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User's Guide for Managed AR2224 L2 Ethernet Switch in 10BaseS (VDSL) Application

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1.0 Introduction

The 10BaseS evaluation board is a complete 16 Fast Ethernet ports + 4 VDSL ports(10Base S) switching system used to evaluate the Infineon's AR2224 Ethernet switch controller chip and 10Mb VDSL chipset. The board includes all the necessary items for a 16FE+4VDSL switch. A diagram of the board is shown in Fig.1

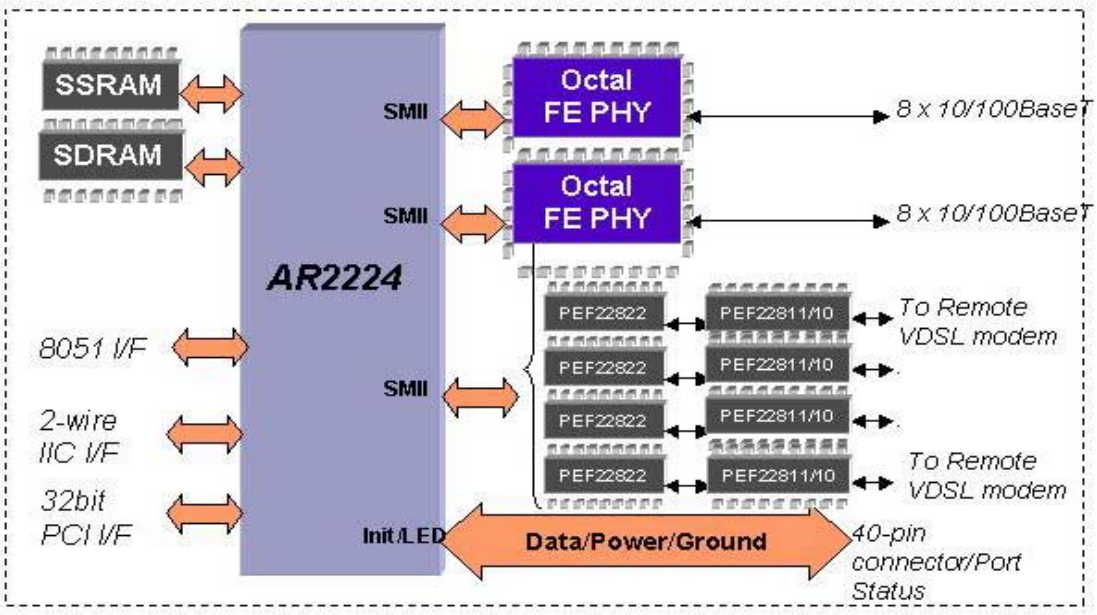


Figure 1

The current release of the 10Base-S board has two versions: one for unmanaged switch without a CPU board; the other is for managed switch that comes with a CPU board. For customer who wants to evaluate a managed switch with its associated features and the switch software API, a Motorola MBX860 board and a Infineon's TMS s/w can be purchased separately from Infineon's LAN group.

1.1 System Description & 10BaseS Evaluation Board Configuration Settings

The 10-BaseS evalution board contains the Infineon's Ethernet Switch AR2224 and the VDSL modem chipset PEB22822/2281/2282, with additional memory/peripheral components, making a complete Fast Ethernet/VDSL Layer 2 switching system. In order to verify the VDSL connectivity, user should connect one of the VDSL ports on the evaluation board with a remote VDSL modem board which can be obtained through the Infineon's VDSL group. The 10BaseS board can run under unmanaged application, requiring no CPU intervention, which processes all incoming/outgoing Ethernet frames.

The components of the Switch and a picture of the Board (Fig.2) are listed below:

- Six 16Mb SDRAM for packet buffer
- One 2Mb SSRAM for address table
- Two Octal Fast Ethernet transceivers
- Four sets of Infineon's VDSL(10Base-S) modem chipset(PEB22822/11/2)
- PCI interface connector for managed switch
- IIC interface connector.
- JM1 connector for a minimum managed 8051 interface.
- LED's for port status
- Four RJ11 connectors to access remote VDSL modem
- Power supply

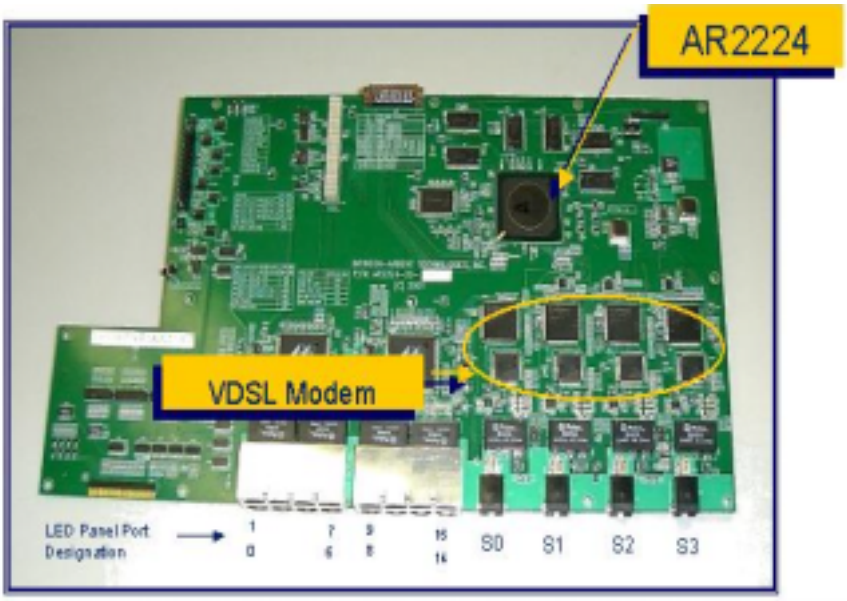


Figure 2

Upon power-up of the board, the power-on strapping pins and other sets of jumper pins will set AR2224, MDIO interface, Fast Ethernet PHY, VDSL PHY and other components to an intitial state. These are indicated in the following sections (1.1.1 – 1.1.13):

1.1.1 Power-on Strapping- for AR2224 initialization

The LED interface pins *led_row_n[3:0]* and l*ed_col[26:0]* are used as power-on strapping pins to set certain operating parameters for the AR2224. On the rising edge of the Reset pulse, the logic level of led_row_n[3:0] and led_col[23:0] are sensed and latched into the Chip Configuration Register, Power-on Strapping Pin Mapping lists the mappings between the strapping pins and the configuration register bits.

Power-on Strapping Pin Mapping

configuration register bit	31	30	29:27	26:0
power strapping pin	led_row_n[3]		led_row_n[2:0]	led_col[26:0]

All the LED signals have internal pull-ups. The power-on strapping pins must be pulled-up or pulled-down through a 10K ohm resistor to set the required value.

The power-on strapping will affect the following:

- AR2224 MAC table, flow control and SMII clock delay
- MDIO mode
- PHY transceiver interface
- LED's Status mode

The power-on strapping table below, lists the mappings between the register bits, and the corresponding jumpers on the board. The default setting of the jumper for the board is given below.

Note1: Ignore the Lucent column as the LucentPHY chips are not used on the 10Base-S evaluation board.

Note2: The jumper setting for 22822 VDSL chip is given in the VDSL (PEB22822) Modem Configuration section. (1.1.13) Jump 89, 93, 96, 99 settings do not apply to 10BaseS board.

