_PARM' EXEC
```

In VM:

```
IOACMD HELP SET_PARM
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF HELP SET_PARM', SIZE=1100K
```

Value_to_set
The value to be set.

Results

The Set Parameter command sets the value for the item specified on the port specified.

Limitations

If RACF is installed, Set Parameter requires CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

You must enter this command from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’SET_PARMS 54 0 fddi_group2_addr 534259474351’ EXEC**

Or, for VM: **IOACMD SET_PARMS 54 0 fddi_group2_addr 534259474351**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF SET_PARMS 54 0 fddi_group2_addr 534259474351', SIZE=1100K**

Sets the parameter second group address on FDDI CHPID 54, Port 0 to "534259474351".

SHUTDOWN

Purpose

The SHUTDOWN command causes the OSA/SF server machine to release all resources and logoff the userid. Once the server is shutdown, commands from the GUI or from CMS will cause the server to logon and start again.

Syntax

Operands

None

Results

The OSASF userid is logged off and the server machine releases all resources.

Limitations

If RACF is installed, Shutdown requires CONTROL authority.

This command is only valid on VM.

Examples

On VM: **IOACMD SHUTDOWN**

START_MANAGING

Purpose

The Start Managing command results in the copy of OSA/SF running in the logical partition (LP) where this command is issued to take over management of the specified CHPID (OSA). If the CHPID is currently managed by a copy of OSA/SF running in another LP, the Force indicator (OS/390, z/OS, or z/OS.e only) must be set. When this command completes, another copy of OSA/SF running on another LP is limited to executing commands to this CHPID that do not change the CHPID's environment. To determine if a command can be used from another LP, see that command's "Limitations" section.

Syntax

Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

FORCE
If the channel is being managed by a different copy of OSA/SF on another logical partition, this indicator must be set to "force" this copy of OSA/SF to take over the management of the specified CHPID. FORCE is not supported on VM.

Results

The Start Managing command causes the copy of OSA/SF currently running in this partition to take over management of the specified CHPID.

Under certain conditions message IOAK873I displays the LP and device number of the channel path that has become the default for the CHPID. This message is only displayed on the LP where OSA/SF is running and where the CHPID is managed. The secondary LP does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other LP, manages the CHPID.

Limitations

If RACF is installed, Start Managing requires UPDATE authority. If the Force option is specified, CONTROL authority is required. The RACF authority you specify pertains to the appropriate RACF facility as defined in "Controlling Access to OSA/SF" on page 52 for OS/390, and on page 76 for VM.

Examples

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'START_MANAGING 58 FORCE' EXEC**

Or, for VM: **IOACMD START_MANAGING 58 FORCE**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF START_MANAGING 58 FORCE', SIZE=1100K**

Starts managing CHPID 58. If another OSA/SF was managing OSA 58, this OSA gets control.

STOP_MANAGING

Purpose

The Stop Managing command stops the current OSA/SF image from managing the OSA CHPID. The command must be issued from the same LP that is currently managing the CHPID. To have another copy of OSA/SF running on another LP manage the CHPID, issue the Start Managing command to that copy of OSA/SF, using the force indicator if needed.

Syntax

Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

Results

The Stop Managing command stops management of the specified CHPID.

Limitations

If RACF is installed, Stop Managing requires UPDATE authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

This command must be entered from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’STOP_MANAGING 22 EXEC**

Or, for VM: **IOACMD STOP_MANAGING 22**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF STOP_MANAGING 22’, SIZE=1100K**

Stops managing CHPID 22 from this copy of OSA/SF. If an OSA mode is running, it continues to run.

SYNCHRONIZE | SYNC

Purpose

Use the synchronize command to update OSA/SF when port parameters are changed for the OSA-2 from a source other than OSA/SF.

Attention

This command **does not** support OSA-Express devices.

Syntax

Operands

chpid
Hexadecimal value that indicates the OSA number. The value is not entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID must be online and accessible.

Results

Failures show which values could not be made to match and why.

Limitations

If RACF is installed, Synchronize requires UPDATE authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 52 for OS/390, and on page 76 for VM.

This command must be entered from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’SYNCHRONIZE 98’ EXEC**

Or, for VM: **IOACMD SYNCHRONIZE 98**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF SYNCHRONIZE 98’, SIZE=1100K**

Chapter 15. OSA/SF Messages and Codes

Most of this section lists OSA error messages and provides explanations and corrective actions. There are also some errors associated with OSA, which you may find in “OSA Reject Codes” on page 338.

OSA/SF Messages

Attention

- Message numbers contain an *x* in this book because the character is a variable that can be A, C, D, I, K, N, or Z. It **cannot** be G. The variable is assigned when a component detects the condition.

  Example:

  ```
  Message number:  IOAA954E
  Documented as:   IOAx954E
  ```

OSA/SF messages have the following format:

Example: **IOA***xnnns*

IOA The first three characters are the product identifier.

If you are looking at the OSA/SF message log, you may see a message without a message ID or with a message ID in the format IOB*xnnns*. Take the action that is stated explicitly or implicitly by the message text. If the severity level of an IOB message is E or S, report the message to IBM.

x Component that detected the condition. In some cases, more than one component can cause OSA/SF to issue the same message; therefore messages are listed in the book with the variable x. If you search for a message and the message is shown with an x, it is the correct description.

nnn 3 digit message sequence number. The messages in this book are listed numerically according to these three digits.

s The message severity, denoted by one of the following characters:

- **I** Informational, no action required
- **W** Warning, action is not required, but an error can occur later
- **A** Action, which is a severity level indicating that some user action may be required
- **E** Error that requires action eventually
- **S** Severe or serious error that requires immediate action

How to Find a Message

Use the last four characters in the message number to locate a message. Messages are listed numerically according to the last four characters.

OSA/SF Reason Codes:

Messages

Reason codes that are issued as part of OSA/SF messages are for IBM use only. It is for this reason that explanations of reason codes are not documented. Reason codes may be encountered in messages found in the OSA/SF message log.

In the event that a message contains a reason code, note the message number, the reason code, refer to “Reporting OSA/SF Problems to IBM” on page 213.

IOAx001E Device *nnnn* incorrectly defined

Explanation: The device number *nnnn* is not defined in the hardware I/O configuration (IODF/IOCDS) with unit type=OSAD.

User Response: Verify the hardware I/O configuration to ensure the unit type of this device number is OSAD.

IOAx002E Device *nnnn* is offline

Explanation: Device *nnnn* is offline to the operating system.

User Response: Vary device *nnnn* online and then retry the task you were performing.

IOAx003E Device *nnnn* incorrectly defined and is offline

Explanation: The OSAD device (UNITADD=FE) is not defined correctly in the hardware I/O configuration (IODF/IOCDS), and the device is offline.

User Response: Check the I/O configuration to ensure device *nnnn* is specified with a unit type = OSAD. Then vary the device online. Retry the task.

IOAx004E Cannot establish non-swappable environment for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Check the I/O configuration (IODF/IOCDS) for proper OSA device definitions. Refer to OSA documentation for OSA IODF/IOCDS requirements. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx005E Unit control block not found for device *nnnn*

Explanation: OSA/SF attempted to find device *nnnn* and could not locate the unit control block (UCB).

User Response: Verify that the device is correctly defined in the hardware I/O configuration (IODF/IOCDS). Refer to OSA documentation for OSA IODF/IOCDS requirements. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx006E Status Modifier received when accessing device *nnnn*

Explanation: An error occurred while trying to perform an action to the OSA device. This is probably a hardware error.

User Response: Review the console log for hardware related messages. Also check the SYS1.LOGREC (EREP) data set. Attempt a retry of the last task that was being performed. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx007E Unable to pagefix/pagefree storage for device *nnnn*

Explanation: OSA/SF was unable to manage storage for OSA device *nnnn*. This could also be an OSA/SF internal error.

User Response: Verify that the OSA/SF region size is correct. Also check for system storage constraints. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx008E Unable to build CCW chain for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Verify that OSA device *nnnn* is properly defined in the hardware I/O configuration (IODF/IOCDS). If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx009E Failed to get the OSA lock for device *nnnn*

Explanation: An internal software lock could not be obtained in order to communicate with OSA device *nnnn*.

User Response: Verify that another OSA/SF image, the hardware system console (PCE), or the hardware management console (HMC) is not currently accessing this CHPID, then retry the command. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx010E Failed when testing the OSA lock for device *nnnn*

Explanation: While in the process of performing a task on the OSA, changes to the state of the OSA were detected for device number *nnnn*.

User Response: Verify that another OSA/SF image, the hardware system console (PCE), or the hardware management console (HMC) is not currently performing a task on this OSA at the same time, then retry the command.

IOAx011E Failed when freeing the OSA lock for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Stop OSA/SF. Then vary device *nnnn* offline to and then online. Restart OSA/SF. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx015E Communication with OSA device *nnnn* **failed (cond code=3)**

Explanation: Communication failed with the OSA device.

User Response: Look for I/O errors on the system console. If using the API, check control block definitions for the OAT and the OSA mode. If you are using the OSA/SF GUI, do a Refresh from the OSA Channels Tree view or Details view. Ensure the OAT definitions and OSA mode feature are correctly defined by reviewing the configuration panels. Retry the task. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx016E Communication with OSA device *nn* **timed out**

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx018E Cannot install/initialize the interrupt handler for device *nn*

Explanation: The OSA/SF interrupt handler could not be started.

User Response: Check for I/O errors on the system console. Stop OSA/SF if it is running, and then restart it. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

Common Problems: If this message is accompanied by MSGIOAA090E and IOAA086E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx019E Cannot start or stop managing device *nnnn*

Explanation: The OSA CHPID is currently being managed by a different OSA/SF image in another logical partition. The action that was requested can not be performed from this logical partition.

User Response: Submit the action from the logical partition running the OSA/SF image that is managing the OSA. If you don’t know what image is managing the OSA, from the GUI double-click on the OSA number from the Channels Tree view and select the Statistics page.

If you want to manage the OSA from this logical partition, from the GUI select Help from the menu bar of any window, select How To, and then double-click on ″Manage OSAs from a different OSA/SF logical partition″. Once this logical partition is managing the OSA, resubmit the action.

IOAx020E Device *nnnn* **is already managed by another partition**

Explanation: The OSA device *nnnn* is currently being managed by a different OSA/SF image in another logical partition.

User Response: The OSA/SF image that is managing the OSA must be used to perform the action that received this message. To locate which logical partition is managing the OSA, from the GUI double-click on this OSA number from the Channels Tree view and select the Statistics window.

If you want to manage the OSA from this partition, use the Start Managing with Force option.

IOAx022E I/O Error for device *nnnn* **with return code** *nnnn*

Explanation: OSA/SF issued the EXCP macro to start an I/O operation to the OSA. Communications failed between OSA/SF and the specified device. The return code may be one of the following hexadecimal expressions. The return codes are:

X'0000': The specified device is working correctly but VM is not at the Version 2 Release 4 level (or level 2.2 or 2.3 with APAR VM62184 applied).
X'0000': on VM, VM not at V2R4 or APAR VM62184
X'0041': permanent I/O error
X'0042': extent error (DASD only)
X'0044': an error occurred after the previous I/O request to the device was posted complete
X'0045': program check or machine check occurred in IOS while the I/O request was being processed
X'0048': channel program was purged
X'0051': command reject
X'0052': bus out check
X'0053': equipment check
X'0054': undefined bit on in sense byte 0
X'0061': protection check
X'0062': channel data check
X'0063': channel control check
X'0064': interface control check
X'0065': chaining check
X'0074': simulated error status, which is set for the following conditions:

– A start I/O operation was attempted to a device that is in a permanent error state, boxed, or not connected.
– A missing interrupt was detected and the I/O operation was terminated as a result of recovery operations by the missing interrupt handler.

User Response: Check the console for additional messages pertaining to this failure. For more information, refer to the EXCP macro description in *DFSMS/MVS V1R4 DFSMSdfp Advanced Services,* SC26-4921. Contact IBM Support if a hardware error occurred.

IOAx023E Unit check on device *dddd* with sense byte 10 value *xx*

Explanation: The command that was sent to the OSA returned a unit check.

User Response: Locate the value in the message and follow the instructions.

01 - 16 Internal OSA error occurred. See "Reporting OSA/SF Problems to IBM" on page 213.

17 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) offline in all logical partitions and then back online to activate the OSA mode.

18 The OSA mode loaded on the OSA has ABENDed. Configure the OSA (CHPID) offline in all logical partitions and then back online to activate the OSA mode.

19 - 24 Internal OSA error occurred. See "Reporting OSA/SF Problems to IBM" on page 213.

25 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) in all logical partitions and then back online to activate the OSA mode.

26–84 Internal OSA error occurred. Refer to "Reporting OSA/SF Problems to IBM" on page 213, then contact the IBM Support Center.

85 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) in all logical partitions and then back to activate the OSA mode.

86–AF Internal OSA error occurred. Refer to "Reporting OSA/SF Problems to IBM" on page 213, then contact the IBM Support Center.

B0 The drive (A:, B:, SYS:) specified is not valid.

B1 The directory specified does not exist.

B2 An attempt was made to remove the current directory. Switch out of the current directory and reissue the command.

B3 An attempt to remove the specified directory failed. Ensure the directory is empty and retry the command.

B4 An attempt was made to create a directory, and the path does not exist. Check that the drive and sub-directories are correct. Retry the command.

B5 The file name or extension is incorrect. Check the spelling and retry the command.

B7, B8, or B9
The file does not exist on the directory. An internal OSA error occurred. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213, then contact the IBM Support Center.

BB - FF
The file does not exist on the directory. An internal OSA error occurred. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213, then contact the IBM Support Center.

IOAx024E Parameter value is too large for device *nn*

Explanation: An attempt was made to access an OSA device for application area that does not exist.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx025E Missing value in parameter table for device *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx026E Requested function is unsupported for device *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx027E *sssssssss* for CHPID *dddd*

Explanation: The command completed with one of the following messages (*sss...*) for the CHPID in *dddd.*

Application is in initialization state
Retry the command.

A status modifier was received
This is used whenever a status modifier is received for an OSA feature.

Data Port ID is not assigned
This is an OSA/SF internal error. See "Reporting OSA/SF Problems to IBM" on page 213.

Device is in use
Stop the use of this device by the application and then retry the command.

OAT Device Type is incompatible
Native Passthru or native SNA OAT cannot be specified in OSA address table when the specified port is not native Token Ring, Ethernet, FDDI, or an emulated Token Ring or Ethernet. MPC cannot be specified in the OSA address table when the specified port is not an HPDT ATM Native port. Correct the device type and retry the command.

Port cannot be disabled
If it is a physical port, try disabling it from the Hardware Management Console (HMC) and then retry the command. Check configuration parameters. Check physical connections.

Port cannot be enabled
If it is a physical port, try enabling it from the Hardware Management Console (HMC) and then retry the command. Check configuration parameters. Check physical connections.

Port is in definition error state
Check the Hardware Management Console for hardware errors.

Port is in Disabled state
The port must be enabled to complete the command. See "Enabling and Disabling Ports" on page 191.

Port is in disabling state
The port was in the process of being disabled when the command was issued. Retry the command.

Port is in Enabled state
The port must be disabled to complete the command. See "Enabling and Disabling Ports" on page 191.

Port is in enabling state
The port was in the process of being enabled when the command was issued. Retry the command.

Port is in Link Failure state
Check the Hardware Management Console for hardware errors.

Port is in unavailable state
The port was not available when the command was entered. Retry the command.

Port is in undefined state
This port must be configured and activated before use.

Unknown status modifier code
Vary offline the devices associated with the CHPID (except the OSAD device) and reissue command.

User Response: Take steps appropriate to the message generated. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx028E x code = *xx* for device *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx03nE API failed attempting to make the connection with OSA/SF

Explanation: An APPC connection between the user address space and the OSA/SF address space failed.

User Response: Verify the APPC/MVS and VTAM definitions are correct. Then restart APPC/MVS, followed by the VTAM OSA/SF major nodes. Then restart OSA/SF.

Note: APPC/MVS and VTAM must be started before starting OSA/SF.

Common Problems:

- The APPC LU may not be active or successfully configured. Display the APPC LU (**D APPC,LU,ALL**) and verify the following attributes:

  ```
  LLUN=IOASERV      SCHED=*NONE*    BASE=NO
  STATUS=ACTIVE  PARTNERS=00000  TPLEVEL=SYSTEM
  TPDATA=SYS1.APPCTP
  ```

  This example illustrates the BASE=NO. If this is the only LU defined for APPC, the BASE should then be equal to YES. Only one LU must be the BASE.
- Security violation via RACF or Security product. Verify that the USERID has sufficient authorization to use the APPC facility. If the security product is other than RACF, be certain that APPC is an authorized facility of the host operating system.

IOAx051E Memory allocation error

Explanation: Memory allocation failed in the OSA/SF address space.

System Programmer Response: The request was for storage in the OSA/SF address space. Check the region size allocated for OSA/SF, it may have to be increased. Stop OSA/SF if required, correct the condition, and restart OSA/SF. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx052E Memory free error

Explanation: There has been a FREEMAIN failure in the OSA/SF address space.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx053E File I/O error

Explanation: The file that was being accessed has encountered an I/O error.

User Response: Verify the file name is correct and that no hardware errors have been encountered. Retry the command. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx054E Command code is unknown or not valid

Explanation: An internal error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx055E Incorrect parameter

Explanation: An incorrect parameter was detected by OSA/SF on the command received.

User Response: If you are not calling OSA/SF at the API and not using your own EXEC, verify that you entered the parameters correctly, if the problem persists, contact the IBM Support Center.

If you are calling the API or using your own EXEC to call IOACMD.EXEC then verify that the command target in the API control block structure is correct and then retry the command.

IOAx056E ***ffffffffffffffffffffffffffffffffffffffffffffffffffffffff*** **file not found**

Explanation: The data set *fff...fff* was not found.

User Response: Ensure that the data set exists, that the data set is catalogued to the system, and that it is accessible to this logical partition. Hint: Use another method of access for the data set, such as TSO BROWSE, to verify the data set's integrity. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx057E File write failed for ***ffffffffffffffffffffffffffffffffffffffffffffffffffffffff***

Explanation: An attempt to write to the data set *fff...fff* failed.

User Response: Verify there is enough space available on the volume and in the VTOC. Verify that the data set is not open by another user nor by the operating system, including other logical partitions. If the data set was built as part of the OSA/SF startup profile, verify that the data set allocations are correct. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 2 for more information about the OSA/SF startup profile. Hint: Use another method of access for the data set, such as TSO BROWSE, to verify the data set's integrity.

Retry the command. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx058E File open failed for ***ffffffffffffffffffffffffffffffffffffffffffffffffffffffff***

Explanation: An attempt to open the data set *fff...fff* failed.

User Response: If you are trying to write the data set,
- Verify there is enough space available on the volume and in the VTOC.

If you are trying to read the data set, verify that:
- The data set descriptors are correct
- The data set exists
- The data set is catalogued to the system
- No I/O errors occurred
- The integrity of the data set by using another approach: for example; try to browse the data set with TSO.

For both read and write,
- Reference the open failure messages that should come back to the session having the problem.
- Check the system log (probably with the help of the system programmer) for details of what failed.

Hint: Use another method of access for the data set, such as TSO BROWSE, to verify the data set's integrity.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx059E File close failed for ***ffffffffffffffffffffffffffffffffffffffffffffffffffffffff***

Explanation: An attempt to close data set *fff...ffff* failed.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx060E File read failed from ***ffffffffffffffffffffffffffffffffffffffffffffffffffff***

Explanation: An attempt to read file *fff...fff* failed.

User Response: Verify that:
- The data set descriptors are correct
- The data set exists
- The data set is catalogued to the system
- No I/O errors occurred

- The integrity of the data set by using another approach: for example; try to browse the data set with TSO.

Then retry the command. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx061E Delete of file failed

Explanation: An attempt to delete a data set failed. A command was issued to replace a data set. Before the data set can be replaced, the existing data set must be deleted.

User Response: Verify that the data set exists and is cataloged. Verify that no other user or function has the data set allocated, including from another logical partition. Retry the command. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx062E IOAx062E File *aaaa* failed

Explanation: A file operation failed during execution of an OSA/SF command. The field *aaaa* describes the type of failing operation.

User Response: Refer to the corresponding message for the type of failing operation.

Write	IOAx057E
Open	IOAx058E
Read	IOAx060E

IOAx063E Cannot do a PUT file for *sss...sss*

Explanation: A Put File operation was attempted to the OSA/SF message log file. This is a protected OSA/SF file. It cannot be over-written.

User Response: Information in the message log data set cannot be altered by the user. If you want a copy of the message log file, and then modify the copy, enter the OSA/SF Get Debug command to get a copy of the message log. The new data set name for the copy can not match the message log data set name.

IOAx064E Dataset specified for STARTUP PROFILE not found

Explanation: During the start up of OSA/SF the data set name IOAPROF, which was allocated during OSA/SF set up, was not found or could not be opened.

User Response: Verify that the data set ID specified for filename IOAPROF in the OSA/SF startup procedure has been previously allocated and cataloged. See **Setting Up OSA/SF** in Chapter2. If all set up instructions were completed properly and the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx065E Filename specified *xxxxx*, is incorrect

Explanation: Too many characters, or characters that are not, valid were entered in the file name *xxxxx* or its extension.

User Response: Use a valid file name and extension.

IOAx081E Cannot allocate working storage

Explanation: OSA/SF cannot obtain the necessary working storage.

User Response: Stop OSA/SF, check the region size and increase the region size if necessary. Restart OSA/SF. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx084E Unknown op code in caller’s request

Explanation: An internal error has occurred in the OSA/SF program.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx085E Incorrect length in caller’s request

Explanation: An internal OSA/SF error has occurred.

User Response: Verify that all API control block length fields are valid. If everything is correct and the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx086E Initialization of OSA/SF attention handler failed

Explanation: A system level name token created during initialization of the OSA/SF was not found by the attention handler code. The attention handler for this OSA/SF was not started.

User Response: Shut OSA/SF down for this LP and restart it. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

Common Problems: If this message is accompanied by MSGIOAA090E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx087I Terminating attention handler attached processor.

Explanation: The attention handler code for this OSA/SF is being shut down.

User Response: None. Normal OSA/SF exit processing continues.

IOAx088I Unexpected attention handler postcode of *dddd* received

Explanation: The OSA/SF attention handler code received an unexpected post code. The attention is handled and processing continues.

User Response: None. OSA/SF operation continues. If the problem continues to reoccur, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx089I Attention handler attached processor terminated

Explanation: The attention handler code for this OSA/SF has completed its shut down processing.

User Response: None. Normal OSA/SF exit processing continues.

IOAx090W Loading of the OSA/SF attention handler code failed.

Explanation: The attention handler code for this OSA/SF failed to load during initialization of OSA/SF. Attention interrupts from the OSA device will not be processed for this OSA/SF.

User Response: OSA/SF will continue to run, but to display interrupts for an OSA, issue the Start Managing command. To resolve the problem, stop OSA/SF in this logical partition and restart it. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

Common Problems: If this message is accompanied by IOAA086E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx100I OSA Support Facility version *xxx*

Explanation: Self-explanatory. *xxx* is the version number with `BASE` or an APAR number appended.

User Response: None.

IOAx101I OSA Support Facility initialization started *hh:mm:ss*

Explanation: Self-explanatory.

User Response: None. OSA/SF is in the process of starting. Wait for message IOAx102I to be issued.

IOAx102I OSA Support Facility initialization completed *hh:mm:ss*

Explanation: Self-explanatory.

User Response: None. OSA/SF operations and commands can now be processed. The GUI interfaces can now be established.

IOAx103I OSA Support Facility terminated at *hh:mm:ss*

Explanation: The OSA/SF successfully stopped at the specified time. Before you can issue another OSA/SF command, you must re-start OSA/SF.

User Response: None.

IOAx104E OSA/SF internal error. Could not spawn task *ttttttt*

Explanation: An attempt to start the OSA/SF task, *ttttttt*, failed. An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx105E *hh:mm:ss* Unrecognized command *cc* was entered by *uuuu* on *sssss*

Explanation: An unknown command, *cc*, was sent to OSA/SF by the API interface. *uuuu* is the userid issuing the command. ***sssss*** is the system name.

User Response: If you are not calling OSA/SF at the API or using your own EXEC, see “Reporting OSA/SF Problems to IBM” on page 213.

If you are calling the API or using your own EXEC to call IOACMD.EXEC, then verify that the command code in the API control block structure is correct, and then retry the command. If the condition persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx106E Improper syntax was used in command

Explanation: An API interface command, the Put File command, and the Get Debug command are all possible sources of a command that is not in the required format (syntax). The command was not executed.

User Response: The following are some common reasons for this message:

- Verify the command syntax in the API control block if the API interface was used. Especially check the command target and the command identifier.
- If the Put File command was used, check that a data set name was passed as part of the command, that it is valid, and that the data set name is catalogued to the system.
- If the Get Debug command was used, especially for the SNA message file, the SNA trace file, or an SNA member, double check that the data set name was passed as part of the command, that it is valid, and that the data set name is catalogued to the system.

Then retry the command that cause the message to be issued.

IOAx107E Incorrect block length passed on the command

Explanation: The command was issued from the API interface. The command requires more parameters than OSA/SF received.

User Response: Check the amount of data passed on input along with the length indication given. Verify the API command control block structure. (Refer to the control block section for the command control block structure.) Then retry the command that received the message.

IOAx108E *hh:mm:ss userid* **on** *system* **not authorized to use** *command*

Explanation: *userid* has attempted to issue a command (*command*) and does not have the proper user access authority. See ″Planning to Control OSA/SF User Access (RACF)″ in the OSA publication.

User Response: Check with your system administrator to coordinate the user access authority for this *userid* with this command.

IOAx109E File allocation error. Error code *eeee* **info code** *iii*

Explanation: OSA/SF internal code attempted to allocate a data set using the DYNALLOC macro. The allocation failed.
- *eeee* - Error code from the DYNALLOC macro
- *iii* - Information code from the DYNALLOC macro

User Response: For information on the two codes, refer to the DYNALLOC macro in *MVS/ESA Programming: Authorized Assembler Services Guide System Product: JES2 Version 5 JES3 Version 5*, GC28-1467.

IOAx110I Notice - Shut down complete

Explanation: The sub-components of OSA/SF have all successfully ended.

User Response: None.

IOAx111I OSA/SF task *ttttttt* **not terminated**

Explanation: An OSA/SF sub-task (*ttttttt*) has not terminated within the time limit. OSA/SF will still terminate.

User Response: OSA/SF has issued this warning message for self-documentation and an audit trail. No action is required unless other messages indicate that a call to the IBM Support Center is necessary in which case this message should be reported.

IOAx112W OSA/SF is shutting down. You will be disconnected

Explanation: This message is sent to any *user_ID* that is currently waiting for a response while OSA/SF is terminating.

User Response: Check with your system administrator as to why OSA/SF on this host was shut down.

IOAx113I Waiting for *ttttttt* **to terminate**

Explanation: OSA/SF is waiting for internal task *ttttttt* to terminate. This message is part of normal OSA/SF shutdown.

User Response: None. Normal OSA/SF shutdown will resume shortly.

IOAx114I *ttttttt* **has terminated**

Explanation: As part of OSA/SF shutdown, task *ttttttt* has ended. This message is part of a normal OSA/SF shutdown.

User Response: None. Normal OSA/SF shutdown continues.

IOAx115E This OSA/SF level does not support the configuration for CHPID *cc*

Explanation: The installed mode on OSA CHPID *cc* is at a different level than is supported by this version of OSA/SF.

User Response: Ensure that the version of OSA/SF that has been started on this system is at the required level for the mode installed on the OSA. See the OSA publication for detailed information about needed version-release levels for OSA mode support.

IOAx116E A copy of OSA/SF is already running. Start OSA/SF not completed

Explanation: An attempt was made to start a second copy of OSA/SF in this logical partition; a copy of OSA/SF is already running. The second copy of OSA/SF was not started.

User Response: Verify that a copy of OSA/SF is running. Only one copy of OSA/SF can be running on an LP at a time. See Chapter 2 for more information on OSA/SF start-up.

IOAx118I Inx Comp Type ID Address Time

Explanation: This is the header information for the OSA/SF trace table dump. The information from the trace table dump is used by IBM for problem determination. The field headings are:
- Inx - The Trace entry number
- Comp - Component that inserted the trace entry

- Type - A reference indicator to point to the location in the source code
- ID - Identifies which task was active when the entry was put into the trace table
- Address - The address in memory where the entry resides
- Time - Time stamp in hours, minutes, and micro-seconds.

User Response: Save the trace table dump output, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx119E No trace table available

Explanation: A Get_Debug operation was attempted and no trace table was found. A trace table should always be available. An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx120I OSA Support Facility terminated

Explanation: OSA/SF has completed its shutdown sequence.

User Response: None. Normal OSA/SF termination is complete.

IOAx121E The Message Log processing has ended due to an error

Explanation: This error indicates that the Message Log function had an error and is no longer active. No message logging is currently being done.

User Response: To reactivate message logging, OSA/SF must be stopped and restarted. Also, check to see if message IOAx143W was displayed. If so, this problem may have occurred due to a user viewing the message log data set while OSA/SF was trying to write to it.

IOAx123E OSA/SF load module is not installed in an APF authorized library

Explanation: In order for OSA/SF to execute, the OSA/SF module must be installed in an authorized partition data set (APF authorized). Also, the LE/370 or C/370 run time libraries that are used by the OSA/SF module must also be in APF authorized libraries.

User Response: Ensure that all the libraries used by OSA/SF are APF authorized. This includes the partition data set that contains the OSA/SF module, and either the C/370 or LE/370 run time libraries, whichever is being used.

IOAx124I *hh:mm:ss* **domain** *sss* **port** *nn* **internet address** *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx125I *hh:mm:ss user_ID* **on** *ssssssss* **issued command** *ccc...ccc*

Explanation: The user ID *user_ID* on system *ssssssss* issued the command *ccc...ccc* at time *hh:mm:ss*

User Response: This message is part of OSA/SF's audit trail. No user action is required.

IOAx126I *hh:mm:ss user_ID* **cmd** *ccccccccccccccccccccccc* **RC=***cc* **Reason=***rrrr*

Explanation: The specified *user_ID* on the system entered the specified command with the resulting return code and reason code.

User Response: Look in the OSA/SF message log for previous messages with additional information regarding this condition.

IOAx127I *hh:mm:ss* **API connection** *x* **number** *y*

Explanation: An APPC connection of type *x* was made to OSA/SF, thus bringing the total of currently active connections to *y.*

User Response: None. Normal APPC operation continues.

IOAx128W *hh:mm:ss* **Reading of OSA device** *nnnn* **information failed with RC=***cc***, reason** *rrr*

Explanation: Device *nnnn* has had changes made since the last command was issued.

User Response: Make sure no other instance of OSA/SF, the hardware system console (PCE), or hardware management console (HMC) is attempting to communicate with this device. Review the message log for additional messages that will accompany this message. Retry the command. If it fails again, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx130E *hh:mm:ss* **APPC call ATBRFA2 RC:** *aaaaaaa* **Reason:***bbbbbbb*

Explanation: An error occurred from APPC for a call to ATBRFA2. See the APPC manuals for more information on the return codes and reason codes.

aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common*

Programming, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

Common Problems: There can be several symptoms associated with this message code. The following represents the most common:

- SOC4 ABEND during startup of OSA/SF. Also the message log contains the following error: `is APPC call ATBRFA2 RC: ATBCTS_REQUEST_UNSUCCESSFUL ATBCTS_INVAL_LOCAL_LU:` Verify the TP profile VSAM dataset has been created and cataloged. Verify that APPC was started prior to starting OSA/SF.
- IOACMD returns:

  ```
  IOACMD: Incorrect command code returned from
          call to OSA/SF
  IOACMD: Command issued failed with rc 16
  IOACMD: Call to OSA/SF never worked
  IOACMD: This usually occurs when the OSA/SF
          code has been
  IOACMD: updated, but the copy running has not
          been refreshed
  ```

  Verify that the load library, SYS1.SIOALMOD and the runtime library that OSA/SF was linked with, are in the User’s TSO LOGON PROC.
- `APPC call ATBCTS RC: ATBCTS_REQUEST_UNSUCCESSFUL ATBCTS_NOT_AUTH_TO_LOCAL_LU` From console, issue: **D APPC,LU,ALL** and verify the following:
  1. Do you see any LU defined with “BASE=YES”? The IOASERV LU doesn’t have to be the one defined as a BASE but at least one LU must be defined.
  2. Do you see: “LLUN=IOASERV”? If, by convention, you do not use the name IOASERV, there must be a corresponding statement put in the Startup Profile, SET APPC NAME luname. This luname must match the name defined in the ACBNAME for APPC. If so,
     a. Does it show: ″SCHED=*NONE*″?
     b. Does is show: ″STATUS=ACTIVE″?
- APPC is failing, however, all of the above symptoms have been verified. If you are using an OEM security product, verify that APPC is an authorized facility and the USERID has sufficient authorization to use it. Security violations from an OEM product may not be found in the message log.

IOAx131E *hh:mm:ss* **APPC call ATBRAL2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBRAL2. See the APPC manuals for further explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx132E *hh:mm:ss* **APPC call ATBRAL2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBRAL2. Look at the APPC manuals for explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx133E *hh:mm:ss* **APPC call ATBURA2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBURA2. See the APPC manuals for explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx134E *hh:mm:dd* **cmrcv return code error**

Explanation: An APPC **CMRCV** function call error has occurred. The data displayed after this message will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx135E *hh:mm:ss* **cmsend return code error**

Explanation: An APPC **CMSEND** function call error has occurred. The data displayed after this message will show the reason for the failure.

User Response: Refer to *SAA: Common*

Programming, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx136E *hh:mm:ss* **cmsdt return code error**

Explanation: An APPC **CMSDT** function call error has occurred. The data displayed after this will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx137E *hh:mm:ss* **cmptr return code error**

Explanation: An APPC **CMPTR** function call error has occurred. The data displayed after this will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx138I **APPC call to** *aaaaaaaa* **failed with** *sssssssssssssssssssssssssssssssss*

Explanation: This displays the return code text for the failure that occurred in the function indicated.

aaaaaaaa = APPC function
sssssssssssssssssssssssssssssssss = return code text

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx139E *mm/dd/yy hh:mm:ss* **OSA/SF failed to start due to error** *nn*

Explanation: The OSA Support Facility failed to start for the reason listed below.

- *mm/dd/yy hh:mm:ss* are the date and time stamp
- *nn* is the value that represents what area of OSA/SF had the error.

All Errors after error 4 are also recorded in the message log. Error numbers 6, 8, and 9 have additional information in the message log.

The following is a list of possible error numbers and their meaning:

-1 - SVM error
0 - Reserved
1 - Trace table initialization
2 - File command error
3 - Startup profile parser
4 - Startup profile parser open log file
5 - System console error
6 - SCC error (see message log)
7 - Data manager failure
8 - OSA/SF interrupt handler error (see message log)
9 - APPC error (see message log)
10 - Missing startup profile data sets
11 - Startup profile data set name error
12 - Startup profile data set UNIT/VOLSER error
13 - Missing Message Log data set name
14 - Message Log data set allocation failed

If any of the failures occur before the message log is created, all the messages that were intended for the message log will be displayed on the system console.

User Response: When OSA starts, it attempts to open and use the user-defined message log (IOAMSG.LP*nn* where *nn* is the partition number where OSA is being run. If IOAx139E prevents OSA from initializing, the message log used to determine the problem may be shown as IOAMSG without .LP*nn* appended to it. When attempting to look in the message log to determine the cause of the failure, check for both message log filenames.

Use the above list of error numbers to isolate the failure. Correct the problem, if possible.

For error number 2, be sure that the APPC started task is started prior to OSA/SF.

For error number 7, if this is a VM operating system and MVS is running as a guest, verify that VM is authorized to put OSA/SF in the VM guest’s directory. Do this by specifying the RMCHINFO option in the OPTION Directory Control statement. Also, if this is not a new installation of OSA/SF, it’s possible that the channel files were corrupted. Find the channel files (HLQ.@CECNAME.#CHP.INFO) and delete them. Startup OSA/SF (the channel files will be dynamically created by OSA/SF).

For error number 14, check for the following common problems:

1. IOAMSG (message log) is defined in STARTUP PROFILE with an invalid data set name.
2. IOAMSG should not be cataloged on the system.
3. IOAMSG (message log) is RACF protected and OSA/SF does not have authority. (Check JES job log for violation errors.)

4. OSA/SF was linked with one version of C library and executed under another version because of LNKLST or incorrect STEPLIB.

Stop and restart OSA/SF. If the nature of the problem is unknown or persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx140I *hh:mm:ss* **API APPC component ended**

Explanation: Informational message to track that the API of the APPC component terminated.

User Response: None. Normal APPC termination continues.

IOAx141I *hh:mm:ss* **API APPC component started**

Explanation: Informational message to track that the API of the APPC component has activated.

User Response: None. Normal APPC activation continues.

IOAx142E **Message file** *ffffffffffffff* **error** *nn*

Explanation: An error occurred attempting to open the message log data set.
- *ffffffffffffff* - Message log data set name
- *nn* - The value is used by IBM service.

User Response: This message will occur after a predetermined number of opens were attempted. If the value of *nn* is 45 or 61, check to see if this data set is open by a user or another program, including users and programs in other logical partitions. If the data set is open, it must be closed before the message log data set can be opened by OSA/SF.

If the value of *nn* is neither 45 nor 61, then see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx143I *hh:mm:ss* **API COMM component ended**

Explanation: The COMM component is the APPC component which handles the individual API connection. This message is issued as part of the normal system shutdown sequence.

User Response: None. The API COMM component has ended normally. The shutdown sequence continues.

IOAx144I *hh:mm:ss* **ALL OSA devices initialized**

Explanation: This is an OSA/SF startup message. OSA/SF has made the internal connection with all OSA CHPIDs and OSAD (X'FE') unit addresses.

User Response: None. Normal OSA/SF initialization continues.

IOAx145W *hh:mm:ss* **Only** *x* **of** *y* **OSA devices initialized**

Explanation: Of the total number of OSAs, *y*, known to the channel subsystem only *x* were successfully initialized.

User Response: Check the preceding entries in the message log to determine why the remaining device numbers could not be initialized.

The following items should be checked:
- Check OSA definitions in the IODF/IOCDS
- Verify channel and diagnostic devices (X'FE') are online.
- Verify that the OSA device addresses are online.

Stop OSA/SF, correct any problems, then restart OSA/SF. If the remaining OSA devices still do not initialize, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx146E *hh:mm:ss* **No OSA devices were initialized**

Explanation: None of the OSA devices found in the channel subsystem could be initialized. Additional messages in the message log explain why the devices were not initialized.

User Response: Check the message log to determine why the OSA devices could not be initialized.

Check the following items:
- Check OSA definitions in the IODF/IOCDS
- Verify channel and diagnostic devices (X'FE') are online.
- Verify that the OSA device addresses are online.

Stop OSA/SF, correct any problems, then restart OSA/SF. If the OSA devices still do not initialize, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx147E **Bind socket error in port** *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx149I *hh:mm:ss* **Interrupt handler component ended**

Explanation: This message is issued as part of OSA/SF shutdown. The interrupt handler component has ended normally.

User Response: None. Normal OSA/SF shutdown continues.

IOAx150I *hh:mm:ss* **Interrupt handler component started**

Explanation: This message is issued as part of normal OSA/SF initialization. The interrupt handler component has started.

User Response: None. Normal OSA/SF initialization continues.

IOAx151E **SVM return code received was not valid**

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx152I **Finished OSA/SF startup profile processing**

Explanation: This message is a part of normal OSA/SF initialization. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

User Response: None. Normal OSA/SF initialization continues.

IOAx153I **Processing of OSA/SF startup profile started**

Explanation: This message is a part of normal OSA/SF initialization. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

User Response: None. Normal OSA/SF initialization continues.

IOAx154E **STARTUP.PROFILE SET NAME** *ssssss* **has duplicate** *uuuuuu* **parm**

Explanation: A duplicate UNIT or VOLSER keyword was found after the SET NAME command *ssssss* in the OSA/SF startup profile. OSA/SF initialization has terminated.

- *ssssss* - One of the SET NAME entries in the OSA/SF startup profile; for example, IOAINX, IOACFG, IOAMSG, IOADSN, and so on.
- *uuuuuu* - Will be either UNIT or VOLSER

User Response: Delete one of the duplicate UNIT or VOLSER entries in the *ssssss* SET NAME entry.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

IOAx155I *hh:mm:ss* **Startup profile command** *ssss*

Explanation: This message is issued as part of the OSA/SF start-up message series.

ssss = the OSA/SF startup profile command that is going to be processed.

User Response: None. Normal OSA/SF start-up continues.

IOAx156E **Unknown command in dataset STARTUP.PROFILE at line** *dd*

Explanation: This message is a part of OSA/SF initialization. In the OSA/SF startup profile, a command at line *dd* is not valid. OSA/SF initialization did not complete.

User Response: In the OSA/SF startup profile, a member in the IOAPROF data set of the OSA/SF started procedure, check the specified line and correct it. Refer to Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile and for what commands are valid. Then restart OSA/SF.

IOAx157E **Incorrect number of parameters on 'SET' command in STARTUP.PROFILE**

Explanation: The SET command was found in the OSA/SF startup profile but the number of parameters to support the SET command is not correct. OSA/SF initialization did not complete.

User Response: Check the parameters on each of the SET commands in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). Refer to Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile and the SET commands. Correct the OSA/SF startup profile then restart OSA/SF.

IOAx158E **Incorrect parameter** *ssss* **on 'SET' command in STARTUP.PROFILE**

Explanation: Parameter *ssss* on one of the SET commands in the OSA/SF startup profile is not correct. OSA/SF initialization terminates.

- ssss - Parameter keyword in SET command that is not valid

User Response: Locate the incorrect parameter in the OSA/SF startup profile and correct it. Restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for

more information about the OSA/SF startup profile.

IOAx159E SET ALIAS in STARTUP.PROFILE has incorrect number of parameters

Explanation: In the startup profile for OSA/SF, the SET ALIAS keyword has an incorrect number of parameters. OSA/SF initialization has terminated.

User Response: Check the OSA/SF startup profile and locate the Set Alias command. It must contain 2 parameters. Any other number of parameters will cause this error. For example: ″SET ALIAS CECNAME SYS1″ contains the correct number of parameters; in this example, CECNAME and SYS1. Correct the OSA/SF startup profile and restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx160E STARTUP.PROFILE requires *cecname/sysname* before SET NAME command

Explanation: In the OSA/SF startup profile, the OSA/SF Set Alias command, either the *cecname* or the *sysname* parameter was missing or was in the wrong location. It must be specified before the OSA/SF Set Name command. OSA/SF initialization has terminated.

User Response: Locate the Set Alias command in the OSA/SF startup profile. Make sure it proceeds all the Set Name commands. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). Refer to Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the startup profile.

Correct the startup profile, then restart OSA/SF.

IOAx161E Incorrect parm *ssss* after SET NAME *IOAxxx* in STARTUP.PROFILE

Explanation: The specified parameter, *ssss*, in the Set Name command of the OSA/SF startup profile, is not valid.

- *ssss* - Parameter that is in error
- *IOAxxx* - The Set Name command containing the incorrect parameter, where *IOAxxx* can be any of the IOA-group sets such as IOAINX, IOADSN, IOACFG, and so on in the OSA/SF startup profile.

User Response: Check the startup profile for OSA/SF. Locate the Set Name command. Make sure all the parameters are correct. Correct the startup profile then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx162E IOAPROF incorrect ALIAS in DATASET *ssssssss*

Explanation: The only aliases allowed in the OSA/SF startup profile (IOAPROF) are &CECNAME and &SYSNAME. An unknown alias (a variable beginning with an ampersand) has been found. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: Locate *ssssssss* in the OSA/SF startup profile. Ensure that only &CECNAME and &SYSNAME are used in the profile. Correct the OSA/SF startup profile, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx163E STARTUP.PROFILE missing ’&’ in ALIAS name in DATASET *ssssssss*

Explanation: In the startup profile, in the SET NAME command’s DATASET keyword, the value following DATASET is missing either the &CECNAME, the &SYSNAME, or the ’&’. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, check the alias name in DATASET *ssssssss* for a correct ’&’. Ensure that only &cecname and &sysname are used in the data set. Correct the startup profile, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx164E Missing quote mark after SET NAME *ssssssss* in STARTUP.PROFILE

Explanation: The name after the DATASET keyword of the SET NAME command is missing a single quote. OSA/SF initialization has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, locate the SET NAME command with *ssssssss*. Following the DATASET keyword, add the missing single quote. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for

more information about the OSA/SF Startup Profile.

IOAx165E Incorrect qualifier after SET NAME *ssssssss* in STARTUP.PROFILE

Explanation: A qualifier in the OSA/SF startup profile DATASET value is not valid. OSA/SF startup has terminated.
- ssssssss - Startup profile SET NAME command with error in supplied value

User Response: Locate the data set name specified after the DATASET keyword in the OSA/SF startup profile. Some of the rules for DATASET qualifiers are:
- The first character of any qualifier cannot begin with a numeric character
- All DATASET values can have any number of qualifiers but each qualifier can not exceed 8 characters in length. (The maximum number of characters, however, including periods, can not exceed 44, except in the IOADSN value where the maximum number of characters can not exceed 26, including periods.)
- DATASET values only need one qualifier (but more are permitted)

Make needed corrections, then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF Startup Profile.

IOAx166E STARTUP.PROFILE DSN *ssssssss* has VOLSER but no UNIT

Explanation: When specifying a VOLSER keyword in the SET NAME command in the OSA/SF startup profile, the UNIT keyword must be specified. The UNIT keyword must proceed the VOLSER keyword. OSA/SF startup has terminated.
- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, locate the SET NAME command that specified the VOLSER keyword and NOT the UNIT keyword. Correct the condition. Then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 2 for more information about the OSA/SF startup profile.

IOAx167E Incorrect *ssssss* name *ffffffff* after SET command in STARTUP.PROFILE

Explanation: The OSA/SF startup profile is not valid. The values specified for either the UNIT or VOLSER keywords are not correct.
- ssssss - will be either keyword *UNIT* or *VOLSER*
- ffffffff - the incorrect value that follows the *ssssss* keyword

User Response: Check the OSA/SF startup profile and correct the value after either keyword VOLSER or UNIT. The value must be specified; blanks are not permitted. Then restart OSA/SF. See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more details about the OSA/SF Startup Profile UNIT and VOLSER keywords. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task).

IOAx168E STARTUP.PROFILE command has incorrect length at line *dd*

Explanation: In the OSA/SF startup profile, the maximum length of the command is 64 characters. The command at line *dd* is too long. In this context, the OSA/SF startup profile, a ″command″ is one line in the OSA/SF profile. Only 64 characters are allowed on each line of the OSA/SF startup profile. Blanks do not count in the total character count. Quote marks and periods do count in the total character count per line. OSA/SF initialization has terminated.

User Response: Shorten the command length on line *dd* to 64 or less characters. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx169E STARTUP.PROFILE has same DSN for *ssssssss* and *dddddddd*

Explanation: The data set names in two of the SET NAME statements in the OSA/SF startup profile are the same. This is not permitted. OSA/SF initialization is terminated.
- *ssssssss* - The first SET NAME entry
- *dddddddd* - The second SET NAME entry

User Response: Change the two entries in the OSA/SF startup profile so that they no longer match. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx170E SET ALIAS *aaaaaa* in STARTUP.PROFILE has already been set

Explanation: The SET ALIAS value for *aaaaaa* has already been declared. Only one SET ALIAS *aaaaaa* value is allowed in the OSA/SF start profile. OSA/SF initialization is terminated.

User Response: In the OSA/SF startup profile, remove one of the SET ALIAS *aaaaaa* entries. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx171E STARTUP.PROFILE DSN for *ssssssss* is too long

Explanation: In the OSA/SF startup profile, the data set name following the DATASET keyword for SET NAME entry *ssssssss* contains too many characters. If the data set name is part of the SET NAME IOADSN entry, the maximum number of characters permitted is 26, including periods. For all other entries, the maximum number of characters is 44, including periods. OSA/SF initialization is terminated.

- *ssssssss* - One of the SET NAME entries in the OSA/SF startup profile; for example, IOAINX, IOACFG, IOAMSG, IOADSN, and so on.

User Response: Check the data set name that follows the DATASET keyword in the OSA/SF startup profile for too many characters. Make corrections, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx172I OSA Support Facility *mm/dd/yy hh:mm:ss*

Explanation: This message is used as a date and time stamp in the message log. It is automatically written to the message log at midnight every night, as well as whenever the message log is renamed, and whenever the Clear Debug command is issued. The message serves as a delimiter when looking through the message log to see what day entries where placed in the message log.

User Response: None. Normal OSA/SF operation continues.

IOAx173I *mm/dd/yy hh:mm:ss* AutoLog component ended

Explanation: This message indicates the AutoLog component has completed. This should only occur when OSA/SF is stopped.

User Response: During normal OSA/SF termination, no user action is required and OSA/SF termination continues. If this message is issued at a time other than normal OSA/SF termination, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx174I *mm/dd/yy hh:mm:ss* AutoLog component started

Explanation: When OSA/SF is being initialized, this message indicates that the AutoLog component is running.

User Response: None. Normal OSA/SF initialization continues.

IOAx175I OSA S/F Communication module SOCKET START

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx176I OSA S/F Communication module SOCKET ENDED

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx177I Listen socket error

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx178I Read socket error

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx179I Select socket error

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx181E The message log is FULL. A new one will be created

Explanation: The message log has reached its maximum size and a new message log will be created. The log that is full will be named to the name specified in IOAC182I and the new empty message log will be created.

User Response: Decide what to do with the renamed message log.

IOAx182I Backup message log named *fffffffffffffffffffffffff.LPnn.Dyyyyddd*

Explanation: The message log has reached its maximum size and was renamed as follows:

- fffffffffffffffffffffffff — The name specified in IOAMSG NAME in the startup profile.
- LPnn — The logical partition number.
- Dyyyyddd — The 'D' is hardcoded; 'ddd' is today's date; 'yyyy' is the current year.

User Response: Decide what to do with the renamed message log. See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

IOAx183E Error renaming file *fffffffffffffffffffffff*

Explanation: A file rename error has occurred for file *fffffffffffffffffffffff*.

User Response: Check the file name for proper naming convention or see the startup profile for the proper IOAMSG name. See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

IOAx184E STARTUP.PROFILE error reported at line *dd*

Explanation: You specified an invalid parameter in the set statement in the startup profile at line number *dd*. The previous message for the startup profile will explain the error.

User Response: Check for the message prior to this one for the exact error and fix the problem.

IOAx201I *hh:mm:ss* **CHPID** *cc* **reports a logical port state change**

Explanation: A logical port state has changed other than the OSA/SF host program which triggered an alert to OSA/SF which issued this message. The change could have been from an external network manager, a cable pull, a LAN Emulation Server, etc.

User Response: Refresh the GUI Tree or Detail channel view to reflect the change and view the current state of the logical ports for the given OSA.

IOAx202I *hh:mm:ss* **CHPID** *cc* **reports OSA ready**

Explanation: OSA/SF has been signaled that OSA CHPID *cc* has entered the ″ready″ state. This could occur if the OSA CHPID had been in the ″not ready″ state and the condition was corrected.

User Response: None. Normal OSA/SF operation continues with CHPID *cc*.

IOAx204I *hh:mm:ss* **CHPID** *cc* **reports Application area dump alert**

Explanation: An error has occurred in the application code that was installed on the OSA by OSA/SF. A dump was taken by OSA/SF. The OSA and OSA/SF continue to run. The dump is stored in the data set specified by the SET NAME IOADSN statement in the Startup Profile. See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for the Startup Profile. The sample name was IOA.&CECNAME;OSASF.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx205I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (5)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx206I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (6)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx207I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (7)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx210I *hh:mm:ss* **CHPID** *cc* **reports Error Log Alert**

Explanation: This is a result of an interrupt from the OSA device. This indicates that an unusual condition requiring immediate host attention has occurred. This message is only issued for an OSA running in SNA mode.

As a result of this condition an error event record has been written to an data set constructed from the SET NAME DATASET IOADSN keyword entry in the OSA/SF startup profile. The data set name is constructed using the IOADSN data set suffixed with ″SNA_chpid″ and ″ERRORLOG″.

For example, if the DATASET name for the SET NAME IOADSN was 'IOA.VOL1.OSASF' and the chpid was 2D, the data set would be 'IOA.VOL1.OSASF.SNA2D.ERRORLOG'.

User Response: Save the error log described above,

see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx211I *hh:mm:ss* **CHPID** *cc* **reports Abend Alert**

Explanation: This indicates that the OSA device reported an alert indicating that a non-recoverable error has occurred within an application running on the OSA device. As a result the application has abended. Message IOAC233E will indicate the application and the error code.

User Response: The CHPID must be reset for the operation to be resumed. To recover operations, configure the CHPID Offline in all logical partitions (CF CHP(nn),OFFLINE) and then back ONLINE (CF CHP(nn),ONLINE).

If using TSO, issue the Get Debug command to save the OSA/SF SNA memory dump. From the GUI, using the Command window, get the SNA memory dump. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx212E hh:mm:ss CHPID cc reports Application Area Startup Failure

Explanation: The OSA mode failed during initialization.
hh:mm:ss = time of entry
cc = CHPID

User Response: From the OSA/SF GUI, do the following to issue the ACTIVATE command.
1. Display the **Configuration** window for the OSA (CHPID).
2. Enter or select the configuration name for the OSA.
3. Select **Configuration** from the menu bar and then select **Activate**.

   Note: After the activate you will have to reset the CHPID.

If the problem persists, contact the IBM support center.

IOAx213I hh:mm:ss CHPID cc reports Application Area Config. Rejection

Explanation: A mismatch exists between the OSA mode files and the OSA/SF GUI on OS/2. Message IOAC234E should also be displayed with more information.
hh:mm:ss = time of entry
cc = CHPID

User Response: Make sure the latest level of the OSA/SF GUI for OS/2 is installed. See Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx214I hh:mm:ss CHPID cc reports Diagnostic Completion Report

Explanation: A port diagnostic subcommand has completed. This message is only for information. There is not a problem.
hh:mm:ss = time of entry
cc = CHPID

User Response: No response required.

IOAx215I hh:mm:ss OSA mode on CHPID cc is now functional

Explanation: The OSA mode has completed initialization and is ready.
hh:mm:ss = time of entry
cc = CHPID

User Response: No response required. Message is for information only.

IOAx216I hh:mm:ss CHPID cc reports Application Area Config. Mod.

Explanation: The OSA’s ATM logical, or LAN emulation client (LEC), parameters for configuration were changed during initialization from the ATM network to allow the OSA mode to run. For example, the LAN Emulation Configuration Server (LECS) could have changed the parameters if **Allow LEC automatic configuration** was specified for the logical port in the configuration.
hh:mm:ss = time of entry
cc = CHPID (OSA)

User Response: This message is for your awareness. If you want to see the OSA’s ATM logical port parameters, do the following from the OSA/SF GUI:
1. Refresh the OSA/SF GUI by selecting **View** and then **Refresh now** from an OSA Channels window.
2. Double-click on the port number from the **OSA Channels - Tree View** window.

IOAx217I hh:mm:ss CHPID cc reports Device Offline Alert

Explanation: A device has failed or has been stopped.
hh:mm:ss = time of entry
cc = CHPID

User Response: Display the **OSA Channels - Details View** on the OSA/SF GUI and look at the **Entry state** for the entries to determine what the current values are.

If one of the entries is **Not Started**, this device is the problem. The device will also go offline to the operating system and will no longer be available for use by the host program.

IOAx218I hh:mm:ss CHPID cc reports a Physical port state change

Explanation: The state of the physical port on the OSA has changed.
hh:mm:ss = time of entry
cc = CHPID

User Response: Message IOAC242I will display the state of the physical port.

IOAx219I (timestamp) CHPID *nn* reports an asynchronous event

Explanation: An unexpected event has occurred in the CHPID named in the message. This message is followed by another giving details of the event that occurred.

User Response: See additional messages.

IOAx2yyI *hh:mm:ss* CHPID *cc* reports an Undefined Register Bit *n*

Explanation: *yy*=19 through 32 to indicate messages **IOAC219I** through **IOAC232**. Bit *n* is one digit less than the last two digits (xx) in the message ID. Each of these messages reports this internal OSA/SF error at *hh:mm:ss* time for CHPID *cc*.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx233E CHPID *cc* OSA mode *xxxxxxxx* failed with a code of *xxxxxxxx*

Explanation: After an application area abend alert is posted from the OSA, this message indicates which CHPID *cc*, OSA mode, and failure code *xxxxxxxx* were associated with the application area abend alert. Message IOAC211I should accompany this message.

User Response: The CHPID must be reset for the operation to be resumed. To recover operations, configure the CHPID offline in all logical partitions, then back online. See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx234E CHPID *cc sssss* configuration reject code of *xx*

Explanation: The OSA mode configuration created for this OSA was found to be in error.
cc = CHPID
xx = Hex value of the reject code.
sssss = String describing configuration type.

User Response: Try to reactivate the configuration from the Configuration window on the OSA/SF GUI. If the problem persists contact the IBM support center.

IOAx235I Created Dump file *ssssssss*

Explanation: This message is displayed with message 211. When the alert took place the dump area was read and placed into file ssssssss

User Response: OSA/SF automatically gathers problem determination information. In an event of a service need, IBM support will direct you to send this file for detailed analyst.

IOAx236E Dump file *ssssssss* already exists

Explanation: The file that was to be used to read the dump area into already exist and needs to be renamed or deleted so another dump area can be read.

User Response: Rename or erase the filename *ssssssss*.

IOAx237E Empty Appl. Area Dump Alert request code for CHPID *cc*

Explanation: The Alert data for the dump area was empty so no dump could be taken.

User Response: Call the IBM support center.

IOAx238A *hh*:*mm*:*ss* CHPID *cc* reports Logical port n *sssss*

Explanation: The OSA ATM logical port (LAN Emulation Client) parameter, **Client enabled state** changed. This parameter indicates the condition of the OSA's logical port for LAN emulation.
hh:mm:ss = time of entry
cc = CHPID (OSA)
n = Port number
sssss = Disabled by Internal Failure, Disabled by Physical Port, Disabled by OSA/SF, Disabled Externally, Not Defined, LEC Activating, Enabled, or Unknown.

User Response: Use this status to determine the state of the logical ATM port (LAN Emulation Client). You can display the port's ATM LAN Emulation Settings by double-clicking on the OSA port number from the OSA Channels - Tree view, or issuing the QUERY command from REXX.

Take any corrective action necessary, based on the information provided in the *sssss* portion of the message. In some cases the condition may be desirable, based on action already taken, and no further action will be required.

IOAx239I *hh*:*mm*:*ss* CHPID *cc* reports logical port *p* changed, REASON=*rr*

Explanation: This reason code is displayed when the status changes for an OSA ATM port. The state of the port is displayed in message IOAC238I.
hh:mm:ss = time of entry

cc = CHPID
p = Port number
rr = Reason Code

User Response: No response required. The reason code is information for IBM support.

IOAx240I *hh*:*mm*:*ss* **CHPID** *cc* **reports port parameter changed for logical port** *p*

Explanation: An OSA ATM logical port (LAN Emulation Client) parameter changed. This parameter indicates the status of the OSA's logical port for LAN emulation. Message IOAC238I indicates the state of the logical port.
hh:mm:ss = time of entry
cc = CHPID (OSA)
p = Port number

User Response:

To display the parameter from the OSA/SF GUI, do the following:
1. Refresh the OSA/SF GUI by selecting **View** and then **Refresh now** from an OSA Channels window.
2. Double-click on the port number from the **OSA Channels - Tree View** window.
3. Select the **Emulation** notebook tab and look for **Client enabled state**.

You can view the port parameters by double-clicking on the OSA port number from the **OSA Channels - Tree View** window.

IOAx241I *hh*:*mm*:*ss* **CHPID** *cc* **had port value** *v*, **bytes 4/5 as** *y* **are not valid**

Explanation: The OSA ATM port parameters were changed, but the data is not valid.
hh:mm:ss = time of entry
cc = CHPID
v = Port value
y = invalid data

User Response: Record the information in this message and report the problem to the IBM support center.

IOAx242I *hh*:*mm*:*ss* **CHPID** *cc* **reports physical port** *p* **is** *sssss*

Explanation: The state of the physical port has changed to enabled, disabled, or unknown.
hh:mm:ss = time of entry
cc = CHPID
p = Port number
sssss = Enabled, Disabled, or unknown.

User Response: Use the status in the message to determine what to do next. You can display the OSA's physical port parameters by double-clicking on the port number from the **OSA Channels - Tree View** window, and then selecting the Physical notebook tab.

IOAx250I **A port parameter was changed for port** *nnn* **on CHPID** *nn*

Explanation: A port parameter was changed by a source other than OSA/SF.

User Response: See message IOAC251I to determine what port parameter changed, and if you need to take any action.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx251I **Port parameter** *sssssss* **changed for port** *nn*

Explanation: The port parameter, *sssssss*, was changed by a source other than OSA/SF.

User Response: Determine if any action is necessary based on the parameter that changed.

IOAx252I **The state of** *ssssss* **port** *p* **changed on CHPID** *cc*

Explanation: The state of *physical* or *logical* port p on CHPID cc has changed. Message IOAC253I contains the state of the port if it became disabled. Message IOAC260I contains the state of the port if it became enabled.

User Response: See the user response for either message IOAC253I or IOAC260I, whichever applies.

IOAx253I *ssssss* **port** *p* **is disabled with** *sssssss*

Explanation: The state of *physical* or *logical* port p has changed. The state is one of the following:
1. Internal port failure
2. Port temporarily disabled
3. Support element disabled
4. External disabled
5. Host program disabled
6. Configuration change (N/A for OSD)
7. Link failure threshold.

User Response: Do one of the following:
- If the disabled reason is 3, 4 OR 5, enter a command from the SE, with LAN manager, or with OSA/SF, to enable the port. See "Enabling and Disabling Ports" on page 191.
- All other reasons are generated by the CHPID. You can reset the CHPID; this may bring the port online.

IOAx254E **CHPID** *nn* **rejected a configuration file**

Explanation: CHPID *nn* rejected the configuration file from either a LAN driver or an SNA application.

User Response: Check the configuration file for the error. Message IOAC255I contains additional information to help pinpoint the error.

IOAx255I *sss* **field** *sss* **is in error.**

Explanation: The first value in the message is the configuration file type. This can be:

LAN emulation

Native ATM

Physical ATM

Gigabit Ethernet

Native SNA

The second value (*sss*) tells you what field is in error.

User Response: Check validity of values for the specified field in the configuration file. Make corrections and reissue command.

IOAx256W **CHPID** *cc* **port** *pp* **reports a configuration change mismatch.**

Explanation: The LAN driver has used a different set of parameter values than those specified in the configuration file.

User Response: None required - this is to make you aware of this change. IOAC257I below contains additional information about which field was changed.

IOAx257I *sss* **field** *sss* **has been changed**

Explanation: The first value in the message is the configuration file type. This can be:

LAN emulation

Native ATM

Physical ATM

Gigabit Ethernet

Native SNA

The second value (*sss*) tells you what field has been changed.

User Response: None. This message is for your awareness.

IOAx258I **CHPID** *c* **reports a discarded message alert**

Explanation: The message buffer for the specified CHPID is full. Some alert conditions may have been lost. This will occur when there is no OSA/SF running and managing the specified CHPID.

User Response: Make sure there is always an OSA/SF on one partition running and managing each OSA.

IOAx260I *ssssss* **port** *p* **enabled on CHPID** *c*

Explanation: The *physical* or *logical* port is now enabled.

User Response: None.

IOAx261I **An alert condition has occurred for CHPID** *nn*

Explanation: This message is to inform you that an alert has occurred on the given CHPID.

User Response: Message **IOAC262I** contains the detailed information about this alert.

IOAx262I **CHPID** *nn* **port** *pp* **error code=***eeee* **severity=***ss*

Explanation: This message provides the details of the alert condition that occurred for the CHPID.

User Response: See the following table for a detailed explanation and to determine the action you should take for the error code and severity.

Error Code	Sev	Explanation	User Response
1144	1	Indicates a port number mismatch between a request that was received from the host and the port number saved in the LSA LAN control block at initialization.	Check for errors in the VTAM configuration file.
1400	2	LLC reported that the LAN header is not valid. Alert Category: 2	Contact IBM Support.
1401	2	Unsupported routing information length received from VTAM. Alert Category: 2	Contact IBM Support.
1402	2	User LLC station or service access point (SAP) undefined. Alert Category: 2	Contact IBM Support.
1403	1	VTAM commands received before initialization. Alert Category: 2	Re-activate the XCA Major node. If the problem persists, contact IBM Support.

1404	1	VTAM commands received before LAN adapter enabled. Alert Category: 2	Contact IBM Support.
1405	2	Unsupported VTAM interface header length. Alert Category: 2	Contact IBM Support.
1406	2	Parameter data length not valid. Alert Category: 2.	Contact IBM Support.
1407	2	Network layer identifier not supported. Alert Category: 2.	Contact IBM Support.
1408	2	Identifier type not valid. Alert Category: 2.	Contact IBM Support.
1409	2	Unsupported VTAM interface version. Alert Category: 2.	Contact IBM Support.
140A	2	Padding length not valid in data from VTAM. Alert Category: 2.	Contact IBM Support.
140C	2	Command or response bits not valid for LAN data. Alert Category: 2.	Contact IBM Support.
140D	1	Unsupported function for network management SAP. Alert Category: 2.	Verify that the host is configured for NetView on the SAP. If the problem persists, contact IBM Support.
140E	1	LLC connection not opened by VTAM. Alert Category: 2.	Contact IBM Support.
140F	2	Unsupported LLC options received from VTAM. Alert Category: 2.	Contact IBM Support.
1410	2	Unsupported LLC flow control options received from VTAM. Alert Category: 2.	Contact IBM Support.
1411	2	Unsupported function request received from VTAM. alert Category: 2.	Contact IBM Support.
1412	1	Received connect request or response before LLC station opened. Alert Category: 2.	Contact IBM Support.
1413	2	Unsupported connection confirmation options received from VTAM. Alert Category: 2.	Contact IBM Support.
1414	1	Received close LLC station response with no request outstanding. Alert Category: 2.	Contact IBM Support.
1803	3	Normal indication if token-ring cable is not connected to access unit or appropriate wall outlet; if token-ring cable is connected, status code might indicate lobe wire fault or defective access unit. Alert Category: 3.	Make sure the Token Ring port is attached to the network. If so, contact IBM Support.
191D	3	An unspecified network error has occurred. Alert Category: 10.	Verify the cable connection to the network. Verify that the correct transceiver type is configured. The adapter device driver will periodically attempt to recover. It will clear the error if recovery is successful. If the problem persists, contact IBM support.

IOAx263I Unknown alert type *sss* was received for CHPID *nn*

Explanation: An alert was received from the OSA feature but it is not an alert that OSA/SF recognizes. Processing is not affected by this alert.

User Response: You can ignore the alert or save the log and contact IBM (see “Reporting OSA/SF Problems to IBM” on page 213) for more information.

IOAx264I The state of port *p* is *ssss*

Explanation: The state of the port specified in the message has changed to a state other than enabled or disabled.

User Response: None.

IOAx265I Port *p* reports a *ssss*

Explanation: An alert has been received. Message IOAC252I, which precedes this message, defines the CHPID for the alert. There are three values for this message: loss of signal, registration failure, or loss of SAAL connection.

User Response: Dependent upon the alert value.

Loss of signal
The most likely cause is an improperly installed or broken cable. Remedy this condition.

Registration failure (ATM only)
The registration was rejected by the ATM switch or the switch is not operational. This is most likely the result of the configuration not matching the configuration of the LES. Fix the configuration and make sure that the required switch is operational. Then enable the port (see “Enabling and Disabling Ports” on page 191).

Loss of SAAL connection (ATM only)
This is set when there is a problem with the communication to the switch. Have your network specialist check the switch connection.

UNKNOWN
This is presented if the LAN driver reports an invalid alert value. Call IBM service if this occurs.

IOAx266I Logical ports associated with physical port *p* have been removed

Explanation: The physical port associated with these logical ports has been disabled for the reason presented in IOAC253I. The logical ports may no longer function when their physical port has been disabled.

User Response: None.

IOAx276E A copy of the attention server already exists

Explanation: A copy of the attention server (IOANMAIN) is already attached.

User Response: Determine if the other attention server (IOANMAIN) is running.

IOAx277E An incorrect command target was entered

Explanation: An internal error has occurred

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx278E SNA image for port *pp* does not support this command.

Explanation: The current level of the SNA mode running on the OSA does not support this command.

User Response: Apply a new version of the SNA image that supports this command. To help you determine which image to install, do one or more of the following:

- Check RETAIN.
- Review applicable PTFs.
- Contact IBM Support Center.

IOAx279E Error opening message log data set

Explanation: An error has occurred while processing the Clear Debug command. The message log data set could not be opened.

User Response: Verify that the message log data set exists, is catalogued in this logical partition, and is not in use in another logical partition. The message log data set is pointed to by the OSA/SF startup profile entry IOAMSG. Retry the Clear Debug command.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx280E Error closing file

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx281E File already exists

Explanation: A command has been issued against an OSA/SF data set that requires that the OSA/SF data set be rewritten. The data set already exists but the Replace option was not specified on the command.

User Response: Reissue the command that received this message specifying the Replace option.

IOAx282E OSAD device does not exist for CHPID *cc*

Explanation: The OSAD device with unit address *X'FE'* associated with the specified CHPID (*cc*) has not been defined.

User Response: Perform the following checks and steps:

- Check the I/O definitions in the IODF/IOCDS to ensure an OSAD device (X'FE') has been defined for this CHPID.
- Update and activate the IODF if necessary
- Display the CHPID and unit status information for CHPID *cc*
- Verify the OSAD device is ONLINE
- Then restart operations on CHPID *cc*

IOAx283W ND mismatch occurred on CHPID *cc*

Explanation: A node descriptor (ND) mismatch occurred on the indicated CHPID. This occurs if there has been a change in the hardware associated with the specified CHPID or if the data currently known by OSA/SF has been altered.

User Response: Verify that the system is operating correctly and issue the Synchronize command. Refer to “SYNCHRONIZE | SYNC” on page 274.

IOAx284W OSA/SF internal data has been updated with new ND value

Explanation: The ND value found on the card has been stored internally.

User Response: None.

IOAx286E Dataset name was not specified

Explanation: A data set name was not included when the command was issued. The command to be executed requires a data set name. The command did not execute.

User Response: Retry the command that received this message specifying a data set name.

IOAx289E CHPID*nn* does not support this command

Explanation: The command you issued to the specified CHPID is not valid for this type of CHPID.

User Response: Check Chapter 14, “OSA/SF Commands for REXX” on page 247 to make sure this command is valid.

IOAx290E Internal SNA command error for port *pp*

Explanation: Internal processing error occurred during SNA command

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx292E Force indicator is required as one or more devices are in use

Explanation: One or more devices, as described in the OAT, are in use. For the Set Parameter command to complete, the FORCE option must be used, but this option was not specified.

User Response: Use IOACMD or the GUI to invoke the Set Parameter command with the FORCE option. This will stop all traffic on the target port. To use the GUI, go to the Port Settings notebook, choose Set LAN traffic state (Hardware State for OSA-2), followed by Disable and Force.

IOAx294E OSA configuration data has changed

Explanation: Changes have been made to OSA configuration information since the last command was entered. This can be caused by another OSA/SF in another logical partition with controlling access.

User Response: Refresh the GUI or use the Query command to obtain the new configuration information, then retry the command that received this message.

IOAx295E Cannot complete command since CHPID *cc* is in use

Explanation: Another command is currently being processed by this OSA/SF. The command that received this message could not be executed.

User Response: Wait a short period of time then retry the command that received the message. If contention continues, check OSA/SF status in each partition. Stop and restart OSA/SF if necessary.

IOAx296W Unable to start managing CHPID *cc* for this OSA/SF

Explanation: OSA/SF was unable to start managing this OSA CHPID.

User Response: See the command output window, if using the GUI, for more details and additional messages. If using the TSO interface, additional messages will be presented to the TSO screen.

IOAx298W Unable to stop managing CHPID *cc* for this OSA/SF

Explanation: OSA/SF was unable to stop managing this OSA CHPID.

User Response: See the command output window, if using the GUI, for more details and additional messages. If using the TSO interface, additional messages will be presented to the TSO screen.

IOAx299I VTAM is not using port *pp*.

Explanation: There is no VTAM currently using port *pp*.

User Response: Refresh the port view on the GUI.

IOAx301W Unable to synchronize this CHPID for this OSA/SF

Explanation: Synchronization between the OSA/SF internally stored data and OSA device data failed.

User Response: Refer to the message log and the command output window for additional messages. If the cause of the problem can not be located or the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx303E *cccc* is only permitted on a single CHPID

Explanation: The command *cccc* that was issued is restricted to just one channel at a time; that is, multiple channels or ALL are not allowed.

User Response: Specify ONE CHANNEL as the command target and retry the command.

IOAx304E CHPID *cc* is not managed by this copy of OSA/SF

Explanation: An OSA/SF command was entered to a copy of OSA/SF that is not managing the OSA channel that was specified in the command.

User Response: Try this command from the partition in which the managing OSA/SF is running, or enter the command after this OSA/SF becomes the managing facility. Refer to the Start Managing command for more information.

IOAx305E Input value for *ssss* is out of range

Explanation: The input value for a load balancing parameter is out of range. *ssss* is one of the following:
- Session Delay (0-375)
- Load Balancing (0-25)
- Load Balancing Enable (0 or 1)

User Response: Enter a value within the specified range.

IOAx306E OSA port type does not match the OSA/SF internal data record

Explanation: Synchronization was attempted to update the card with the OSA/SF internal port data but the port type was not the same as found on the OSA device. This situation can occur if a new OSA was installed that contains different port parameters than the OSA that was originally installed (for example, ports were token ring and are now FDDI).

User Response: Check that the correct OSA device was installed. If so, then issue the Synchronize command to store the OSA data into the OSA/SF internally maintained data records.

If an OSA device with different port parameters has been installed, refer to Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215. Also, refer to the OSA publication for a description of mode and port parameters.

IOAx307W Channel offline, only data from OSA/SF returned

Explanation: The channel that the command was directed to is offline to the operating system. The only valid information that OSA/SF could determine was from the OSA/SF internally maintained data. No data from the OSA device is available.

User Response: The command requires that the OSA CHPID be online to the operating system. Determine why the channel is offline by issuing the ″D M=CHP(nn)″ command. Remedy the problem and then retry the command.

IOAx308I CHPID *cc* Port *pp sssssss* has different values

Explanation: For the port on OSA *cc*, a mismatch was detected between the data maintained by OSA/SF on the host system and the value on the OSA device.
- *pp* - Port number
- *cc* - OSA CHPID number
- *sssssss* - Description of the port parameter that does not match between OSA/SF and OSA device

User Response: Review the message log for additional information regarding the mismatch. If the OSA is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the

OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

Then retry the command that received the message.

IOAx309I CHPID *cc* LP *p* UA *uu ssssssss* was found to have different values

Explanation: The item indicated was found to have a mismatch between OSA/SF internally maintained data and the value on the OSA.

cc = OSA CHPID
p = Logical partition number
uu = Unit Address
ssssssss = Description of item in conflict

User Response: Review the message log for additional information regarding the mismatch. The data from the message log should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

Then retry the command that received the message.

IOAx310W Unable to set parameter for a port on this CHPID

Explanation: The Set Parameters command that was issued contained a parameter that is not valid or that was unable to be set.

User Response: See the command output response in the message log for more information.

IOAx312I Station doesn’t exist on port *pp*. See message log.

Explanation: A station on port *pp* does not exist. The source SAP *nn*, destination SAP*nn*, and destination MAC address *mmmmmmmmmmmm*, is shown in the message log (IOAMSG).

User Response: Refresh the connection view on the GUI.

IOAx313I SAP *nn* is not open on port *nn*

Explanation: The SAP that was open has changed since the last operation.

User Response: Refresh the SAP view on the GUI.

IOAx314E Incorrect LAN port parameter ID *iiiiiiii*

Explanation: An incorrect LAN port parameter has been specified or the LAN port parameter is not valid for this OSA mode of operation.

iiiiiiii = port parameter ID that is not valid

User Response: Check the Parameter ID specified with the SET PARM command. If using the GUI, verify that the configuration is valid for this OSA mode and OSA device type. Then retry the command that received this message.

IOAx315I OSA/SF internal data has value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A following message, IOAK316I shows the value obtained from the channel.

dddddddd = hexadecimal value OSA/SF has in its internal record

User Response: Using the values from messages IOAx308I, IOAx315I, and IOAx316I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx316I OSA hardware has data value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A previous message, IOAK315I shows the value obtained from the internal OSA/SF data.

dddddddd = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx315I, and IOAx316I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx317E Unable to set the managing partition for CHPID *cc*

Explanation: A Start Managing command was issued to OSA/SF. OSA/SF was unable to set the ″managing partition″ indicator in the specified OSA CHPID. An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx318E Update to OAT failed due to in use OAT entries

Explanation: An attempt to unassign an OAT entry that is associated with the subchannel was attempted. The unassign attempt was not successful.

User Response: OAT entries that are currently in use can not be unassigned. The currently executing applications for those entries that are in use must be UNLOADed from the OSA. Refer to the LANRES mode section for more information. Once the applications have been UNLOADed, then update the OAT.

IOAx319E Update to OAT failed due to in use passthru entries

Explanation: An attempt was made to unassign an OAT entry that is associated with an active device address in the OSA/SF TCP/IP Passthru mode. The device address was in use and cannot be unassigned without the Force parameter.

User Response: Retry this command with the Force parameter. USE CAUTION! This is an active TCP/IP Passthru port. The FORCE option will terminate active connections through the port. An alternative action is to stop the use of entries by terminating devices from TCP/IP at the host.

IOAx320E Prime of database did not complete successfully

Explanation: An operation was attempted to copy database records from the OSA and it failed. This indicates that an OSA channel file data set could not be created.

User Response: The OSA channel file data sets are pointed to by the IOADSN keyword in the OSA/SF startup profile. Ensure that the OSA/SF startup profile IOADSN keyword is correct and that there is sufficient space on the DASD for the OSA channel file data sets. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx321I OSA/SF internal data has value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A following message, IOAK322I shows the character string value obtained from the OSA.

dddddddd = character string OSA/SF has in its internal record

User Response: Using the values from messages IOAx308I, IOAx321I, and IOAx322I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx322I OSA hardware has data value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A previous message, IOAK321I shows the character string value obtained from the internal OSA/SF data.

dddddddd = character string received from the OSA

User Response: Using the values from messages IOAx308I, IOAx321I, and IOAx322I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx323W CHPID *cc* OSA OAT and OSA/SF internal OAT data are out of sync

Explanation: The OSA address table (OAT) data and the data maintained by OSA/SF in host data sets for the specified OSA CHPID do not match.

- *cc* - OSA CHPID that is no longer synchronized

User Response: Review the message log for additional information regarding the mismatch. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to

realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

Then retry the command that received the message.

IOAx324W CHPID *cc* OSA PORT OSA/SF internal PORT data are out of sync

Explanation: The port data maintained by the OSA hardware (CHPID *cc*) no longer matches the internal port data maintained by OSA/SF on the host system. This condition can occur, for example, if a network management program that has access to the OSA has altered the PORT data.

User Response: Review the message log for additional information regarding the mismatch. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA.

Then retry the command that received the message.

IOAx325I CHPID *cc* is no longer managed by partition *pp*

Explanation: CHPID *cc* is no longer managed by partition *pp* because a Stop Managing command was entered from this partition.

cc = CHPID
pp = LP number

User Response: No action is required. The Stop Managing command has completed successfully.

IOAx326I CHPID *cc* is currently managed by partition *pp*

Explanation: This message was issued during initialization or a Start Managing command.

cc = CHPID
pp = LP number

User Response: None. Normal OSA/SF initialization or the Start Managing command continue.

IOAx327W ND mismatch occurred on CHPID *cc*

Explanation: An OSA device has been replaced and the physical information from the old card does not match the physical information on the new card. The current and previous physical information are listed in the message log.

cc = CHPID
ND = Node Descriptor

User Response: Review the data in the message log. Refer to Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215 for additional information on OSA device replacement.

IOAx328W No saved configuration file for CHPID *cc*

Explanation: No information about the specified channel was saved while OSA/SF was being refreshed or initialized; that is, the channel file information for CHPID *cc* does not exist or the channel file data set for CHPID *cc* cannot be located.

User Response: The channel file data sets are pointed to by the IOADSN entry of the OSA/SF start-up procedure. Ensure that the pointer has not changed and that the DASD volume, pointed to by the volume keyword, is operational. The channel file data set for CHPID *cc* must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

IOAx329W Could not write OSA information to file for CHPID *cc*

Explanation: A write error occurred while trying to save information about the specified channel in an OSA/SF data set.

User Response: Check the system console for error messages. Verify that the OSA/SF startup profile is valid. Check for other users accessing the data set at the same time. The OSA/SF channel information data sets are pointed to by the SET NAME IOADSN entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx330E Port *pp* on CHPID *cc* is not in the enabled state

Explanation: The specified port must be enabled for LAN traffic (Hardware state for OSA-2) in order for the previous task to complete.

User Response: Change the port to **LAN Traffic Enabled** (enabled Hardware State for OSA-2) and retry the command. See “Enabling and Disabling Ports” on page 191.

IOAx333E Port *pp* does not exist on this CHPID

Explanation: A Set Parameters command has been issued specifying a PORT number as part of the command. The OSA targeted by the command does not contain the specified PORT number.
- *pp* - The port number on the OSA that does not exist

User Response: Check that the OSA targeted by the command is correct. Verify the number of PORTs on the OSA. From the OSA GUI, the PORT information can be checked from the Channel View window. Reissue the Set Parameters command.

IOAx334E Port is in support element control mode. Operation not allowed.

Explanation: An attempt was made to enable or disable LAN traffic on a port on an OSA. The action cannot be completed because the port on the OSA is in hardware support element control mode.

User Response: Using the HMC or the PCE, depending on the hardware configuration, remove support element control mode from the port. Then enable or disable LAN traffic on the port (change Hardware State to enable or disable for OSA-2). See “Enabling and Disabling Ports” on page 191.

IOAx335E Unable to store the current data key in OSA/SF internal data

Explanation: An internal OSA/SF error has occurred during the condition described in the message text.

User Response: Stop and restart OSA/SF. If the condition reoccurs, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx336E Enable of port failed

Explanation: OSA/SF was unable to enable the port specified in the Set Parameters command because the port was disabled externally or the port is not operational.

User Response: Check the hardware master console (HMC) or processor control (PCE) for OSA port status and hardware errors. Re-attempt to enable the port if the port is disabled. Contact IBM Service if required.

IOAx340E Incorrect group size *n* specified

Explanation: An incorrect group size was specified in the OSA/SF Put Table command. Passthru device types should each have a group size of 2. Subchannel and SNA device types should each have a group size of 1.
n = group size that was specified

User Response: Correct the group size and retry the command that received this message.

IOAx341W Not all *sss* entries stored successfully for CHPID *cc*

Explanation: During a Put OAT ADDRESS TABLE or INSTALL operation, some of the OAT/PVC (indicated by *sss*) entries were not written to OSA.
cc = OSA CHPID number

User Response: Review the message log for further messages. Each OAT/PVC entry that is not valid should have an explanation. If some messages have reason codes associated with them, this could be the result of an internal OSA/SF error; reason codes are reserved for IBM use only. For further assistance, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx342E No *sss* entries stored successfully for CHPID *cc*

Explanation: During a Put OAT ADDRESS TABLE or INSTALL operation, none of the OAT/PVC (indicated by *sss*) entries were written to the OSA.
cc = OSA CHPID number

User Response: Review the message log for further messages. Each OAT/PVC entry that is not valid should have an explanation. If some messages have reason codes associated with them, this could be the result of an internal OSA/SF error; reason codes are reserved for IBM use only. For further assistance, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx343E No OAT slot for this group of input is available

Explanation: This group of OAT entries was not written to the card because there are no free slots on the OSA for the entries specified.

User Response: Using the GUI, OSA Configurations, delete some of the defined entries. If using the Put OAT command, delete even-odd pairs of entries that are not in use or set them to UNASSIGNED. Retry the command that resulted in this message.

IOAx345E PVC entry *n* has incorrect format

Explanation: The PVC data entry specified as *n* does not have the correct eye-catcher or the correct control block ID.

User Response: An internal OSA/SF error occurred. Report the problem to the IBM Support Center.

IOAx346E *ffff* for PVC name *nnnn* is out of range

Explanation: One of the following fields as specified by *ffff* has a value that is not within the allowed range.
- Forward Peak Cell Rate (0-353207)
- Backward Peak Cell Rate (0-353207)
- Forward Max PDU size (64-9188)
- Backward Max PDU size (64-9188)

User Response: Enter a value in the range shown for the field in error. The OSA/SF GUI checks these values on input, if you are using the Set Parameters command, correct the value.

IOAx347E Incorrect LP *p* with UA *uu*

Explanation: The logical partition (LP) number, *p*, for the unit address (UA) *uu* is not valid.

User Response: Check the OSA unit address and logical partition numbers in the IODF (or IOCDS). Correct the partition number and retry the command.

IOAx348E Must set LP number to zero for this OAT entry

Explanation: This channel is not a shared channel; that is, it is not a EMIF channel. For a channel that is not shared, only LP number 0 can be used for this channel in the command.

User Response: Change the LP number to 0 and retry the command.

IOAx349E CHPID *cc* is not online

Explanation: The CHPID *cc* was found to be offline.

User Response: Issue the *D M=CHP(cc)* command to verify the status of the CHPID. If the CHPID is offline, issue the *CF CHP(cc),ONLINE* command to configure the OSA channel online and retry the command.

IOAx350E IP Address *iiiiiiiiiiiiiii* already used by LP *p* UA *uu*

Explanation: The IP Address (*iiiiiiiiiiiiiii*) specified in a Put OAT operation is already in use by another logical partition.

iiiiiiiiiiiiiii = IP Address
p = LP number
uu = Unit address

User Response: If TCP/IP port sharing is desired, the IP addresses must be unique to each logical partition (refer to the OSA publication for more information). Provide a unique IP address for each logical partition and retry the command.

IOAx351W Portions of the Query command failed

Explanation: The Query command completed but not all of the data that was requested was returned.

User Response: Explanations of why portions of the data were not returned are interspersed in the output data set from the Query command. Refer to messages in the command output for further information.

IOAx352E Query command failed, no data was returned

Explanation: The Query command did not complete successfully. No output data from the command was returned.

User Response: If using the GUI, refer to the command output window for additional messages. If using the TSO interface, additional messages will be displayed in the query command output data set specified on the TSO command input. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx353E Incorrect *ccccccc* target *tttt*

Explanation: The command target or port target for a Query command has an incorrect value.

ccccccc = either command or port
tttt = specified target in hexadecimal notation

User Response: This message is issued from the API interface. The target is a field that is passed through the API; that is the target of the command being issued. This field indicates if the command is for: ONE (channel), ALL CHANNELS, or OSA/SF. Refer to the API interface documentation and control block section. Correct the command target or port target and retry the command used with the API interface.

IOAx359E LP *p* UA *uu* has a zero IP address for the default OAT entry

Explanation: The OAT entry specified by LP *p* and unit address *uu* was specified as either a primary or secondary default entry. The default entry cannot have an IP address of all zeros.

p = logical partition (LP) number
uu = unit address (UA)

User Response: A non-zero IP address must be specified. Correct the IP address for the default entry. Reissue the Put OAT or Install command, whichever was used.

IOAx360E *nnn* entries were specified as default OAT entry for port *pp*

Explanation:

nnn number of entries
pp port number

A Put OAT command was issued and more than one OAT entry was specified as the primary or secondary default path for unknown IP packets.

A port can only have one of the following:

- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry.

User Response: Correct the data being used for the Put OAT command. Reissue the Put OAT or Install command, whichever was used.

IOAx361E **Current *ddd* default LP (LP *p* and UA *uu*) missing from input**

Explanation: A Put OAT or Install command was issued to add or change OAT entries. The IOACMD EXEC determined that the primary or secondary default entry was missing on the input.

ddd = primary or secondary
p = logical partition (LP) number of default router
uu = unit address (UA) of the default router

A port can have one of the following:
- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry.

User Response: Do either of the following:
- Include the missing primary or secondary default indicator to the OAT entry and then reissue the Put OAT or Install command.
- If you want to replace all OAT entries, reissue the Put OAT or Install command and answer Yes when asked if all entries should be replaced.

IOAx362E **All *nnn* OAT entries for port *pp* must be specified with port sharing**

Explanation: To use TCP/IP port sharing mode, all OAT entries with port *pp* must be specified in the OAT, and all entries must have non-zero Internet Protocol (IP) addresses.

nnn = number of entries
pp = port number

User Response: Do the following:

__ 1. Include all the OAT entries associated with this port and verify that all entries are non-zero. Change zero IP addresses to valid non-zero IP addresses or delete the entries that contain zero IP addresses.

__ 2. If you are using the GUI, follow the instructions in Chapter 7 for TCP/IP Passthru mode and sharing OSA Ports.

__ 3. If you are using the REXX interface, issue the Put OAT command to rewrite the OAT.

__ 4. Configure the OSA offline and then online to all logical partitions.

IOAx365E **Unable to clear the OAT table for CHPID *cc***

Explanation: During an Install command or during a Put Table command with the New Table option, OSA/SF attempted to clear the previous OAT table entries. A problem was encountered during the attempt to clear existing OAT table entries for CHPID *cc*.

User Response: Check the following:

__ 1. Review the OSA GUI message log and command output windows for related messages

__ 2. Review the TSO screen for additional messages if using the TSO interface

__ 3. If using the API interface, examine the reason code data structure from this operation

__ 4. Check the console for error messages.

Retry the command. If the problem continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx366I **Disk image loaded, config CHPID *cc* off/on before reissuing INSTALL**

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID. The message is now prompting that the CHPID be configured online to activate the code image.

User Response: The installation of an OSA mode has successfully progressed to this point. Configure the CHPID offline (CF CHP(nn),OFFLINE) in all logical partitions and then back online (CF CHP(nn),ONLINE) to activate the image just written.

IOAx367E ***hh:mm:ss uuuuuuuu*** **on** ***sssssss*** **not authorized to use FORCE option**

Explanation: At the specified time, user ID *uuuuuuuu* on system *sssssss* entered a command with the Force option, which this user ID is not authorized to use.

User Response: Reissue the command without the Force option or contact your system administrator to obtain authorization to use the Force option.

IOAx372E **Install command failed**

Explanation: The Install command failed, or installation procedure failed during initialization of the OSA mode.

User Response: Check the following:

__ 1. Review the OSA GUI message log and command output windows

__ 2. Review the TSO screen for additional messages if using the TSO interface

__ 3. If using the API interface, examine the reason code data structure from this operation and take the appropriate action.

__ 4. Check the console for error messages.

Retry the command. If the problem continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx373E Trace mask *tt* is out of range. Must be less than *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx376W Unable to allocate file for channel data for CHPID *cc*

Explanation: An error occurred when OSA/SF attempted to dynamically allocate a data set to store the OSA channel file information for CHPID *cc*.

User Response: The channel file data sets are built on the DASD volume pointed to by the IOADSN entry of the OSA/SF startup procedure. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile. Ensure that the pointer has not changed and that the DASD volume, pointed to by the VOLUME keyword, is operational. The channel file data sets must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

IOAx377E Input Value *dddd* for parameter ID *pppppppp* is out of range

Explanation: The decimal input data *dddd* for a Set Parameter command with hexadecimal parameter ID *pppppppp* is not in the valid range.

User Response: Check the parameter and input data and retry this command.

IOAx378I OSA hardware has data value *sss...sss*

Explanation: This message is issued with a previous message, **IOAK308I**, that describes which item OSA/SF found to be mismatched with the channel hardware. Another message, **IOAK379I**, shows the value obtained from the internal OSA/SF data.

sss...sss = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx378I, and IOAx379I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx379I OSA/SF internal data has value *sss...sss*

Explanation: This message is issued with a previous message, **IOAK308I**, that describes which item OSA/SF found to be mismatched with the internal data. Another message, **IOAK378I**, shows the value obtained from the OSA hardware data.

sss...sss = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx378I, and IOAx379I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

IOAx381I OSA/SF has an OAT entry for CHPID *cc* LP *pp* UA *uu*, but not the OSA.

Explanation: The OAT entry exists as specified, but the corresponding OSA hardware is not installed. This message is issued as the result of the synchronize command. As the synchronize command processes the OAT, each time an entry in the OAT does not correspond to the OSA CHPID *cc*, this informational message is issued.

- *cc* - OSA CHPID in OAT
- *pp* - Logical partition identified in the OAT
- *uu* - Unit address that does not match the OSA

User Response: The synchronize command continues to re-align the internal files with the OSA hardware information. Normal operation continues.

IOAx382E Port *yy* on CHPID *xx* could not be enabled.

Explanation: The specified port could not be enabled.

User Response: Check the message log for additional information. Verify that the port is not disabled from the Hardware Management Console’s Advanced Facilities. Try to enable the port from the hardware management console. If the port cannot be enabled, try unplugging the LAN cable from the OSA port and then enable the port. If you cannot enable the port, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx383E Port *yy* on CHPID *xx* could not be disabled.

Explanation: The specified port could not be disabled.

User Response: Check the message log for additional information. Try to disable the port from the hardware management console. If you still cannot disable the port, unplug the LAN cable from the OSA port and then try to disable it. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx386E Port *yy* on CHPID *xx* was enabled, but the OAT update failed

Explanation: An internal OSA/SF error has occurred.

User Response: Contact the IBM support center. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx387E Port *yy* on CHPID *xx* was not disabled and the OAT updated failed

Explanation: A failure occurred while updating the OAT for the specified port. The port state (enabled/disabled) is unchanged.

User Response: Check the message log for additional information. If the problem persists, contact the IBM support center. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx388E Error detected while writing non-volatile storage for CHPID *xx*.

Explanation: An error was detected while updating non-volatile storage for CHPID (OSA) *xx*.

User Response: Check for messages and errors on the hardware management console. If a hardware error is not found, retry the previous task. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx389E Incorrect buffer number *nn* for GET ATM TRACE

Explanation: You entered an incorrect value for the ATM trace buffer.

User Response: Valid values are 1–16. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx390E Not a valid command for CHPID *cc*

Explanation: The command issued cannot be issued against this CHPID because the command is not valid for this type of OSA feature.

User Response: Check the command in Chapter 14, “OSA/SF Commands for REXX” on page 247 to see which OSA feature types use this command. Issue the Query command against the OSA if you are uncertain which hardware feature type it is.

IOAx391W Empty trace buffer was found for CHPID *cc*

Explanation: This error occurred because of an OSA SNA image error such that the SNA trace buffer was not created.

User Response: Perform a single reinstall of the SNA image on the OSA. If the problem reoccurs after a reinstall, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx392W Empty message log buffer was found for CHPID *cc*

Explanation: This error occurred because of an OSA SNA image error such that the SNA message log buffer was not created.

User Response: Perform a single reinstall of the SNA image on the OSA. If the problem reoccurs after a reinstall, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx393E OSA CHPID *cc* not set up for SNA

Explanation: A Set Parameter command specifying an SNA option was issued to OSA CHPID *cc* but the licensed internal code installed on this OSA does not support SNA mode.

User Response: Install SNA mode on the OSA or correct the Set Parameter command so that SNA options are not specified.

IOAx394E Unknown device type *dd* found in OAT for CHPID *cc*

Explanation: A control block from an API interface contains an unknown device type.

dd - Unknown device type that was encountered

User Response: Examine the API input control block. Refer to the control block section for information. Correct the device type entry and reissue the API.

IOAx396W Port data is set in OSA hardware but OSA/SF has different port type

Explanation: The port data specified in the **Set Parameter** command is set in the OSA hardware successfully but OSA/SF internal data shows this port has a different port type.

User Response: Issue the Synchronize command to update the OSA/SF internal data. Refer to the Synchronize command for further information. If unable to resolve condition, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx397W Set command completed but LAN port is in disabled state

Explanation: The Set Parameters command completed, but since the LAN port is in the disabled state, no data transfer can be performed.

User Response:

__ 1. Enable the port for LAN traffic. See “Enabling and Disabling Ports” on page 191.

__ 2. Invoke the REXX QUERY command or refresh the GUI for this port.

IOAx398E Input value for group address entry *nn* is incorrect

Explanation: The group address field is not correct for entry *nn*. This message follows a SET PARM command that has submitted data in which the group address is not valid.

User Response: Retry the command specifying the group address according to the following rules.

- For a FDDI LAN attachment, set bits 0 and 1 of each group address to 1.
- For a token-ring LAN and token-ring ATM LAN emulation attachments, set bits 0 and 1 to 1; set bits 2–15 to 0; set bit 16 to 1.
- For an Ethernet LAN and Ethernet ATM LAN emulation attachments, set bits 0–5 to 0; set bits 6 and 7 to 1; set bits 8–15 to 0; set bit 23 to 1.
- For FENET bits 6 and 7 must be 1.

IOAx399I SNA image loaded, config CHPID *cc* off/on to activate loaded image

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID.

cc = CHPID

User Response: Configure the CHPID offline in all logical partitions and then online to activate the image just written.

IOAx401E UA *uu* specified for partition *p* is out of range

Explanation: The specified UA in the OAT entry is out of range. The valid ranges for LANRES configuration is 0 thru 210(X’00″ - X’DB’). The valid range for HPDT MPC, HPDT ATM native, SNA and TCP/IP Passthru configurations is 0 thru 253(X’00’ - X’FD’) where:

uu = Unit Address

p = Partition Number

User Response: Correct the unit address in the input data and reissue the command.

IOAx402E Write SNA Control Command failed. Return code *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx403E Input value for address *ssss* is incorrect

Explanation: The input data for a Set Parameter command for the address (*ssss*= functional or MAC) specified is not valid.

User Response: Correct the input data and reissue the Set Parameter command. Contact the IBM Support Center for assistance (see “Reporting OSA/SF Problems to IBM” on page 213).

IOAx404E There is no corresponding data found in OSA/SF for this port

Explanation: When executing the Install command, OSA/SF host based data does not have data to correspond to a port on the OSA device. The Install command has found a mismatch between the number of ports on the OSA device and the number of ports for this OSA device as found in the host information data base. The Install command terminates.

User Response: This message can be issued if OSA was replaced and now the Install command is being used to update the information on the new OSA. Refer to Chapter 11, “Servicing OSA-Express and OSA/SF” on page 215.

If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx405W CHPID *cc* is shared, but partition number is zero

Explanation: In a shared channel (port sharing) EMIF (ESCON Multiple Image Facility) environment, the LP number cannot be zero. For OSA CHPID *cc* the LP number is zero for one of the port shared entries in the OAT. This message can be issued by either the Put OAT or Install command.

cc = channel path id

User Response: Correct any LP values in the OAT that are specified as zero for all devices on shared CHPID *cc*. Reissue the Put OAT or Install command, whichever was used.

IOAx406W CHPID *cc* is dedicated, but partition number is not zero

Explanation: If a channel is dedicated to a logical partition (LP), that is, the channel is not shared, then the LP number for the devices associated with the channel in the OAT must be specified as zero. This

message can be issued by either the Put OAT or Install command.

cc = channel path id

User Response: Specify zero as the LP number for all device addresses in the OAT for CHPID *cc*. Reissue the Put OAT or Install command, whichever was used.

IOAx409I OAT updated. Config CHPID *cc* off/on to activate the changes

Explanation: The OAT in the IOACFG data set of the OSA/SF startup profile was successfully written to the OSA located on CHPID *cc*.

User Response: Configure CHPID *cc* offline in all logical partitions, then back online to activate the OAT. Refer to Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile and the IOACFG data set.

IOAx410E timerX value(tttt msec specified) must be ccccccc than timerY value (tttt msec specified)

Explanation: When setting the SNA timer values, timerX was found to have an incorrect value because of setting of timerY value.

timerX,timerY = Ti(SNA LLC Inactivity Timer), T1(SNA LLC Response Timer), or T2(SNA LLC Acknowledgment Timer).
ccccccc = greater or less
tttt = time unit in msec

User Response: Correct the timerX value and re-issue the command.

IOAx411E OSA/SF does not support OSA processor code level of CHPID cc

Explanation: The OSA processor for CHPID cc is not at the correct level. OSA/SF will not be able to communicate with the OSA device correctly.

cc = CHPID

User Response: Upgrade the code level for the OSA processor.

IOAx413E CHPID *cc* is not configured as ATM Native mode

Explanation: PVC entries are only for OSAs configured for ATM Native mode. This message should not be displayed if you are using the GUI.

User Response: If you are using the OSA/SF commands, either delete the PVC entries for this OSA using the Set Parameter command or customize the OSA for HPDT ATM Native mode using Put OAT.

IOAx414E No PVC data was found in input for CHPID *cc*

Explanation: You attempted to use the set PVC command without supplying the associated PVC data.

User Response: Retry the command using the appropriate input PVC data. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx415E CHPID *cc* has *n* PVC entries and has reached the limit

Explanation: The maximum number of PVC entries for an OSA is 256.

User Response: Delete PVC entries that are not needed.

IOAx416E LP *x* UA *y* is already used by LP *x* UA *z* (group of 2)

Explanation: The unit address specified by *y* is already being used. The second LP and unit address specified in the message has a group size of 2. This means that it is a TCP/IP Passthru entry which uses an even odd pair.

User Response: Change the UA for one of the OAT entries.

IOAx417E *ssss* completed with reason *rrrrrrrr*

Explanation: In the process of an INSTALL/ACTIVATE command, image file ssss specified in the configuration completed with reason code rrrrrrrr.

ssss = specified image file
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action needed.

If you are using the GUI, go to the Command Output Window.
If you are using the TSO REXX interface, go to the message log.

IOAx418E LP *p* UA *uu* completed with reason code *rrrrrrrr*

Explanation: In the process of an INSTALL/ACTIVATE command, an OAT entry specified in the configuration with partition p and unit address uu completed with reason code rrrrrrrr.

p = partition number
uu = Unit Address
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

If you are using the GUI, go to the Command Output Window.
If you are using the TSO REXX interface, go to the message log.

IOAx419E Query for CHPID *cc* completed with reason code *rrrrrrrr*

Explanation: In the process of doing the QUERY command for CHPID cc, it completed with reason code rrrrrrrr.
cc = CHPID
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.
If you are using the GUI, go to the Command Output Window.
If you are using the TSO REXX interface, go to the message log.

IOAx420E Query for CHPID *cc* Device dd completed with reason code *rrrrrrrr*

Explanation: In the process of doing the QUERY command for CHPID cc, it completed with reason code rrrrrrrr when trying to obtain device information.
cc = CHPID
dd = Device number
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx421E Current LP x(LP_NAMEx), managing LP y(LP_NAMEy) CHPID *cc rrrrrrrr*

Explanation: In the process of a START/STOP MANAGING command for CHPID cc, it completed with reason code rrrrrrrr.
x = current partition number
LP_NAMEx = name of current partition
y = managing partition number
LP_NAMEy = name of managing partition
cc = CHPID
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx422E Operation on port *p* completed with reason code *rrrrrrrr*

Explanation: In the process of a command associated with port p it completed with reason code rrrrrrrr.
p = port number
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx424E PVC operation for CHPID *cc* failed with reason code *rrrr*

Explanation: The Add, Modify, or Delete of a PVC entry failed.

User Response: Look in the message log for more information. There should be a message following this one that contains more information. The reason code is for use by IBM in problem determination.

IOAx425E Specified OSAname and PORTname cannot be accessed

Explanation: This message is the result of an unsuccessful SNMP query.

An unsuccesful SNMP query is usually caused by mismatched PORTNAMEs which are specified both in the TCPIP profile and OSA/SF configuration.

For OSA Express ATM CHPIDs, the PORTNAME is defined in the DEVICE statement in the TCPIP profile and it has to match the one in the OSA/SF configuration.