Power-on Strapping Table

Bit Field	Bit Name	Signal	Jumper	Lucent	Marvell
31	intelligent	led_row_n[3]	J107	Closed(Default)	
30	reserved				
29	reserved	led_row_n[2]	J106		
28	disable_pause	led_row_n[1]	J105	Closed(Default)	
27	GMII/SEDES_25	led_row_n[0]	99	closed	open
26	GMII/SEDES_24	led_col[26]	96	closed	open
25	GMII/MII_25	led_col[25]	93	open	
24	GMII/MII_24	led_col[24]	89	open	
23:22	delay_sel5[1:0]	led_col[23:22]	86,84	closed,closed	open,open
21:20	delay_sel4[1:0]	led_col[21:20]	80,76	closed,closed	open,open
19:18	delay_sel3[1:0]	led_col[19:18]	102,101	closed,closed	open,open
17:16	delay_sel2[1:0]	led_col[17:16]	98,95	closed,closed	open,open
15:14	delay_sel1[1:0]	led_col[15:14]	92,90	closed,closed	open,open
13:12	delay_sel0[1:0]	led_col[13:12]	87,85	closed,closed	open,open
11:10	reserved	led_col[11:10]	81,77		
9	in_ma_en	led_col[9]	104	Open	
8	use_mdio_mode	led_col[8]	103	Open	
7	en_txq_drop	led_col[7]	100	Open	
6	en_rx_flow_ctl	led_col[6]	97	Open	
5	mask_coll_led	led_col[5]	94	Open	
4	en_tx_led	led_col[4]	91	Open	
3	led_mode	led_col[3]	88	Open	
2:0	pcb_config	led_col[2:0]	83,82,78	Default: 78 closed, 82 & 83 open	

1.1.2 Port Enable Jumper: 107

This jumper is used to enable or disable all the ports after reset. For system without a CPU, the jumper should be closed to enable all the ports.

1.1.3 Full Duplex Flow_Control: Jumper 105

Jumper 105 is used to enable or disable the full duplex flow_control by using pause frame. The Jumper 105 is closed by default to enable the flow control. The actual flow control is done by the physical layer transceivers controlled by the MII registers, the AR2224 can access these MII registers by using the MDIO or SMII interface.

1.1.4 SMII Interface Clock Delay Jumpers:

84,86,76,80,101,102,95,98,90,92,85,87

These jumpers control the delay of the clock to FE PHY for received data. The setting of these jumpers depends on the PHY devices you use, different PHY's timing requirement is different, when interfacing to AR2224, refer to the PHY device's data sheet to select the correct value for the delay of the SMII_CLK.

Each two jumpers controls the clock delay for four ports, Delay Selection Table list the mapping of delay and the jumper setting for the jumper 87 and 85, the same applies to other jumper group. Default is all open.

Delay Selection Table

Delay	J85	J87
delay by 0.0 ns	closed	closed
delay by 0.8 ns	closed	open
delay by 1.6 ns	open	closed
delay by 2.4 ns	open	open

For interface to Marvell 88E3080/3081 PHY, the delay of the smii_clk could be 2.4ns, the two jumpers should be in the open position.

1.1.5 Simulation Mode : Jumper 81, 7

These two jumpers should be in the open position for the evaluation board. The two bits in the registers are used for simulation purpose only.

1.1.6 Internal MAC Address Table:Jumper 104

In the AR2224, there is an internal MAC address table with 256 entries. In the case the MAC table in the external SSRAM is full this internal MAC table can be used. Default setting is in the open position that enables the internal MAC table.

1.1.7 MDIO Mode : Jumper 103

This jumper controls whether to use the MDIO interface or SMII interface for link information such as speed, duplex, pause enable and link_ok. Default is open and enable the MDIO interface for link parameters.

1.1.8 Transmit Queue Drop : Jumper 100

This jumper should be in the open position.

1.1.9 Back_pressure Control: Jumper 97

This jumper controls whether to enable or disable the back_pressure for flow control in half duplex. Jumper 97 is open by default to enable the back pressure.

1.1.10 LED Control: Jumper 94,91

Jumper 94 is used to control the collision display on the LED in the case of collision. Default setting is open which enables the LED to display collision by flashing.

Jumper 91 is used to control the LED display in transmission. Default setting is open which enables LED to flash upon successful transmission.

1.1.11 LED Mode Selection: Jumper 88

Three different display modes are supported – two modes are controlled by the Configuration Register 0x00 in AR2224, whereas the third mode is software controlled via a CPU. This jumper determines the two hardware modes. Mode 1 is the default mode where jumper 88 is in the open position which sets bit3=1 in the Configuration Register. Closing the jumper sets the LED Mode to 0.

The two h/w controlled modes are available on Port 0-25, while the s/w controlled mode is only available on the CPU port.(Port 26)

Refer to AR2224 datasheet for more information on LED Mode/Status.

1.1.12 Board Configuration: Jumper 82,83,78

With a managed switch configuration, these three jumpers can be used for the management software to read some configuration information about the board. For 10BaseS board, default is J78 closed, J82 & J83 open. Other versions of the board may have these three jumpers installed differently, depending on the package of the AR2224 used, and/or PHY devices used.

1.1.13 VDSL modem(PEB22822) Configuration:

The board shipped is pre-configured to the 10Mbit operation of the PEB22822 VDSL chip. All the configuration parameters are stored in the EEPROM. If there is a need to change/update the parameters of the chip, the following steps are recommended:

Step 1: choose which VDSL chip to program (setting the jumper)-see Fig.3 (Page 14)

There are four VDSL(22822) chips on the evaluation board, each one is programmed individually according to the following table:

Display port# \ jumper #	Jumper JS11	Jumper JS13	Jumper JS10	Jumper JS12
S0	1+2	1+2	---	---
S1	2+3	2+3	---	---

S2	---	---	1+2	1+2
S3	---	---	2+3	2+3

Example: To access the corresponding 22822 from the S3 port: Connect pin 2 and 3 on Jumper JS10; pin 1 and 2 on Jumper JS12 together. By doing it, you have selected VDSL device #8. (i.e. JS10 2+3 sets the S3 TX path, JS12 2+3 sets the S3 RX path). Read Step 8 for more explanation. When the board is shipped, all four jumpers should have been preset to 2+3. This means you can program those two VDSL chips directly above the S1, and S3 ports.

Note 1: The S3 port marked on the LED display panel is hardwired to the JS0 marked on the evaluation board. Likewise, for the S1=JS2, S2=JS1, S0=JS3.

Note 2: JRS1 and JRS2 jumpers are not used, leave it open.

Step 2: make the connection:

Connect the cable labeled as VDSL term (shipped with the evaluation board) between a PC Com port and one of the VDSL ports. If you start with the S3 port (the right most connector, see Fig.1), then the cable should connect it to a PC's com port.

Note: The wiring diagram of the cable is:

RJ11 DB9
pin2---------->pin3
pin5---------->pin2
pin6---------->pin5

Step 3: call the E2prom Programmer

Open the 10BaseS EE Download folder where the E2prom Programmer resides, double click the E2prom Programmer icon, the Wizard will expand this program. After expanding, double click the Utility E2prom Programmer.exe file. A screen should show up by asking you to select which device, default is PEF22822 v2.2, select it. Then, the screen asks you to choose four options: Configuration, Save File, Open File, Program. Only the Open File option is highlighted. Select it, and enter the file name e2rb50_N.bin to open it.(see note) Then, select the option Program. Upon this point, the screen should show connecting, reading, programming….

consecutive squares which tells you it is programming the on-board EEprom. When it is done, "program complete" will show up. Exit the program.

Note: both e2rb50_N.bin and E2promProgrammer should be in the 10BaseS EE download folder, in the CD shipped. If error message occurs, it means it can't find the file. Make sure the directory is where the CD directory is.

Step 4: modify the EEprom data you just downloaded

From this point, you may need to manually modify the EEprom data you just downloaded. In order to do it, activate the Hyper Terminal. When the HT asks you for a name, give any name you want (i.e.10BaseS), select the Com port on your PC. Then, select 9600, n, 8, 1, If the link is there, L> prompt should appear after you hit the enter key a few times.

If there is no L> prompt, it means there is no link. Depending on your PC, it may due to the Flow Control is not set up properly. To change it, click the disconnect icon on the tool bar of the Hyper Terminal. Go back to the setup screen, select Xon/Xoff in the Flow Control section, if it is in Hardware or None setting. OK it to see if the L> would appear.

If you get scrambled characters, you might have selected 2400 baud as it is the default for the HT. You should change it to 9600.

Step 5: configure the 22822 Ethernet interface

This step configures the Ethernet interface side of the on-board 22822 to set it to 100Mb in order to communicate with the on-board AR2224 switch controller. The L> prompt must be changed to M> mode to modify the parameter. Follow the procedures below: (bold is what you type in)

A. L> **WR8D00 B4** (this changes to M>) .
B. M> **RD 8340, 8** (read register 8340 and its next 8 registers)
C. M> 2c cx ……..(2c is the 2Mb Ethernet mode. The x is the VDSL device your are working on, the display should be one of the 8,9, a, b devices)
D. M> **WR C060 3C** (change to 3c which sets to 20Mb mode)
E. M> turn off the power, then turn it back on. (if you the Hyper Terminal is stuck, use the "disconnect", "connect" icon on HT's tool bar. Wait for a few seconds, the L> should be back).
F. L>**RD 8340, 8** (re-enter to read the register 8340)

G. M>3c cx…. (it should display 3c cx. this means 100Mb mode has been set, if not, go back to change the c060 register to 3c).

Step 6: configure the 22822 VDSL interface

This step configures the VDSL interface side of the on-board 22822 to set it to communicate with a remote Infineon's VDSL modem.

A. L> **WR 8D00 B4** (make sure the L> is changed to M>)
B. M>**WR C020 32** (change the register C020 value to 32)
C. M>**WR C021 24** (change the register C021 value to 24)
D. M>**WR C022 58** (change the register C022 value to 58)
E. M>**WR C024 F1** (change the register C024 value to F1)
F. M>**WR 8C00 84** (validate the above write changes, or turn off the power switch)
G. M>**RD C020, 8** (read back to ensure the values have been updated to the above, if not, repeat step A…G. It should read 32 24 58 00 F1…).

Step 7: turn off the power switch, and turn it back on

Turn the power off at the end of each step 4 and 5 and turn it back on. If you don't turn power off, the new values may not be updated in the EEPROM. Also, all the changes must be made while M> appears. The changes made while L> appears are not updated in the EEPROM.

Step 8: configure each VDSL PHY device

In Step 5.c, the register displays a value of cx, where the x is the device ID for the VDSL 22822. If the jumper JS10/JS12 pair is set to 1+2, then the cx value will display c8 which is the right most device that you're looking at. To go to the next device, which is the 2nd device(device #9) next to it, jumper JS10/12 pair must be set to 2+3, then the c9 value will display. (don't need to move the VDSL term cable, it should be in the S3 position). Repeat step 5,6,7 to make the same change for device #9.

To change the parameters on the 3rd and the 4th VDSL PHY device, the VDSL term cable must be moved to the S0 or S1 RJ11 connector. If jumper JS11/13 is set to 1+2, then the display will be ca(device #a). Repeat step 5,6,7 to make necessary register changes. Then, set jumper JS11/13 to 2+3, the display should be cb, repeat step 5,6,7 to make the change.

1.2 Switch Configuration Settings

The AR2224 switch controller chip can be configured to use one of four possible modes for different level of management. Three bus interfaces for attaching a CPU sub-system are 32-bit PCI bus (target only), 32-bit generic (slave) bus and 2-wire serial (slave) bus. The fourth interface is a 2-wire serial master bus and is used to read configuration EEPROM in an unmanaged, system. Only one bus can be used in a system. The selection of PCI or IIC is made upon chip reset through J74. The current 10BaseS release uses PCI bus as the defualt bus

Note 1: Jumpers J123/J124 from the 24FE+2Gbit Ethernet board are not available on the 10BaseS board. J123 was used to select either PCI or Generic bus. J124 was used to select mux or non-muxed Addr/Data bus.

The following sections describe the IIC settings.

1.2.1 IIC Interface

Follow the procedures below to select the IIC interface and speed.

1. Select IIC interface by setting J74 to open
2. Select slave mode by set J118 to close, master mode:set J118 to open.
3. Select speed by J125, J128

CPU interface selection Table

Interface	**J74**	**J118**
32 Bit PCI	Closed(Default)	-
IIC Slave(AR2224)	Open	Closed
IIC Master(AR2224)	Open	Open

IIC Speed Selection

	J128	**J125**
100K	2+3	2+1
400K	2+3	2+3
1 M	2+1	2+1
3.3 M	2+1	2+3

Select device address as shown below, AR2224 supports 7-Bit addressing of IIC. Some addresses are reserved in the IIC specification, so you should not select these addresses, including 0000xxx, 1111xxx. You can select

any address except address 1010000, as this address is occupied by the EEPROM and its address is hardwired in the AR2224 which can not be changed.

IIC device address selection: for AR2224 in the Slave mode.

	Logic 1	Logic 0
Dev_ID0 : J114	open	closed
Dev_ID1 : J127	1+2	2+3
Dev_ID2 : J115	open	closed
Dev_ID3 : J119	open	closed
Dev_ID4 : J120	open	closed
Dev_ID5 : J121	open	closed
Dev_ID6 : J126	1+2	2+3

1.2.2 EEPROM Interface

Should an EEPROM is needed for updating the AR2224, Follow the procedure below to select the EEPROM interface.

1. Select IIC interface by set J74 to open
2. Select AR2224 in master mode by setting J118 to open
3. Select speed shown in ITC Speed Selection Table
4. The EEPROM ID is fixed to 1010000(0xA0).

The current release has no EEPROM chip installed.

1.2.3 Fast Ethernet PHY settings

On the 10Base-S evaluation board, you only need to configure two MDIO addresses for the 16 ports in the two octal PHY devices. Jumpers , JX156, JX157, JX158, JX159 are used to set the upper two bits address [4:3] of the 16 10/100 Ethernet ports in the two PHY devices, the lower three bits are hardwired internally in the PHY devices, as the following table shows:

Fast Ethernet MDIO Jumper Setting Tables

PHY 1			MDIO

Jumper	JX158	JX159	Address
Default	open	open	11xxx

PHY 2			**MDIO**
Jumper	JX156	JX157	Address
Default	open	closed	10xxx

1.2.4 VDSL PHY Jumper Setting Table

On the 10Base-S board, the MDIO addresses of the VDSL are set by the following jumpers.

VDSL phy#\Jumper #	Jumper JS11	Jumper JS13	Jumper JS10	Jumper JS12
B	1+2	1+2	---	---
A	2+3	2+3	---	---
9	---	---	1+2	1+2
8	---	---	2+3	2+3

1.2.5 F.E. port/ VDSL port mapping to the LED panel

The table below shows the mapping between the ports of the AR2224 and the ports indicated on the LED panel. As Port 0 on the AR2224 is not necessarily mapped into Port 0 as shown on the LED panel, a mapping table would be helpful in case there is a need to trace which port that packets flow through. Also, a picture of the board with its mapping port numbers is shown to help you visualize the port mapping.(See Fig.3) Fore example: when select port 1 on the s/w web i/f, it is actually port 16 selected on the ar2224.