```
*-----------------------------------------------*
 * TCP/IP profile sample OSA Express ATM CHPID EC
 *-----------------------------------------------*
 DEVICE DEVEC ATM PORTNAME GANTZ;GANTZ is PORTNAME
 LINK LNKEC ATM DEVEC       ;DEVEC is device name
```

For OSA Direct Express CHPIDs, the device name in the DEVICE statement defined in the TCPIP profile must match the PORTNAME in the TRLE statement in the VTAM definitions.

```
 *-----------------------------------------------*
 * TCP/IP profile sample for CHPID F9
 *-----------------------------------------------*
 DEVICE OSDF9P00 MPCIPA PRIROUTER;OSDF9P00 device
 LINK OSDF9 IPAQGNET OSDF9P00  ;and also PORTNAME

 *-----------------------------------------------*
 * VTAM definition sampel for CHPID F9           *
 *-----------------------------------------------*
 TRL36F9   TRLE  LNCTL=MPC,
                 READ=590,
                 WRITE=591,
                 DATAPATH=(592),
                 PORTNAME=OSDF9P00,
                 MPCLEVEL=QDIO
```

For more about SNMP, see *IP Configuration Guide* (SC31-8513) in your Communication Server library.

User Response: Look in the message log for more information. There should be a message following this one that contains more information. The reason code is for use by IBM in problem determination.

IOAx426E OAT entry *nn* has incorrect format

Explanation: When processing the OAT entries, OAT entry number *nn* has an incorrect format.
nn = OAT entry number

User Response:
- If this failure occurs during a PUT_TABLE command, check the input OAT entry number.
- If this failure occurs during a QUERY or GET_TABLE command, an internal OSA/SF error has occurred. Rename the OSA CHPID command file data set

specified in the OSA/SF startup profile IOADSN statement. (Refer to Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information on the OSA/SF startup profile and IOADSN entry.) The IOADSN command file data set will be dynamically rebuilt after it is renamed. Call the IBM Support Center to arrange to send a copy of the renamed IOADSN data set to IBM for analysis.

IOAx427E **CHPID *cc* hardware is not OSA-2 ATM**

Explanation: The specified CHPID *cc* is not of type OSA-2 ATM.

User Response: The function you requested is only valid on an OSA-2 ATM CHPID.

IOAx428E **CHPID cc is not configured as mmm mode**

Explanation: The specified CHPID cc is not configured as mmm mode for the SET_PARM command to complete successfully.
cc = CHPID number
mmm = SNA or ATM

User Response: Configure the CHPID with the mmm mode and retry the command.

IOAx430I **ATM image loaded, config CHPID cc off/on to activate loaded image**

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID.
cc = CHPID

User Response: Configure the CHPID offline in all logical partitions and then online to activate the image just written.

IOAx431W **LP *p* and UA *uu* defines sharing of port *x* without an IP address**

Explanation: The OAT entry for logical partition p and unit address uu is specified as a passthru type entry for port x. There is also an SNA type entry that shares the same port. This means that an IP address must be specified with the passthru entry type to allow port sharing.
p = Logical partition number
uu = Unit address
x = Port number

User Response: Do the following to specify an IP address from the OSA/SF GUI.
1. Display the Configuration window for the OSA.
2. Select **TCP/IP Passthru** from the **Configured Modes** listbox and then select **Change**.
3. Select the entry you want to change in the listbox and then select **Change**.
4. Enter the IP address for this logical partition and unit address entry.
5. Select **Change** and then select **Set**.
6. Select **Configuration** from the menu bar of the Configuration window and then save the configuration.
7. Select **Configuration** from the menu bar and then select **Activate**.

IOAx432I ***ssssss*** **type LP *n* UA *uu* defines sharing of port *n***

Explanation: The entry specified defines port sharing. Another message follows indicating what is the problem. The *ssssss* can be ’Passthru, ’SNA’, or ’MPC’ (for MVS only).

User Response: See the message that follows this one in the message log for more information.

IOAx433W **LP *p* UA *uu* voids passthru entries for port *x* with no IP address**

Explanation: The OAT entry for logical partition p and unit address uu is specified as an SNA type entry for port x. However, there are existing passthru OAT entries with no IP address. By configuring this SNA entry, all the passthru devices that share this port without an IP address will not be functional.
p = LP number
uu = unit address
x = port number

User Response: Do the following to specify an IP address from the OSA/SF GUI.
1. Display the Configuration window for the OSA.
2. Select **TCP/IP Passthru** from the **Configured Modes** listbox and then select **Change**.
3. Select the entry you want to change in the listbox and then select **Change**.
4. Enter the IP address for this logical partition and unit address entry. Select **Change** and the select **Set**.
5. Select **Configuration** from the menu bar of the Configuration window and then save the configuration.
6. Select **Configuration**from the menu bar and then select **Activate**.

IOAx434I **PT type LP *n* UA *xx* defines sharing port *y* without IP address**

Explanation: You specified a port for port sharing but the IP address is all zeroes. An IP address of zero indicates no port sharing.

User Response: You cannot share a port without a specific IP address on each OAT entry that wishes to use the port.

IOAx435E VPI *x* and VCI *y* already used by PVC name *ssss*

Explanation: The VPI and VCI combination specified for the PVC is already being used by another PVC. The combination of these two parameters must be unique for each PVC entry.

User Response: Change the VPI or VCI so that it is unique for this PVC.

IOAx436E Invalid *tttt* name *nnnn*

Explanation: *tttt* is either PVC or OSA. *nnnn* is either the PVC name or OSA name. The PVC name or OSA name is not valid.

User Response: Enter a name of 1 through 8 characters in the following format:

First Character - Any capital letter A through Z, @ # $.

Remaining Characters - Capital letters A through Z, 0 through 9, @ # $.

IOAx437E ATM OSA mode *ssssssss* is corrupted. Reason = *nnnnnnnn*

Explanation: The ATM image, *ssssssss* loaded on the card has been corrupted.

User Response: Re-configure the card.

IOAx439E PVC name *ssssssss* not found

Explanation: Specified PVC name *ssssssss* cannot be found on this ATM card.

User Response: Correct the name and retry the command. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx440E LP *nn* UA *nn* is already used by *nn* port *nn*

Explanation: The LP and UA in the OAT entry in the install process are already used by another port.

User Response: This message is generated when configuring an OSA CHPID that has multiple logical ports. Change the OAT entry and retry the command.

IOAx441E NetMask a.b.c.d for LP *x* UA *y* is incorrect

Explanation: The NetMask specified for OAT entry LP *x* UA *y* is 255.255.255.255

User Response: Change the NetMask and retry the command. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx444E Port type *ttttttt* not supported on CHPID *cc* port *pp*

Explanation: The port type, *ttttttt*, is not supported on the specified CHPID.

ttttttt can be one of

- Token ring
- FDDI
- Ethernet
- Fast ethernet
- Gigabit ethernet
- ATM Native
- ATM LAN emulation

User Response: None. This is an internal error.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx446E Set of LAN port parameter ID pppp is invalid for port *nn*

Explanation: The input parameter is improper for the specified port type.

User Response: Reenter the correct parameter or specify the correct port type. If the error persist, see “Reporting OSA/SF Problems to IBM” on page 213

IOAx448E No OAT entries were specified for port *pp*

Explanation: The OAT file specified in the master index (ioainx) contains no OAT entries for the port the install was directed to, where *pp* is the target port number.

User Response: If OAT entries are necessary to configure this port, use the GUI configuration tool. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx449W OSA/SF not able to access channel file information for CHPID *cc*

Explanation: OSA/SF had a channel error during OSA/SF initialization. It is necessary to correct this error in order for OSA/SF to function properly. Messages IOAD499W and IOAD505W detail the error.

User Response: Make sure a 70xx minidisk has been created and is available. If this is not a VM guest, then a channel file is missing or unable to be accessed. Processing can continue, but certain commands will not work.

IOAx450E Task not supported by SNA image level *xx* on CHPID *cc*

Explanation: The SNA firmware level to support the input command is not installed on the specified CHPID.

User Response: Upgrade the SNA firmware level on the specified CHPID. If the error persists, call IBM service.

IOAx451I Indicators have been set in one or more channel blocks

Explanation: One of the following conditions was detected by the OSA/SF:
- Physical card mismatch
- No file information found for card
- The port type has not been set for this card
- Could not write file information for this card

User Response: This is an internal OSA/SF error. See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx455E The specified OSA mode file already known to OSA/SF

Explanation: During a Put File command, the file name specified was already known by OSA/SF and the Replace option was not selected.

User Response: Retry the Put File command and specify the Replace option. If the problem persists, issue the Delete File command to first remove the file and then reissue the Put File command.

IOAx456E The specified OSA mode file not known by this copy of OSA/SF

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx457E The specified CHPID is managed by another partition

Explanation: An OSA channel number, which was to be part of a set of OSA channels to be managed by a Start Managing operation, is already managed by another logical partition.

User Response: Either retry the command using the Force option or issue the Stop Managing command from the managing partition currently managing the OSA.

IOAx459E The specified CHPID is not known by this copy of OSA/SF

Explanation: The CHPID number specified on the current command is not known by this copy of OSA/SF.

User Response: Verify that the CHPID number specified is defined as an OSA channel in the IODF/IOCDS. Reissue the API or command that resulted in this message.

IOAx460E The specified port is not known by this copy of OSA/SF

Explanation: The port number specified does not match the allowed OSA port number range. For a FDDI port, only port number 00 is valid. On an OSA-1, port numbers 00 through 04 are valid for a token-ring or Ethernet port. On an OSA-2, port numbers 00 and 01 are valid for a token-ring or Ethernet port.

User Response: Verify the OSA type. Check the port number range. Reissue the command. If problems continue, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx464W The system is currently in configuration mode

Explanation: OSA/SF has determined that the system is in configuration mode. The command may not be able to complete, or if OSA/SF was in the process of initializing, it might not be able to initialize successfully. Any data that is returned may not be correct.

User Response: Take the system out of configuration mode. Retry the failing command.

IOAx466E The system is not running in EMIF mode

Explanation: The system on which OSA/SF is to run and on which an OSA is installed must support the ESCON Multiple Image Facility mode (EMIF mode). An attempt has been made to start OSA/SF on a system without EMIF firmware support.

User Response: See the OSA publication for the hardware requirements for OSA. Multiple image facility mode support is a prerequisite requirement for OSA hardware devices and the OSA Support Facility software.

IOAx467E Incorrect code returned to OSA/SF

Explanation: OSA/SF has attempted to communicate with the channel subsystem and the communication has failed. An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx468E Service not available for this request

Explanation: OSA/SF has attempted to communicate with the channel subsystem and the communication has failed. An internal OSA/SF error has occurred.

User Response:
- For the OSA CHPID that was the target of the command that received this message, configure the OSA CHPID offline in all logical partitions (CF CHP(nn),OFFLINE), then back online (CF CHP(nn),ONLINE).

- Stop and restart OSA/SF

If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx469E The specified CHPID *cc* in use - cannot complete command

Explanation: The OSA CHPID to which the last command was directed is in use either by another user or another partition. The command that was issued did not execute.

User Response: Wait a short period of time for the OSA CHPID to complete its current task. Then resubmit the command that received this message. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx470E Channel is unlocked (query) or it must be locked (set)

Explanation: The OSA CHPID to which the last command was directed is in use either by another user or another partition. The command that was issued did not execute.

User Response: Wait a short period of time for the OSA CHPID to complete its current task. Then resubmit the command that received this message. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx472E Could not access Channel Subsystem information

Explanation: OSA/SF could not access Channel Subsystem information.

User Response: If you are running as a VM guest , you must specify the RMCHINFO in the VM directory entry for this guest. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx473E A parameter for a internal OSA/SF request is incorrect

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx474E The requested Channel Subsystem Command is not supported

Explanation: The Channel Subsystem Command (CHSC) is not supported on this processor. This support is a requirement for OSA and OSA/SF.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and to run OSA/SF. If all requirements are met, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx475I No channel sub-system physical information is available

Explanation: The Channel Subsystem Command (CHSC) attempted to obtain information from the channel subsystem and could not.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx476I Requested CHPID is not defined in the I/O configuration

Explanation: A command attempted to access a CHPID that is not defined in the IODF/IOCDS.

User Response: Verify that the IODF/IOCDS has an entry for each OSA. Refer to the OSA publication for hardware and IODF/IOCDS requirements. Check that the command was issued to a valid OSA CHPID.

IOAx477I No device information available for this type CHPID

Explanation: An OSA CHPID in the IODF/IOCDS has no device information associated with it. Device and unit address values are required in the IODF/IOCDS for the OSA CHPID.

User Response: Verify that the IODF/IOCDS has CNTLUNIT and IODEVICE information associated with each OSA CHPID. Refer to the OSA publication for hardware and IODF/IOCDS requirements.

IOAx478I No devices associated with this CHPID are applicable

Explanation: An OSA CHPID in the IODF/IOCDS has device information associated with it, but the device information is not valid for an OSA CHPID.

User Response: Verify that the IODF/IOCDS CNTLUNIT and IODEVICE information associated with each OSA CHPID has valid OSA device information. Refer to the OSA publication for hardware and IODF/IOCDS requirements.

IOAx479I The requested partition is not described in the I/O configuration

Explanation: The specified LP is not defined in your IOCDS.

User Response: Return to HCD and define LP to system.

IOAx480W No LP reconfig access for the requested CHPID

Explanation: OSA/SF attempted to access the internal logical partition reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx481E No reconfig access to LP processing command

Explanation: OSA/SF attempted to access the internal logical partition reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx482E LP requesting information not authorized to get it

Explanation: OSA/SF attempted to access the internal logical partition reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx483E The field being set is not known by this copy of OSA/SF

Explanation: A Set Parm command was issued for a field which does not support the set function.

User Response: Check "SET_PARAMETERS | SET_PARM | SET_PARMS" on page 268 for the fields supported by the command.

IOAx484E Lock handles do not match for a set or unlock operation

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx485I CHPID *cc* has been replaced. Physical information follows.

Explanation: An OSA device has been removed and a new OSA device has been installed in the same OSA cage card position. Message IOAx486 that follows will detail the current and previous physical information associated with each of the OSA devices. It will be necessary to update the hardware information from the new OSA device to the OSA/SF file information about the OSA installed at this CHPID location.

User Response: An Install sequence should be performed. Refer to Chapter 11, "Servicing OSA-Express and OSA/SF" on page 215 for more information.

If the condition can not be corrected, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx486I *vvvvvvvvvvvvvvvvvvvv*
ddddddddddddddddddddddddd

Explanation: Displays the data in the format below:
vvvvvvvvvvvvvvvvvvvv = replaceable header containing either
Current physical information:
or
Previous physical information:
ddddddddddddddddddddddddd = actual physical information

User Response: This message is paired with message IOAx485I. Refer to message IOAx485I for instructions.

IOAx487E Cannot put file to OSA without the associated host name

Explanation: During a Put File command, the fully qualified input data set name was not specified.

User Response: If this message was issued following a Put File command, then ensure the fully qualified input data set name was specified. If this message is issued during any other command, then an internal OSA/SF error has occurred; see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx488W File processing error for CHPID *cc* last ID: *aa* current ID: *bb*

Explanation: An internal OSA/SF error has occurred relating to the channel file data sets.
cc = CHPID
aa = last ID
bb = current ID

User Response: The channel file data sets are built on the DASD volume pointed to by the IOADSN entry of the OSA/SF started procedure. (See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43). Ensure that the pointer has not changed and that the DASD volume, pointed to by the VOLUME keyword, is operational. The channel file data sets must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

If all OSA channel file data sets appear normal, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx489W Tried to add a duplicate *aaaaaa* to cache

Explanation: OSA/SF tried to add item *aaaaaa* to the OSA/SF internal cache, but the item already exists in cache and it was not added.

aaaaaa = Channel, device, or file

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx490E OSA/SF must be migrated to the current release

Explanation: This message is issued if a newer version of OSA/SF had been executed on the system, the newer version stopped, and now an older, down-level version of OSA/SF has been started.

User Response: Cancel the older version of OSA/SF that was started and resume running with the latest version of OSA/SF.

IOAx491E Cannot access channel file for command. See message log for name

Explanation: The message log will contain message IOAx492E which will specify the channel file data set name that could not be accessed.

User Response: Refer to the message log and locate message IOAx492E. Cross-check the channel file data set name with a VTOC list of the DASD volume. The DASD volume is specified in the IOADSN entry of the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile. Ensure that the pointer has not changed and that the DASD volume, pointed to by the volume keyword, is operational. The channel file data set must also be catalogued on the system. Restart OSA/SF if the channel file data set name is verified.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

If all OSA channel file data sets appear normal, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx492E Could not access file *ssssssss*

Explanation: This message is in response to message IOAx491E. It indicates which channel file data set could not be accessed.

User Response: Refer to message IOAx491E for further information and corrective action.

IOAx493E Input or output block pointer not correct on command

Explanation: An OSA/SF internal error occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx494E ALL specified for command which is directed to one channel

Explanation: The ″ALL″ option was specified for a command that does not support the ″ALL″ option.

User Response: If this message is issued for a TSO issued command, remove the ″ALL″ option. If the message is issued for another reason, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx495E Unknown field ID used on command. See message log for details

Explanation: An OSA/SF internal error occurred.

User Response: Check the ID listed in message IOAD496E in the message log. If it is not a valid ID, correct it and reenter the command. ID values must be in the form of X'0000nnnn'. If it is a valid ID, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx496E Incorrect ID *xxxxxxxx* is being set for *ssssssss* field

Explanation: *xxxxxxxx* is the ID being set. *ssssssss* is replaced by one of the following: non-port type, FDDI, Token Ring, or Ethernet.

User Response: See message ID IOAx495E for more information and instructions.

IOAx497E File open error *xx* on *sss...sss*

Explanation: The OSA channel file data set *sss...sss* could not be opened because of error *xx*. The value of *xx* could be any of the following:

07 - I/O buffer could not be allocated
08 - LRECL or BLKSIZE exceeds maximum allowable value
40 - Attempt was made to open a non-partitioned data set as a PDS
41 - System level open failed
45 - Data set is already open
47 - Invalid input for data set name
49 - Cannot locate data set specified
50 - Cannot catalog new data set name used in rename routine
57 - Open mode string is invalid
61 - Error trying to define data set to system
63 - Error in control block

67 - Trying to open non-existent data set for READ
74 - Open parameters require ″type=record″ specified
79 - Data set was not opened as: ″type=record″
86 - Open mode specified invalid for PDS member
87 - Data set characteristics specified do not match those of the existing data set
88 - Open mode specified invalid for device
91 - Unable to perform function due to failure of a system utility
92 - An I/O abend has been trapped
95 - Requested disk not accessed or data set not found
98 - Invalid RECFM for opening PDS member
113 - Bad data set descriptor
117 - Data set exists
121 - Invalid argument

These error numbers are found in the *IBM C/370 Programming Guide*.

User Response: Because this condition relates to the OSA channel file data set, retry the command one more time. The OSA channel file data sets are pointed to by the IOADSN keyword in the OSA/SF startup profile.

Also, ensure that the OSA/SF startup profile IOADSN keyword is correct and that there is sufficient space on the DASD for the OSA channel file data sets. The channel file data set must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx498W Channel file error. View message log for error

Explanation: An error has occurred during a file operation for a channel file data set. Additional information about the error can be found in the OSA/SF message log.

User Response: Issue the Get Debug command to get a copy of the message log. (Refer to the command section for information about the Get Debug command.) Locate message IOAx498W in the message log. Then look back a few lines in the message log for addition channel file data set error messages. These messages will provide additional information.

IOAx499E Channel File Error. Do get_debug TRACE

Explanation: An internal OSA/SF error has occurred. The error relates to the channel file data sets.

User Response: Do the following:

__ 1. Issue the Get Debug command to obtain a copy of the OSA/SF trace table.

__ 2. Reissue the Get Debug command to get a copy of the OSA/SF message log.

__ 3. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx500E CHPID in PVC and input block mismatch

Explanation: The CHPID number does not match on the OSA/SF data cache operation.

User Response: Report the problem to the IBM Support Center.

IOAx501E Empty PVC block passed

Explanation: No data is passed to OSA/SF data cache component for the PVC operation.

User Response: Report the problem to the IBM Support Center.

IOAx503E A Data Manager internal block was not found

Explanation: This is an internal error.

User Response: Issue the Get Debug command, specifying Trace Table and send it to IBM. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx505E Bad return code *nn*. Get debug trace from OSA/SF

Explanation: The return code *nn* was received trying to do the requested function.

User Response: Do the following:

__ 1. Issue the GET_DEBUG command, specifying TRACE_table.

__ 2. Forward this data to IBM service.

__ 3. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx506I The system channel type does not match the one currently in OSA/SF

Explanation: The current channel type (as determined by the channel subsystem information) is different from the channel type currently in the OSA/SF cache. The old channel file information will be removed from the

cache and replaced with information appropriate for the new channel type.

User Response: None. This message is generated if you put in a new channel of a different type. For example, if the old channel type in cache is OSA−2 and the channel type from CHSC is OSA-Express.

IOAx507I Channel saved information not being used due to channel type mismatch

Explanation: The current channel type (as determined by the channel subsystem information) is different from the channel type saved in the channel files. The information from the channel files will not be used.

User Response: None. This message is generated if you put in a new channel of a different type. For example, if the old channel type in cache is OSA−2 and the channel type from CHSC is OSA-Express.

IOAx508E Size mismatch for *ssssss*. ID is *xx*, size is *yy*

Explanation: This is an internal error.

User Response: None

IOAx509E The CHPID type for CHPID *cc* is not valid for this command

Explanation: The command is not allowed for the type of CHPID targeted.

User Response: Reissue the command against the correct type of CHPID.

IOAx510E Parameter length of *pp* not valid for port info structure

Explanation: Internal error. The size of the input structure to set the port type is incorrect.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx511W Number of ports not specified when setting port type

Explanation: Internal OSA/SF component did not set up parameters correctly.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx512I CHPID *cc*, specified in the STARTUP.PROFILE, does not exist

Explanation: You specified the CHPID number in the SYSINFO statement in the STARTUP.PROFILE, but the CHPID does not exist in the current system configuration.

User Response: Check your system configuration to see if you specified an incorrect CHPID number, and make the necessary corrections and restart OSA/SF.

IOAx513I Device *nn* from the STARTUP.PROFILE, does not exist on CHPID *cc*

Explanation: You specified the device number in the SYSINFO statement in the STARTUP.PROFILE but the device is not associated with the listed CHPID in the current system configuration.

User Response: Check your system configuration to see if you specified an incorrect VM guest device number, make the necessary corrections and restart OSA/SF.

IOAx514E Virtual CHPID *nn* has been used multiple times in STARTUP.PROFILE

Explanation: You specified the same virtual CHPID for multiple real CHPIDS in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx515E Multiple real CHPIDs using the same virtual one in STARTUP.PROFILE

Explanation: You specified the same virtual CHPID for multiple real CHPIDS in STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF. See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43.

IOAx516E Virtual device *nn* has been used multiple times in STARTUP.PROFILE

Explanation: You specified the same virtual device for multiple real devices in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx517E Multiple real device using the same virtual one in STARTUP.PROFILE

Explanation: You specified the same virtual device for multiple real devices in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx518E CHIPID *cc* represented multiple times in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real CHPID specified in the message text is associated with multiple virtual CHPIDs in STARTUP.PROFILE.

__ 2. The virtual CHPID associated in the STARTUP.PROFILE to the real CHPID specified in the message text already exists as a real CHPID, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx519E Multiple CHPIDs assoc to same real CHPID in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real CHPID specified in the message text is associated with multiple virtual CHPIDs in STARTUP.PROFILE.

__ 2. The virtual CHPID associated in the STARTUP.PROFILE to the real CHPID specified in the message text already exists as a real CHPID, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx520E Device *nn* represented multiple times in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real device specified in the message text is associated with multiple virtual devices in STARTUP.PROFILE.

__ 2. The virtual device associated in the STARTUP.PROFILE to the real device specified in the message text already exists as a real device, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx521E Multiple devices assoc to the same real device in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real device specified in the message text is associated with multiple virtual devices in STARTUP.PROFILE.

__ 2. The virtual device associated in the STARTUP.PROFILE to the real device specified in the message text already exists as a real device, as determined from IOCDS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx522E OSA/SF was not able to access channel file information for CHPID *cc*

Explanation: OSA/SF had a channel file error after initialization was completed. Messages IOAD499W and IOAD505W detail the error. You must resolve this error before issuing any other OSA/SF commands.

User Response: Make sure a 70xx minidisk has been created and is available as described in the OSA/SF OSA publication. If this is not a VM guest, then a channel file is missing or unable to be accessed. Processing can continue, but certain commands will not work.

IOAx523E OSA/SF was not able to access channel file information for a CHPID

Explanation: OSA/SF had a channel file error after initialization was completed. Messages IOAD499W and IOAD505W detail the error. The actual CHPID number is in message log in message IOAD522E. You must resolve this error before issuing any other OSA/SF commands.

User Response: Make sure a 70xx minidisk has been created and is available as described in the OSA/SF OSA publication. If this is not a VM guest, then a channel file is missing or unable to be accessed. Processing can continue, but certain commands will not work.

IOAx524W Virtual CHPID *cc* replaces real CHPID *cc* in OSA/SF internal info

Explanation: In the STARTUP.PROFILE, you specified a virtual CHPID that also exists as a real CHPID. The virtual CHPID is used and the real CHPID is not available.

User Response: If you want to use this particular real CHPID number, change the STARTUP.PROFILE.

IOAx525E Size of *ssss* (*ss*d); constant size is *sss*

Explanation: A control block has changed in the OSA/SF internal data.

User Response: You must upgrade to the most recent copy of OSA/SF.

IOAx526E Data block size mismatch. See message log for details

Explanation: This is an internal error.

User Response: This error occurs when the data manager control blocks are updated incorrectly and are no longer the correct size. The message log contains complete details (IOAD508E/IOAD525E). Collect this information and contact IBM (see “Reporting OSA/SF Problems to IBM” on page 213).

IOAx620E *hh:mm:ss* **IOASNMP failed to start**

Explanation: An error occurred while the IOASNMP load module was attempting to start threads or acquire memory required for proper execution.

User Response: Check to determine if the port defined for the OSA SNMP task is the same port IOASRV is using. If that is not the case, then try to restart the IOASNMP product. If that fails, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx638E **No SNA connection data available for port** *pp*

Explanation: No VTAM is actively using the OSA for Port *pp*.

User Response: None. Check again after VTAM activity has started.

IOAx639W **The Netview PPI module could not be loaded into memory**

Explanation: The module containing the Netview Program to Program Interface (PPI) function could not be loaded into memory. An alertable condition was detected by OSA hardware. OSA/SF attempted to load the Netview PPI module into memory as part of the processing required to notify Netview of the alertable condition detected by the OSA hardware. The load of the module into memory failed.

User Response: If the Netview product is not installed or Netview is not being used to record alertable conditions detected by OSA hardware, then this message may be ignored.

If the Netview product is installed and Netview is to be used to record alertable conditions detected by OSA hardware, then verify that the library containing the Netview PPI module is in the library search path specified when starting OSA/SF.

- For OS/390, verify that the Netview load module library is included in the list of libraries specified by the STEPLIB DD statement in the JCL procedure used to start OSA/SF.
- For VM, verify that the Netview load module library is included in the list of libraries specified on a GLOBAL LOADLIB command issued before OSA/SF was started.
- For VSE, verify that the Netview load module library.sublibrary is in the startup JCL for the OSA/SF job.

IOAx640E **LEC port state is unchanged. Physical port on CHPID** *cc* **is disabled**

Explanation: An attempt was made to enable a logical ATM port, but the associated physical port was disabled for LAN traffic.

User Response: Enable the physical port for LAN traffic, then enable the logical port. See "Enabling and Disabling Ports" on page 191.

IOAx641E **Netview PPI failed to send alert, PPI rc=xx.**

Explanation: OSA/SF uses the NETVIEW program-to-program (PPI) interface to report alerts (messages describing a problem) to a Netview focal point. An attempt to use PPI failed. Return code xx was issued by the Netview program-to-program interface.

User Response: Refer to the Netview Application Programming Guide to determine the cause of the PPI failure and perform corrective actions as indicated.

IOAx642E **The Netview subsystem is not active or available**

Explanation: OSA/SF uses the Netview program-to-program (PPI) interface to report alerts (messages describing a problem) to a Netview focal point. The PPI is used to query the program-to-program interface status before attempting to report an alert to Netview. This query indicated that the Netview PPI was not able to receive alerts.

User Response: If the Netview product is not installed or Netview is not being used to record alertable conditions detected by OSA hardware, then this message may be ignored.

If the Netview product is installed and Netview is to be used to record alertable conditions detected by OSA hardware, then verify that the library containing the Netview PPI module is in the library search path specified when starting OSA/SF.

- For MVS, verify that the Netview load module library is included in the list of libraries specified by the STEPLIB DD statement in the JCL procedure used to start OSA/SF.
- For VM, verify that the Netview load module library is included in the list of libraries specified on a GLOBAL LOADLIB command issued before OSA/SF was started.
- For VSE, verify that the Netview load module library.sublibrary is in the startup JCL for the OSA/SF job.

Determine the state of the Netview PPI as described in NetView Operation. Perform the actions necessary to activate the PPI as described in Netview Operation.

IOAx643E **Unknown adapter type reported by OSA/SF.**

Explanation: OSA/SF identified an unknown adapter. OSA/SF can only forward alerts (messages describing a problem) to Netview for Token Ring, Ethernet, FDDI, and Fast Ethernet.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx644E OAT entry LP *pp* UA *uu* was specified more than once in the input

Explanation: Logical Partition number and Unit Address number was specified more than once in the Put OAT input data set.

User Response: Correct the input data and reissue the command.

IOAx645E SNA Network Management device was specified more than once in the input

Explanation: For each OSA device operating in SNA mode, there can only be one SNA network management device.

User Response: Correct the input data and reissue the command.

IOAx646I SNA Network Management device LP *pp* UA *uu* already exists

Explanation: The existing SNA network management device with Logical Partition number and Unit Address number is already defined.

User Response: None.

IOAx647W No OAT entries specified in input for CHPID *cc*

Explanation: There are no OAT entries in the input file for Put OAT command. *cc* is the CHPID.

User Response: Specify OAT entries in the input file for Put OAT command.

IOAx648I Command completed successfully. Config CHPID *cc* off/on to activate

Explanation: The requested action completed. A CHPID reset is required to activate the changes.

User Response: Quiesce all traffic on the LAN ports on the associated OSA CHPID. Configure the CHPID offline and then online from all logical partitions.

IOAx649E LAN port parameter ID *xx* is not supported by port *nn*

Explanation: The input parameter is not valid for the specified port type.

User Response: Re-enter the correct parameter or specify the correct port type or port number. If the error persists, call IBM service. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx650E Input not supported by firmware level // of CHPID *cc*

Explanation: The minimum firmware level to support the input is not installed on the specified CHPID.

User Response: Upgrade the firmware level of the specified CHPID. If the error persists, call IBM service. “Reporting OSA/SF Problems to IBM” on page 213.

IOAx652E OSA configuration data has changed

Explanation: Changes have been made to OSA configuration information since the last command was entered. OSA/SF is responding to an alert status from the OSA. A SNMP may have accessed the OSA.

User Response: Use the Query command to obtain the updated information on the OSA. Then resume the command sequence in progress when this message was issued.

IOAx653E Image sssssssss is not compatible with OSA processor code level x

Explanation: A mismatch exists between the OSA mode image and the OSA processor code that is currently on the OSA features.

sssssssss = label of the OSA mode image
x = high-level qualifier of the OSA processor code

User Response: Make sure the machine is at the appropriate MCL level to support the OSA ATM feature.

IOAx654E Specified configuration file is not supported by this hardware type

Explanation: The IOACFG configuration file for this CHPID does not match the hardware definition.

User Response: Create a new configuration that matches the hardware definition for the CHPID.

IOAx655E Specified configuration file is incorrect for this hardware type

Explanation: The configuration file specified in the IOACFG is not the correct one needed for the port type being configured.

User Response: Configure the CHPID using a new configuration as specified in the OSA/SF documentation.

IOAx656E No data in OSA Configuration file for OSxx CHPID *cc*

Explanation: The install command was issued, but IOACFG did not contain any information for the specified CHPID. This may be because the target CHPID type is not the same as the one for which the install was initially issued.

OSxx can be OSA2, OSE, or OSD

cc is the CHPID number

User Response: Set up the configuration and issue the install command.

If you are using the GUI:

1. Highlight the CHPID on the OSA-CHPIDs panel
2. Pull down **Selected** from the menu bar
3. Select **Configuration→Configuration list**
4. Create a new configuration using the **Add** button
5. Save and activate the configuration

If you are using REXX:

1. Copy the sample configuration from the IOA.SIOASAMP
2. Modify the configuration file and set up an OAT file, if applicable
3. Enter Configure OSA command from REXX

See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx657E Configuration file version *x* is not supported

Explanation: OSA/SF and OSA firmware are not compatible.

User Response: Either upgrade OSA/SF or OSA firmware. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx658E Incorrect configuration file specified for *ssss* port *pp*

Explanation: The specified configuration file for port *pp* is not the correct type for the port type or configuration file type shown in *ssss*.

User Response: Correct the filetype in OSAS.CONFIG or use the GUI to set up the configuration file. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx659E File not installed due to failure on the *ssss* file

Explanation: This configuration file was not written because the associated physical configuration file encountered a failure when writing to the OSA feature. *ssss* is the OSA port type.

User Response: See the error message that is associated with the physical configuration file and take appropriate action. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx660E *ssss* = *xx* and is out of range

Explanation: The specified configuration variable (*ssss*) entered in the configuration file was found to have a value (*xx*) that exceeds the valid range.

User Response: Update the configuration file variable to fall within the valid range. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx661E Unable to open OSA configuration file

Explanation: An error has occurred while trying to open the OSA/SF configuration data set.

User Response: Ensure the OSA configuration data set is cataloged to this partition, is not in use by another user or another user in another logical partition, and is properly pointed to by the IOADSN entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If OSA/SF is still running, it must be stopped. Then restart OSA/SF.

IOAx662E Incorrect parameter pointer passed to Install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx663E Incorrect operation code passed to install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx664E Incorrect parameter length passed to Install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx665W Incorrect dataset name found in OSA configuration file

Explanation: A data set name, in a format which is not valid, was found in the OSA configuration data set (IOACFG).

User Response: Examine the list of data set names found in the OSA configuration data set to find the data set name which is not valid. The OSA configuration data set is defined in the IOACFG entry of the OSA/SF

startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx666E Install output table overflow

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx667E No OSA mode file for CHPID *cc* in the OSA configuration file

Explanation: An Install of an OSA mode to an OSA was attempted. The OSA mode file and/or the OSA image and/or the OAT was (were) not loaded to the OSA device.

User Response: If using the GUI, check the command output window and message log output window for further messages and information. If using the TSO interface, additional information should be displayed on the TSO screen. After corrections, retry the Install command. If problems persist, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx668W Incorrect data set name length

Explanation: A data set specified in the OSA/SF master index data set has an incorrect logical record length (LRECL) or an incorrect block size (BLKSIZE).

User Response: The OSA/SF master index data set contains a list of OSA/SF data set names. One of the data sets in the list has a logical record length (LRECL) or a block size (BLKSIZE) that does not match the data sets in the list ***of the same OSA/SF configuration type***. The OSA/SF master index data set is pointed to by the IOACFG parameter in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx669W Incorrect member name length

Explanation: A member name associated with a data set name in the OSA/SF configuration data set has an incorrect length. Members in the configuration data set are referenced in the format:

MVSDATASETNAME(membername)

One of the member names is less than one character or greater than eight characters in length.

User Response: Examine the OSA configuration data set to locate the member name that has the incorrect length. The incorrect member name can be located by browsing the data set itself. The OSA configuration data set is defined by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

IOAx670W Dynamic allocation failed with RC=*aaaa*, reason=*bbbb*

Explanation: Dynamic allocation failed for a data set specified in the OSA/SF configuration data set (IOACFG).

aaaa = return code from DYNALLOC macro
bbbb = reason code from DYNALLOC macro

User Response: The OSA/SF configuration data set contains a list of data set names used by OSA/SF. These data sets are dynamically allocated. One of the data sets in the list could not be dynamically allocated. The OSA/SF configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

Check the return code from the DYNALLOC macro and take appropriate action. For return code and reason code information see the DYNALLOC macro in *Programming: Authorized Assembler Services Reference, Volume 1*, GC28-1475.

If problem persists, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx671W GETMAIN failure

Explanation: Unable to allocate storage for an OSA/SF operation. This could be the result of a storage constraint or an OSA/SF region size that is inadequate.

User Response: Free up system storage resources. Also check the system console for error messages. Increase the OSA/SF region size. Stop then restart OSA/SF.

IOAx672W Dynamic de-allocation failed with RC=*aaaa*, reason=*bbbb*

Explanation: Dynamic de-allocation failed for a data set specified in the OSA configuration data set.

aaaa = return code from DYNALLOC macro
bbbb = reason code from DYNALLOC macro

User Response: Check return code from DYNALLOC macro. The DYNALLOC macro documentation can be found in *Programming: Authorized Assembler Services*

Reference, Volume 1, GC28-1475. Make corrections. Stop and restart OSA/SF.

IOAx673W Install did not complete successfully

Explanation: Unable to load application and/or OAT and/or image for this OSA CHPID. This message is frequently issued if an Install command is issued without the Force option. The application and/or OAT and/or image already installed on the OSA match what is being Installed.

User Response: Additional messages should be displayed in the command output window if using the GUI or on the TSO screen if using TSO. Check these additional messages for further information and instructions. Reissue the Install command with the Force option if appropriate.

If problems persist, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx674W CHPID number found in OSA configuration data set is not valid

Explanation: A CHPID number in the OSA configuration data set was found to have an incorrect format. The correct format is:

OSAnn ...where ″nn″ is the OSA CHPID number.

User Response: Examine the OSA configuration data set and look for an incorrectly formatted OSAnn CHPID number. The OSA configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

Make corrections. Then reissue the Install command.

IOAx677E Unable to open Master Index file

Explanation: OSA/SF was unable to open the master index data set specified in the IOAINX entry of the OSA/SF startup profile.

User Response: Check that the data set name specified in the IOAINX entry of the OSA/SF startup profile exists and that it is cataloged to the system in this logical partition. Also ensure that the data set is not in use by another user in this logical partition or in any other logical partition (such as a browse or edit function). Redo the Install procedure for this OSA mode to ensure the Install steps were all performed correctly (such as the copy from IOA.SIOASAMP). Refer to Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information on the IOAINX data set of the OSA/SF startup profile and the OSA mode install procedures.

IOAx678E OSA status register read failed

Explanation: An OSA/SF internal error occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx679E Download dataset open failed

Explanation: OSA/SF was unable to open one of the data sets listed in the IOACFG or IOAINX data set. Possible causes include:

- MVS has the data set open
- Another user, even in another logical partition, may have the data set open
- The data set has been deleted.

User Response: Check that the data set names specified in the IOACFG and IOAINX entries of the OSA/SF startup profile exist and are all catalogued to the system in this logical partition. Verify the data sets are not currently open by this system or any system in any LP. If a data set has been deleted, then an SMP/E reinstall of OSA/SF is required. After the data sets have been replaced, an OSA/SF Install must be performed to the OSAs.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx680E OSA/SF release V*x*R*x*M*x* doesn't support hardware level of CHPID *cc*

Explanation: There is a co-dependency between the OSA hardware and the OSA/SF software level. For CHPID *cc* the co-dependency is not met.

User Response: Refer to the OSA publication for a list of OSA device and OSA/SF mode co-dependencies. Obtain the correct level of OSA/SF that supports the OSA CHPID.

IOAx681W Code image *xxxx* wasn't written because it's already loaded on the OSA

Explanation: The code image *xxxx* was not written to the OSA. The name of the image that was requested to be written (installed) matches the name of the OSA mode image that is currently installed on the OSA device.

User Response: To write (re-write) the same named OSA mode image *xxxx*, reissue the OSA/SF Install command with the Force option.

IOAx682E Unable to open data set *fff...fff*

Explanation: The data set could not be opened during the Install process.

fff...fff = name of the data set that could not be opened by OSA/SF

User Response: The data set is either an OSA/SF image data set or a OSA/SF NLM data set. These data sets are restored by SMP/E when OSA/SF is installed. Check that:
- OSA/SF SMP/E installation completed successfully
- The data set exists on the volume where SMP/E installed it
- This logical partition has the data set catalogued
- The data set is not used by another user, including another user in another logical partition

Retry the Install command. If problem cannot be resolved, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx683E Unable to read data set (*fff...fff*)

Explanation: The data set could not be read during the Install process.

fff...fff = name of the data set that could not be read by OSA/SF

User Response: Check that the OSA image data set name or NLM data set name as specified in the list of data set names contained in the IOACFG data set or the IOAINX data set:
- Exists and is catalogued in this logical partition
- Is not currently open by a system task or another user in this or another logical partition

The IOACFG and IOAINX data sets are pointed to by the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 2 for more information about the OSA/SF startup profile.

If the file has been deleted, then an SMP/E reinstall of OSA/SF must be performed to reload the data set.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx684E Configuration set up error

Explanation: The file type (image type) specified in the configuration data set (IOACFG entry of OSA/SF startup profile) is not valid for this OSA device.

User Response: Check the configuration for this OSA. Then check the file type (column two) in the configuration data set (IOACFG). The configuration data set is specified by the IOACFG entry in the OSA/SF startup profile. Correct the configuration file, stop OSA/SF if it is still running, then restart OSA/SF. Refer to Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information regarding the IOACFG data set.

IOAx686W This file not loaded because an Image file is not active

Explanation: Following an Activate or an Install sequence, the OSA must be configured offline in all logical partitions then configured back online. This message is issued because the I-files were not found on the OSA or the activation step (configure CHPID offline/online) did not complete. If you are using the GUI, the command output window will contain the name of the data set. If you are using the REXX interface, the data set name will be sent to the TSO screen.

User Response: The Image files (I-files) are installed as part of the OSA/SF SMP/E installation sequence. Ensure that the SMP/E install of OSA/SF completed successfully. Configure the OSA CHPID offline in all logical partitions (CF CHP(nn),OFFLINE) and then back online (CF CHP(nn),ONLINE). This loads the configured image file to the OSA. Then rerun the OSA mode Install sequence.

IOAx687E Incorrect Image type is specified for this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (pointed to by the IOACFG entry in the OSA/SF startup profile) for this OSA, contains an image that is not valid for this OSA.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA hardware (for example FDDI, Token Ring, ATM, or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Double check that the OSA/SF SMP/E install completed successfully. If message issued as the result of using the API, or the configuration data sets have been altered, check the API control blocks and/or correct alterations.

If problem continues, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx688E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the OSA/SF configuration data set contains an image that is not valid for this OSA-1 device type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA-1 hardware (for example FDDI, Token Ring, or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The OSA/SF configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on z/OS, z/OS.e, and OS/390" on page 43 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx689E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (IOACFG) contains an image that is not valid for this OSA-2 hardware type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA-2 hardware (for example Token Ring or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx690E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (IOACFG) contains an image that is not valid for this OSA-2 hardware type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA2-ATM hardware (for example Token Ring or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on z/OS, z/OS.e, and OS/390” on page 43 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx691E Unknown hardware model passed to install