Fast Ethernet AR2224 Ports/LED Panel Mapping Table

AR2224 Port Number	LED Panel Port Number
8-15	P8 to P15
16-23	P0 to P7

VDSL Ports/ LED Panel Mapping Table

AR2224 Port Number	LED Panel Port Number(VDSL ports)
3, 2, 1, 0	S0, S1, S2, S3
4-7(not used)	N/A

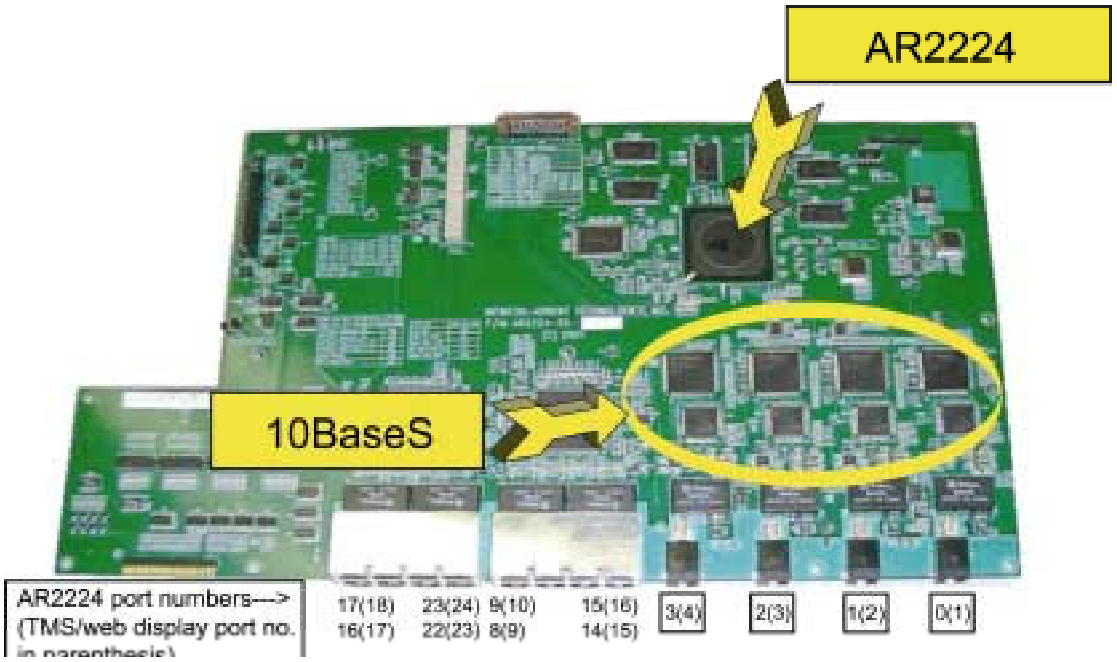


Fig.3

1.2.6 Other ConfigurationsJumpers: JS118 and System Reset Switch J79

In the unmanaged 10Base-S configuration, the JS118 must be closed (default) in order to reset AR2224, then it can be reset by pushing Reset Switch J79. For managed configuration, the JS118 can be left open which enables the AR2224 to get the reset from either CPU or 8051 selected by setting the jumper pins on JS79 below.

Jumper JS79- 3pin

For managed switch, this 3pin jumper is used to select which Reset source to reset AR2224. Pin1+2 selects CPU soft reset, Pin2+3 selects 8051 reset from the JM1 Header i/f. For un-managed switch, JS79 is left open as default.

1.2.7 JTAG Pin and Jumper Mapping

In the evaluation board, some jumpers are used to configure the JTAG interface, the default setting for these jumpers is shown below, normal working mode is selected.

Pin	Jumper	Default
Norm_mode	J108	off
Trst	J109	off
Tck	J110	off
Tms	J111	off
Tdi	J112	off
t_rsv	J113	off
Tdo	JX112	off

1.2.8 JM1 Header/JM130 Header

This JM1 header is used to interface with an 8051 style board. The i/f signal pins are described on the 10Base-S schematcis.

JM130 Header is for the LED display panel.

2.0 Managed Switch- using MBX860 CPU board and Infineon Switch Software

In order to use the Ar2224 in a managed network, an external CPU board is needed. Section 3.0 and 4.0 address the s/w applications of this reference board that comprises of MBX860 CPU board and Infineon's Switch Software for managed switch. Through the managed s/w , it gives greater control or add flexibility to the Switch which are not accessible otherwise.

The Managed Switch is shipped with the management S/W preinstalled in the Flash at the factory. Power up the Switch, wait for 5+ minutes for the s/w to load. Then, connect an Ethernet cable from PC to any of the FE ports on the Switch, perform **ping 10.1.1.1.** It should get a reply. Now, activate Internet Explorer Browser or Netscape, and enter **10.1.1.1** on the URL. The Infineon's Network Management Home page will show up.

Note 1:you must wait until the s/w finishes the download; otherwise, ping will not function. Note 2.Do not connect the Ethernet cable to the Ethernet port on the MBX860 to see how the switch works. This port is only used for installing the s/w. Note 3.If you want to watch the s/w download process, you can connect a serial cable to the rs232 port on the MBX860. Enter **password** when asked, then activate IE or Netscape.

To install a new s/w for upgrade, follow the procedures below:

2.1 Setup the MBX860 BootROM Image

The following procedures are used to set up the MBX860's BootROM:

-Change MBX860 Jumper J4 to1-2, power up the Switch, activate HyperTerminal, the "EPPC-Bug>" prompt should immediately show up from the HyperTerminal. (Must setup HyperTerminal in 9600,8,N,1, flow control set to None or Xon/Xoff)

-Turn on tftpd32.exe on your PC to allow the configuration, and observe the activity of the download.

-After unzipping a full released s/w, put the BootROM binary file "bootrom.bin", "vxWorks.Z" file, and "tftpd32.exe" in the same folder. Sometimes, you will get a single interim vxWorks.Z file, update it with the existing one, then put all three files in one folder.

-Use niot, niop and pflash commands to load the VxWorks BootROM image into flash memory as described below.

-The **bold** letters, with or without underline, are the entries user should type in.

-Set the TCP/IP property to IP Static under Network Neighborhood, Give a value of y.y.y.y. and must use this value throughout the installation process

-Must use a crossover cable to connect between the Ethernet port of the PC and the Ethernet port on the MBX CPU board.
==========

-Connect the Null-Modem cable btw the 2-pin connector on the MBX860 board and PC's COM port.
-Connect the crossover Ethernet cable between the Ethernet port on the MBX860 and the NIC card of the PC.

2.1.1

EPPC-Bug>

EPPC-Bug>**niot**

Controller LUN =00? **20**

Device LUN =00?

Node Control Memory Address =00FC8000?

Client IP Address =192.168.21.191? **x.x.x.x** **(enter the IP address of the CPU board)**

Server IP Address =192.168.21.187? **y.y.y.y** **(enter the IP address of the PC)**

Subnet IP Address Mask =255.255.255.0?

Broadcast IP Address =255.255.255.255?

Gateway IP Address =0.0.0.0?

Boot File Name ("NULL" for None) =?

Argument File Name ("NULL" for None) =?

Boot File Length =00000000?

Boot File Byte Offset =00000000?

BOOTP/RARP Request Retry =00?

TFTP/ARP Request Retry =00?

Trace Character Buffer Address =00000000?

BOOTP/RARP Request Control: Always/When-Needed (A/W)=W?

BOOTP/RARP Reply Update Control: Yes/No (Y/N) =Y?

Update Non-Volatile Memory (Y/N)? **y** **(enter yes)**

2.1.2

EPPC-Bug>

EPPC-Bug>**niop**

Controller LUN =20?

Device LUN =00?

Get/Put =G?

File Name =? **bootrom.bin** (enter the file name bootrom.bin, make sure this file is in the same folder as tftpd32.exe)

Memory Address =00004000?

Length =00000000?

Byte Offset =00000000?

Bytes Received =&292220, Bytes Loaded =&292220 (display to inform you when done)

Bytes/Second =&292220, Elapsed Time =1 Second(s)

2.1.3

EPPC-Bug>

EPPC-Bug>**pflash 4000:83fff fc000100**

Source Starting/Ending Addresses =00004000/00083EFF

Destination Starting/Ending Addresses =FC00020/FC07FFFF

Number of Effective Bytes =0007FF00

Program FLASH Memory (Y/N)? **y**

Virtual-Device-Number =00

Manufacturer-Identifier =01

Device-Identifier =D5

Virtual-Device-Number =01

```
Manufacturer-Identifier  =01
Device-Identifier        =D5
Virtual-Device-Number    =02
Manufacturer-Identifier  =01
Device-Identifier        =D5
Virtual-Device-Number    =03
Manufacturer-Identifier  =01
Device-Identifier        =D5
Sector-Size              =00040000
Address-Mask             =FFE00000
Erasing Block Number     =0000 ($FC000000)
Erasing Block Number     =0001 ($FC040000)
Erasing Block Number     =0002 ($FC080000)
Programming Block Number =0000 ($FC000000)
Programming Block Number =0001 ($FC040000)
Programming Block Number =0002 ($FC080000)
FLASH Memory Programming Complete
EPPC-Bug>
```

==========

Turn off the power. Change Jumper4 from 1-2 to 2-3 on the MBX860.

2.2 Format the Flash Memory

Power on the Switch. From HyperTerminal, type "F" to format flash memory:

[VxWorks Boot]: **F** (Must be Capital F, no message will display when done. Hit Enter key, [vxWorks Boot] prompt should reappear, user must do this step before performing steps 2.3,2.4, 2.7)

2.3 Download File (vxWorks.Z)

Step 2.3.1- Download the vxWorks.Z to a temporary RAM on the MBX860 board:

-connect a crossover Ethernet cable between the PC's NIC card and the Ethernet port on MBX860 board.

-Make sure Jumper 4 on the CPU board is in the 2-3 position.

-In case you need to delete old parameters(settings) without giving any new parameters, you must enter. (a dot) right after the old parameter. This will erase the old parameter.

-from HyperTerminal, configure boot parameters as follows:

[VxWorks Boot]: **c**

boot device : tffs0 **cpm0**
processor number : 0
host name :
file name : /rfa1/vxWorks.Z **vxWorks.Z** **(this file must reside in the same folder as tftpd32)**
inet on ethernet (e) : 172.29.96.192 **x.x.x.x** **(this is the IP address of the CPU board)**
inet on backplane (b):
host inet (h) : 172.29.96.236 **y.y.y.y** **(this is the IP address of your PC)**
gateway inet (g) :
user (u) :
ftp password (pw) (blank = use rsh):
flags (f) : **0x80** **(make sure it is 0x80)**
target name (tn) :
startup script (s) :
other (o) :

[VxWorks Boot]: **p** **(This is to verify what you entered)**

boot device : cpm
unit number : 0
processor number : 0
file name : vxWorks.Z
inet on ethernet (e) : x.x.x.x (example: 2.1.1.1- the cpu board's IP address)
host inet (h) : y.y.y.y (example: 2.1.1.6- the PC's IP address)
flags (f) : 0x80 (your display must be like the above 7 lines)

VxWorks Boot]: @ **(To download the vxWorks.Z image)**

Step 2.3.2-Download vxWorks.Z from PC to the Flash:

After the vxWorks.Z image finished its dowonloading to RAM(step 3.1), a menu display will show up. This is called the Console Screen. Now, you need to perform step 3.2 below.

Take out the cross-over Ethernet cable from the CPU board, reinsert it into any of the Fast Ethernet ports on the Switch.(If the ref. switch uses Marvel 3081 PHY)

Type "**password**" when you're asked to enter the password. Then, from console screen, select the "Switch Configuration" page, change the IP address to [**x.x.x.x**] which must be identical to what you entered in section 3.1, and change the Subnet Mask to [**255.255.255.0**]. Select "**Apply**", go back to the Main Menu.

Then, select the "Image File Download" page, change the Image Path to [**vxWorks.Z**], and change TFTP Server IP address to [**y.y.y.y**] which must be identical to what you entered in section 3.1. Then, select Download type to <**Application**>. Then, move the cursor down to select APPLY tab. This allows the download of "vxWorks.Z" from the host PC to the MBX860 board, via the FE port on the Switch.

After the image finishes its downloading, a "Complete" message will show up on the console screen.

Turn off the switch.

Note: the cross-over cable must be used to connect between the PC and the MBX860 board. When change over to connect between the PC and any of the FE ports on the Switch, you may continue to use the same cross-over cable IF a Marvel 3081 PHY is observed from the Switch. However, if a Lucent PHY or a Marvel 3080 PHY is observed from the Switch, you must use a straight Ethernet cable to connect between the PC and the Switch.

Troubleshooting tip#1: occsionally, you can't perform step 2.3.1 after you have checked the Ethernet cable used is cross-over, the serial cable used is Null-Modem cable, and the tftpd32.exe is open and located in the same folder as the VxWorks.Z, You may want to change the NIC card as some of them can't interface with TFTP well.

Troubleshooting tip#2: sometimes, the download just can't start in step 2.3.2. Error message is loading error, or wrong file name. So, keep the tftpd32 open during the download process. If communication exists, tftp client will be active. If the screen is not active during download, it means there is no communications. Go to the DOS screen, enter **ping x.x.x.x**, to see if there is any reply from the MBX board. If there is no reply, you have not set up the MBX board correctly. If there is a reply, go back to the console screen, redo step 3.2. Most likely, it will start downloading.

Troubleshooting tip#3: when you fail to finish step 2.3.2, try to redo from step 2.1.1. You must not skip any steps between step 2.1 and 2.3.

2.4 Bootup from Flash memory

The is the last step to condition the MBX860 board so it can boot from the flash in which it has stored the vxWorks.Z file that was downloaded in step 3.2. This step is necessary if you want to boot the run-time code(vxWorks.Z) every time from a cold start.

-Turn on the power supply, from the HyperTerminal:

[VxWorks Boot]: **c**

'.' = clear field; '-' = go to previous field; ^D = quit

boot device : cpm0 **tffs**

processor number : 0

host name :

file name : vxWorks.st **/rfa1/vxWorks.Z** **(user must enter /rfa1/vxWorks.Z exactly as shown, don't enter any other file name)**

inet on ethernet (e) : 172.29.96.192 **x.x.x.x** **(the IP address of the CPU board)**

inet on backplane (b):

host inet (h) : 172.29.96.236 **y.y.y.y** **(the IP address of the PC)**

gateway inet (g) :

user (u) :

ftp password (pw) (blank = use rsh):

flags (f) : 0x80 (make sure it is 0x80)

target name (tn) :

startup script (s) :

other (o) :

[VxWorks Boot]: **p**

boot device : tffs

unit number : 0

processor number : 0

file name : /rfa1/vxWorks.Z

flags (f) : 0x80

[VxWorks Boot]: @ (start downloading, it takes a while to finish download)

Your are done. The Switch is now ready to run…

2.5 Access thru the Web U/I via a Web Browser

Activate your browser of choice, enter URL: **x.x.x.x** which is the same value(IP address of the MBX860) as you entered thruout the installation process. The TMS management web screen will pop up, type the user ID as "**admin**", and password as "**password**". You're in.

2.6 Find out which s/w version you're working on:

The fastest way to tell is go to the DOS mode, upon c:>, enter "**telnet x.x.x.x**"(x.x.x.x is the IP address of the MBX860), which should immediately display a version number and the date/time of the code compiled. When file a bug report, report this information.

2.7 Build your own logo into the Flash:

User can build their company logo into the flash, please follow the steps below in stead of steps listed in section 2.3.2.

Step 1:Build your company's logo first, name it *yourownlogo.gif* under the Image directory and rename it to *infineon-logo.gif.*(..\binary\vxWorks_web_separated\webfs\image). Always rename the original infineon-logo.gif file to another name (e.g. infineon-logo.gif1) BEFORE naming *yourownlogo.gif* file name to infineon-logo.gif.