Explanation: This is a internal OSA/SF error.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx692E Unable to read label for ssss

Explanation: In the process of an INSTALL/ACTIVATE command, OSA/SF is unable to read the label for the specified image file ssss. The possible cause could be a corrupted image file.

ssss = specified image file in the IOACFG

User Response: Report to IBM service.

IOAx693E Install for CHPID cc not complete. See message log for details

Explanation: The INSTALL sequence for this CHPID (OSA) did not complete successfully. See the message log for more information.

cc = CHPID

User Response: Read the message log. It may be necessary to do an ACTIVATE or INSTALL again.

IOAx694I Install for CHPID *nn* completed successfully

Explanation: The Install command was issued from either the GUI or REXX interface or from the operator Modify command. The installation operation was successful for OSA CHPID *nn*.

User Response: Continue with the installation process.

IOAx695I Install for CHPID *nn* started

Explanation: An install operation was issued from the operator Modify command. The installation process has successfully started.

User Response: Monitor the system and message log for additional messages that will state the success or failure of the installation. Processing continues.

IOAx696E Install for CHPID cc not complete. See command output for details

Explanation: The INSTALL sequence for this CHPID (OSA) did not complete successfully. See the command output window for more information if using GUI. If REXX, messages should be in user console that issued command.

cc = CHPID

User Response: Read the command output window. It may be necessary to do an ACTIVATE or INSTALL again.

IOAx697E Incorrect CHPID cc was specified

Explanation: Incorrect CHPID (OSA) was specified with modify command.

cc = CHPID - must be alphanumeric from 00 through FF

User Response: Correct the CHPID and retry the command

IOAx698E Busy installing CHPID cc. Retry command later

Explanation: OSA/SF is busy trying to install CHPID cc. This could be because OSA/SF is currently doing an install to another CHPID.

cc = CHPID - must be alphanumeric ranged from 00 through FF

User Response: Retry the command when the INSTALL for CHPID cc is complete.

IOAx699E Incorrect option specified for CHPID cc

Explanation: An incorrect option was entered with the modify command for an OSA install. Valid options are FORCE and NOFORCE. The default is NOFORCE.

NOFORCE installs the OSA mode only when an image does not already exist, or when the images are different.

FORCE installs the OSA mode regardless of any image already on the OSA feature.

Command Syntax: **F OSASF,INSTALL cc,FORCE** or **NOFORCE**

User Response: Retry the command with the correct option.

IOAx700E Incorrect parameter ssssss specified

Explanation: An incorrect parameter was specified with the modify command for an OSA install. The only valid command is INSTALL. The only required parameter is the CHPID number. Optional parameters are FORCE or NOFORCE. The default is NOFORCE.

The syntax is **F OSASF,INSTALL cc,FORCE**; where OSASF is the started task name, and cc is the CHPID (OSA).

User Response: Retry the command with the correct parameter or syntax.

IOAx701E An attempt was made to free a not valid internal region

Explanation: This is a internal OSA/SF error.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx702I Delete of unknown region at line *d* of *s*

Explanation: This is an internal OSA/SF error. OSA/SF will continue to run. An OSA/SF component attempted to free an internal storage area that was already free.

User Response: OSA/SF will continue to run, but please contact IBM service if this message is displayed.

IOAx751E START not entered as the first operator command

Explanation: The OSA/SF task was not started by a Start command. OSA/SF can not be started though JCL submission. OSA/SF initialization has terminated.

User Response: Start OSA/SF with a Start command. Batch job JCL submission or the use of the TSO SUBMIT command can not be used to start OSA/SF. OSA/SF must run as a started task.

IOAx752W ESTAE macro load failed with rc=*rrrrrrrr*

Explanation: Unable to execute ESTAE macro successfully. No OSA/SF recovery action will be taken upon any exception.

rrrrrrrr = return code from the ESTAE macro

User Response: Investigate the return code from the ESTAE macro found in *Programming: Authorized Assembler Services Reference, Volume 2, GC28-1476*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx756W IOASTADM load failed with rc=*rrrrrrrr*

Explanation: OSA/SF uses a recovery routine, IOASTADM, to handle errors. The recovery routine is LOADed when OSA/SF is started. OSA/SF was unable to load the OSA/SF recovery routine successfully. Therefore, no OSA/SF recovery action will take place for any exception conditions.

rrrrrrrr = return code from LOAD macro.

User Response: Investigate the return code from the LOAD macro found in *Programming: Authorized Assembler Services Reference, Volume 3, GC28-1477*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx776E OSA/SF Abend =*xxxx*/*yyyy*. Failing PSW=*pppp pppp*

Explanation: Host application OSA/SF has abended.

xxxx = abend code

yyyy = reason code

pppp pppp = PSW content at time of abend

User Response: Collect the dump dataset and restart OSA/SF. See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx801E Region service failed with RC=*rrrrrrrr*

Explanation: An internal error has occurred in an OSA/SF memory allocation service routine.

rrrrrrrr = return code for IBM diagnostic use

User Response: Additional storage resources are needed by OSA/SF. Check the OSA/SF region size and increase if required. Also check the system console for addition storage resource constraint messages. Free up system storage resource and retry the command that received this message.

If allocating additional storage for OSA/SF does not correct the situation, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx802E SCC name/token create failed with RC=*rrrrrrrr*

Explanation: Unable to create a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTCR

User Response: Check the IEANTCR return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx803E SCC name/token retrieve failed with RC=*rrrrrrrr*

Explanation: Unable to retrieve a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTRT

User Response: Check the IEANTRT return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx804I SCC name/token delete failed with rc=*rrrrrrrr*

Explanation: Unable to delete a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTDL

User Response: Check the IEANTDL return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx805E Register for ENF online event failed with rc=*rrrrrrrr*

Explanation: OSA/SF attempted to register with the Event Notification Facility for an online event. The register attempt failed.

rrrrrrrr = return code from ENF register attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx806E Register for ENF offline event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to register with the Event Notification Facility for an offline event. The register attempt failed.

rrrrrrrr = return code from ENF register attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx807I Delete of ENF online event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to delete (unregister) with the Event Notification Facility for an online event. The delete attempt failed.

rrrrrrrr = return code from ENF delete attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx808I Delete of ENF offline event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to delete (unregister) with the Event Notification Facility for an offline event. The delete attempt failed.

rrrrrrrr = return code from ENF delete attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx809E Load of ENF listen module failed with RC=*rrrrrrrr*

Explanation: Unable to load the ENF (Event Notification Facility) event handler.

rrrrrrrr = return code from LOAD macro

User Response: Investigate the return code from the LOAD macro found in *Programming: Authorized Assembler Services Reference, Volume 3, GC28-1477*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx820I CHPID *cc* is no longer managed by this partition

Explanation: The OSAD device number with unit address X'FE' was varied offline, so OSA CHPID *cc* cannot be managed by OSA/SF in this partition.

cc = CHPID

User Response: No user action is needed if the OSAD device was knowingly varied offline to the system. Vary the OSAD device back online to the system. Message IOAx821I should then follow.

IOAx821I CHPID *cc* is now managed by this partition

Explanation: The OSAD device for the CHPID was varied online and is now being managed by the OSA/SF in this partition.

cc = CHPID

User Response: When an OSAD device comes online to the system, OSA/SF will assume management control of the CHPID (if no other OSA/SF is currently managing the OSA). This informational message notifies the user; no user action is required.

IOAx822E ENF exit routine initialization failed with RC=*x*

Explanation: The Event Notification Facility routine for OSA/SF has failed to initialize. OSA/SF will continue to start up but there will be no automatic CHPID online notification.

User Response: See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx823E GETMAIN failed with rc = *dddd.*

Explanation: Unable to allocate storage successfully. Failing return code is indicated by *dddd.*

dddd = GETMAIN return code

User Response: Investigate the return code from the GETMAIN macro found in *Programming: Authorized Assembler Services Reference, Volume 2, GC28-1476*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx824E BLDL macro failed with rc = *dddd*.

Explanation: Unable to execute BLDL macro successfully. Failing return code is indicated by *dddd*.

dddd = BLDL return code

User Response: Investigate the return code from the BLDL macro found in *Programming: Authorized Assembler Services Reference, Volume 1, number GC28-1475*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 213.

IOAx861E Specified PVC name *ssssssss* is not valid for ATM IP forwarding mode

Explanation: When running in ATM IP Forwarding mode, only PVC name WANPVC00 is allowed.

User Response: Correct the PVC name in the input and retry the command.

IOAx862E Only one PVC is allowed when configuring ATM IP forwarding mode

Explanation: You specified more than one (1) PVC entry while configuring ATM IP forwarding.

User Response: Fix the input file (GUI or REXX) and retry command.

IOAx863E More than *n* passthru entries with IP addresses specified for port *p*

Explanation: There are more than *n* TCP/IP entries with IP addresses defined in the OAT, where *n* is the limit for the CHPID type. You can only define a maximum of *n* IP addresses per port.

User Response: Define only a maximum of *n* OAT entries with IP addresses for the specified port. See "Guidelines for Changing an OAT" on page 242 for information on limitations.

IOAx864E Primary default entry not removed; secondary (LP *p* UA *uu*) exists

Explanation: A port can have one of the following:

- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry

This OAT entry was previously defined as the primary default entry for the associated port. Replacing this entry would cause the port to have a secondary default entry without a primary default entry. This is not valid. The secondary default entry currently defined has unit address *uu* for logical partition *p*.

p = logical partition (LP) number
uu = unit address

User Response: Specify a replacement primary default entry or remove both the primary and secondary default entry.

IOAx865E Multi IP addresses not supported by OSA processor code level *x.yy*

Explanation: The multiple IP addresses protocol is not supported by the OSA processor code level *x.yy*. The minimum OSA processor code that supports this enhancement is as follows:

OSA2–6.2x
OSA2–ATM–5.9

OSA2–FENET–1.3

User Response: Obtain the specified or higher level of OSA processor code and reissue the Put OAT command.

IOAx866E Secondary default entry (LP *p* UA *uu*) specified without a primary

Explanation: A secondary default entry was specified without a primary default entry being on the port.

User Response: Add a primary default entry to the input and reissue the Put OAT command.

IOAx867E Get configuration command not valid for new ATM CHPID *cc*

Explanation: A new ATM CHPID does not contain a configuration. This command will therefore not work correctly until the CHPID has been configured once.

User Response: Use either the GUI configuration panels or the IOAATM2 SAMPLE file to configure this CHPID. Once you have configured the ATM CHPID using either of these methods, this command will return valid data.

IOAx868E Duplicate IP addresses found for LP *n* UA *uu*

Explanation: The specified OAT entry for logical partition *p* unit address *uu* has multiple IP addresses and more than one IP address was found to have the same value.

User Response: Fix the data being used for the PUT OAT command. Reissue the PUT OAT or Install command, whichever was used.

IOAx869E Data not consistent for LP *p* UA *uu* & LP *p* UA *vv* (Group of 2)

Explanation: OAT entries LP *p* UA *uu* and LP *p* UA *vv* combine to make one valid OAT entry with a group size of 2. The settable data for both entries (if specified in the input) must match.

p = logical partition (LP) number
uu = unit address(even)
vv = unit address(odd)

For Passthru Type, check
port number
IP address(es)
NetMask(s) if applicable

For HPDT MPC Type
port number
OSA name

User Response: Fix the data being used for the OAT input. Reissue the Put OAT or Install command, whichever was used.

IOAx870E Entry type *dd* is not supported for CHPID *cc*

Explanation: The specified device type *dd* is not supported on this OSA platform/configuration.

Where *dd* can be:
MPC
Passthru
SNA
SNA Network Management

User Response: Fix the data being used for the OAT input. Reissue the Put OAT or Install command, whichever was used.

IOAx871E PVC name *ssss* already used by another PVC entry in the input

Explanation: The PVC name specified *ssss* is already used by another PVC entry in the input.

User Response: Choose another PVC name for this entry or remove this PVC entry.

IOAx872E Entry type *dd* is not supported in *ssss* mode for CHPID *cc*

Explanation: The specified entry type ssss is not supported when the OSA is configured in mmmm mode.

Where *ssss* can be:
Passthru
SNA
SNA Network Management

Where *mmmm* can be:
HPDT Native
ATM(LE)

User Response: Fix the data being used for the Put OAT command. Only MPC entry types are valid when the OSA is in HPDT Native mode. Only passthru and SNA entry types are valid in ATM (LE) mode.

IOAx873I CHPID *cc* port *pp* default entry is LP *nn* UA *uu*

Explanation: All unknown IP packets received by port *pp* in CHPID (OSA) *cc* will be forwarded to LP *nn* UA *uu* per default OAT entry (or TCP/IP definitions for Gigabit Ethernet). This situation can occur under these conditions:

You reset the specified CHPID, and either the primary or secondary default OAT entry is now active.
No primary or secondary default OAT entry was originally defined, but now you have defined one and activated the new configuration.
Both primary and secondary default OAT entries were defined. Because of either an overt action on your part or because of an error on the primary,

unknown packets are now being forwarded to LP n UA uu as defined for the secondary default.

Where
cc = CHPID number
pp = port number
nn = Logical partition number
uu = unit address number

The specified port on the CHPID (OSA) was previously identified as the default entry for forwarding IP packets and is no longer forwarding the packets.

This message is only displayed on the LP where OSA/SF is running and where the CHPID is managed. The secondary LP does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other LP, manages the CHPID.

User Response: No action is necessary if you want unknown IP packets to be forwarded to the LP/UA specified in the message text. If you do not want unknown packets forwarded to this LP/UA combination, do the following:

- Check that the OAT entries you specified as being the primary or secondary default OAT entries are on the CHPID.
- After this check, if you determine it is not what you want, remove the default OAT entry indicator from this LP/UA OAT entry.
- After this check, if the LP/UA specified is for the secondary default OAT entry and you want unknown packets going to the primary default OAT entry, then verify that TCP/IP is active on this combination. This may require problem determination as to why the primary default originally failed.

IOAx874W CHPID *cc* port *pp* is no longer forwarding unknown packets

Explanation: The specified port on the CHPID (OSA) was previously identified as the default entry for forwarding IP packets and is no longer forwarding the packets.

Where
cc = CHPID number
pp = port number

User Response: This message may require you to take action.

If there was a primary or secondary default OAT entry on the specified CHPID/port forwarding unknown packets, one or both of these entries are no longer available.

Check that TCP/IP is active on the specified LP/UA designated as the primary and/or secondary default OAT entry.

This message is only displayed on the LP where OSA/SF is running and where the CHPID is managed. The secondary LP does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other LP, manages the CHPID.

IOAx875E Empty Application Dump area for CHPID *cc*

Explanation: The CHPID you issued the GET_DEBUG command to does not have an active SNA application. For OSA2-ATM, there can be two application segments, one for the SNA application and one for the ATM application.

This message can be issued if:
The OSA2-ATM CHPID is not configured for any mode.
The OSA2-ATM CHPID is configured in HPDT ATM Native or IP forwarding mode. In either of these modes, the SNA application is not active.

User Response: To configure the OSA mode, refer to Chapter 8, “Configuring OSA-Express Modes” on page 149.

IOAx876E Incorrect data returned from CHPID *cc*

Explanation: The data returned from CHPID cc is not valid. This is an internal error probably in the OSA firmware.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx877E An internal OSA/SF error occurred. Reason code *cccc*

Explanation: An internal OSA/SF error occurred. The reason code is used by IBM to determine where the failure occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx878E Port state on CHPID *c* Port *p* is not valid

Explanation: The specified port has indicated an unarchitected state to OSA/SF.

User Response: Change the LAN Traffic state to disabled and back to enabled (for OSA-2, disable and enable the Hardware State). See “Enabling and Disabling Ports” on page 191.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOAx879E Unable to enable physical port associated with port *pppp*

Explanation: This message is generated when you attempt to enable a physical port and an error occurs enabling the associated physical port.

User Response: Follow local procedures for enabling port.

IOAx880E Target port *pp* **is not in current configuration for CHPID** *cc***.**

Explanation: This message is returned whenever you issue a command against a specific port type that is not configured on the OSA feature.

User Response: Determine desired action (either reconfigure the card or issue the correct parm ID for the currently configured type) and reissue command.

IOAx881E LP *n* **UA** *nnn* **had an OSA OAT reject code of** *xxxx*

Explanation: The LP/UA combination indicated had an error described by the reject code *xxxx*. See "OSA Reject Codes" on page 338 for an explanation of the reject codes.

User Response: Fix the problem as described in "OSA Reject Codes" on page 338 and try again.

IOAx882I Action complete. Configure CHPID *cc* **off/on to activate the changes**

Explanation: The action you started is complete. Configure the CHPID offline in all logical partitions and then online to activate the change.

User Response: None.

IOAx883E *"***SSAP** *nn***, DSAP** *nn***, DMAC** *nn"*

Explanation: This message contains the information that could not fit into message IOAx312I.

User Response: Same as IOAx312I.

IOAx884E *ttttttt sssssss* **alert received for CHPID** *cc* **port** *p*

Explanation: An ATM alert was received from the CHPID and port referenced in the message. The alert can be one of the following:

Mismatched frame size

Operation and Maintenance (OAM) loopback timeout

Mismatched ELAN type

Message IOAC885I contains more information on this alert.

User Response: Fix the cause of the problem and continue.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOAx885I Expected *ssssssss* **was** *rrrrrrrr*

Explanation: This is information assocated with message IOAC884E. *ssssssss* will be one of the following:

Frame size

LAN emulation type

The information in *rrrrrrrr* depends on which of the above appears in the message.

For frame size it can be one of:

1516

4544

9234

18190

For LAN emulation type it can be:

Ethernet

Token Ring

User Response: Make the necessary changes and rerun the operation.

IOAx886I *ttttttt sssssssss* **alert received for CHPID** *cc* **port** *p*

Explanation: An ATM alert indicating OAM loopback established has been received from the OSA. This is an informational message only.

User Response: None.

IOAx887W LP *x* **UA** *y* **is not defined in the Channel Subsystem**

Explanation: The specified OAT entry is defined in the configuration but not defined in the Channel Subsystem. The OSA can only flow traffic if the LP/UA combination is defined in both the Channel Subsystem and in the OAT.

User Response: Define the devices in the Channel Subsystem and retry the process.

IOAx888I *sssssssss* **for CHPID** *dddd*

Explanation: The command completed before the port completely entered the enabled or disabled state.

sssssssss = Port is in enabling state or Port is in disabling state

dddd = OSAD CHPID

User Response: Issue the Query command from IOACMD or refresh the GUI and check the LAN traffic enabled field to determine the state of the port.

IOAx889E Logical port *pp* is in use by LP *nn* UA *xxxx*

Explanation: A command was issued to disable the port, but one or more devices associated with this port are in use.

pp = Port ID

nn = Logical Partition

aaaa = Unit Address

User Response: Stop the programs that are using the devices. Retry the command.

IOAx890E Configuration parameter *aaaa* not supported for CHPID *cc*

Explanation: The parameter specified in the message is not valid for this hardware model.

User Response: Correct your configuration file and reissue the command.

IOAx891W Port type *pppp* not supported on OSD CHPID *cccc* port *nn*

Explanation: This message is presented when the port type received from the OSA is not supported on this CHPID type. This situation will occur if the target OSA CHPID was dynamically changed from one CHPID type to another and the CHPID has not been reconfigured.

Message variables are:

pppp is port type of **HPDT ATM Native** or **Emulated Token Ring**

cccc is target CHPID number

nn is target port number

User Response: Issue the REXX Configure OSA CHPID or the GUI activate command for the target CHPID.

IOAx892W The port type of CHPID *cccc* is not supported by this version of OSA/SF

Explanation: OSA/SF detected an OSA CHPID whose port type could not be determined. This is probably due to a newly available CHPID type, which your version of OSA/SF does not support.

User Response: Upgrade to the latest level of OSA/SF.

IOAx893E CHPID *cccc* port *pp* reports excessive port state changes

Explanation: CHPID *cccc* has most likely experienced a hardware error which is causing port *pp* to move repeatedly from the enabled state to the disabled state. After this error is reported, all other port state change messages will be suppressed for 30 minutes. At that time, if the condition still persists, additional port state change messages will be presented, followed again by this message. This pattern will continue until the port is disabled externally or the hardware condition is corrected.

User Response: Disable the port or find the cause of the hardware error.

IOAK894E Data length mismatch on CHPID xx. Please retry command.

Explanation: This error occurs when two users issue the command to query extended multicast or IP address information at the same time.

User Response: Retry the command and verify correct completion.

IOAx951W Not valid or closed pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx952W Failed to open pipe communications

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx953E Failed to drain pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAx954E Pipe full

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAC955W Unknown error while writing to pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 213.

IOAC956E Pipe communication error *dd*

Explanation: An internal communication error occurred within OSA/SF.

User Response: Stop and restart the Attention Server (IOANMAIN). If the problem persists, contact the IBM support center.

IOAx998S *sssssssssssssss*

Explanation: This message is presented when OSA/SF has system error information to communicate. The message is only presented in the OSA/SF message log.

sssssssssssssss is the text of the message.

User Response: Take appropriate steps based on the text of the message..

IOAx999I Configuration mode for CHPID*cc* **is** *mmmmmmmm*

Explanation: This is an informational message to indicate what configuration mode the specified CHPID is running with.

mmmmmmmm is one of the following or a valid combination of the following.

HPDT MPC
HPDT ATM
ATM(LE)
TCP/IP Passthru
SNA
LANRES

User Response: None.

IOB000I Starting OSA SNMP subagent

Explanation: The OSA Direct SNMP subagent has been started and is going through initialization

User Response: None.

IOB001I OSA Subagent: Using loopback to connect to agent

Explanation: The OSA subagent is using the local address LOOPBACK to connect to. This was done since a host address was not supplied on the invocation.

User Response: None

IOB002I Could not obtain handle from agent. Retrying

Explanation: During initialization, the subagent needs to connect to the SNMP agent to process any commands. The connection could not be established.

User Response: Check the following:

1. The SNMP agent (normally OSNMPD) is running
2. The correct port is being specified on invocation
3. The correct stack is being specified on invocation

IOB003E Need community name

Explanation: The OSA subagent was started without a valid community name.

User Response: When the OSA subagent was started, the -c option was used, but there was no corresponding name specified, -OR- the parameter specified was not valid.

IOB004E Need stack name

Explanation: The OSA subagent was started with the -s option, but no stack name was supplied.

User Response: Specify a valid stack name when starting the OSA subagent with the -s parameter.

IOB005E Need port number

Explanation: The OSA subagent was started with the -p option but a valid port number was not specified.

User Response: Provide a valid port number when starting the OSA subagent if you specify the -p option.

IOB006E Need debug level

Explanation: The OSA subagent was started with the -d option, but a valid value was not entered

User Response: Enter a valid debug level (0 or higher) when starting the OSA subagent with the -d option

IOB007E DPI rc received from Agent --> n. Exiting

Explanation: The OSA Subagent received the indicated rc from the SNMP agent. This rc was not expected and indicates that the subagent cannot continue processing.

User Response: Check the output job to see if any errors that can be corrected are noted. If not, check the SNMP agent, normally started as OSNMPD, which may indicate the cause of the unexpected rc.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOB008E Received NULL hdr from Agent. Exiting

Explanation: The OSA subagent received a NULL response from the SNMP Agent. It was expecting a command or response.

User Response: Re-start the OSA subagent and retry the command.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOB009E Unexpected DPI packet type nn

Explanation: The OSA subagent received a request from the Agent that it did not understand. The value received was 'n'.

User Response: Re-start the OSA subagent and retry the command.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOB010E Bad RC X received from OSA on ssss

Explanation: The OSA returned a request with a non-zero return code of X. The OSA in question is device ssss.

User Response: None.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOB011E The input OID matches one already in the list

Explanation: The OID received from an OSA init request is already in the list maintained by the OSA subagent.

User Response: Re-start the OSA subagent.

IOB012E Could not allocate storage for interface nn

Explanation: The OSA subagent attempted to allocate memory to communicate with interface nn and it could not be obtained.

User Response: Check your system resources to make sure there is enough free memory for the OSA subagent job. Re-starting the subagent may alleviate the problem.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOB014E hdr_p->error_code not DPI_noError for unregister

Explanation: The OSA subagent did not receive a successful return code when it attempted to unregister an OID with the SNMP Agent.

User Response: Re-start the OSA subagent

IOB015E Could not open connection to agent

Explanation: The OSA subagent attempted to start communications with the SNMP agent and it failed.

User Response: Check that the SNMP agent is running and is not issuing error messages. Check that the SNMP Agent and the OSA subagent are being started with the same port number if you are using the -p option.

IOB016E Could not send open packet to agent

Explanation: The OSA subagent was not able to send an open packet request to the SNMP Agent.

User Response: Make sure the SNMP Agent is running and has not indicated any errors. Make sure the port used for the SNMP Agent and the OSA subagent are the same if using the -p option.

IOB017E Did not receive answer from agent

Explanation: The OSA subagent expected a response from the SNMP Agent and it never arrived.

User Response: Check that the SNMP Agent is still running and has not reported any errors. Re-start the OSA subagent.

IOB018E Received NULL hdr from Agent. Exiting

Explanation: The OSA subagent received a NULL response from the SNMP Agent. It was expecting a command or response.

User Response: Re-start the OSA subagent and retry the command.

See "Reporting OSA/SF Problems to IBM" on page 213.

IOB019E Did not receive SNMP response from agent

Explanation: The OSA subagent expected a response from the SNMP Agent and it never arrived.

User Response: Make sure the SNMP Agent is up and running and has not reported any errors. Re-start the OSA subagent.

IOB020E OSA SNMP Subagent: Internal error XX

Explanation: The OSA SNMP subagent had an internal error that prevents it from functioning.

User Response: Re-start OSA subagent.

IOB021I OSA SNMP Subagent initialization complete

Explanation: The OSA SNMP subagent is now ready to accept requests from the SNMP Agent.

User Response: None

IOB022E OSA SNMP Subagent: duplicate subagent identifier error

Explanation: The OSA Subagent attempted to connect to the SNMP Agent. It got back an error indicating a duplicate subagent identifier. Check for errors from the SNMP Agent

User Response: Try re-starting the SNMP Agent, then

re-starting the OSA subagent.

IOB023I Using default stack name ssss in INET environment

Explanation: The OSA subagent was able to connect to stack ssss in an INET environment.

User Response: None

IOB024E Could not establish affinity with ssss

Explanation: The OSA subagent attempted to establish affinity to stack ssss and it could not be completed successfully.

User Response: Make sure the stack name specified is correct. Make sure the stack is up and functioning.

IOB025E Exiting due to bad RC from last function

Explanation: The OSA subagent tried to send a message to the SNMP Agent and got back a return code it did not understand or expect.

User Response: None.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOB026E Could not initialize list

Explanation: The OSA Subagent could not initialize its internal lists.

User Response: Check that there is enough memory available for the OSA subagent. Make sure there are no system problems preventing storage allocation.

See “Reporting OSA/SF Problems to IBM” on page 213.

IOB027E Debug level specified must be greater than 0

Explanation: The -d option was entered when the OSA subagent was invoked, but the value received was less than 0. Valid values are 0 or higher.

User Response: Re-start the OSA subagent with a proper debug value.

IOB028E Using stack name ssss

Explanation: The OSA subagent is connected to stack ssss.

User Response: None. If you are having trouble getting data from the OSA subagent, check this stack name vs. the one you are trying to get data for and make sure they are the same.

IOB029E Could not obtain memory

Explanation: The OSA subagent attempted to allocate memory and there was none available.

User Response: Check that there are enough resources available for the OSA subagent to allocate memory.

See “Reporting OSA/SF Problems to IBM” on page 213.

OSA Reject Codes

Any of the following OSA return codes can be included in a message displayed by host programs other than OSA/SF. The message description for the other application directs you to this section.

E003 An invalid LAN type was detected. Ensure that the LAN type defined in your configuration matches the actual LAN type being used.

E004 An invalid LAN number was detected. Check the LAN port number specified in your setup.

E005 An IP address was received by the OSA port that duplicates an IP address already in use by another MPC (HPDT MPC mode) or LCS (TCP/IP Passthru mode) session attached to the port.

Change one of the IP addresses.

Refer to the issuing message documentation for information on any other appropriate action to take.

E006 The IP address table is full. Remove some of your TCP/IP addresses.

E010 The primary default LP has already been defined.

E00A An IP address was received by the OSA port that duplicates an IP address being used by another IP connection in the IP network. Change one of the IP addresses in the network.

E00B Invalid frame type detected. Check that the frame type specified in your setup is correct.

E00C Unsupported LAN type.

E080 A LAN connection could not be made, possibly for one of the following reasons:

- The cable may not be present
- The LAN may not be functioning
- The port may have been disabled from the Support Element (SE) of the server

Fix the error as explained above. Then, depending on the error, restart the device or restart TCP/IP.

The following return codes indicate internal errors and should be reported to IBM:

E001 or E100

The communication to the OSA port cannot be successfully started. This is most likely due to an error in the LINK statement defined in TCP/IP (for example, the port number or the LAN type specified is not correct) or the state of the OSA port cannot support traffic at this time.

If the failure is due to a misconfiguration in the LINK statement, correct the error and start the device again. If the error is due to something else, investigate the state of the specific port to make sure that it is enabled and operational, and then reissue the command. If neither of these options resolves the problem, report the problem to IBM.

E002 Invalid MTU size was detected.

E007 A LAN port state error was detected.

E008 A start LAN command was not received.

E009 The Set IP command was already received.

E012 Invalid Set Routing indicator.

E00D Invalid IP version specified.

E00E Unsupported ARP assist command received.

The following return codes are provided by OSA/SF:

0 Indicates that the command completed successfully.

4 Indicates the command completed and any data that is returned is valid. However, a warning message is issued.

8 The command failed. Any data that is returned is not valid. A message with an E-severity level is issued.

12 The command failed. No data is returned. A message with an S-severity level is issued.

Part 3. Appendixes

Appendix A. Physical Connection Information

Physical Ports and LEDs

Each OSA-Express feature has two physical ports for cable connection. The cable type varies with the feature type.There are two sets of LEDs for each physical port. One set indicates OSA status, the other indicates status of the PCI bus, through which the OSA communicates with the network. The number of PCI LEDs depends on the OSA-Express feature type. Figure 117 show the relative positions of the physical ports and LEDs on the OSA-Express features. Table 11 on page 344 and Table 12 on page 344 explain how to read the LEDs.

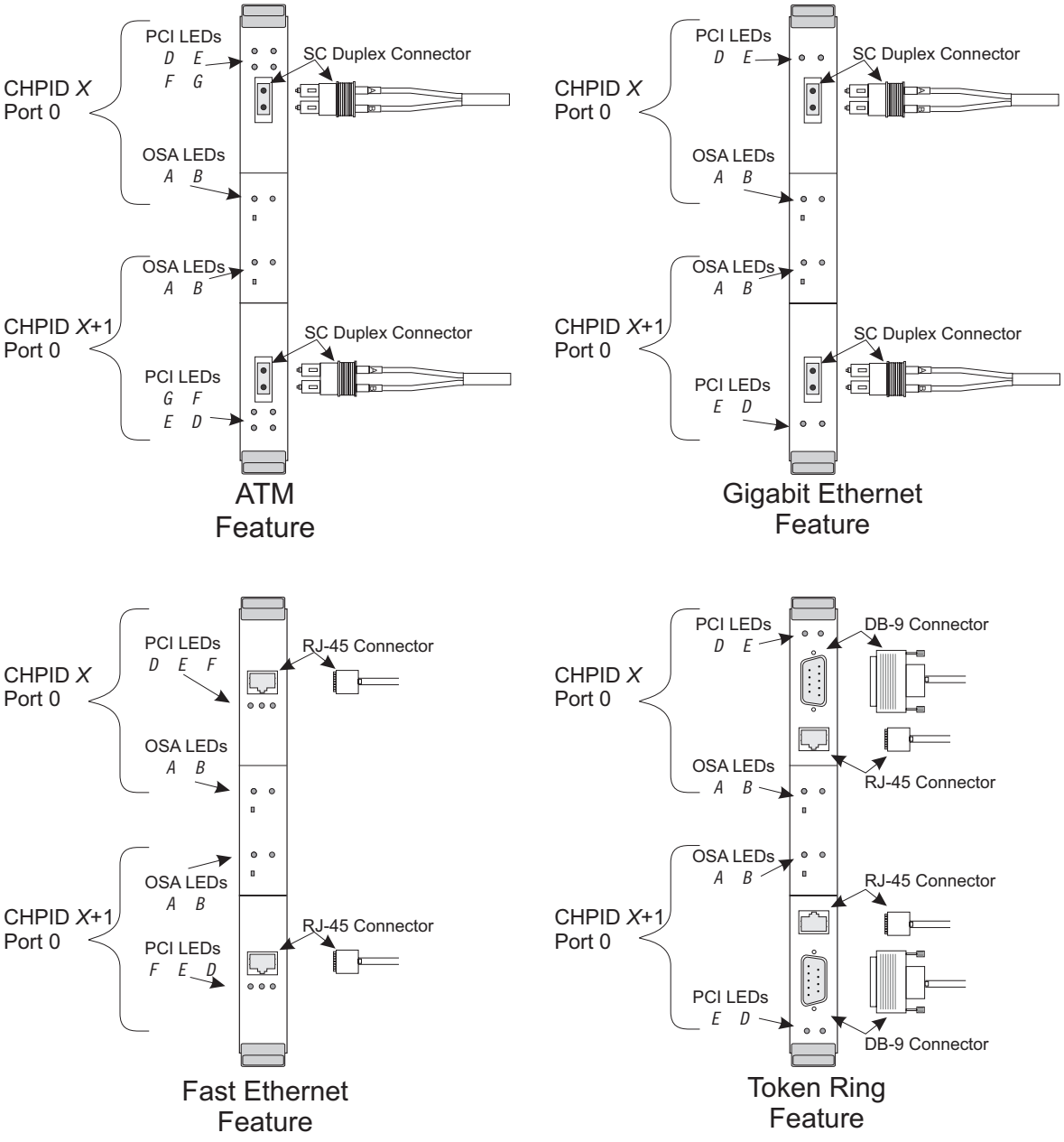


Figure 117. OSA-Express Connections and LEDs

When determining status from the PCI LEDs it is important to note that the port 1 (bottom) set of LEDs (labeled D through G) is reversed due to the way the PCI card is mounted on the OSA-Express feature. The OSA LEDs (A and B) are read the same way for both ports.

Each physical port has two OSA LEDs, one green and one amber, indicating status as follows:

Table 11. OSA LEDs

LED A Test Complete (Green)	**LED B Not Operational (Amber)**	**OSA Status**
Off	Off	No power to the OSA feature, or processor is in a loop
Off	Blinking	Power-on self tests running
Blinking	Off	Tests complete, CHPID online
Blinking	On	Hardware error detected
On	Blinking	Invalid indication

Any LED combination in which neither A nor B is flashing (both on, both off, or one on and one off) indicates that the OSA-Express feature is powered off or that the processor on the feature is in a loop.

Depending on which OSA-Express feature is installed, up to four additional LEDs may be found for each physical port on the bezel. These indicate PCI bus status.

Table 12. PCI LEDs - Number of LEDs differs by OSA-Express Feature

Feature	D (Amber)	E (Green)	F (Amber)	G (Green)
GbE	ON = Transmitting or receiving	ON=Port Active	Unused	Unused
FENET	ON = Transmitting or receiving	ON = 100Mb/ps OFF = 10Mb/ps	ON=Full duplex OFF=half duplex	Unused
ATM	ON = Initialization complete	ON=Active Link	ON=Registered with switch	Unused

Table 13. PCI LEDs on Token Ring Feature

D (Amber)	E (Green)	Meaning
On	On	Adapter reset — only on until microcode runs
Off	On	Diagnostics failed; adapter check; fatal error
On	Off	Adapter open; adapter OK
Off	Off	No power, initilaization in progress
Blinking	On	Not used
Blinking	Off	Awaiting open; adapter OK
On	Blinking	Beaconing; hard error
Off	Blinking	Wire fault; auto removal; open failed
Blinking	Blinking	Awaiting initialization; Diagnostics not yet started

Fiber Optic Cabling

OSA-Express cabling must follow the standards for the LAN type being installed and must have physical connections as follows:

Gigabit Ethernet (1Gbps) SX
uses duplex SC connector for multi-mode fiber

Gigabit Ethernet (1Gbps) LX
uses duplex SC connector for MM or SM fiber

ATM (155Mbps) SM
uses 568SC duplex SC connector (single mode fiber)

ATM (155Mbps) MM
uses 568SC duplex SC connector (multi-mode fiber)

Fiber Optic Attachment Options For Gigabit Ethernet

The following table lists maximum unrepeated distance and link budget for Gigabit Ethernet fiber links. Longer distances are possible using repeaters, switches, or channel extenders.

Note: The OSA-Express Gigabit SX and LX features cannot communicate directly, regardless of mode conditioning or cable length, because their receivers are tuned for different wavelengths.

Fiber	Connector	Bit Rate	Fiber Bandwidth	Maximum Distance	Link Loss
MM* 62.5 micron 1000BaseSX	SC duplex	1.25 Gb/s	160 MHz-km 200 MHz-km	220 meters 275 meters	2.6dB*
MM* 50.0 micron 1000BaseSX	SC duplex	1.25 Gb/s	500 MHz-km*	550 meters	3.6 dB*
SM 1000BaseLX	SC Duplex	1.25 Gb/s	N/A	5 Km	4.6dB
MM w/MCP ** 62.5 micron 1000BaseLX	SC duplex	1.25 Gb/s	500 MHz-km	550 meters	2.4dB
MM w/MCP ** 50.0 micron 1000BaseLX	SC duplex	1.25 Gb/s	500 MHz-km	550 meters	2.4dB

Notes:

1. Minimum fiber bandwidth requirement to achieve the distances listed is applicable for multimode (MM) fiber only. There is no minimum bandwidth requirement for single mode (SM) fiber.
2. Bit rates given below may not correspond to effective channel data rate in a given application due to protocol overheads and other factors.
3. SC duplex connectors are keyed per the NCITS Fiber Channel Standard specifications.
4. MCP denotes mode conditioning patch cable, which is required to operate some links over MM fiber.
5. As light signals traverse a fiber optic cable, the signal loses some of its strength (decibels (dB) is the metric used to measure light loss). The significant factors

that contribute to light loss are: the length of the fiber, the number of splices, and the number of connections. All links are rated for a maximum light loss budget (i.e., the sum of the applicable light loss budget factors must be less than the maximum light loss budget) and a maximum distance (i.e., exceeding the maximum distance will cause undetectable data integrity exposures). Another factor that limits distance is jitter, but this is typically not a problem at these distances.

6. Unless noted, all links are long wavelength (1300 nm) and the link loss budgets and fiber bandwidths should be measured at this wavelength. For planning purposes, the following worst-case values can be used to estimate the total fiber link loss. Refer to the references listed and contact the fiber vendor, if possible, for specific values that may be different for your configuration:

   Link loss at 1300 nm
   = 0.50 db/Km

   Link loss per splice
   = 0.15 db/splice (not dependent on wavelength)

   Link loss per connection
   = 0.50 db/connection (not dependent on wavelength)
7. Deviations from these specifications (longer distances or link budgets) may be possible. They are evaluated on an individual basis by submitting a Request for Price Quote (RPQ) to IBM.
8. * Indicates channels which use short wavelength (850 nm) optics; all link budgets and fiber bandwidths should be measured at this wavelength.
9. ** A Mode Conditioning Patch cable is required for an LX card in a multimode fiber environment.

Connecting a Singlemode OSA-Express Gigabit Ethernet Feature to a Multimode Cable

This section contains instructions for the following IBM Mode Conditioning Patch Cable (MCP) kits:

- 50 micron: PN 21L4172, PN 21L4174
- 62.5 micron: PN21L4173, 21L4175

DO NOT MIX DIFFERENT TYPES OF MULTIMODE FIBER IN THE SAME LINK.

These adapter kits allow the interconnection of a single adapter card used on FICON, Gigabit Ethernet, and other channel types with multimode fiber optic cable. The purpose of these kits is to allow customers to continue using their existing 50 micron or 62.5 micron multimode fiber optic cable at reduced distances with singlemode link adapter cards. There are four versions of these kits; all of the kits are terminated with an SC Duplex connector which plugs into the adapter card, and different female adapter types which attach to the cable plant:

- 50 Micron:
  - PN 21L4172: Terminated with an SC duplex coupler
  - PN 21L4174: Terminated with an ESCON coupler
- 62.5 micron:
  - PN 21L4173: Terminated with an SC duplex coupler
  - PN 21L4175: Terminated with an ESCON coupler

The kits contain the following assembled parts ready to use, plus this instruction page:

- PN 21L4172 MCP kit for attachment to 50 micron SC Duplex cables
  - PN 21L4169 2 meter mode conditioning patch cable
  - PN 54G3381 IBM multimode duplex ST to SC adapter
- PN 21L4174 MCP kit for attachment to 50 micron ESCON cables
  - PN 21L4169 2 meter mode conditioning patch cable
  - PN 73F5419 IBM multimode duplex ST to ESCON adapter
- PN 21L4173 MCP kit for attachment to 62.5 micron SC Duplex cables
  - PN 21L4168 2 meter mode conditioning patch cable
  - PN 54G3381 IBM multimode duplex ST to SC adapter
- PN 21L4175 MCP kit for attachment to 62.5 micron ESCON cables
  - PN 21L4168 2 meter mode conditioning patch cable
  - PN 73F5419 IBM multimode duplex ST to ESCON adapter

The mode conditioning patch cable assembly contains a combination of singlemode and multimode fiber, signified by the yellow and orange cable jackets respectively, and a small box located just behind the SC duplex connector which contains the mode conditioning apparatus. The ST connectors on the mode conditioning patch cables (21L4169) are assembled to the corresponding ″A″ and ″B″ ST ports on the ST-ESCON adapter (73F5419) or the ST-SC adapter (54G3381). **IT IS NOT NECESSARY TO SEPARATE THESE TWO CONNECTIONS IN ORDER TO USE THE ADAPTER KIT.**

To use the adapter kit simply insert the kit between a singlemode optical transceiver receptacle and a multimode cable on both ends of a link. Two kits are required for each duplex link, one at either end. When these kits are used with multimode fiber, the maximum available link distance and link budget will be less than if singlemode fiber had been used. For example, a singlemode FICON link supports a maximum distance of 10 km with a 7 dB link budget; a multimode FICON link using these kits supports a maximum distance of 550 meters with a 5 dB link loss. Be sure to verify that the application you are using supports MCPs at the appropriate distance and link budgets. Maintenance and optical power measurement on links using this adapter kit are described in *Maintenance Information for S/390 Fiber Optic Links*, SY27-2597.

RJ-45 Cabling for FENET

The OSA-Express FENET feature attaches the zSeries via an appropriate Ethernet hub, router, or switch to either a 100 Mbps or 10 Mbps Ethernet LAN and operates in either half- or full-duplex mode. A FENET OSA-Express supports auto-negotiation with its attached Ethernet hub, router, or switch.

Attach an OSA-Express FENET feature using an EIA/TIA category 5 unshielded twisted pair (UTP) cable that does not exceed 100 m (328 ft). Attach the FENET OSA-Express RJ-45 connector to an Ethernet hub, router, or switch that is appropriate for the LAN speed.

Cabling for Token Ring

Attach the OSA-Express TR feature using an EIA/TIA category 5 unshielded twisted pair (UTP) cable that does not exceed 100 m (328 ft), or a shielded twisted pair (STP) cable with DB-9 D Shell connector. Attach the OSA-Express to an Ethernet hub, router, or switch that is appropriate for the LAN speed.

Autosensing the LAN speed: At initialization, the OSA-Express Token Ring feature autosenses and conforms to the speed of the token ring (4 Mbps, 16 Mbps, or 100 Mbps) and whether communications are in full- or half-duplex. If no carrier is sensed on the ring, the OSA enters the ring at the speed of its last successful entry.

For half-duplex communications:

- Attach the port to a half duplex 4 Mbps, 16 Mbps, or 100Mbps token ring LAN that conforms to the IEEE 802.5 (ISO/IEC 8802.5) standard.
- Between logical partitions (LP-to-LP data transfer) on the same CPC, either attach this connector to a LAN or cover it with a wrap plug.

  For LP-to-LP communications, the port must be defined to both logical partitions. Port-sharing must be defined for the OSA mode, which is to say access to the port must be defined through OSA/SF to be shared between the two LPs in this mode.

For full-duplex communications:

- Attach the port via a full-duplex switch, such as the 8270 NWays Token Ring switch, to a 4 Mbps, 16 Mbps, or 100Mbps token ring LAN that conforms to the IEEE 802.5 (ISO/IEC 8802.5) standard.
- LP-to-LP communications are not supported.
- Set the switch for full duplex communications. Do not set the ENTR OSA-2 port because it autosenses as stated above.

Cabling: Installation-dependent factors determine the cabling requirements for the token ring RJ-45 connector to the customer's token ring Multistation Access Unit (MAU or MSAU). The RJ-45 connector supports either a standard shielded twisted pair (STP) cable or an unshielded twisted pair (UTP) cable. For more information on these cables, refer to *Token Ring Network Introduction and Planning Guide,* which is listed in the bibliography (page xviii).

To attach the RJ-45 connector to an alternate connector type, you can use:

- IBM P/N 60G1063 (RJ-45 to ICS data connector)
- IBM P/N 60G1066 (RJ-45 8-pin to a 9-pin subminiature "D" shell receptacle)

Wrap plug: Token Ring wrap plug, P/N 08J5792, is provided.

Appendix B. OSA-Express Coexistence with OSA-2

This section is intended to assist you in using OSA/SF Version 2 Release 1 to make or change an existing configuration for an OSA-2 feature. **Configuration is only one step in the setup of an OSA-2. Refer to your OSA-2 publications for help with the initial setup.** See *Planning for OSA-2*, GA22-7477, and *OSA/SF User's Guide for OSA-2*, SC28-1855.

The I/O Expansion cage (FC 2022) is required to install OSA-2 features in the z900. OSA-2 is not supported on the z800.

Migrating From OSA-2 to OSA-Express

If you are replacing an OSA-2 with an OSA-Express OSE CHPID, in other words, using an OSA-Express in non-QDIO mode to provide the same LAN connectivity that a currently installed OSA-2 provides, then you can use the OSA-2 OAT to configure the OSA-Express. You must use the REXX commands as follows, since the OSA/SF GUI will not allow you to use OSA-2 OAT data copied to an OSA-Express CHPID. (When replacing an OSA-2 with an OSA-Express OSD CHPID, the new OAT is automatically generated.)

1. On OS/390 or z/OS enter **EX 'IOACMD.EXEC' 'GET_OAT** *CHPID* **OAT.DAT' EXEC**

   Or, on VM: **IOACMD GET_OAT** *CHPID* **OAT DAT**

   Or, on VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OAT** *CHPID* **PRD2.OSASF.OAT.DAT', SIZE=1100K**

   Where *CHPID* is the OSA-2. This Gets the OSA address table for the OSA-2 saves it as OAT.DAT (OAT DAT on VM). You can specify any filename you want. See "GET_OSA_ADDRESS_TABLE | GET_OAT | GET_OSA | GET_TABLE" on page 258 for more information.

2. For OS/390 or z/OS enter **EX 'IOACMD.EXEC' 'CONFIG_OSA' EXEC**

   For VM: **IOACMD CONFIG_OSA**

   Or, on VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF CONFIG_OSA', SIZE=1100K**

   The command will prompt you for the required input, including the name of the OAT saved in the previous step. "CONFIG_OSA" on page 252 contains more information.

OSA-2 and OSA/SF

In the introduction to this book, we recommend that you migrate to OSA/SF V2R1 if you have more than one OSA installed. The more OSAs you install, the more you benefit from OSA/SF, which is required to set up many of the OSA-2 modes of operation. OSA/SF V2R1 supports both OSA-2 and OSA-Express features but it ***does not support OSA-1***.

Customizing OSA-2 Using the GUI

Follow this procedure to customize OSA-2 with the GUI. If you require instructions to customize OSA-2 from a REXX command interface, see "Customizing OSA-2 Using the REXX Command Interface" on page 351.

Note: If the OSA was already set up previously for a different mode and you are changing the mode, quiesce the current mode, then continue with these instructions.

__ 1. Write down the logical partition name of where OSA/SF is running and the associated icon name shown on the OSA/SF GUI **Hosts** window:

OSA/SF Logical Partition Name _____

OSA/SF GUI Host Icon Name _____

If more than one OSA/SF image is installed, you will see corresponding host icons on the **OSA/SF Hosts** window.

__ 2. From the OSA/SF GUI, do the following to start managing the OSA−2:

Note: If the OSA-2 feature (hardware) is not yet installed, do *not* do this step. You will have to do the Start Managing after the OSA-2 feature is installed.

a. From the **OSA/SF Hosts** window, select the host icon (OSA/SF image) that you want to use to manage the OSA-2.

b. Display the **OSA Channels - Tree View** or **Details View** window. If you need instructions, select **How to** from the menu bar and double-click on **Display the OSA channels**.

c. Select the OSA number on the channels view window.

d. Select **Command** from the menu bar.

e. Select **Manage channel** from the pull-down.

f. Select **Start**, **No force**, and **OK**. If another LP was managing the OSA-2, use **force**.

__ 3. Do the following to display the **Configuration for OSA** window. If you know how to display the configuration window, go to step 4.

a. Select **Help** on the menu bar.

b. Select **How to** from the pull-down.

c. Double-click on **Define Configurations for an OSA**.

The **How to** instructions will assist you with displaying the configuration window, when the **Configuration for OSA** window is displayed, continue with the next step.

__ 4. From the **Configuration for OSA** window, verify the **Hardware type** and **Port type** are correct.

Note: The hardware type and port type are read from the OSA-2 feature (hardware) if the OSA-2 feature is installed in the system, the I/O hardware configuration is complete, and the OSA-2 CHPID is online to at least one LP. If you are defining a configuration prior to these conditions, select the hardware type and port type.

__ 5. Enter a **Configuration name** of your choice for this OSA-2.

__ 6. From the **Configuration for OSA** window, select a mode from the **Available modes** listbox and then select **Add**.

Attention

If the system is in basic mode, or the OSA (CHPID) is defined as not shared, a zero must be specified for the logical partition number when defining OAT entries.

- ***For TCP/IP Passthru:***

  Select **Add** again to display the **Passthru OAT record definition** window. Use this window to change the default unit addresses and to share ports between logical partitions. When you are done, select **cancel** and then be sure to select **Set**.

- ***For SNA:***

  Select **Add** again to display the **SNA OAT record definition** window. Enter the required information. If you are adding more than one entry, select **Add** after each entry and then type over the previous information. When you are done adding entries, select **Cancel** and then select **Set**.

__ 7. Select **Configuration** from the menu bar and then select **Save**

__ 8. The Activate task is disruptive to all devices using the OSA-2 (CHPID). You can either:

- Complete the install process now by selecting **Configuration** and then **Activate**. The activation takes a few minutes; monitor the command output window and the console.

or

- Defer the install to a more opportune time by selecting **ACTIVATE (no install)**. Later, when you want to complete the install:
  - Select the **OSA** from the Channels-Tree View
  - Select **Command** from the menu bar
  - Select **Install, Force**, and then **OK**.

  You can also complete the install by running the IOACMD:

  ```
  EX 'IOACMD.EXEC' 'INSTALL xx FORCE' EXEC
  ```

  where *xx* is the CHPID number.

Important Message

A message will be displayed on the GUI indicating that activation completed successfully. The CHPID port will be automatically reset and brought online.

__ 9. Start the connection using the VTAM host program.

Customizing OSA-2 Using the REXX Command Interface

Use these instructions to customize OSA-2 without the use of an OSA/SF GUI. More detailed information can be found in *OSA/SF User's Guide for OSA-2*.

1. Make sure the I/O hardware configuration data is complete. See "Using HCD for Hardware I/O Configuration" on page 31 for setting up the hardware configuration.
2. Make sure OSA/SF (job IOAMAIN) is running on the server (host).
3. Make sure the OSA (CHPID) is configured online and that the OSAD device is online.
4. Copy an OAT summary template from IOA.SIOASAMP on OS/390 or z/OS, or the E (200) minidisk on VM, based on the OSA-2 feature and type of OAT you want to install, or use the Get OAT command. Record the new data set name of the copied template.

- For a TR, or FDDI OSA-2 Feature, copy one of the following:

*Table 14. Summary OAT Templates for FDDI, ENTR OSA-2 Features. *See Table 5 on page 124 for supported operating modes.*

OSA Mode	Template Name	Type of Template
TCP/IP Only	IOAOSHRT	Ports Shared Between LPs
SNA Only	IOAOSHRS	Ports Shared Between LPs
TCP/IP, SNA, and HPDT MPC (FDDI only)*	IOAOSHRA	All Three Modes With Ports Shared Between LPs

Modify the summary OAT that you just copied according to the instructions in the template.

5. ***For all OSA-2 types***, enter the following to install the mode on the OSA-2.
   - On OS/390 or z/OS:

     ```
     EX 'IOACMD.EXEC' EXEC
     ```

   - On VM:

     ```
     IOACMD
     ```

   - On VSE:

     ```
     // EXEC REXX=IOACMD PARM='PRD2.OSASF',SIZE=1100K
     ```

   and specify **CONFIGURE OSA**. Then answer the prompts.
6. Configure the CHPID (OSA-2) offline and then online to all logical partitions to activate the OSA mode.

   Attention: If you changed the local MAC address, the associated CHPID must be reset in order for the change to take effect. To do so, first vary all devices offline from *every* logical partition that has the CHPID online. Configure the CHPID offline from *every* logical partition that has the CHPID online. Then configure the CHPID back online to any partitions that will use it and vary the devices back online.

Appendix C. Examples and Notes from Our Test Team

Although we designed OSA-Express to be as easy to set up as possible, today's information service environments are varied and complex. Because OSA-Express and OSA/SF depend on the correct settings in a number of other software products, we have provided the following descriptions of how we set up certain areas in our test environment in order to get OSA-Express up and running.

The following test subjects are discussed:

- "Primary and Secondary Routing"
- "Multiple Secondary Routes with Dynamic Routing" on page 360
- OSA-Express ATM Test Examples
  - "ATM Example 1: Classical IP over ATM Native" on page 364
  - "ATM Example 2: Ethernet and Token Ring Passthru on ATM LANE" on page 366
  - "ATM Example 3: QDIO with Two Ports on Two LPs" on page 372
  - "ATM Example 4: Ethernet LAN Emulation with Dynamic VIPA" on page 373
- OSA-Express Fast Ethernet Test Examples
  - "FENET Example 1: Multiple IP Passthru Entries per OAT" on page 379
- OSA-Express Gigabit Ethernet Test Examples
  - "Gigabit Ethernet Example 1: Basic Mode" on page 381
  - "Gigabit Ethernet Example 2: Two TCP/IP Stacks" on page 382
  - "Gigabit Ethernet Example 3: Two LPs" on page 383
- OSA-Express Token Ring Example
  - "OSA-Express Token Ring Example: QDIO Mode with VIPA and Enterprise Extender" on page 383
- "Priority Queuing" on page 386
- "VM Guest Support" on page 390.

We've also added a "Sample TCP/IP Profile (IPv4 and IPv6)" on page 395, showing the definitions we used to test IPv6.

Primary and Secondary Routing

When planning for network availability in a TCP/IP-based network environment, it is important to consider failure at the TCP/IP stack. One safeguard against such failure is the use of primary and secondary routing. You can define your OSA-Express adapters to be primary and secondary routers, thereby ensuring continued data flow and routing of unknown IP data packets.

If an incoming IP address does not match any of the OSA adapter port addresses, the IP data will be sent to the primary network routing path. If the primary path is not functioning, the IP data will be sent to the secondary network routing path. For an OSA-Express adapter, you must use the primary/secondary function to get to an IP address on another LAN.

Note: Although the ability of a defined secondary path to *takeover* and handle IP data is dynamic, any TCP/IP applications running on your workstations or

RS/6000s may have to be restarted on these devices, even though the secondary path (route) is automatically enabled and ready to handle the IP traffic.

In our test environment, we set up a simple, basic configuration with static routing to prove the primary/secondary (PRI/SEC) concept. We began with two partitions in our S/390 sysplex, two OSA-Express GbE adapters with shared ports and two RS/6000s (Figure 118 on page 356).

Our test included the following variations on attempted pings between the RS/6000 and the workstation:

- Both partitions NONRouter (no PRIRouter, no SECRouter)
- Only PRIRouter S39 (LP4) is defined for CHPID F4, while CHPID FC remains NONRouter and S35 (LP5) is NONRouter for both CHPIDs
- PRIRouter (S39) is defined for CHPIDs F4 and FC, while S35 is NONRouter for both CHPIDs
- SECRouter (S35) is defined for CHPIDs F4 and FC while PRIRouter (S39) is still defined for both CHPIDs. Bring up TCP/IP on S35 SECRouter and take down TCP/IP on S39 PRI
- Take down the stacks in both partitions to ensure the two RS/6000s cannot ping to each other

CHPID F4 was on the 7.1 network and CHPID FC was on the 8.1 network. Since the two RS/6000s were not on the same LAN, the only way these two devices could communicate was through the use of PRI/SEC routing on the OSA-Express features.

TCP/IP Profile Statements

We used the following key statements for our test series. Any necessary changes we made are noted for each variation in the test.

S39 Profile − S39PRI

IPCONFIG statement:

```
DATAGRAMFWD
```

ASSORTEDPARMS statement

```
; NOFWD
```

For PRIMARY/SECONDARY to work, you **must** specify DATAGRAMFWD under IPCONFIG **and** you **must not** specify NOFWD under ASSORTEDPARMS. If **both** of these conditions are not met, IP packets will not be forwarded between different networks.

DEVICE and LINK statements:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA NONRouter
  LINK GIGF4 IPAQGNET GIGPF4

; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA NONRouter
  LINK GIGFC IPAQGNET GIGPFC
```

HOME statements:

```
7.1.145.22      GIGF4
8.1.145.26      GIGFC
```

GATEWAY statements:

```
; Network     First hop     Driver     Packet size     Subnet mask     Subnet value

  7.1.1.107   =           GIGFC      1492            host
  8.1.1.108   =           GIGF4      9000            host
```

S35 Profile − S35SEC

IPCONFIG statement:

```
DATAGRAMFWD
```

ASSORTEDPARMS statement

```
; NOFWD
```

DEVICE and LINK statements:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA NONRouter
  LINK GIGF4 IPAQGNET GIGPF4

; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA NONRouter
  LINK GIGFC IPAQGNET GIGPFC
```

HOME statements:

```
7.1.125.22      GIGF4
8.1.125.26     GIGFC
```

GATEWAY statements:

```
; Network     First hop     Driver     Packet size     Subnet mask     Subnet value

  7.1.1.107   =           GIGFC      1492            host
  8.1.1.108   =           GIGF4      9000            host
```

RS/6000 Configurations

RS/6000–1 is configured on the 7.1 network with a static route through 7.1.145.22 (CHPID F4). RS/6000–2 is configured on the 8.1 network with a static route through 8.1.145.26 (CHPID FC).

Table 15. RS/6000s Configured with Static Routing

	RS/6000–1	**RS/6000–2**
IP Address	7.1.1.107	8.1.1.108
Destination	8.1.0.0	7.1.0.0
Gateway	7.1.145.22	8.1.145.26
Network Mask	255.255.0.0	255.255.0.0

Test 1 − No Primary/Secondary Routing

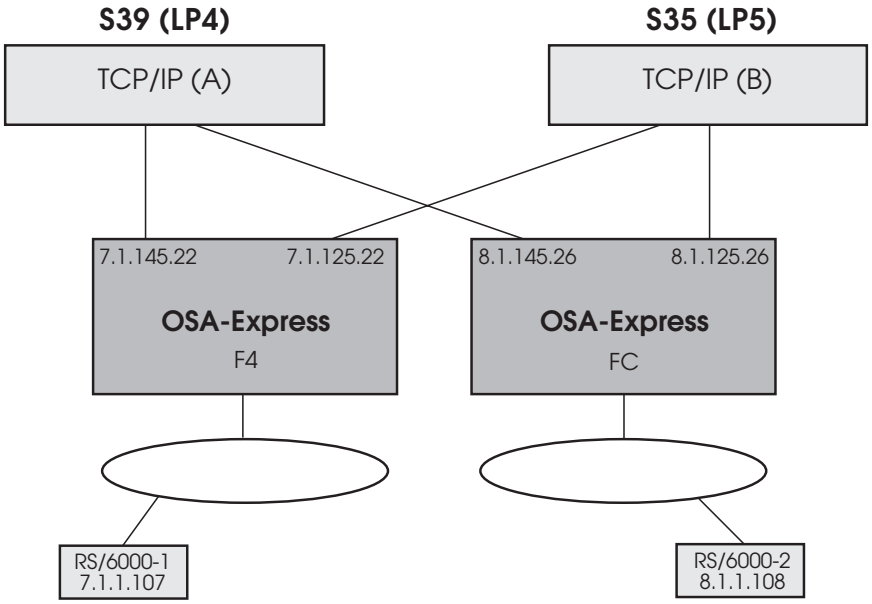


Figure 118. Test Configuration 1 − No Primary/Secondary Routing

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
This fails because OSA-Express CHPID F4 only knows how to get to its own network, as defined in the S39PRI and S35SEC TCP/IP profiles. F4 does not recognize any 8.1 addresses. Traffic stops at the OSA level (at F4) because there is no path to which unknown IP addresses can be routed.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This fails for the same reason except that it is OSA CHPID FC's inability to recognize any address other than those on its own network. Again, there is no path defined for routing unknown IP addresses.

Test 2 − One CHPID Primary on One LP

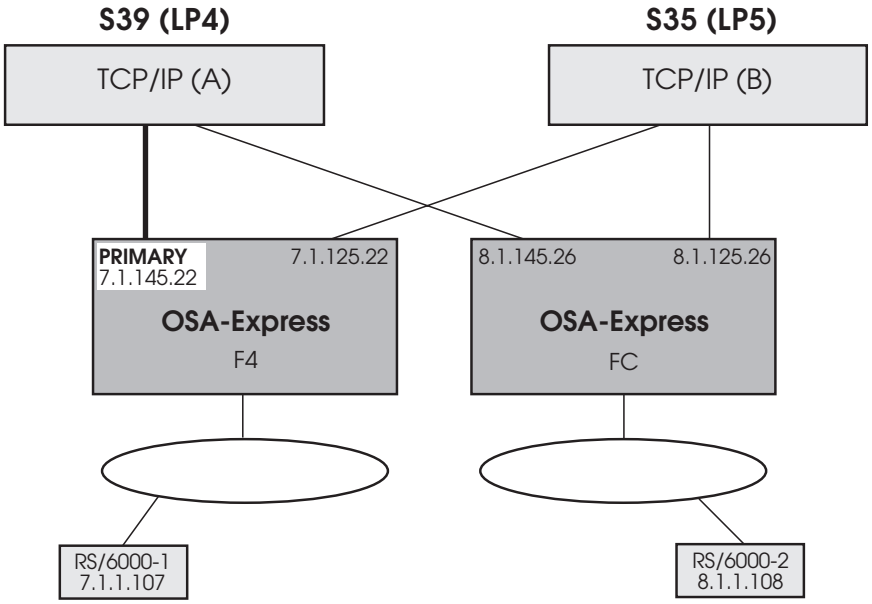


Figure 119. Test Configuration 1 − F4 Primary on S39

We changed the DEVICE and LINK statements for F4 in the TCP/IP profile for S39:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA PRIRouter
  LINK GIGF4 IPAQGNET GIGPF4
```

S39 (LP4) is now managing both CHPIDs F4 and FC. Also, S39 and S35 can see each other's messages on the operator console.

Note: When TCP/IP is started on S39 with OSA/SF running, we saw the following message on our S39 OS/390 operator console:

```
IOAK873I CHPID F4 port 0 default entry is LP 4 UA C2
```

This message confirms that the (primary) path to LP 4 is now the default for CHPID F4. Unit address C2 corresponds to the device number for this datapath in the OSA address table. This message is only displayed on the LP where OSA/SF is running and where the CHPID is managed. The secondary LP does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other LP, manages the CHPID.

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108

In this case, we can get to RS/6000–2, but the ping has no path back for the return acknowledgment and FC filters it out. Therefore, the ping fails.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107

This fails for the same reason described in "Test 1 − No Primary/Secondary Routing" on page 356. OSA CHPID FC knows only the addresses on its own network, and no other path is defined for routing unknown IP addresses.

Test 3 − Two CHPIDs Primary on One LP

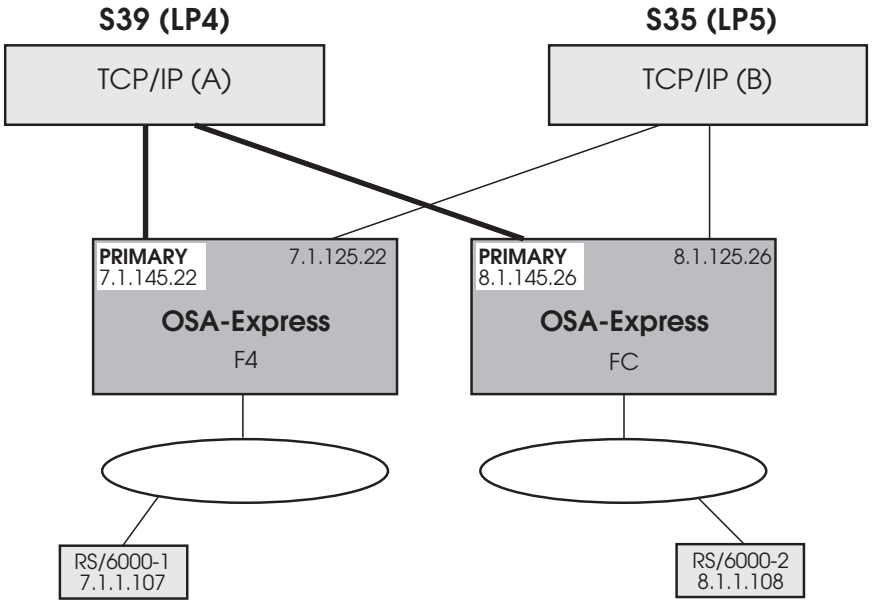


Figure 120. Test Configuration 3 − F4 and FC Primary on S39

We changed the DEVICE and LINK statements for FC in the TCP/IP profile for S39:

```
; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA PRIRouter
  LINK GIGFC IPAQGNET GIGPFC
```

Both F4 and FC have PRIRouter in their DEVICE statements in the same S39PRI TCP/IP profile at this point.

Note: When TCP/IP was started on S39 with OSA/SF running, we saw the IOAK873I message on our S39 OS/390 operator console for both F4 and FC.

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
This variation works. Because a primary routing path is defined on both OSAs in the S39 TCP/IP profile, the network now has the ability to route unknown IP addresses. There is now a path to RS/6000–2 and a return path to RS/6000–1 for the acknowledgment.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This now works for the same reason.

Test 4 − Two CHPIDs Primary on One LP, Two CHPIDs Secondary on Another LP, Fail TCP/IP on One LP

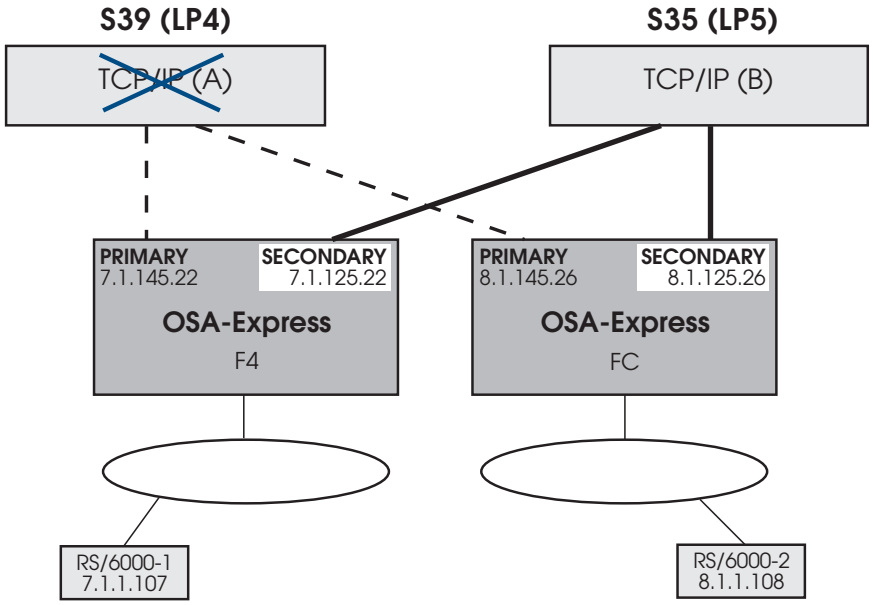


Figure 121. Test Configuration 4 − F4 and FC PRI on S39, F4 and FC SEC on S35, Fail TCP/IP on S39

We changed the DEVICE and LINK statements for F4 and FC in the TCP/IP profiles for S35:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA SECRouter
  LINK GIGF4 IPAQGNET GIGPF4
; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA SECRouter
  LINK GIGFC IPAQGNET GIGPFC
```

Both F4 and FC keep PRIRouter in their DEVICE statements in the S39PRI TCP/IP profile from the previous test. Now we have added SECRouter to their device statements in the S35SEC TCP/IP profile.

Because we used static routing, we had to modify both RS/6000's GATEWAY statements to reflect the SECRouter IP addresses in order to ping. Referring to Table 15 on page 355, RS/6000–1's GATEWAY became 7.1.125.22 and RS/6000–2's became 8.1.125.26.

Notes:

1. After we failed TCP/IP on S39 with TCP/IP started on S35 and OSA/SF running, we saw these IOAK873I messages on our S39 OS/390 operator console for both F4 and FC.

   ```
   IOAK873I CHPID F4 port 0 default entry is LP 5 UA C2
   IOAK873I CHPID FC port 0 default entry is LP 5 UA A2
   ```

   Notice the LP is now LP5 (S35) instead of LP4.
2. We also received these IOAK874W messages on S35 because we failed TCP/IP on that partition:

   ```
   IOAK874W CHPID F4 port 0 is no longer forwarding unknown packets
   IOAK874W CHPID FC port 0 is no longer forwarding unknown packets
   ```

Test Examples

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108

This works for the same reasons described in “Test 3 − Two CHPIDs Primary on One LP” on page 358 with one difference—there is no longer a primary path. Although the primary path has disappeared, the secondary path takes over and routes the IP data, including unknown IP addresses. There is still a complete path available for the acknowledgment from RS/6000–2 back to RS/6000–1.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107

This works for the same reason.

Test 5 − Two CHPIDs Primary on One LP, Two CHPIDs Secondary on Another LP, Fail TCP/IP on Both LPs

We failed TCP/IP on both partitions and then tried to ping between the two RS/6000s. The pings failed, which is what we expected. We wanted to ensure these two devices could not communicate and that there was no *backdoor* path between them.

Multiple Secondary Routes with Dynamic Routing

The basic test has four unique networks. Our goal is to be able to establish communication between the two workstations on the ″outside″ network. The two routers have no physical connections between them. The routers are running OSPF with two interfaces defined to each. One interface is attached to the OSA-Express CHPID and the other is connected to the ″outside″ network. In our case, this is a Linux workstation.

The workstations have a static route pointing to the router. Once OSPF is running on both routers and all TCP/IP stacks, routing information is exchanged. The z/OS images will contain routing information identifying the ″outside″ networks. A route will be created to the 192.168.105.0 network through the router interface 192.168.103.1. Another route is created to the 192.168.108.0 network through the router interface 192.168.102.3. With the OSA devices defined as primary router all unknown packets will be forwarded up to that TCP/IP stack.

Since OSPF has established routes to the other network , the stack will forward those packets through the other OSA interface to the appropriate router. We now have established connectivity between the two ″outside″ networks. Workstation 192.168.108.180 can ping workstation 192.168.105.106.

Next, we simply take down the primary TCP/IP stack. OSA moves the forwarding of unknown packets to one of the secondary stacks. Those stacks now have the same OSPF routes as the primary. OSPF running on the 2 routers detects the loss of the primary stack and adjusts the routes accordingly. Since we are taking advantage of dynamic routing the workstations do not need to make any route adjustments. Connectivity is reestablished through the secondary stack.

In this case we have two secondary stacks defined. After a secondary stack picks up the routing function, we take that stack down as well. Now another secondary picks up the routing function just as when the primary was taken down.

When the primary stack is made active again, OSA returns the function to that router.

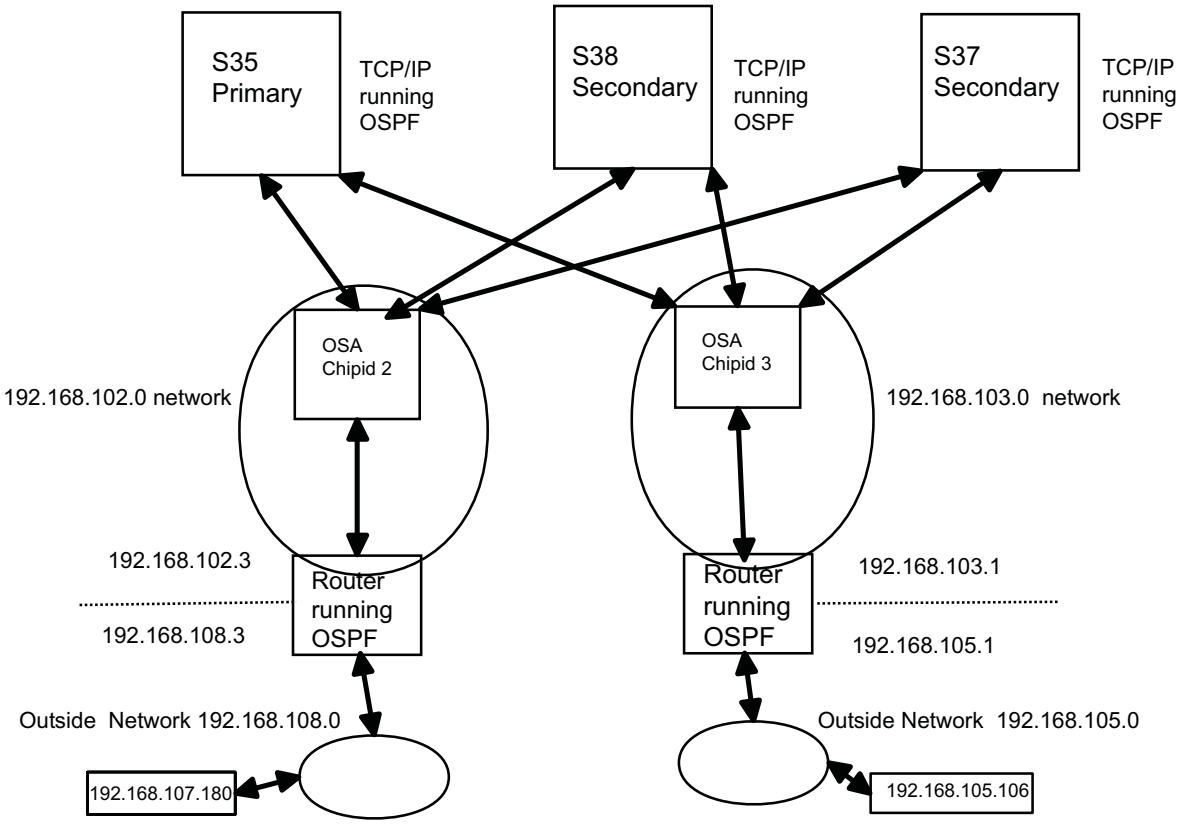


Figure 122. Multiple Secondary Routers

OSPF Configuration

```
; OMPROUTE Configuration file for OSPF
;
;
;  Rules - all parms must end in a semi-colon
;        - mixed case is ok
;
; AREA
;    Sets the OSPF AREA.  If no areas are defined, the router software
;    assumes that all the router's directly attached networks belong to
;    the backbone area (area ID 0.0.0.0)
;
;           Stub Area Definition
; For Totally Stubby Areas, set the following:
;     Area_Number=n.n.n.n
;     Stub_area=YES
;     Import_Summaries=No;
 AREA
   Area_Number=1.1.1.1
   Authentication_Type=None
   Stub_area=YES
   Stub_Default_Cost=5
   Import_Summaries=No;
;
 Comparison=Type2;
;
;OSPF_INTERFACE
;
; s35  OSA chipid 3 interface
```

Test Examples

```
;
OSPF_INTERFACE
   IP_address=192.168.103.235       ; must match tcpip profile
   Name=LNK03                       ; must match tcpip profile
   Subnet_mask=255.255.255.0
   Demand_Circuit=no
   Attaches_To_Area=1.1.1.1
   MTU=1500
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=3                 ; Must be consistent with other
   Dead_Router_Interval=9           ;   routes in the area
   Cost0=3
;
; s35  OSA chipid 2 interface
;
OSPF_INTERFACE
   IP_address=192.168.102.235       ; must match tcpip profile
   Name=LNK02                       ; must match tcpip profile
   Subnet_mask=255.255.255.0
   Demand_Circuit=no
   Attaches_To_Area=1.1.1.1
   MTU=1500
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=3                 ; Must be consistent with other
   Dead_Router_Interval=9           ;   routes in the area
   Cost0=3
;
;    ROUTERID -
;
 RouterID=192.168.102.235
;
 AS_BOUNDARY_ROUTING
    Import_RIP_Routes=No
    Import_Static_Routes=YES
    Import_Direct_Routes=YES
    Import_Subnet_Routes=Yes
    Originate_Default_Route=No
    Originate_as_Type=2
    Default_Route_Cost=1
;
```

Display Routes

```
  MVS TCP/IP onetstat  CS V1R4       TCPIP Name: TCPIP5
  IPv4 Destinations
  Destination          Gateway          Flags     Refcnt   Interface
  -----------          -------          -----     ------   ---------
* Default              192.168.102.3    UGO       000000   LNK02
  127.0.0.1/32         0.0.0.0          UH        000004   LOOPBACK
  192.168.102.0/24     0.0.0.0          UO        000000   LNK02
  192.168.102.235/32   0.0.0.0          UH        000000   LNK02
  192.168.103.0/24     0.0.0.0          UO        000000   LNK03
  192.168.103.235/32   0.0.0.0          UH        000001   LNK03
* 192.168.105.0/24     192.168.103.1    UGO       000000   LNK03
* 192.168.108.0/24     192.168.102.3    UGO       000000   LNK02

These are routes created by OSPF that allow us to complete the
 communication path.
```

TCP/IP Profile

```
* tcpip profile statements for the primary router.

IPCONFIG
  DATAGRAMFWD

ASSORTEDPARMS       ; comment out NOFWD
; NOFWD

Autolog
  opmroute          ; start omproute to run OSPF

; ---------------------------------------------------------------------
;
; Device definitions:
;
; IPv4
;--------------------------------------------
  DEVICE DEV02 MPCIPA PRIRouter ;OSD FEN
  LINK LNK02 IPAQGNET DEV02

  DEVICE DEV03 MPCIPA PRIRouter ;OSD FEN
  LINK LNK03 IPAQGNET DEV03
;
  HOME
  192.168.103.235 LNK03             ;OSD FEN
  192.168.102.235 LNK02             ;OSD FEN
; ---------------------------------------------------------------------

 - no gateway or begingroutes statement needed since OSPF will be
   generating routes


=============================================================================

** tcpip profile statements for one of the secondary primary routers.
   All the other will look the same except the home IP address will be different

IPCONFIG
  DATAGRAMFWD

ASSORTEDPARMS       ; comment out NOFWD
; NOFWD

Autolog
  opmroute          ; start omproute to run OSPF

; ---------------------------------------------------------------------
;
; Device definitions:
;
; IPv4
;--------------------------------------------
  DEVICE DEV02 MPCIPA SecRouter ;OSD FEN
  LINK LNK02 IPAQGNET DEV02

  DEVICE DEV03 MPCIPA SecRouter ;OSD FEN
  LINK LNK03 IPAQGNET DEV03
;
  HOME
  192.168.103.238 LNK03             ;OSD FEN
  192.168.102.238 LNK02             ;OSD FEN
```

```
; -------------------------------------------------------------------

 - no gateway or begingroutes statement needed since OSPF will be
   generating routes
```

OSA-Express ATM Examples

ATM Example 1: Classical IP over ATM Native

This example shows how we configured Classical IP to run between an OSA-Express ATM and a RS/6000 workstation. The OSA-Express feature is configured for Native ATM mode and has a Best Effort PVC defined. We set up IP traffic to run over Best Effort SVCs and Best Effort PVCs.

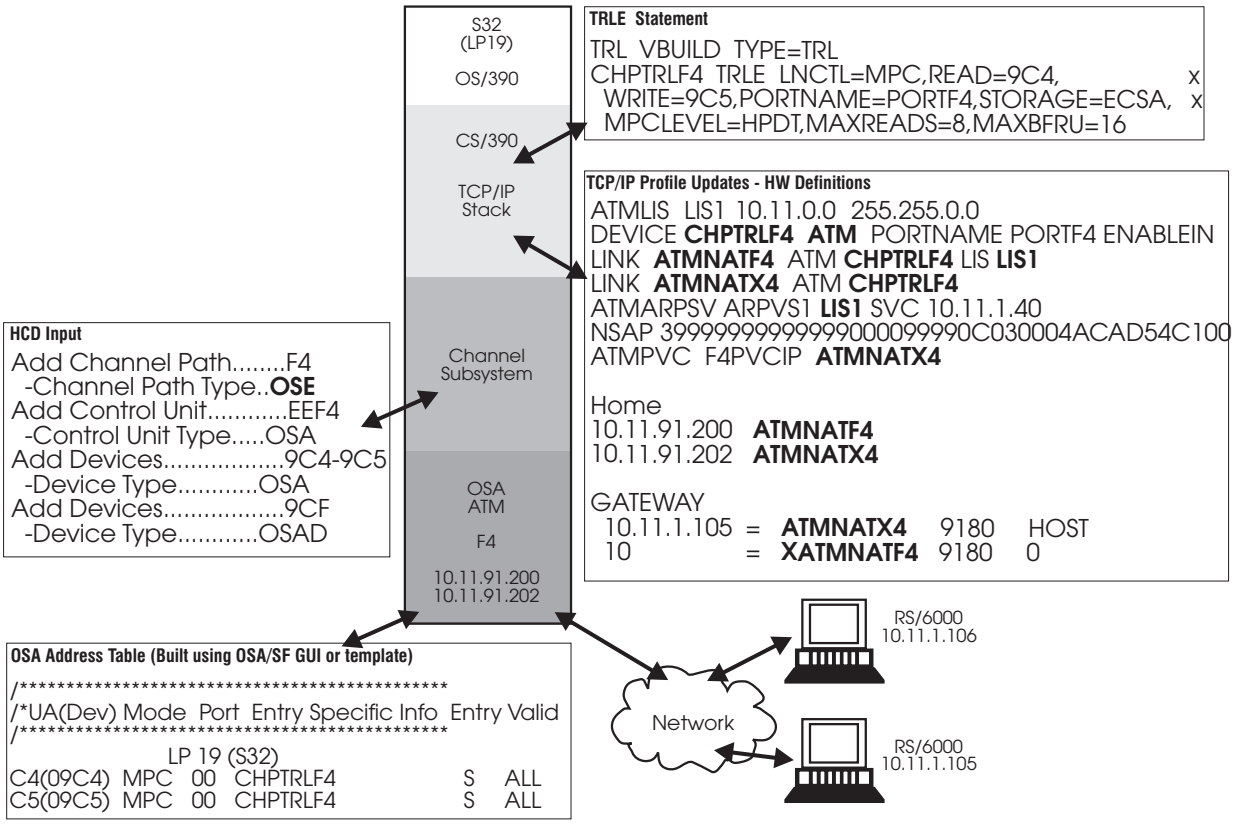


Figure 123. Classical IP over ATM Native

The TRLE Statement

The **PORTNAME** must match the portname in the TCP/IP profile, as well as the definition specified in OSA/SF when the ATM Native port was configured.

The TCP/IP Profile

The IP data connects to the SVC and PVC channels through the following definitions:

ATMLIS

This statement is only needed for SVC's. It describes the characteristics of an ATM logical IP subnet (LIS).

DEVICE

Specifies the name of the devices and the port name as specified in the TRL and the configuration on the CHPID.

LINK The first LINK statement with the LIS parameter is for the SVC and the second LINK statement is for the PVC. The LIS parameter is only needed for SVC's.

ATMARPSV
Designates the ARP server to be used to resolve ATMARP requests. Since PVC's do not need an ARP server, this statement is used here only for the SVC's. The line starting with NSAP is actually a continuation of the ATMARPSV statement. It specifies the address of the ARP server to be used.

ATMPVC
This statement is only needed for PVC's. It contains the name of the PVC as defined to the OSA feature by OSA/SF for use by an ATM link.

The GATEWAY Statement

We included one statement for the PVC and one for the SVC. ATMNATX4 is the LINK for the PVC and we used a specific gateway for it so that any communication intended for the node at the other end of the PVC would be forced to go over that PVC. If we set up additional PVC's, we would simply add more gateway statements for them.

ATM Native Port Configuration

In order to configure the Native port on the OSA-Express ATM, we tailored the IOAATME template, shown in its original state on page 226, as follows:

```
ATM Configuration
  |
  |------------------------------------------------------------------------------>
OSA-Express ATM

Output (from a REXX Get Config):

/*====================================================================
/* Parameters for physical port 0
/*====================================================================
phy.0.1 = F4 Native-Perf          /* Configuration name (32-char max)
phy.0.2 = PORTF4NATIVE            /* Port description (16-char max)
phy.0.3 = PORTF4                  /* Port name (8-char max)
phy.0.4 = 0204357A09F4             /* Local End System ID (12 hex digits)
phy.0.5 = Auto                      /* Port UNI version (AUTO, 30 or 31)
phy.0.6 = 0                         /* Control plane use
                                    /*  0 - ILMI & SVC enabled
                                    /*  3 - ILMI & SVC disabled
phy.0.7 = 0                         /* Transmit clock source
                                    /*  0 - OSA generated
                                    /*  1 - Network generated
phy.0.8 = 0                         /* Physical layer type
                                    /*  0 - Sonet
                                    /*  1 - SDH
phy.0.9 = 0.0.0.0                   /* TCP/IP instance IP address
phy.0.10= 1                         /* Bandwidth allocation
                                    /*  1 - Best effort only
                                    /*  2 - Reserve bandwidth
                                    /*      & best effort
                                     /*  3 - Reserved bandwidth
/*====================================================================
/* Parameters for Native port 0
/*====================================================================
nat.0.1 = F4 Native-Perf           /* Configuration name (32-char max)
nat.0.2 = Yes                       /* Enable LAN traffic (Yes, No)
/*====================================================================
/* This portion of the file contains the required input parameters
/* to configure the PVC entries for ATM Native.
/*
```

Test Examples

```
/* You can have a maximum of 256 PVC entries per OSA.
/*
/* PVC parameters are in the format 'pvc.port.entry.parameter' where
/*  'pvc' is the keyword indicating this is a PVC entry
/*  'port' is the port number
/*  'entry' is the PVC entry this parameter is for
/*  'parameter' is the number corresponding to the parameter
/*  For example, pvc.0.1.4 is parameter 4 for PVC entry 1 on port 0.
/*=====================================================================
/* PVC entry 1 for port 0 starts here
/*=====================================================================
pvc.0.1.1 = F4PVCIP               /* PVC name (8-char max)
pvc.0.1.2 = 353000                /* Forward peak cell rate (0-353207)
pvc.0.1.3 = 353000                /* Backward peak cell rate(0-353207)
pvc.0.1.4 = 0                     /* VPI for this PVC entry (0-255)
pvc.0.1.5 = 190                   /* VCI for this PVC entry (32-65535)
/*=====================================================================
/* The forward and backward PDU value should be the same for both
/* pvc.p.n.6 and pvc.p.n.7.  Do not set them with different values.
/*=====================================================================
pvc.0.1.6 = 8448                  /* Forward Max PDU size (64-9188)
pvc.0.1.7 = 8448                  /* Backward Max PDU size(64-9188)
/*=====================================================================
/* To specify a reserved bandwidth PVC, set field pvc.p.n.8 to 1.
/* To use the defaults, set pvc.p.n.8 to 0.
/*=====================================================================
pvc.0.1.8 = 0                     /* Reserved bandwidth
                                   /*  0 - Use defaults
                                   /*  1 - Specify parameters 9-12
/*=====================================================================
/* If pvc.p.n.8 is 1, then the values in pvc.p.n.9-pvc.p.n.12 are used
/* If pvc.p.n.8 is 0, you must include pvc.p.n.9 to pvc.p.n.12, but
/* the values are ignored.
/*=====================================================================
pvc.0.1.9 = 4294967295        /* Forward sustain cell rate (0-353207)
pvc.0.1.10= 4294967295        /* Backward sustain cell rate(0-353207)
pvc.0.1.11= 4294967295       /* Forward cell burst rate (0-353207)
pvc.0.1.12= 4294967295       /* Backward cell burst rate(0-353207)
/*********************************************************************
/**********    End of Configuration file output    *********************
/*********************************************************************
```

ATM Example 2: Ethernet and Token Ring Passthru on ATM LANE

We configured two emulated ports on an OSA-Express ATM to run Ethernet and token ring traffic simultaneously.

Figure 124 on page 367 shows how we configured the OSA-Express ATM feature.

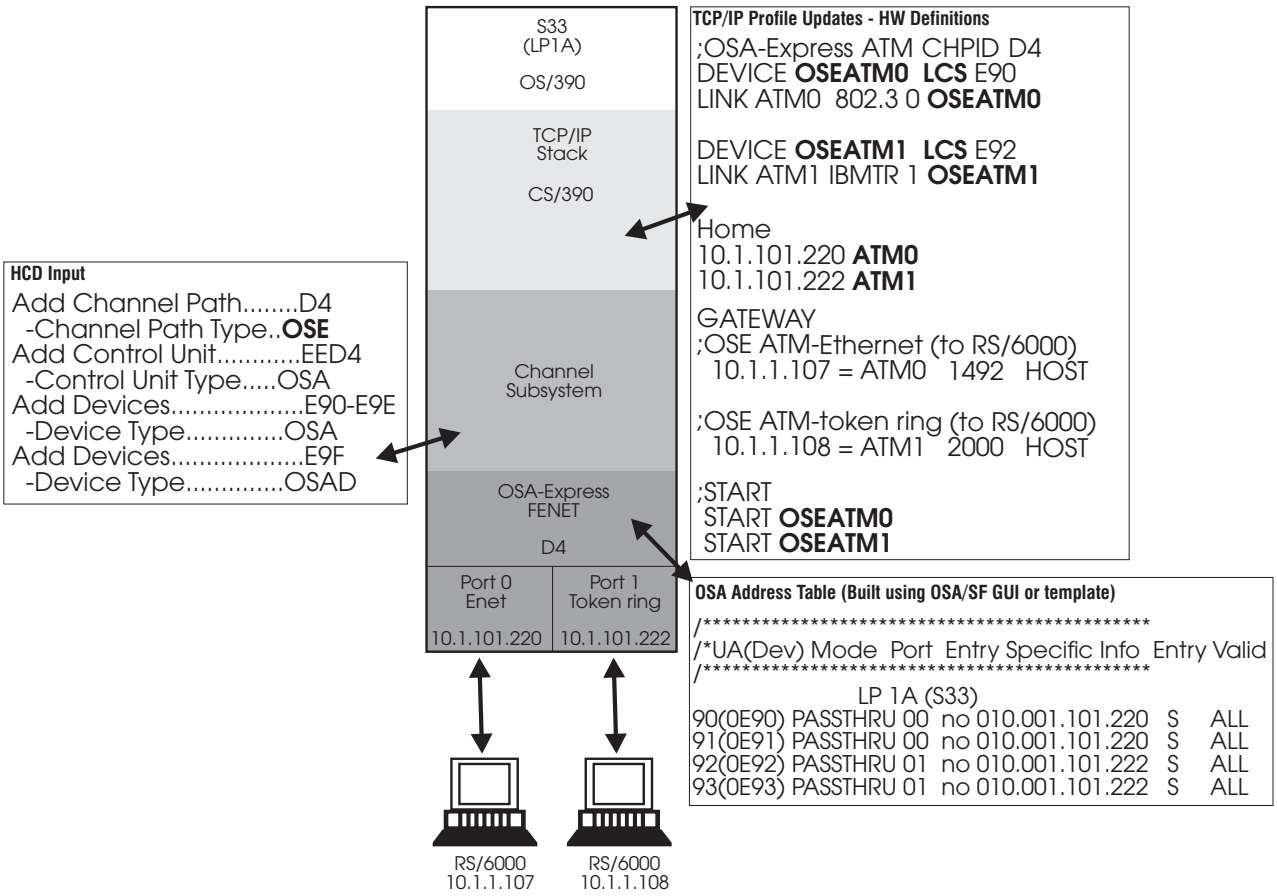


Figure 124. Ethernet and Token Ring Passthru on ATM LANE

In order to configure the emulated ports on the OSA-Express ATM, we tailored the IOAATME template, shown in its original state on page 226, as follows:

```
/*====================================================================
 /* Parameters for physical port
0
/*====================================================================
phy.0.1  = CHPD4  2 port PT      /* Configuration name (32-char max)
phy.0.2  = ATM LE ETH/TR         /* Port description (16-char max)
phy.0.3  = PortD40               /* Port name (8-char max)
phy.0.4  = 0204357A09B5          /* Local End System ID (12 hex digits)
phy.0.5  = Auto                  /* Port UNI version (AUTO, 30 or 31)
phy.0.6  = 0                     /* Control plane use
                                 /*  0 - ILMI & SVC enabled
                                 /*  3 - ILMI & SVC disabled
phy.0.7  = 0                     /* Transmit clock source
                                 /*  0 - OSA generated
                                 /*  1 - Network generated
phy.0.8  = 0                     /* Physical layer type
                                 /*  0 - Sonet
                                 /*  1 - SDH
phy.0.9  = 0.0.0.0               /* TCP/IP instance IP address
phy.0.10 = 1                     /* Bandwidth allocation
                                 /*  1 - Best effort only
                                 /*  2 - Reserve bandwidth
                                 /*      & best effort
                                 /*  3 - Reserved bandwidth


/*====================================================================
```

Test Examples

```
/* Parameters for emulated port 0
/*
/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.