Step 2:Go to the folder ..\binary\vxWorks_web_separated where the following files should be residing: tftpd32.exe, ftp_script, wxWorks.Z and the webfs folder. If some of these files are not there, copy them into this folder.(..\binary\vxWorks_web_separated)

Step 3:Open the DOS>, go to the ..\binary\vxWorks_web_separated folder, type

ftp –i –s:ftp_script x.x.x.x. (x.x.x.x is the IP address of the MBX board)**.** If ftp is successful, multiple screen-full of messages will display on the screen. Type bye at the dos prompt when finished.

Turn off the switch, then perform step 2.4 to reboot from Flash. After rebooting, the home page will show yourcompany logo.

Note 1: user must take out the cross-over cable from the CPU board, reinsert it into any of the FE ports while performing section 2.7.

Note 2: perform step 2.3.1 is still required before performing 2.7.

Note 3: if step 3 is not successful, try to ping the Switch to ensure connectivity.

3.0 User's Guide for Ar2224 Switch Software

Section 3 and 4 describe the software features of the Ar2224 and provide instructions to users how to use these features.

1.Console Screen Editing- Command Line interface via Serial Port or TelnetWEB(HTTP).

2.Switch Configuration

3.SNMP Notification(v1, v2c, v3)

4.Spanning Tree Protocol (802.1d)

5.VLAN Filtering- Port Based

6.MAC Entry Configuration

7.Link Aggregation

3.1 Console Overview

The ANSI / VT20 console screens provide network and switch management using serial port and/or telnet sessions. TMS concurrently supports one serial and up to five Telnet sessions. The TMS sample console implementation uses a single user password and does not require a user name.

The serial console is available shortly after the switch is turned on. Telnet is not available until at least one switch port is in the forwarding state and the switch has valid IP parameters.

3.2 Screen Features and Display/Edit Field Examples

The following table shows the screen features, including *display* and *edit* field examples.

All screens have the following features:

- The *Screen Title* is left justified on line 1.
- The *Lx Switch Status*, and Agent/*Switch IP Address* are right justified on line 1. The *Lx Switch Status* field provides switch

initialization, debug information according to the following table:

Lx	Fw	IP	Notes
L0	0	0	
L1	0	1	This state should not occur during initialization
L2	1	0	At least one port is in the forwarding state, but does not have an IP address
L3	1	1	Now able to perform SNMP, Web, Telnet, or ping operations

- Fwd = 1 if any port is in the forwarding state. Note that the **AppManager** indicates that a port is in the forwarding state when STP (spanning tree) has stabilized or is disabled.

- IP = 1 when the switch has valid IP parameters (currently includes 0.0.0.0), as described below:

```
IP = 1 if (DHCP OR BOOTP gets a valid response) OR
if ( (both are disabled OR enabled DHCP/BOOTP option(s) time out)
AND (NVM has valid IP parameters) )
```

- Until the switch has a valid IP address, the Agent/Switch IP Address field displays `-- Undefined --.`

-The TMS-Product enterprise MIB **idbTms:tmsCommonMiscProductName** object is right justified on line 2. This string can be edited by the user and can be up to 32 characters long.

- Line 22 is reserved for the *Command Bar*, which is a horizontal menu.

- Line 23 is reserved for *Error* message text, which reports errors from the last operation and is left justified.

- Line 24 is reserved for context sensitive *Help*, which is displayed in reverse video and is left justified.

The following field types are used:

Field Type	Notes	Example
Display	Display fields are read-only. Selected display fields (for example, **statistic**s) are automatically updated every three seconds.	Line 13 in Figure 3-1.
Text edit	Text edit field are enclosed by square brackets (**[** and]) and allow you to enter and edit text. Current text edit fields are displayed in reverse video.	Line 14 in Figure 3-1

Field Type	Notes	Example
Toggle	Toggle fields are enclosed by angle brackets (**<** and **>**) and allow you to select a value from a pre-determined list. Pressing **SPACEBAR** advances the displayed value to the next available value. Current toggle fields are displayed in reverse video.	Line 15 in Figure 3-1
Menu	Use the **TAB** or **ARROW KEYS** to select a menu item (displayed in reverse video), then press **ENTER** to activate the selection.	Line 22 in Figure 3-1

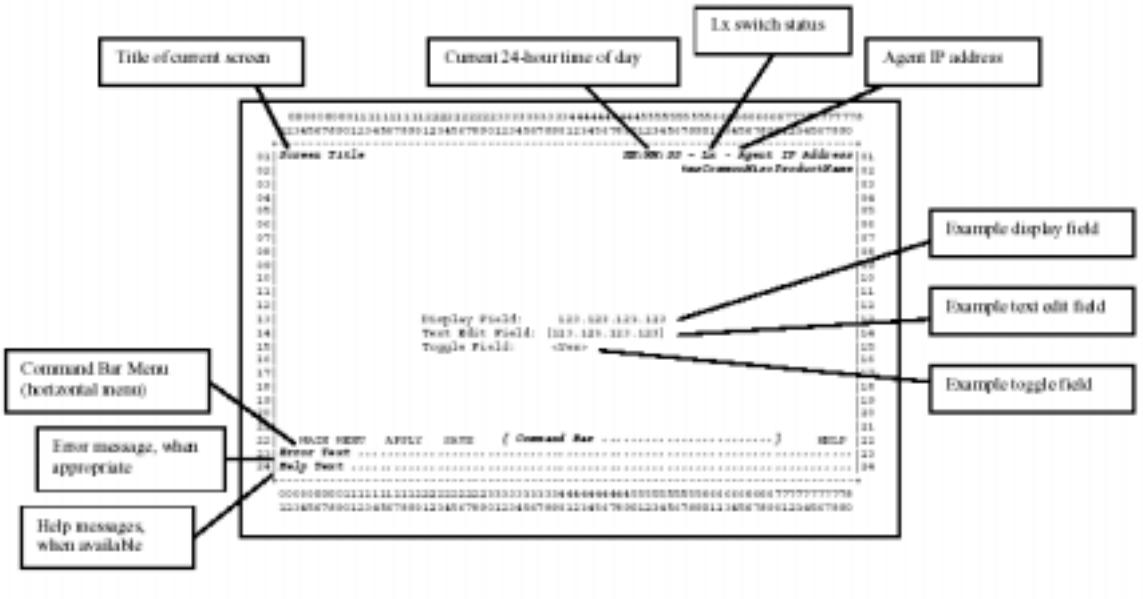
Common *Command Bar* Items – use the **ARROW KEYS** to select desired item, then press **ENTER**:

Command Bar Item	Function
MAIN MENU	Returns you the Main Menu.
APPLY	Applies the values on this screen to the switch and/or management agent.
SAVE	Does an **APPLY** and then saves all configuration values to NVM storage. As the **SAVE** feature may take a while to perform (due to erasing and writing to Flash), it is recommend that you make all changes before selecting **SAVE**.
HELP	Displays help for this screen.

3.3 Keys for Screen Navigation

The console screens use the following navigation keys (**ESC** is ignored and the selected field is displayed in reverse video):

Figure 3-1 **Screen Features and Display/Edit Field Examples**



Key	Function
TAB	Move right and down through menu items and edit fields (same as . and .)
ENTER	Same as **TAB** except for menu items, which are selected
–>	Move right and down through menu items and edit fields (same as **TAB** and .)
<–	Move left and up through menu items and edit fields (same as .)
↓	Move right and down through menu items and edit fields (same as **TAB** and .)
↑	Move left and up through menu items and edit fields (same as .)