/*====================================================================
emul.0.1  = CHPD4  2 port PT      /* Configuration name (32-char max)
emul.0.2  = Yes                   /* Enable LAN traffic (Yes, No)
emul.0.3  = 1                     /* Emulated port type
                                  /*  1 - Ethernet
                                  /*  2 - Token ring
emul.0.4  =                       /* User data (32-char max)
emul.0.5  = Ethernet ELAN 1       /* ELAN name (32-char max)
emul.0.6  = 0224357A09B5          /* Local MAC address (12 hex digits)

emul.0.7  = 155.0                 /* Best effort peak rate (1-155)
                                  /*  in 0.1 increments
emul.0.8  = 1                     /* IBM Enhanced mode
                                  /*  0 - drop direct connect
                                  /*  Not 0 - keep connections

/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.

/*====================================================================
emul.0.9  = 1516                  /* Max LAN frame size

emul.0.10 = 0                     /* LEC auto configure
                                  /*  0 - disable auto config
                                  /*    parms 11-21 are valid
                                  /*  1 - enable auto config
                                  /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.

/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.

/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.

/*====================================================================
emul.0.11 = 120                   /* Control timeout (10-300)
emul.0.12 = 1200                  /* VCC timeout
emul.0.13 = 300                   /* Aging time (10-300)
                                  /* LES ATM address (40 hex digits)
emul.0.14 = 399999999999990000099990C0240008210C20108
emul.0.15 = 5                     /* Max unknown frame count (1-10)
emul.0.16 = 1                     /* Max retry count (0-2)
emul.0.17 = 15                    /* Forward time delay (4-30)
emul.0.18 = 1                     /* LE ARP timeout (1-30)
emul.0.19 = 1                     /* Flush timeout (1-4)
emul.0.20 = 6                     /* Path switching delay (1-8)
```

```
emul.0.21 = 4                     /* Connection complete timeout (1-10)


/*====================================================================
/* Parameters for emulated port 1

/*
 /*================================================================================
emul.1.1  = CHPD4 2 port PT       /* Configuration name (32-char max)
emul.1.2  = Yes                   /* Enable LAN traffic (Yes, No)
emul.1.3  = 2                     /* Emulated port type
                                  /*  1 - Ethernet
                                  /*  2 - Token ring
emul.1.4  =                       /* User data (32-char max)
emul.1.5  = Token Ring ELAN 1     /* ELAN name (32-char max)
emul.1.6  = 4004AC20CA9A          /* Local MAC address (12 hex digits)
emul.1.7  = 155.0                 /* Best effort peak rate (1-155)
                                  /*  in 0.1 increments
emul.1.8  = 1                     /* IBM Enhanced mode
                                  /*  0 - drop direct connect
                                  /*  Not 0 - keep connections

/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
 /*================================================================================
emul.1.9  = 4544                  /* Max LAN frame size
emul.1.10 = 0                     /* LEC auto configure
                                  /*  0 - disable auto config
                                  /*    parms 11-21 are valid
                                  /*  1 - enable auto config
                                  /*    parms 11-21 are ignored
 /*================================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
 *================================================================================
emul.1.11 = 120                   /* Control timeout (10-300)
emul.1.12 = 1200                  /* VCC timeout
emul.1.13 = 300                   /* Aging time (10-300)
                                  /* LES ATM address (40 hex digits)
emul.1.14 = 399999999999990000999990C0240008210C20102
emul.1.15 = 5                     /* Max unknown frame count (1-10)
emul.1.16 = 1                     /* Max retry count (0-2)
emul.1.17 = 15                    /* Forward time delay (4-30)
emul.1.18 = 1                     /* LE ARP timeout (1-30)
emul.1.19 = 1                     /* Flush timeout (1-4)
emul.1.20 = 6                     /* Path switching delay (1-8)
emul.1.21 = 4                     /* Connection complete timeout (1-10)

Output (from a REXX Get Config):

/*====================================================================
/* Parameters for physical port
0
/*====================================================================
phy.0.1 = CHPD4 port 2 PT         /* Configuration name (32-char max)
phy.0.2 = ATM LE ETH/TR           /* Port description (16-char max)
phy.0.3 = PORTD40                 /* Port name (8-char max)
phy.0.4 = 0204357A09B5            /* Local End System ID (12 hex digits)
```

Test Examples

```
phy.0.5 = Auto                  /* Port UNI version (AUTO, 30 or 31)
phy.0.6 = 0                     /* Control plane use
                                /*  0 - ILMI & SVC enabled
                                /*  3 - ILMI & SVC disabled
phy.0.7 = 0                     /* Transmit clock source
                                /*  0 - OSA generated
                                /*  1 - Network generated
phy.0.8 = 0                     /* Physical layer type
                                /*  0 - Sonet
                                /*  1 - SDH
phy.0.9 = 0.0.0.0               /* TCP/IP instance IP address
phy.0.10= 1                     /* Bandwidth allocation
                                /*  1 - Best effort only
                                /*  2 - Reserve bandwidth
                                /*      & best effort
                                /*  3 - Reserved bandwidth
/*====================================================================
/* Parameters for emulated port 0
/*
/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*====================================================================
emul.0.1  = CHPD4 with MPC      /* Configuration name (32-char max)
emul.0.2  = Yes                 /* Enable LAN traffic (Yes, No)
emul.0.3  = 1                   /* Emulated port type
                                /*  1 - Ethernet
                                /*  2 - Token ring
emul.0.4  =                     /* User data (32-char max)
emul.0.5  = Ethernet ELAN 1     /* ELAN name (32-char max)
emul.0.6  = 0224357A09B5        /* Local MAC address (12 hex digits)
emul.0.7  = 155                 /* Best effort peak rate (1-155)
                                /*  in 0.1 increments
emul.0.8  = 1                   /* IBM Enhanced mode
                                /*  0 - drop direct connect
                                /*  Not 0 - keep connections
/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
/*====================================================================
emul.0.9  = 1516                /* Max LAN frame size
emul.0.10 = 0                   /* LEC auto configure
                                /*  0 - disable auto config
                                /*    parms 11-21 are valid
                                /*  1 - enable auto config
                                /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
/*====================================================================
emul.0.11 = 120                 /* Control timeout (10-300)
emul.0.12 = 1200                /* VCC
```

```
timeout
emul.0.13 = 300                  /* Aging time (10-300)
                                 /* LES ATM address (40 hex digits)
emul.0.14 = 399999999999990000099990C0240008210C20108
emul.0.15 = 5                    /* Max unknown frame count (1-10)
emul.0.16 = 1                    /* Max retry count (0-2)
emul.0.17 = 15                   /* Forward time delay (4-30)
emul.0.18 = 1                    /* LE ARP timeout (1-30)
emul.0.19 = 1                    /* Flush timeout (1-4)
emul.0.20 = 6                    /* Path switching delay (1-8)
emul.0.21 = 4                    /* Connection complete timeout (1-10)

/*====================================================================
/* Parameters for emulated port 1
/*
/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*====================================================================
emul.1.1  = CHPD4 2 port PT      /* Configuration name (32-char max)
emul.1.2  = Yes                  /* Enable LAN traffic (Yes, No)
emul.1.3  = 2                    /* Emulated port type
                                 /*  1 - Ethernet
                                 /*  2 - Token ring
emul.1.4  =                      /* User data (32-char max)
emul.1.5  = Token Ring ELAN 1    /* ELAN name (32-char max)
emul.1.6  = 4004AC20CA9A         /* Local MAC address (12 hex digits)
emul.1.7  = 155                  /* Best effort peak rate (1-155)
                                 /*  in 0.1 increments
emul.1.8  = 1                    /* IBM Enhanced mode
                                 /*  0 - drop direct connect
                                 /*  Not 0 - keep connections
/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
/*====================================================================
emul.1.9  = 4544                 /* Max LAN frame size
emul.1.10 = 0                    /* LEC auto configure
                                 /*  0 - disable auto config
                                 /*    parms 11-21 are valid
                                 /*  1 - enable auto config
                                 /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
/*====================================================================
emul.1.11 = 120                  /* Control timeout (10-300)
emul.1.12 = 1200                 /* VCC timeout
emul.1.13 = 300                  /* Aging time (10-300)
                                 /* LES ATM address (40 hex digits)
emul.1.14 = 399999999999990000099990C0240008210C20102
emul.1.15 = 5                    /* Max unknown frame count (1-10)
```

Test Examples

```
emul.1.16 = 1                   /* Max retry count (0-2)
emul.1.17 = 15                  /* Forward time delay (4-30)
emul.1.18 = 1                   /* LE ARP timeout (1-30)
emul.1.19 = 1                   /* Flush timeout (1-4)
emul.1.20 = 6                   /* Path switching delay (1-8)
emul.1.21 = 4                   /* Connection complete timeout (1-10)
```

ATM Example 3: QDIO with Two Ports on Two LPs

Figure 125 shows how we configured an OSA-Express ATM feature to run in QDIO mode.

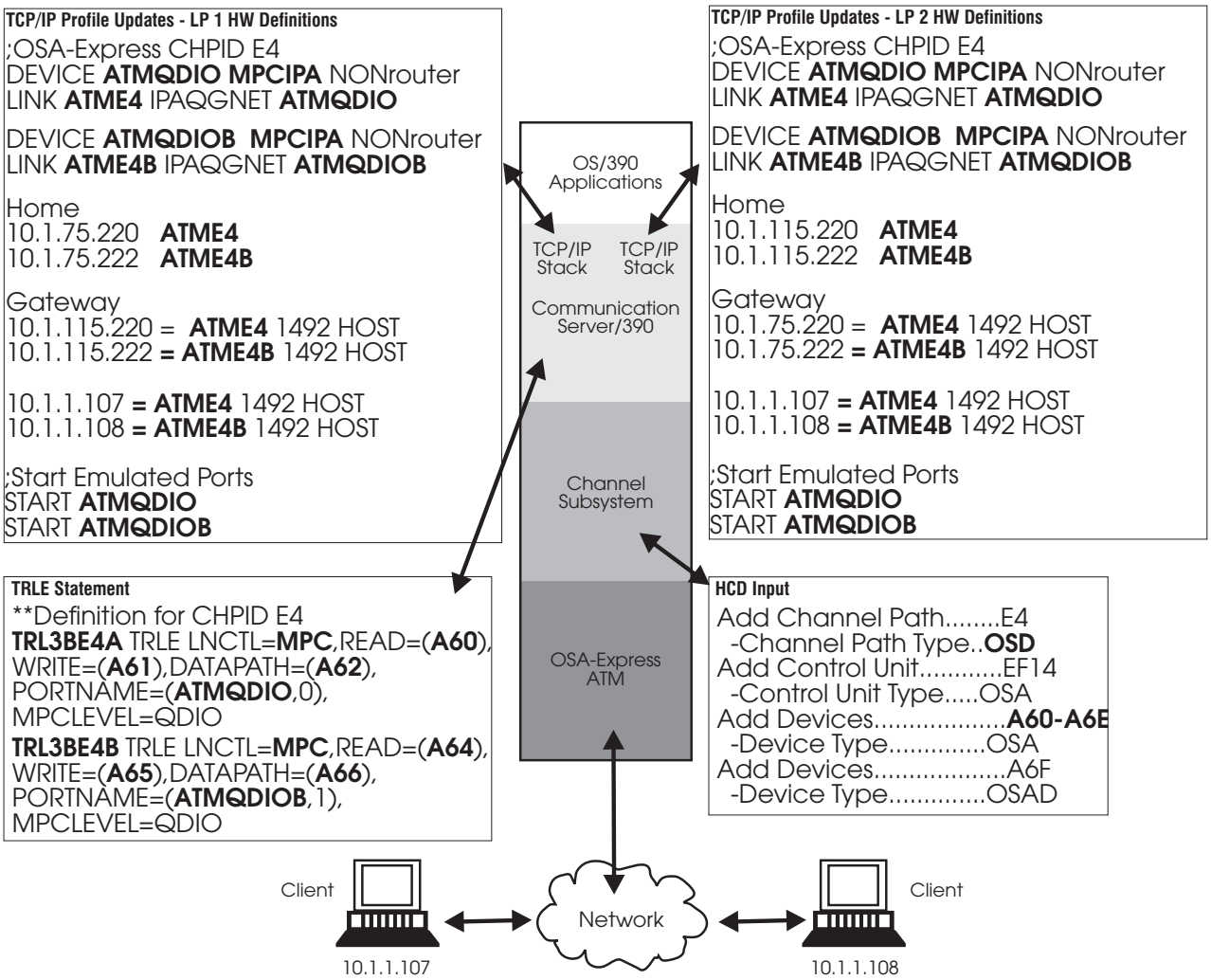


Figure 125. OSA-Express ATM Configured for QDIO on ATM with Two Logical Partitions

It is important to note that we defined the channel path type as OSD in the HCD input, and the link type as IPAQGNET in the LINK statement of the TCP/IP profile. The first two GATEWAY statements allow LP-to-LP communication. The last two GATEWAY statements allow port 0 and port 1 to communicate with two RS/6000s. Note, too, that a logical port number (0 or 1) is required in the PORTNAME definition of the TRLE statement.

The OSA address table is built automatically for OSD CHPIDs. For this configuration it contains the values shown in Figure 126 on page 373.

```
                    LP 1  (HOST 1)
60(0A60) MPC  N/A    TRL3BE4A   (QDIO control)  SIU  ALL
61(0A61) MPC  N/A    TRL3BE4A   (QDIO control)  SIU  ALL
62(0A62) MPC  00 No  TRL3BE4A   (QDIO data)     SIU  ALL
                     010.001.075.220
                     010.001.075.222
63(0A63) N/A                    N/A    CSS
64(0A64) MPC  N/A    TRL3BE4B   (QDIO control)  SIU  ALL
65(0A65) MPC  N/A    TRL3BE4B   (QDIO control)  SIU  ALL
66(0A66) MPC  01 No  TRL3BE4B   (QDIO data)     SIU  ALL
                     010.001.075.222
                     010.001.075.220
```

```
                    LP 2  (HOST 2)
60(0A60) MPC  N/A    TRL3BE4A   (QDIO control)  SIU  ALL
61(0A61) MPC  N/A    TRL3BE4A   (QDIO control)  SIU  ALL
62(0A62) MPC  00 No  TRL3B E4A  (QDIO data)     SIU  ALL
                     010.001.115.220
                     010.001.115.222
63(0A63) N/A                    N/A    CSS
64(0A64) MPC  N/A    TRL3BE4B   (QDIO control)  SIU  ALL
65(0A65) MPC  N/A    TRL3BE4B   (QDIO control)  SIU  ALL
66(0A66) MPC  01 No  TRL3BE4B   (QDIO data)     SIU  ALL
                     010.001.115.222
                     010.001.115.220
```

Figure 126. Contents of OAT (Built Automatically) for ATM Feature Running QDIO on Two LPs with Two Ports

ATM Example 4: Ethernet LAN Emulation with Dynamic VIPA

This example shows how we configured two OSA-Express ATM QDIO CHPIDs for Dynamic VIPA with the OSPF Routing Protocol. The ATM features are both configured for ATM LE Ethernet on two LPs with three workstations.

In Figure 127 on page 374, ethernet1, ethernet2, and ethernet3 are the names of the three different ELANs used. By using OSPF and defining the TCP/IP devices to be Primary and Secondary routers, we were able to have each workstation ping the other two workstations, even though they were on different networks.

The workstations were configured to have static routes pointing to the physical OSA feature addresses, giving each direct access to the other workstations. This was strictly for testing the OSPF protocol. Each workstation had another static route defined to allow it access to the 9.10.20.xx network through the dynamic VIPA addresses.

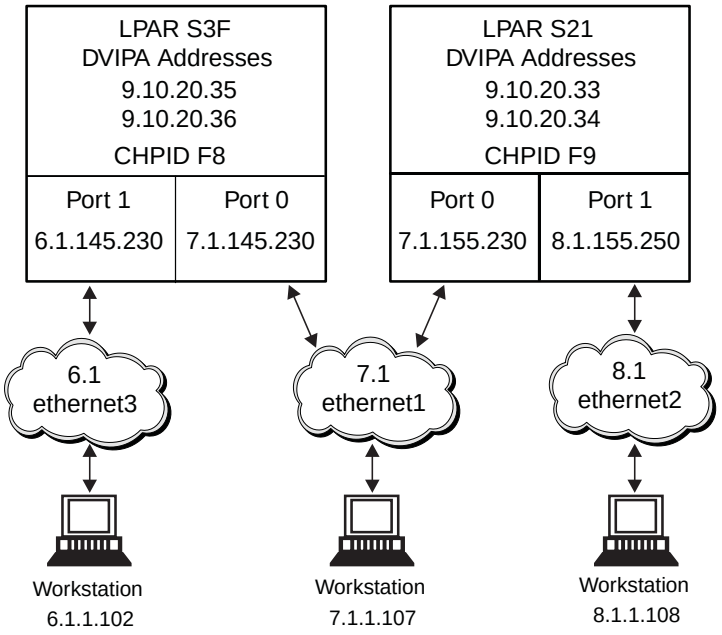


Figure 127. Two OSA-Express ATM Features Configured for Ethernet LAN Emulation with Dynamic VIPA

TRL Statements

These are the TRL statements we used:

S3F - TRLATMF8

```
TRL        VBUILD  TYPE=TRL
***
TRLCH0F8  TRLE   LNCTL=MPC,
                   READ=560,
                 WRITE=561,
                 DATAPATH=(562),
                 PORTNAME=(DEV0F802,0),
                 MPCLEVEL=QDIO
TRLCH1F8  TRLE   LNCTL=MPC,
                 READ=564,
                 WRITE=565,
                 DATAPATH=(566),
                 PORTNAME=(DEV1F802,1),
                 MPCLEVEL=QDIO
```

S21 - TRLATMF9

```
TRL        VBUILD   TYPE=TRL
 ***
TRLCH0F9  TRLE   LNCTL=MPC,
                   READ=580,
                   WRITE=581,
                   DATAPATH=(582),
                   PORTNAME=(DEV0F902,0),
                   MPCLEVEL=QDIO
TRLCH1F9  TRLE   LNCTL=MPC,
                   READ=584,
                   WRITE=585,
                   DATAPATH=(586),
                   PORTNAME=(DEV1F902,1),
                   MPCLEVEL=QDIO
```

TCP/IP Profiles

Following are the key statements in the TCP/IP profiles used for this configuration. Note that there are no Gateway statements. This is because we used OSPF, which does not require Gateway statements.

LP S3F - TCP/IP Profile OSPFS3FV

```
; Dynamic VIPA Definitions
;
  VIPADYNAMIC
     VIPADEFINE   255.255.255.248 9.10.20.35   9.10.20.36
     VIPABACKUP    100    9.10.20.34
     VIPABACKUP     70    9.10.20.33
  ENDVIPADYNAMIC

; OSAD ATM CHPID F8

  DEVICE DEV0F802 MPCIPA PRIROUTER AUTORESTART
  LINK LNK0F802 IPAQGNET DEV0F802

  DEVICE DEV1F802 MPCIPA SECROUTER AUTORESTART
  LINK LNK1F802 IPAQGNET DEV1F802

HOME
   7.1.141.230     LNK0F802
   6.1.141.230     LNK1F802


  START DEV0F802
  START DEV1F802
```

LP S21 - TCP/IP Profile OSPFS21V

```
; Dynamic VIPA Definition
;
  VIPADYNAMIC
     VIPADEFINE   255.255.255.248   9.10.20.33   9.10.20.34
     VIPABACKUP    100    9.10.20.35
     VIPABACKUP     70    9.10.20.36
  ENDVIPADYNAMIC
;
; OSAD ATM CHPID F9

  DEVICE DEV0F902 MPCIPA PRIROUTER
  LINK LNK0F902 IPAQGNET DEV0F902

  DEVICE DEV1F902 MPCIPA SECROUTER
  LINK LNK1F902 IPAQGNET DEV1F902

HOME
   7.1.151.230     LNK0F902
   8.1.151.250     LNK1F902


  START DEV0F902
  START DEV1F902
```

OMPROUTE Configuration File

We used OMPROUTE to invoke OSPF. The following key parts of the OMPROUTE configuration file show how we defined LP S3F for CHPID F8. The only differences between this and the configuration file for LP S21 are the physical IP addresses and the link names.

```
S3F - OMPROUTE Config Info
AREA
   Area_Number=0.0.0.0
;
Comparison=Type2;
;
OSPF_INTERFACE
   IP_address=7.1.145.230
   Name=LNK0F802
   Subnet_mask=255.0.0.0
   Demand_Circuit=no
   Attaches_To_Area=0.0.0.0
   MTU=1492
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=10
   Dead_Router_Interval=40
   Cost0=3
;
OSPF_INTERFACE
   IP_address=6.1.145.230
   Name=LNK1F802
   Subnet_mask=255.0.0.0
   Demand_Circuit=no
   Attaches_To_Area=0.0.0.0
   MTU=1492
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=10
   Dead_Router_Interval=40
   Cost0=3
;
```

```
OSPF_INTERFACE
   IP_address=9.10.20.32
   Name=DynVIPAAddress
   Subnet_mask=255.255.255.248
;
 AS_BOUNDARY_ROUTING
    Import_RIP_Routes=No
    Import_Static_Routes=YES
    Import_Direct_Routes=YES
    Import_Subnet_Routes=Yes
    Originate_Default_Route=No
    Originate_as_Type=2
    Default_Route_Cost=1
```

HCD Definitions

These are the HCD values we used in the hardware I/O definitions:

```
Channel Subsystem
Add Channel Path...........F8
   -Channel Path Type...OSD
Add Control Unit.............EEF8
   -Control Unit Type......OSA
Add Devices..................560-56E
for port 1
   -Device Type.............OSA
Add Devices.................56F
   -Device Type.............OSAD

Add Channel Path...........F9
   -Channel Path Type...OSD
Add Control Unit.............EEF9
   -Control Unit Type......OSA
Add Devices..................580-58E
for port 1
   -Device Type.............OSA
Add Devices.................58F
   -Device Type.............OSAD
```

GET_CONFIG Output

Finally, we include below the key parts of the output from the GET_CONFIG output showing the basic configuration of ATM CHPID F8. Because the configurations for both CHPID F8 and F9 are so similar, we show only one. The main differences are the MAC addresses and the ELANs to which the ports are assigned.

```
ATM Configuration
 |

|------------------------------------------------------------------------------>
OSA-Direct Express ATM

Output (from a REXX Get Config):

/*    For OSD (QDIO) CHPIDs, no OAT file is required or asked for by
/*    IOACMD.
/*====================================================================
/* Parameters for physical port 0
/*====================================================================
phy.0.1 = OSD-ATM                /* Configuration name (32-char max)
phy.0.2 = OSD-ATM                /* Port description (16-char max)
phy.0.3 = PCI02F8                /* Port name (8-char max)
phy.0.4 = 0020357C22F8           /* Local End System ID (12 hex digits)
phy.0.5 = Auto                   /* Port UNI version (AUTO, 30 or 31)
phy.0.6 = 0                      /* Control plane use
                                 /*  0 - ILMI & SVC enabled
                                 /*  3 - ILMI & SVC disabled
phy.0.7 = 0                      /* Transmit clock source
                                 /*  0 - OSA generated
```

```
                                /*  1 - Network generated
phy.0.8 = 0                     /* Physical layer type
                                /*  0 - Sonet
                                /*  1 - SDH
phy.0.9 = 0.0.0.0               /* TCP/IP instance IP address
phy.0.10= 1                     /* Bandwidth allocation
                                /*  1 - Best effort only
                                /*  2 - Reserve bandwidth
                                /*      & best effort
                                /*  3 - Reserved bandwidth
/*====================================================================
/* Parameters for emulated port 0
/*
/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*
/* Emulated token ring is valid only for OSE (non-QDIO) CHPIDs.
/*====================================================================
emul.0.1  = OSD-Ethernet        /* Configuration name (32-char max)
emul.0.2  = Yes                 /* Enable LAN traffic (Yes, No)
emul.0.3  = 1                   /* Emulated port type
                                /*  1 - Ethernet
                                /*  2 - Token ring
emul.0.4  = port0000        /* User data (32-char max)
emul.0.5  = ethernet1           /* ELAN name (32-char max)
emul.0.6  = 0210101010F8        /* Local MAC address (12 hex digits)
emul.0.7  = 155                 /* Best effort peak rate (1-155)
                                /*  in 0.1 increments
emul.0.8  = 1                   /* IBM Enhanced mode
                                /*  0 - drop direct connect
                                /*  Not 0 - keep connections
/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
/*====================================================================
emul.0.9  = 1516                /* Max LAN frame size
emul.0.10 = 0                   /* LEC auto configure
                                /*  0 - disable auto config
                                /*    parms 11-21 are valid
                                /*  1 - enable auto config
                                /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
/*====================================================================
emul.0.11 = 120                 /* Control timeout (10-300)
emul.0.12 = 1200                /* VCC timeout
emul.0.13 = 300                 /* Aging time (10-300)
                                /* LES ATM address (40 hex digits)
emul.0.14 = 399999999999990000099990C0140008210000102
emul.0.15 = 5                   /* Max unknown frame count (1-10)
```

Test Examples

```
emul.0.16 = 1                    /* Max retry count (0-2)
emul.0.17 = 15                   /* Forward time delay (4-30)
emul.0.18 = 1                    /* LE ARP timeout (1-30)
emul.0.19 = 1                    /* Flush timeout (1-4)
emul.0.20 = 6                    /* Path switching delay (1-8)
emul.0.21 = 4                    /* Connection complete timeout (1-10)
/*====================================================================
/* Parameters for emulated port 1
/*
/* Parameters emul.p.22.1 to emul.p.22.32 are used to specify group
/* addresses for port 'p'.  You can have up to 32 assigned per OSA.
/* The last index specifies which group address you are setting.
/* emul.1.22.4 is used to set group address 4 on emulated port 1.
/* The format of this parameter is 12 hex digits - 1234567890AB.
/*
/* To specify a group address, modify the proper emul.p.22.y entry.
/* To omit a group address, set emul.p.22.y to 0 or delete the entry
/* from this file.  If you do not want any group addresses, you can
/* omit all these parameters.
/*
/* Emulated token ring is valid only for OSE (non-QDIO) CHPIDs.
/*====================================================================
emul.1.1  = OSD-Ethernet1        /* Configuration name (32-char max)
emul.1.2  = Yes                  /* Enable LAN traffic (Yes, No)
emul.1.3  = 1                    /* Emulated port type
                                 /*  1 - Ethernet
                                 /*  2 - Token ring
emul.1.4  = port1111             /* User data (32-char max)
emul.1.5  = ethernet3           /* ELAN name (32-char max)
emul.1.6  = 0220202020F8         /* Local MAC address (12 hex digits)
emul.1.7  = 155                  /* Best effort peak rate (1-155)
                                 /*  in 0.1 increments
emul.1.8  = 1                    /* IBM Enhanced mode
                                 /*  0 - drop direct connect
                                 /*  Not 0 - keep connections
/*====================================================================
/* Valid values for Max LAN frame size are 1516, 4544, 9234 or 18190.
/* If enable auto configure is set, emul.p.10 = 1, the value you
/* specify for Max LAN frame size will be checked that it matches the
/* value obtained from the switch.
/*====================================================================
emul.1.9  = 1516                 /* Max LAN frame size
emul.1.10 = 0                    /* LEC auto configure
                                 /*  0 - disable auto config
                                 /*    parms 11-21 are valid
                                 /*  1 - enable auto config
                                 /*    parms 11-21 are ignored
/*====================================================================
/* Parameters emul.p.11 through emul.p.21 are used only when
/* LEC auto config is disabled.
/*
/* When LEC auto configure is disabled, (emul.p.10 = 0), the values
/* you specify for parameters emul.p.11 through emul.p.21 must be valid.
/*
/* When LEC auto configure is enabled, (emul.p.10 = 1), you must specify
/* parameters emul.p.11 through emul.p.21, but they are not checked.
/*====================================================================
emul.1.11 = 120                  /* Control timeout (10-300)
emul.1.12 = 1200                 /* VCC timeout
emul.1.13 = 300                  /* Aging time (10-300)
                                 /* LES ATM address (40 hex digits)
emul.1.14 = 39999999999999000099990C0140008210000104
emul.1.15 = 5                    /* Max unknown frame count (1-10)
emul.1.16 = 1                    /* Max retry count (0-2)
emul.1.17 = 15                   /* Forward time delay (4-30)
emul.1.18 = 1                    /* LE ARP timeout (1-30)
emul.1.19 = 1                    /* Flush timeout (1-4)
```

```
emul.1.20 = 6                    /* Path switching delay (1-8)
emul.1.21 = 4                    /* Connection complete timeout (1-10)
/*************************************************************************
/**********    End of Configuration file output    *********************
/*************************************************************************
```

OSA-Express Fast Ethernet Examples

FENET Example 1: Multiple IP Passthru Entries per OAT

Defining multiple IP passthru entries for a given OAT is another way of enhancing network availability. We wanted to ensure that a TCP/IP packet could be successfully routed through an alternate IP address in the event of a device failure. Pings were used to determine whether the packets were routed successfully.

For our test we used a simple configuration consisting of:

- One LP (S30, LP17)
- Two OSA-Express Fast Ethernet CHPIDs, D8 and EC
- One RS/6000 workstation as a client

We configured the environment as shown in Figure 128.

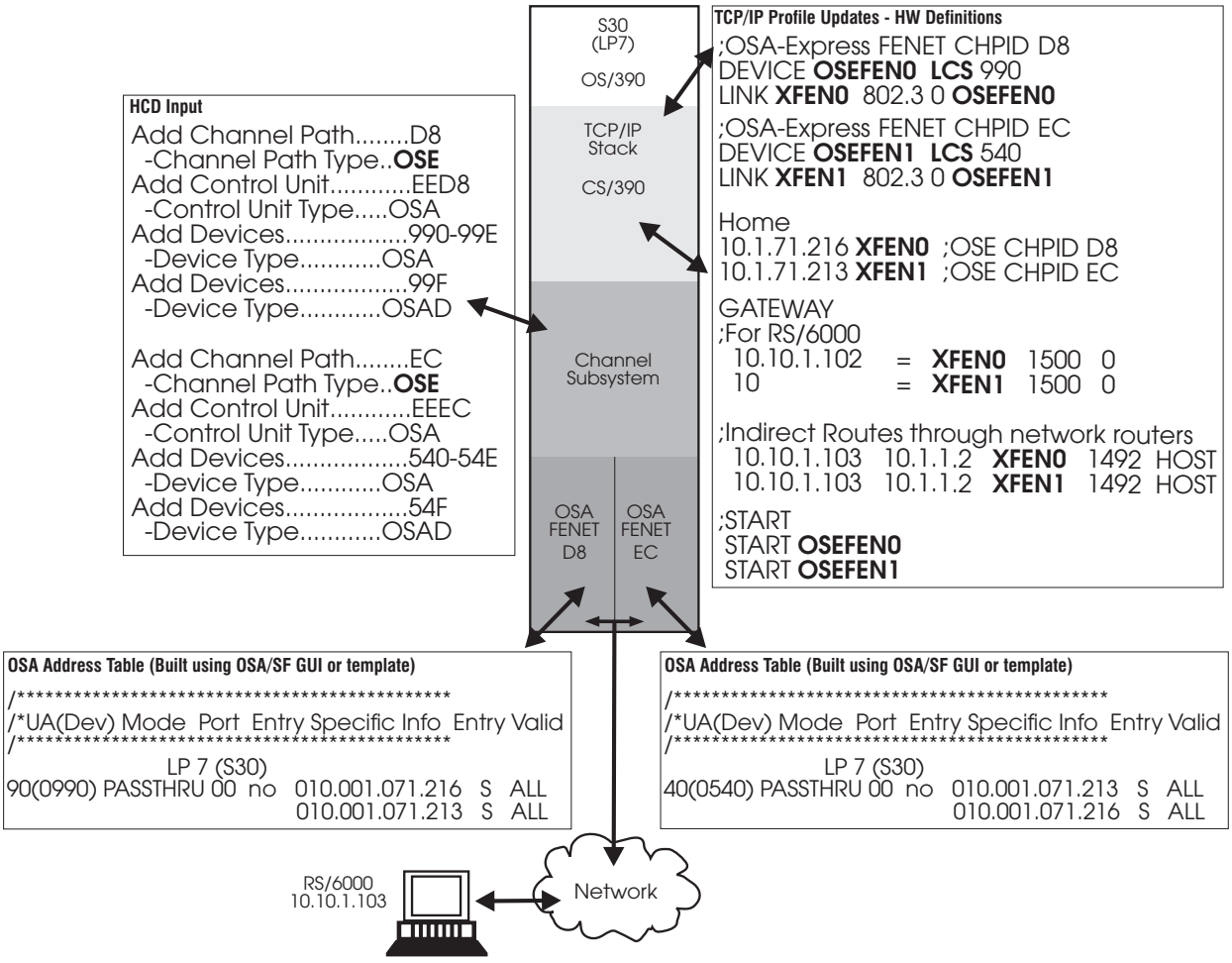


Figure 128. Multiple IP Passthru Entries

Test Examples

We ran this test case two ways:

- We stopped the device with the `vary tcpip,tcpip,stop,xxxxxx` command and then started it again (`vary tcpip,tcpip,start,xxxxxx`). (*xxxxxx* is the DEVICE name as specified in the TCP/IP profile.)
- We pulled the CHPID cable and then reinserted the cable to force the recovery action.

We followed these steps to ensure that the alternate path was used and that TCP/IP ARP takeover occurred.

Note: We used the **arp -a** command to display the arp table on the workstation.

1. We started TCP/IP on S30, using the profile in Figure 128 on page 379.
2. From the workstation, we cleared the arp table to get rid of any residual entries left over from previous testing.
3. We pinged both CHPIDs D8 and EC to verify that the packets were successfully routed. The arp table showed that 10.1.71.216 was associated with D8's MAC, and 10.1.71.213 was associated with EC's MAC address.
4. We issued **v tcpip,tcpip,stop,osefen0** to stop D8. These messages were sent to the operator console and SYSLOG:

   ```
   EZZ0053I COMMAND VARY STOP COMPLETED SUCCESSFULLY
   EZZ4329I LINK XFEN1 HAS TAKEN OVER ARP RESPONSIBILITY FOR INACTIVE LINK XFEN0
   EZZ4315I DEACTIVATION COMPLETE FOR DEVICE XFEN0
   ```

5. We pinged both CHPIDs D8 and EC. The arp table showed that 10.1.71.216 and 10.1.71.213 were both associated with EC's MAC address.
6. We issued **v tcpip,tcpip,start,osefen0** to restart D8. Then we pinged both CHPIDs D8 and EC. The arp table now showed that 10.1.71.216 was associated with D8's MAC address, and 10.1.71.213 was associated with EC's MAC address. These messages were sent to the operator console and SYSLOG:

   ```
   EZZ0053I COMMAND VARY START COMPLETED SUCCESSFULLY
   EZZ4313I INITIALIZATION COMPLETE FOR DEVICE XFEN0
   ```

7. We issued **v tcpip,tcpip,stop,osefen1** to stop EC.
8. We pinged both CHPIDs D8 and EC. The arp table showed both 10.1.71.216 and 10.1.71.213 associated with D8's MAC address.
9. We issued **v tcpip,tcpip,start,osefen1** to restart EC.
10. Now the arp table showed that 10.1.71.216 was associated with D8's MAC address, and 10.1.71.213 was associated with EC's MAC address.

When we pulled the cable, these messages were sent to the operator console and SYSLOG:

```
EZZ4311I LINK XFED8 HAS FAILED ON DEVICE OSEFED8
EZZ4329I LINK XFEN1 HAS TAKEN OVER ARP RESPONSIBILITY FOR INACTIVE LINK XFEN0
EZZ4315I DEACTIVATION COMPLETE FOR DEVICE XFEN0
```

Since we were managing CHPID D8, we also received two additional OSA/SF port alert messages at the operator console, the SYSLOG, and the OSA/SF message log:

```
IOAC252I hh:mm:ss The state of physical port 0 changed on CHPID D8
IOAC260I Physical port 0 reports a loss of signal
```

When we reinserted the cable, these additional port messages were sent to the operator console, the SYSLOG, and the OSA/SF message log:

```
IOAC252I hh:mm:ss The state of physical port 0 changed on CHPID D8
IOAC260I Physical port 0 enabled on CHPID D8
```

Gigabit Ethernet Configuration Examples

Gigabit Ethernet Example 1: Basic Mode

Figure 129 shows an example of the definitions required in the TRLE, TCP/IP Profile, and HCD for an OSA-Express in basic mode (no logical partitions).

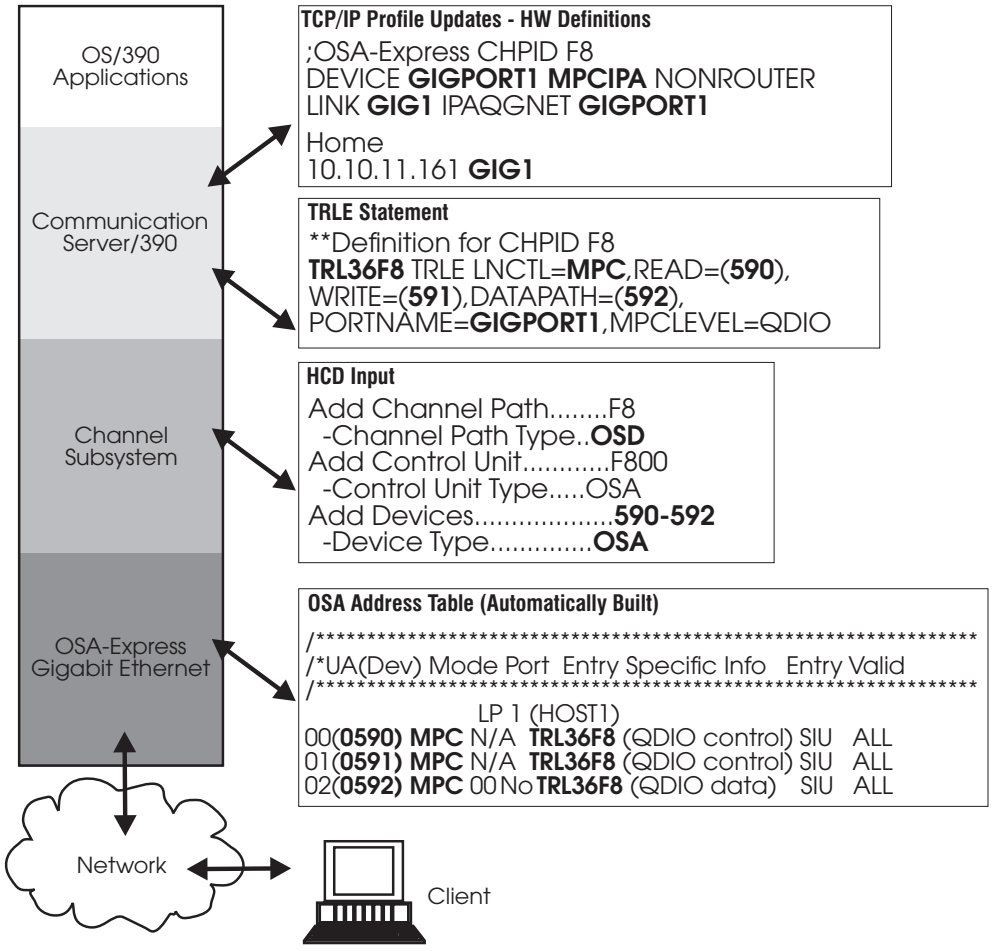


Figure 129. OSA-Express GbE Definitions for S/390 in BASIC Mode — No Logical Partitions

Note how **GIGPORT1**, specified for the DEVICE name in the TCP/IP profile, matches the PORTNAME as defined in the TRLE statement. Note too, how the device numbers, **590**–**592**, specified for READ, WRITE, and DATAPATH in the TRLE statement are defined in the HCD input.

The OSA address table (OAT) is automatically created, reflecting the device addresses, **MPC** channel type, and **TRL** name you specified. Figure 129 shows the OAT that would be returned from a QUERY or a GET OAT command, based on these inputs.

Gigabit Ethernet Example 2: Two TCP/IP Stacks

In order to add a second TCP/IP stack, an additional DATAPATH device must be added to the TRLE statement and defined to HCD. Figure 130 shows these additions, including a second TCP/IP Profile update for the new link name and IP address used by the second stack.

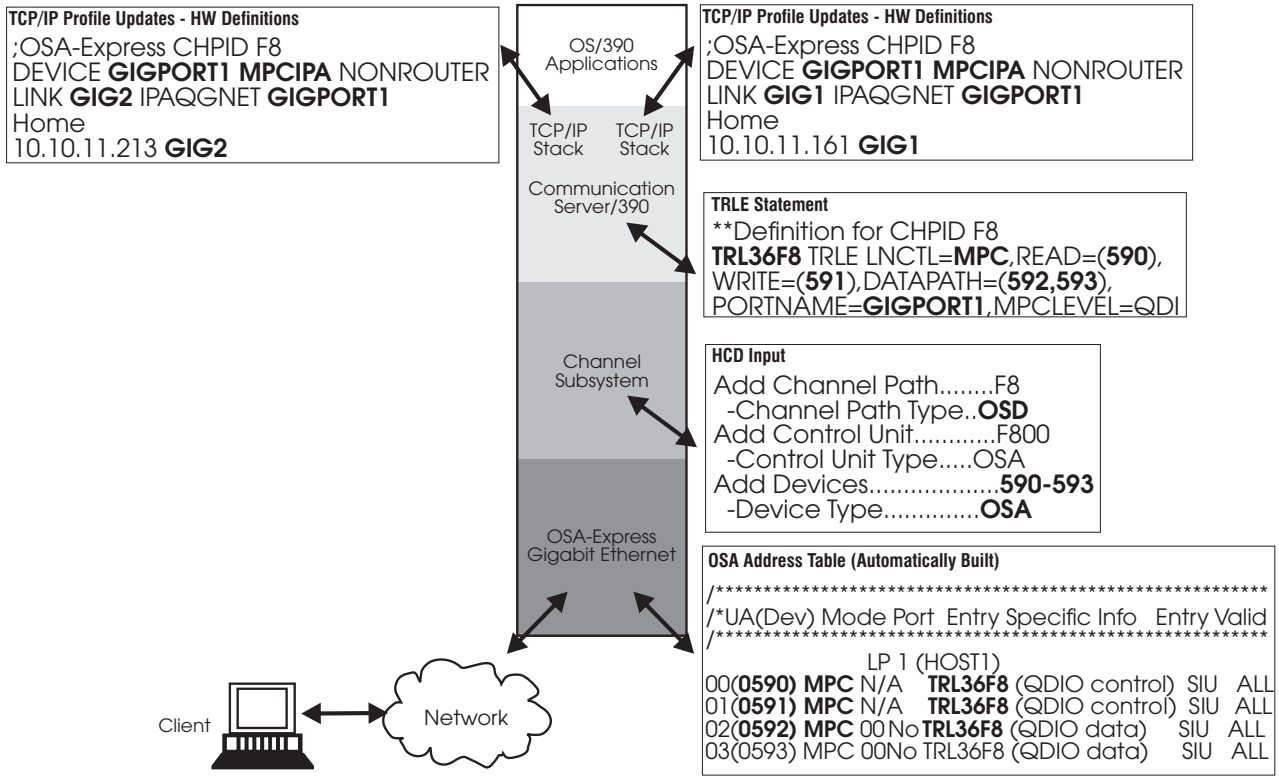


Figure 130. OSA-Express GbE Definitions for S/390 with Two TCP/IP Stacks

Gigabit Ethernet Example 3: Two LPs

Figure 131 shows an example of the definitions required in the TRLE, TCP/IP Profile, and HCD for an OSA-Express shared between two logical partitions.

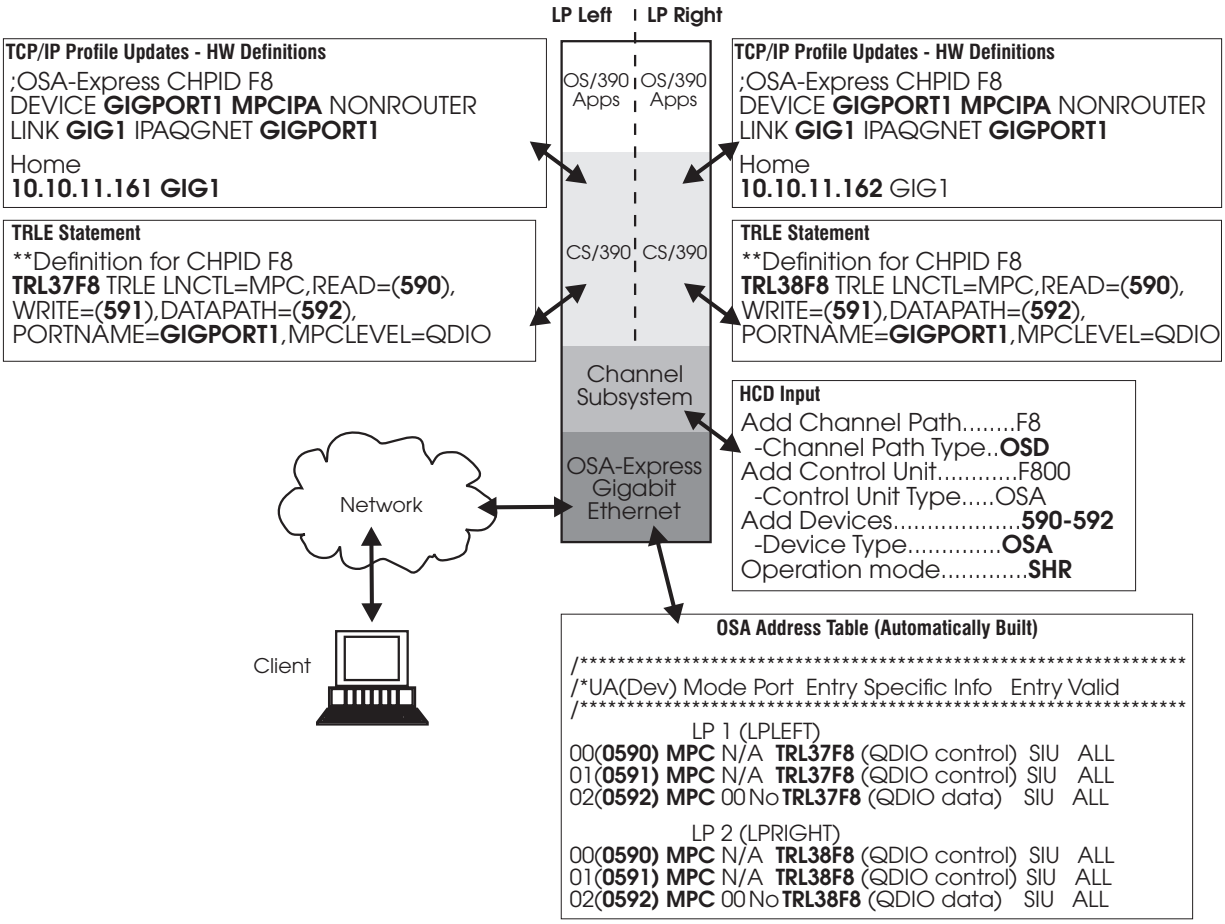


Figure 131. OSA-Express GbE Definitions for S/390 in LPAR Mode with Two Logical Partitions

In Figure 131, two different home IP addresses are specified in the TCP/IP profile, and two different TRLE statements are defined. Because the operation mode for the OSA channel path is specified as **SHR** in the HCD, both LPs have access to the READ, WRITE, and DATAPATH devices.

Note that two different OATs are generated, both of which would be returned from a QUERY or a GET OAT command issued from either LP.

OSA-Express Token Ring Example: QDIO Mode with VIPA and Enterprise Extender

Enterprise extender allows us to run SNA traffic on the IP network. Using VIPA, we eliminate hardware and transmission media as a single point of failure by configuring the stack to a virtual IP address rather than to the OSA-Express CHPID. Both of these Communications Server functions are defined in the DEVICE, LINK, and HOME statements in the TCP/IP profile. Extra devices must be defined in the TRLE statement as well.

Test Examples

See “Enterprise Extender” on page 20 and “Virtual IP Addressing” on page 19 for brief descriptions. *z/OS Communications Server: IP Configuration Guide* contains a thorough description and detailed examples of VIPA configuration.*z/OS Communications Server: SNA Network Implementation Guide* contains detailed instructions for Enterprise Extender configuration.

We configured the OSA-Express Token Ring feature as shown in Figure 132.

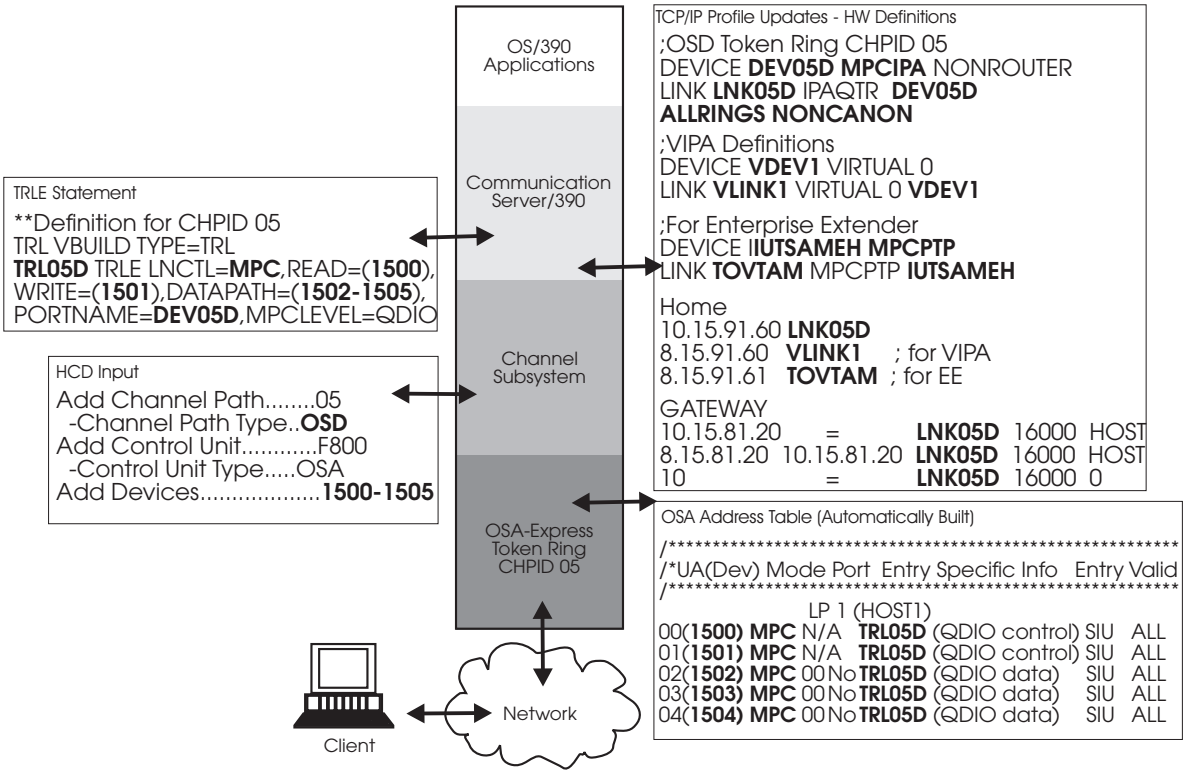


Figure 132. Token Ring QDIO with VIPA and EE

Note that for an OSD (QDIO) OSA-Express Token Ring CHPID, the DEVICE type is **MPCIPA** and the LINK type is **IPAQTR**. To configure an OSE (non-QDIO) OSA-Express Token Ring CHPID, the DEVICE type would be LCS and the LINK type would be IBMTR. For OSE, the OAT would not be automatically built but would require input to the mode configuration procedure described in Chapter 8, “Configuring OSA-Express Modes” on page 149.

The LINK statement for the IPAQTR link type includes two unique parameters: **ALLRINGsbcast** and **NONCANONical**. These are defaults and need not be explicitly specified. If these defaults are not wanted, you must specify the alternative values: **LOCALBcast** and **CANONical**. “Updating the TCP/IP Profile for QDIO” on page 130 describes these parameters.

The Switched Major Node includes the following definitions with an IP address that corresponds to the GATEWAY statement in the TCP/IP profile.

```
SWTRS36  VBUILD TYPE=SWNET
*          - TO USE THIS SWITCHED MAJOR NODE FOR ANY CHPID, JUST CHANGE
*            THE IP ADDRESS AND THE CPNAME TO MATCH THE IP ADDRESS AND
*            CPNAME USED ON THE PARTITION BEING DIALED.
*********************************************************************
```

```
*
TOIPS31  PU    ADDR=01,                                          X
               CPCP=YES,                                         X
               HPR=YES,                                          X
               CAPACITY=16M,                                     X
               CPNAME=VTAM31,                                    X
               MAXDATA=256,                                      X
               PUTYPE=2
PTHIPS31 PATH  GRPNM=GPIP,                                       X
               IPADDR=8.15.81.20,                                X
               SAPADDR=4
```

The Partition being dialed would have a similar TCPIP Profile and Switched Major node pointing to this Partition.

The following XCA Major Node is also required for Enterprise Extender (MEDIUM=HPRIP):

```
*  NAME:  XCAIP (XCA MAJOR NODE FOR HPR OVER UDP--ENTERPRISE EXTENDER)
XCAIP    VBUILD TYPE=XCA
PORTIP   PORT  MEDIUM=HPRIP,SAPADDR=4
GPIP     GROUP DIAL=YES,ANSWER=ON,ISTATUS=ACTIVE,CALL=INOUT
LNIP1    LINE
PIP1     PU
          |
          |
LNIPx    LINE
PIPx      PU
```

Priority Queuing

CS for OS/390 and OSA-Express provide a function for QDIO devices that assigns a priority value to each outbound datagram and attempts to provide preferential service to the higher priority data. CS for OS/390 supports four priority values (1-4) for outbound QDIO traffic (with 1 being the highest priority). TCP/IP uses the first three bits of the type-of-service (TOS) byte in the IP header to determine the outbound priority value for a given datagram. The default mapping of TOS values to priorities is:

TOS Setting	Priority
111	1
110	1
101	1
100	1
011	2
010	3
001	4
000	4

As the following discussion shows, you can use the OS/390 UNIX Service Policy Agent to override the default mapping of TOS values to priorities.

To set up a TCP/IP Service Policy for Service Differentiation functions, we first ensured that the correct file system was available. Having determined that the HFS was mounted, we were now able to run PAGENT, the OS/390 UNIX System Services Policy Agent. But activating the Policy Agent without setting any priorities makes no sense, so we had to find out how priorities are set. We turned to *OS/390 Communications Server: IP Configuration* for information. That publication contains an entire chapter devoted to configuring Service Policy.

An initial policy configuration file is required to start PAGENT. Although a sample is provided, the default settings are of no use, so we built an initial configuration file by copying the sample file located at **/usr/lpp/tcpip/samples/pagent.conf** to location **/tmp/pagent.conf**. Since this configuration file was copied to a subdirectory of root, it may be lost if the OS/390 driver is changed. You may wish to store your configuration file in a directory that will not be lost should the driver change, or in a partitioned data set from which they can be restored.

Customize the configuration file to suit your environment. For our test runs, we modified the file in the following ways.

SetSubnetPrioTosMask Statement

This statement defines the TOS/priority field in the IP header type of service byte. It is used by the TCP/IP stack to read the TOS value and assign appropriate service to the corresponding IP packets. If this statement is not specified, TCP/IP will use the system default TOS mask and priority levels for all interfaces currently defined for IPv4.

```
SetSubnetPrioTosMask
{
   SubnetAddr         10.10.11.161  # CHPID F0
   SubnetTosMask      11100000
   PriorityTosMapping 1 11100000
   PriorityTosMapping 1 11000000
   PriorityTosMapping 2 10100000
   PriorityTosMapping 2 10000000
   PriorityTosMapping 3 01100000
   PriorityTosMapping 3 01000000
   PriorityTosMapping 4 00100000
   PriorityTosMapping 4 00000000
}
```

As you can see, the sample configuration file allows eight separate TOS setting identifiers, with the user controlling the assignment of priority level. We used only five TOS settings, two for priority 1 and the first one for each subsequent priority: 11100000, 11000000, 10100000, 01100000, and 00100000.

ServiceCategories Statements

This statement specifies the type of service that a flow of IP packets (for example, from a TCP connection, or UDP data) should receive end-to-end as it traverses the network. ServiceCategories can be repeated with each having a different name so that they can be referenced later.

```
ServiceCategories   inter1
{
             PolicyScope    DataTraffic
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    11100000
}

 ServiceCategories   inter2
{            PolicyScope    DataTraffic
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    11000000
}

ServiceCategories   ftp1
{
             PolicyScope    DataTraffic
             MaxRate        100000

             MinRate        10000
             MaxTokenBucket 10000
             Priority       2
             Interface      10.10.11.161

             OutgoingTOS    10100000

}

ServiceCategories   stream1
```

```
{                          #
             PolicyScope    DataTraffic
             MaxRate        100000

             MinRate        10000
             MaxTokenBucket 10000
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    01100000

}

ServiceCategories   batch1
{
             PolicyScope    DataTraffic
             Priority       4
             Interface      10.10.11.161

             OutgoingTOS    00100000

}
```

We included one ServiceCategories statement for each TOS setting we planned to use in this configuration. Although we left them in the configuration file, the default service categories for the three TOS settings we didn't use are not shown.

ServicePolicyRules Statements

This statement specifies the characteristics of IP packets that are used to match to a corresponding service category. In other words, it defines a set of IP datagrams that should receive a particular service.

```
ServicePolicyRules  netrule1
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2121 2140
     ServiceReference   inter1
}

ServicePolicyRules  netrule2
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2141 2160
     ServiceReference   ftp1
}

ServicePolicyRules  netrule3
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2161 2180
     ServiceReference   stream1
}

ServicePolicyRules  netrule4
{
```

```
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2181 2190
     ServiceReference   batch1
}

ServicePolicyRules  rule2
{
     PolicyScope        DataTraffic
     Direction          Outgoing
     Permission         Allowed
     ProtocolNumber     1         # ping
     ServiceReference   inter2
}
```

For our tests, the SourcePortRange was especially meaningful since our application differentiated traffic on the basis of this parameter. It allowed us to control the priority of our traffic using the port designation in each iteration of the application.

As these statements show, we set SourcePortRanges for netrules 1 through 4, and used rule2 to set a priority for *ping* traffic. Thus, our configuration file settings can be summarized as follows:

Priority	TOS Setting	Service Category	ServicePolicyRule	Protocol	Port Range
1	11100000	inter1	netrule1	#6 tcp	2121-2140
1	11000000	inter2	rule2	#1 ping	
2	10100000	ftp1	netrule2	#6 tcp	2141-2160
2	10000000	ftp2			
3	01100000	stream1	netrule3	#6 tcp	2161-2180
3	01000000	stream2			
4	00100000	batch1	netrule4	#6 tcp	2181-2190
4	00000000	batch2			

Empty cells indicate unused settings.

With a customized configuration file installed, you can now start PAGENT. The pagent command is located in the **/usr/lpp/tcpip/sbin** directory, which should be in your path. Include the configuration file's path in your command as well:

```
pagent -c /tmp/pagent.conf
```

You should verify that the agent successfully started by browsing the **/tmp/pagent.log** file to ensure that only informational messages were generated. You can also specify the **−d** flag with the pagent command to display startup progress.

Once the agent is running you can begin TCP/IP transmissions that correspond to the setting in your policy configuration file.

As priority queuing is designed, any traffic assigned priority 1 is transmitted from the TCP/IP stack as soon as it is received. In order to improve throughput, priorities 2 through 4 may be held for millisecond periods to allow blocking of Maximum Transfer Units (datagrams) before being transmitted, in priority order. If the link is

not saturated, the priority scheme may have little impact on your traffic. In that case all traffic is released as soon as it is received, effectively on a first come–first served basis. This makes it difficult to predict how fast one application may transmit data relative to another.

VLAN Priority Tagging

To test this function we updated the service policy agent data set to modify the SetSubnetPrioTosMask statement by adding VLAN tags . See “Priority Queuing” on page 386 for more about the service policy agent.

```
SetSubnetPrioTosMask
{
   SubnetAddr         10.10.11.161  # CHPID F0
   SubnetTosMask      11100000
   PriorityTosMapping 1 11100000 4
   PriorityTosMapping 1 11000000 4
   PriorityTosMapping 2 10100000 3
   PriorityTosMapping 2 10000000 3
   PriorityTosMapping 3 01100000 2
   PriorityTosMapping 3 01000000 2
   PriorityTosMapping 4 00100000 1
   PriorityTosMapping 4 00000000 1
}
```

The VLAN tags (shown in bold) set the Virtual LAN priority. Higher numbers indicate higher priority. In this way we set the VLAN priority to match the existing TOS priority, which assigns higher priority to lower numbers. Thus, traffic with highest TOS priority, 1, was also assigned the highest VLAN priority, 4. No other modifications were required.

Once the policy agent was invoked and traffic was run, we were able to verify that each packet contained an additional packet right after the Ethernet header. This was the 802.1Q packet reflecting the VLAN priorities set in the service policy agent data set.

Refer to *z/OS Communications Server: IP Configuration Guide* for more information.

VM Guest Support

While testing OSA-Express Gigabit Ethernet on VM we compiled the following list of observations.

Note: All references to VM in this discussion refer to VM/ESA Version 2.4, which is required for OSA-Express support of QDIO.

VM/ESA V2R4 ***does not*** support native use of the OSA-Express feature in QDIO mode, but it ***does permit*** attachment to an OS/390 guest using OSA-Express in QDIO mode.

In our test, the OS/390 guest was a member of a simple sysplex. The OS/390 guest may or may not be a member of a sysplex. There are several possible sysplex configurations:

- A coupling facility sysplex using multiple CECs, a physical coupling facility, and an external time reference
- A *simple* sysplex where multiple CECs may or may not be used and a physical coupling facility is not used, and an external time reference is used

- A *simple* sysplex where no external time reference is used, the sysplex is restricted to one CEC, and no coupling facility is used. (This was our test set-up.) The OS/390 members of the sysplex may or may not be guests of VM.
- A VM-simulated coupling facility restricted to one CEC, no physical coupling facility, and no external time reference. In this case all members of the sysplex must be guests under VM.

Only OS/390 is supported as a VM OSA-Express guest. This raises a number of questions regarding setup. In our test lab, we introduced VM into the OS/390 sysplex environment where it had not existed before. Therefore, we had to adapt our OS/390 sysplex to the configuration VM supports.

We had an established sysplex but the test called for two existing sysplex members to be placed under VM control. The other six members of the sysplex were to remain outside VM control, each in its own logical partition.

No Support for Sysplex Timer

VM does not support a physical sysplex timer. We had to convert to a simulated timer (use of the TOD clock). See the ETRMODE, ETRZONE, and SIMETRID parameters in the CLOCKxx member in the OS/390 documentation.

```
SYS1.PARMLIB(CLOCKxx)
/*-------------------*/
   OPERATOR NOPROMPT
   TIMEZONE W.00.00.00
   ETRMODE NO
   ETRDELTA 10
   ETRZONE NO
   SIMETRID 1E
```

Altered CPUID

The CPUID is essential to distinguishing members of the sysplex. When VM is introduced, it alters the CPUID. The other sysplex guests must tolerate this alteration. See the VMCPUIDTOLERATION parameter in the COUPLExx member of the OS/390 documentation.

```
SYS1.PARMLIB(COUPLExx)
/*-------------------*/
 :
 :
  COUPLE SYSPLEX(PLEX1)
  PCOUPLE(OSASOLT.COUPLE.PRIMARY,OSAXCF)
  ACOUPLE(OSASOLT.COUPLE.ALTERNAT,OSAXCF)
  CLEANUP(20)
/*          PERMIT VM GUESTS TO JOIN WITHOUT ENFORCING CPU ID  */
  VMCPUIDTOLERATION(YES)
 :
```

Channel-to-Channel Requirement

In order for members to join a sysplex, an ESCON CTC is needed between each member, forming a web of links. These ESCON CTCs must be uniquely identified in the IODF and be cross-LP eligible. Ours were not. Our IODF had to be adjusted to support more LPs and additional links (see the OS/390 COUPLExx member, operands PATHIN and PATHOUT).

Note that we were not using VM emulated coupling facility support for our tests. If that facility is used, virtual CTC links can connect the OS/390 sysplex participants. All members of the emulated coupling facility sysplex must be under VM if that facility is used.

Test Examples

Further, the requirement for our test was to support multiple OS/390 guests in the Sysplex. All our ESCON CTCs were LP-specific, that is, I/O must flow from one LP to another. In order for the two VM guests to communicate, the ESCON CTC had to be specifically allocated within the VM LP to permit guest-to-guest XCF communications.

```
SYS1.PARMLIB(COUPLExx)
/*------------------*/
 :
 :
/*                LP18    LP19    LP1A    LP11    LP12    LP13
/*********************************************************************
   PATHIN  DEVICE(880,881,890,891,8A0,8A1,810,811,820,821,830,831)
   PATHIN  DEVICE(884,885,894,895,8A4,8A5,814,815,824,825,834,835)
/*                LP15    LP17    LP14    LP16
/*********************************************************************
   PATHIN  DEVICE(850,851,870,871,840,841,860,861)
   PATHIN  DEVICE(854,855,874,875,844,845,864,865)
/*                LP18    LP19    LP1A    LP11    LP12    LP13
/*********************************************************************
   PATHOUT DEVICE(780,781,790,791,7A0,7A1,710,711,720,721,730,731)
   PATHOUT DEVICE(784,785,794,795,7A4,7A5,714,715,724,725,734,735)
/*                LP15    LP17    LP14    LP16
/*********************************************************************
   PATHOUT DEVICE(750,751,770,771,740,741,760,761)
   PATHOUT DEVICE(754,755,774,775,744,745,764,765)
```

Defining DASD

Defining the shared DASD of a simple sysplex with its JES MAS requires that the DASD be defined as full-pack mini-disks, assigned to a *slave* guest, and LINKED-TO by the OS/390 guests. The COUPLE DASD must be defined with the WORKING ALLEGIANCE (WRKALLEG) support. Note that technically, full-pack DASD are not needed if all the participants in the sysplex are under VM. Since some of our OS/390 were native, we were restricted to full-pack DASD.

```
VM DASD LINK Definitions for OS/390 SYSPLEX Guest (*)
/*-------------------------------------------*/
 :
 :
CP LINK slave_guest vdeva AS vdevaa MW
CP LINK slave_guest vdevb AS vdevbb MW
CP LINK slave_guest vdevc AS vdevcc MW  /* COUPLE DASD */
CP SET SHARED OFF real_devc
CP SET WRKALLEG ON vdevcc
CP LINK slave_guest vdevd AS vdevdd MW
CP LINK slave_guest vdeve AS vdevee MW
 :
 :
 *) Standard full-Pack mini-disk definitions for slave_guest not shown.
```

Defining Unit Addresses for Multiple Guests under One LP

The following is very precise and must be read carefully. As with OSA2, the same OSA-Express unit addresses cannot be shared between OS/390 guests WITHIN the SAME LP. To *port share* the OSA-Express in the same LP between multiple guests requires that unique addresses first be defined on each port, then the addresses be ATTACHED to the OS/390 guest. The OS/390 sharing is accomplished by defining additional groups of unit addresses in the TRLEs. Each TRLE PORTNAME must be the same. For example:

*Table 16. Multiple Guests Under One LP. *Assume only one TCP/IP image per OS/390 guest.*

VM Guest	IODF UNITADDR	Explanation*

*Table 16. Multiple Guests Under One LP (continued). *Assume only one TCP/IP image per OS/390 guest.*

MVS1	900-901	MPC Control Addresses
	902	Datapath Address
MVS2	904-905	MPC Control Addresses
	906	Datapath Address
MVS3	908-909	MPC Control Addresses
	90A	Datapath Address

MVS1, 2, and 3 are guests under one VM in one LP. Attach 900–902 to MVS1, 903–906 to MVS2, and 908–90A to MVS3.

```
VM ATTACH, TRLEs, TCP/IP LINKS for PORT SHARING WITHIN ONE LP
/*-------------------------------------------------------------*/
 A) PORTNAMES MUST BE THE SAME
 B) UNITADDRESS MUST BE DIFFERENT
 C) TRLE NAMES MUST BE DIFFERENT

CP ATT 900-902 MVS1
CP ATT 904-906 MVS2
CP ATT 908-90A MVS3

; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS1
; ---------------------------------
TCP/IP:
  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF1 IPAQGNET GIGPF0
VTAM:                                   CC72
           VBUILD TYPE=TRL
  TRLMVS1  TRLE  LNCTL=MPC,                X
                 READ=900,                 X
                 WRITE=901,                X
                 DATAPATH=(902),           X
                 PORTNAME=GIGPF0,          X
                 MPCLEVEL=QDIO

; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS2
; ---------------------------------
TCP/IP:
  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF2 IPAQGNET GIGPF0
VTAM:                                   CC72
           VBUILD TYPE=TRL
  TRLMVS2  TRLE  LNCTL=MPC,                X
                 READ=904,                 X
                 WRITE=905,                X
                 DATAPATH=(906),           X
                 PORTNAME=GIGPF0,          X
                 MPCLEVEL=QDIO


; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS3
; ---------------------------------

  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF3 IPAQGNET GIGPF0
VTAM:                                   CC72
           VBUILD TYPE=TRL
  TRLMVS3  TRLE  LNCTL=MPC,                X
                 READ=904,                 X
                 WRITE=905,                X
                 DATAPATH=(906),           X
                 PORTNAME=GIGPF0,          X
                 MPCLEVEL=QDIO
```

Defining Unit Addresses for Multiple Guests under Different LPs

The same addresses can be shared between OS/390 guests that are **not** in the same LPs. Note that the PORTNAME **must be the same** in each of the TRLEs. For example:

*Table 17. Native Systems in Unique LPs. *MVS1, 2, and 3 are either guests under* **separate VMs in separate LPs**, *or a mixture of native OS/390s and VM guest OS/390 systems.*

VM Guest	IODF UNITADDR	Explanation*
MVS1	900-901	MPC Control Addresses
	902	Datapath Address
MVS2	900-901	MPC Control Addresses
	902	Datapath Address
MVS3	900-900	MPC Control Addresses
	902	Datapath Address

```
VM ATTACH, TRLEs, TCP/IP LINKS for PORT SHARING BETWEEN THREE LPS
/*-----------------------------------------------------------------*/
 A) PORTNAMES MUST BE THE SAME
 B) UNITADDRESSES CAN BE THE SAME OR DIFFERENT
 C) TRLE NAMES MUST BE DIFFERENT

CP ATT 900-902 MVS1   /* VM GUEST; CHPID FO Shareable in IODF */
MVS2 is Native in its own LP; CHPID F0 Shareable in IODF
MVS3 is Native in its own LP; CHPID F0 Shareable in IODF

; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS1
; ---------------------------------
TCP/IP:
  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF1 IPAQGNET GIGPF0
VTAM:                                  CC72
           VBUILD TYPE=TRL
  TRLMVS1  TRLE  LNCTL=MPC,               X
                 READ=900,                X
                 WRITE=901,               X
                 DATAPATH=(902),          X
                 PORTNAME=GIGPF0,         X
                 MPCLEVEL=QDIO

; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS2
; ---------------------------------
TCP/IP:
  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF2 IPAQGNET GIGPF0
VTAM:                                  CC72
           VBUILD TYPE=TRL
  TRLMVS2  TRLE  LNCTL=MPC,               X
                 READ=900,                X
                 WRITE=901,               X
                 DATAPATH=(902),          X
                 PORTNAME=GIGPF0,         X
                 MPCLEVEL=QDIO


; OSA-Express CHPID F0 - TCP/IP AND VTAM TRLE -- MVS3
; ---------------------------------
TCP/IP
  DEVICE GIGPF0  MPCIPA NONRouter
  LINK GIGF3 IPAQGNET GIGPF0
VTAM:                                  CC72
           VBUILD TYPE=TRL
  TRLMVS3  TRLE  LNCTL=MPC,               X
```

```
READ=900,               X
WRITE=901,              X
DATAPATH=(902),         X
PORTNAME=GIGPF0,        X
MPCLEVEL=QDIO
```

A combination of multiple OS/390 guests under one LP and OS/390 native systems in unique LPs can be used by combining the techniques shown on pages 392 – 394.

If the customer's environment is already established with VM support, introduction of OSA-Express should NOT be a concern for the OS/390 VM guests.

The use of the OSA-Express under a VM OS/390 guest is the same as OSA-2. That is, the channel is not attached to the OS/390 guest, only the devices are attached to the OS/390 guest. The CHPID is first brought online to VM, then the devices are ATTACHED to the OS/390 guest. The use of a VTAM OS/390 TRLE is unique to OSA-Express and CS for OS/390.

Documentation on this setup from an OS/390 perspective can be found in *OS/390 V2R6.0 MVS Initialization and Tuning Reference*, SC28–1751–05, in the CLOCKxx and COUPLExx members.

See *VM/ESA V2R3.0 CP Command & Utility Reference*, SC24–5773–02, under WRKALLEG and the LINK AND SET command.

See also *VM/ESA V2R3.0 General Information*, GC24–5745–02, for a general discussion of VM Sysplex support.

DASD sharing is discussed in *VM/ESA V2R3 Planning and Administration*, SC24–5750–02, under ″DASD Sharing″.

Sample TCP/IP Profile (IPv4 and IPv6)

This profile was used to test IPv6 and includes the INTERFace definition statement unique to IPv6.

```
; Device definitions:
;
; IPv4
;--------------------------------------------
;  VIPA definitions
  DEVICE VDEV1  VIRTUAL 0
  LINK   VLINK1 VIRTUAL 0 VDEV1
; Gigabit CHPID 02
  DEVICE DEV02 MPCIPA NONRouter ;GbE
  LINK LNK02 IPAQGNET DEV02
; For Enterprise Extender
  DEVICE IUTSAMEH MPCPTP
  LINK TOVTAM MPCPTP IUTSAMEH
;--------------------------------------------
; IPv6
;--------------------------------------------
; DEVICE DEV02 MPCIPA NONR
  INTERFACE LNK02V6 DEFINE IPAQENET6 PORTNAME DEV02
; SOURCEVIPAINT LV6VIPA1
  IPADDR FEC0:0:0:1::3302
         FEC0:0:0:1001::3302
         2020:10:10:141::30
         FEC0:0:0:1::/64
;--------------------------------------------
;
```

Test Examples

```
; IPv4 HOME Internet addresses of each link in the host.
;
;
  HOME
  8.10.141.120   VLINK1            ;Static VIPA for EE
  8.10.141.121   TOVTAM            ;Enterprise Extender
  10.10.141.30   LNK02             ;GbE
;
; ------------------------------------------------------------------------
; STATIC ROUTING FOR IPv4 and IPv6 ADDRs
;
BEGINROUTES
  ROUTE FE80::0/10 = LNK02V6 MTU 8992
  ROUTE FEC0::0/10 = LNK02V6 MTU 8992
  ROUTE 2020::0/16 = LNK02V6 MTU 8992
  ROUTE DEFAULT6 2020:10:10:141::165 LNK02V6 MTU 1500
  ROUTE 10.10.41.40 HOST = LNK02 MTU 8992
  ROUTE 8.10.41.120 HOST 10.10.41.40 LNK02 MTU 8992
  ROUTE 10.10.0.0/16 = LNK02   MTU 8992
  ROUTE DEFAULT 10.10.141.165 LNK02 MTU 1500
ENDROUTES
.
.
.
START DEV02
 START LNK02V6
 START IUTSAMEH
```

Appendix D. OSA-Express Function/Mode Summary

The following tables summarize the capabilities and functional limits of each OSA-Express feature type. To determine your OSA licensed internal code (LIC) level, issue `D NET,TRL,TRLE=`*`trle statement name`* when TCP/IP is active. For information about licensed internal code upgrades, contact your IBM service representative.

Table 18. OSA-Express LAN-Channel Type Matrix

Channel Type	OSA-Express Feature	S/390	zSeries OSA LIC level 1.*nn*	zSeries OSA LIC level 2.*nn*	zSeries OSA LIC level 3.*nn* - 4.*nn*
OSE	**Fast Ethernet**	x	x	x	x
	HS Token Ring			x	x
	ATM MM	x	x	x	x
	ATM SM	x	x	x	x
OSD	**Fast Ethernet**	x	x	x	x
	HS Token Ring			x	x
	ATM MM	x	x	x	x
	ATM SM	x	x	x	x
	Gigabit SX	x	x	x	x
	Gigabit LX	x	x	x	x

Table 19. OSA-Express Function-Channel Type Matrix (for OSE)

OSA-Express Function	S/390	zSeries OSA LIC level 1.*nn*	zSeries OSA LIC level 2.*nn*	zSeries OSA LIC level 3.*nn* - 4.*nn*
IPv4	x	x	x	x
Broadcast	x	x	x	x
Multicast	x	x	x	x
VIPA	x	x	x	x
SNMP (via OSA/SF)	x	x	x	x
SNA	x	x	x	x

Table 20. OSA-Express Function-Channel Type Matrix (for OSD)

OSA-Express Function	S/390	zSeries OSA LIC level 1.*nn*	zSeries OSA LIC level 2.*nn*	zSeries OSA LIC level 3.*nn* - 4.*nn*
IPv4	x	x	x	x
IPv6 (ethernet only)				x
VLAN (priority tagging - Ethernet only)		x	x	x
VLAN (full - Ethernet only)				x
ARP Query		x	x	x
ARP Purge				x
Broadcast				x

Table 20. OSA-Express Function-Channel Type Matrix (for OSD) (continued)

OSA-Express Function	S/390	zSeries OSA LIC level 1.*nn*	zSeries OSA LIC level 2.*nn*	zSeries OSA LIC level 3.*nn* - 4.*nn*
Multicast	x	x	x	x
SNMP (via OSA/SF)	x	x	x	x
SNMP (direct - QDIO only)				x
VIPA	x	x	x	x
Primary/Secondary Routers	x	x	x	x
Multiple Secondary Routers (QDIO Ethernet only)				x

Table 21. OSA-Express Functional Limits

OSA-Express Functional Limits		S/390	zSeries OSA LIC level 1.*nn*	zSeries OSA LIC level 2.*nn*	zSeries OSA LIC level 3.*nn* - 4.*nn*
IP	**Home IPs (IPv4+IPv6)**	512	512	2.048	2,048
	ARP Table Size *	512	2,048	8,192	8,192
	Multicast Addresses (IPv4 + IPv6)	64	64	64	1,024
	# PUs	2,048	4,096	4,096	4,096
OSE	**# Devices**	240	240	240	240
	# IP Stacks	120	120	120	120
OSD	**# Devices**	240	240	240	240
	# IP Stacks	15	80	80	80
VLANs	**LINUX**				4,096

* Note: The ARP Table's capacity limits the sum of the IPv4 Home Addresses, plus the IPv6 Home Addresses, plus the IPv4 Multicast Addresses, plus the IPv6 Multicast Addresses, and plus the IPv4 Remote Addresses stored in the table.

Table 22. OSA-Express Feature-LAN Transmission Matrix

OSA-Express Feature	Auto Sense	Auto Negotiate	Operating Mode	Frame Size
Gigabit Ethernet	NO	YES	full duplex	802.3: 1492 DIX: 1492 jumbo: 8992
Fast Ethernet	NO	YES	full duplex half duplex	802.3 1492 DIX: 1492
ATM	N/A	N/A	full duplex	
Token Ring	YES	NO	4Mbps: full/half duplex 16Mbps: full/half duplex 100Mbps: full duplex	Frame size: 4 Mbps: 4550 16/100 Mbps: 18200

Function/Mode Summary

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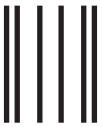

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