3.4 Keys for Editing a Field

The console screens use the following keys within a text edit field (the **TAB** and

ARROW KEYS are ignored while editing a field):

Key	Function
alphanumeric displayable	Replaces existing field text when the first character entered. Alphanumeric keys are ASCII keys including punctuation, but not the **TAB** key.
BACKSPACE	Deletes the previous character (same as **Delete**).
DELETE	Deletes the previous character (same as **Backspace**).
ENTER	Accepts field data and moves to the next field, unless there is an error in the field data (for example, invalid IP format). In case of an error, the original value is restored, an error message is displayed on line 23, and the cursor stays in the current field.
ESC	Aborts changes, displays the original value, and the cursor stays in the current field.

The console screens use the following keys within a toggle field (the **ESC** key is ignored while toggling field values):

Key	Function
↓	Accept toggle field data and move to the next field (same as .)
ENTER	Accept toggle field data and move to the next field (same as **TAB**)
←	Accept toggle field data and move to the previous field (same as .)
→	Accept toggle field data and move to the next field (same as .)
SPACE	Toggle through the available selections
TAB	Accept toggle field data and move to the next field (same as **ENTER**)
↑	Accept toggle field data and move to the previous field (same as .)

On the Port Statistics screen (see Figure 3-6), the Port field is an exception to the above toggle field rules. For this field, the current displayed value is used immediately.

3.5 Keys to Access Hidden Debug Features

The console screens use the following control and function keys to support product debug. All of the screens are read-only.

Key	Function
F2	Redraw console screen (same as **CTRL**+**L**)
CTRL+**D**	Open Device Driver Diagnostic menu that provides for the following screens: • Port settings • MAC address table • Multicast group settings • VLAN settings
CTRL+**E**	Show list of VxWorks tasks
CTRL+**K**	Show list of VxWorks TCP connections
CTRL+**L**	Redraw console screen (same as **F2**)
CTRL+**R**	Show VxWorks routing table
CTRL+**T**	Resume paused screen updates (that is, re-start screen auto-updates)
CTRL+**U**	Pause screen updates (that is, stop screen auto-updates) and clear screen, press **CTRL+T, Enter** to resume screen.
CTRL+**W**	Clear screen only
CTRL+**X**	Show VxWorks memory partition blocks and statistics
CTRL+**Y**	Show list of Web socket connections

The hidden debug screens only work on the serial console (because they use **printf( )** statements). Currently, they can be initiated from Telnet (not recommended), but the results show up on the serial console. Note that it is sometimes necessary to press **ENTER** (because the console is waiting for input) before the desired output is displayed.

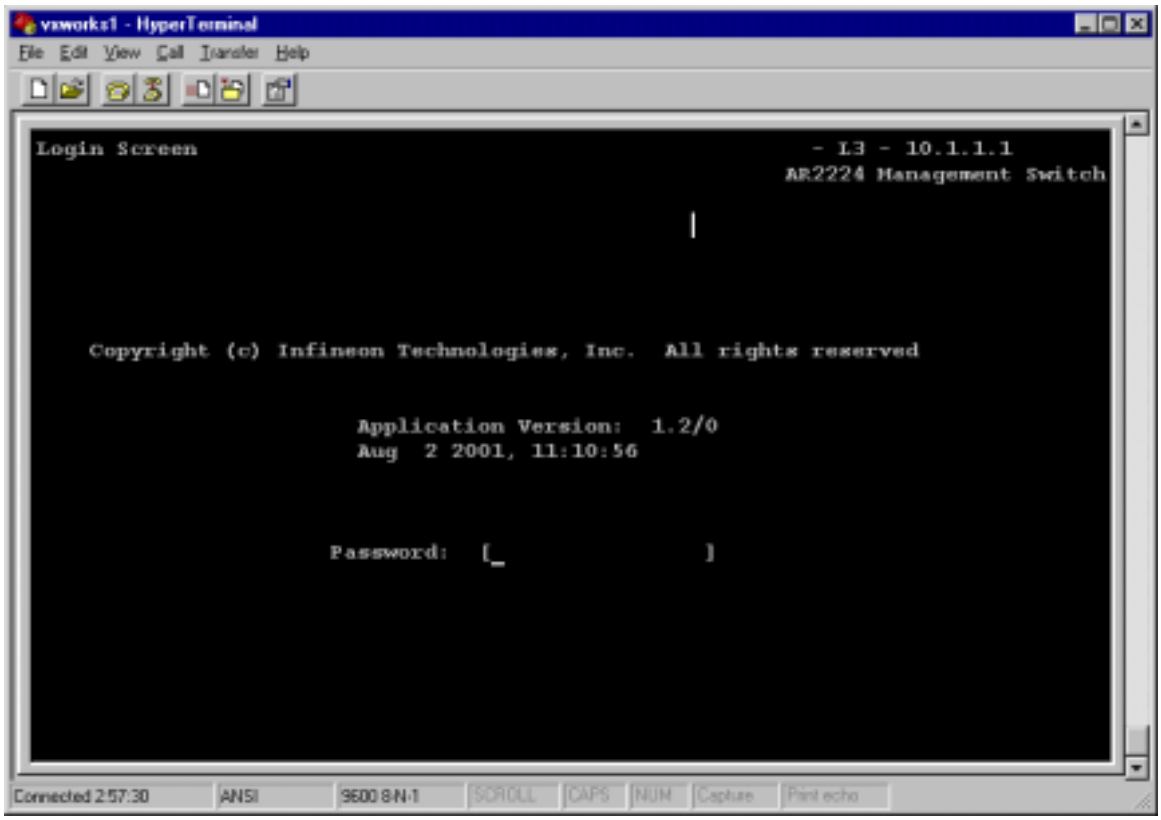
3.6 TMS Supplied Sample Console Screens

3.6.1 Login Screen

Figure 3-2 shows the Login Screen. This is the initial screen displayed to the user. The TMS sample console application supports a single login only. Consequently, no user name is required. Enter the password (which is case sensitive and up to 16 characters in length), then press **ENTER** to log in to the console screens. The default password is "password". The screen shows the s/w revision and the date/time the code was compiled.

When report s/w issues, report Application Version number shown on the screen.

Figure 3-2 **Login Screen**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Application Version	**TMS-Common**	**tmsCommonVerAppSWMajor**, **tmtmsCommonVerAppSWMinor**	**INTEGER**, **INTEGER**,	R-O	

Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-O

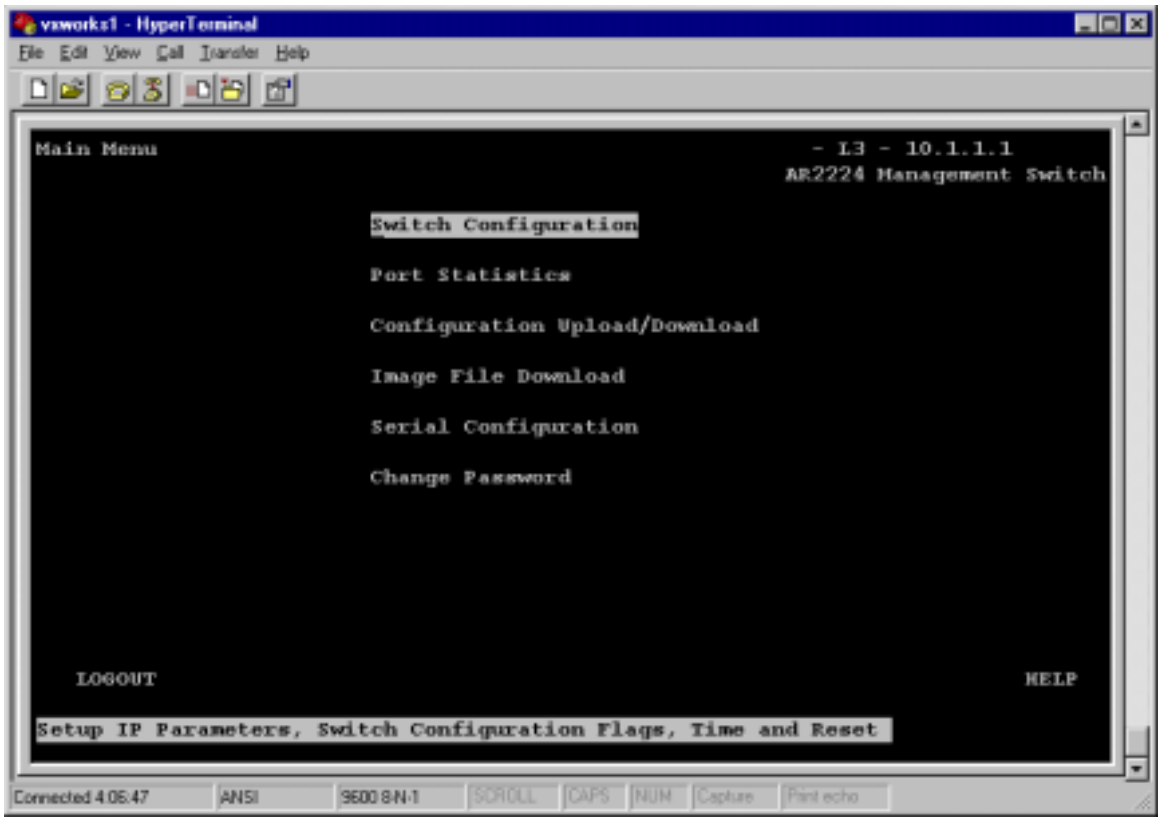
Default password is password

3.6.2 Main Menu Screen

Figure 3-3 shows the Main Menu screen. Press **ENTER** while a menu item is highlighted to go to that screen. LOGOUT returns you to the Login Screen if you are using the console. If you are using a telnet session, then LOGOUT terminates the connection

.

Figure 3-3 **Main Menu**



3.6.3 Switch Configuration Screen

Figure 3-4 shows the Switch Configuration screen. Using decimal dot format, enter the Switch IP address, subnet mask, and default gateway into the IP Address, Subnet Mask, and Default Gateway fields, respectively. The subnet mask default is 255.255.255.0, default gateway is 0.0.0.0. Enter the Switch MAC address into the MAC Address field in hex format if it is not shown. If either reset or reset factory defaults is selected for the Reset field during an APPLY, the Reset Switch Warning screen in Figure 3-5 is displayed. The default is no reset.

The default setting for Spanning Tree is Enabled, for BOOTP is Disabled, for DHCP is Disabled. If you want to change these default setting, you should select the option, then click on SAVE button, then select reset in the Reset field. Then, you can reboot the s/w without turning off the Switch. These sequences should also be followed if you want to change the Switch IP address, subnet mask, default gateway, MAC address, etc..

After the s/w is rebooted, you should see the new changes taken effect during the code download from the Flash to the on-board DRAM.

Figure 3-4 **Switch Configuration Screen**

Field Source Information

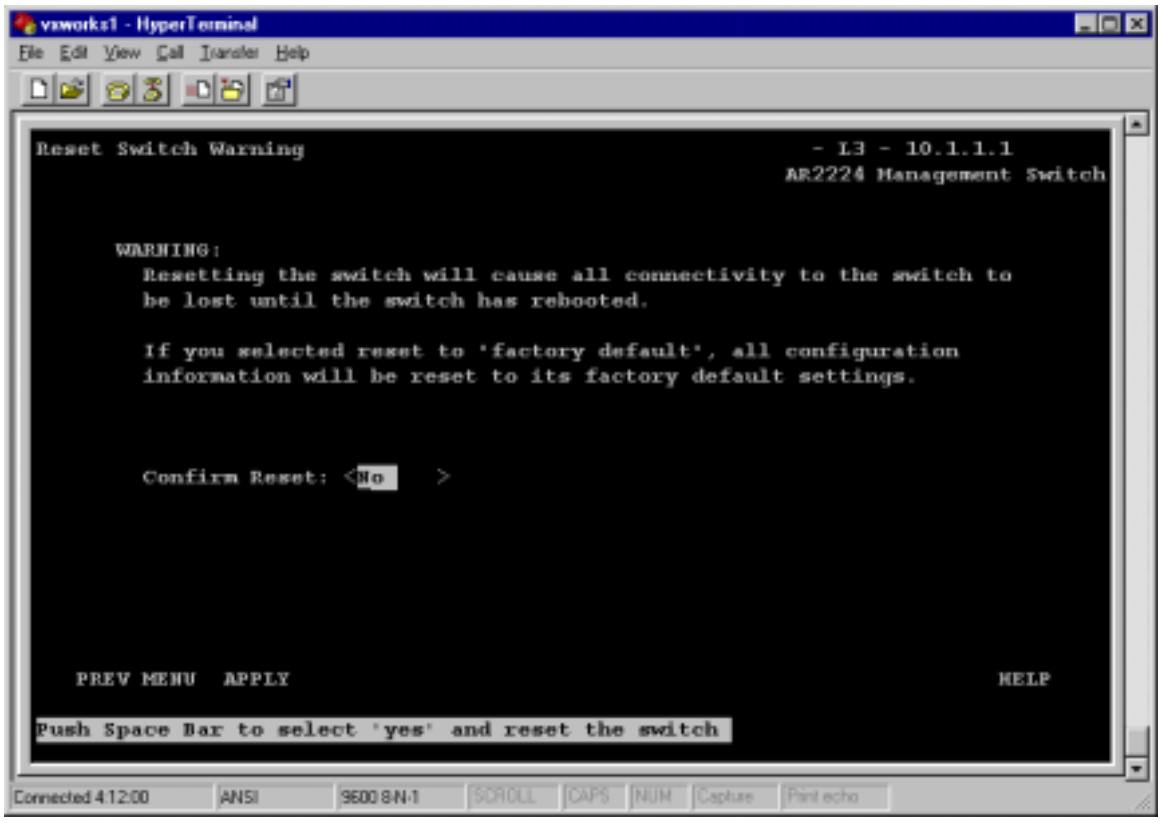
Field	MIB	Object(s)	Syntax	Access
IP Address	**TMS-Common**	**tmsCommonIPIpAddress**	**IpAddress**	R-W
Subnet Mask	**TMS-Common**	**tmsCommonIPNetMask**	**IpAddress**	R-W
Default Gateway	**TMS-Common**	**tmsCommonIPGateAddress**	**IpAddress**	R-W
MAC Address	**TMS-Common**	**tmsCommonIPMACAddr**	**MacAddress**	R-W
Spanning Tree	**TMS-Common**	**tmsCommonMiscSpanOnOff**	**INTEGER**	R-W
BOOTP	**TMS-Common**	**tmsCommonMiscBOOTPOnOff**	**INTEGER**	R-W
DHCP	**TMS-Common**	**tmsCommonMiscDHCPOnOff**	**INTEGER**	R-W
Time/Date	none	--- --- ---		
Reset	**TMS-Common**	**tmsCommonMiscReset**	**INTEGER**	R-W

Field Toggle Information

Field	Toggle Values	Notes
Spanning Tree	enable, disable	Default: enable
BOOTP	enable, disable	Default: disable
DHCP	enable, disable	Default: disable
Reset	no reset, reset, reset factory defaults	Default: no reset

Figure 3-5 shows the Reset Switch Warning screen. This screen is shown if reset or reset factory defaults is selected for the Reset field during an APPLY. Select Yes to proceed with the reset or No to cancel.

Figure 3-5 **Reset Switch Warning Screen**



Field Toggle Information

Field	Toggle Values	Notes
Reset Switch	No, Yes	Default: No

3.6.4 Port Statistics Screen

Figure 3-6 shows the Port Statistics screen. The Port field is an exception to the toggle field rules described in *3.4 Keys for Editing a Field*. This field uses the current displayed value immediately (without APPLY or SAVE). Enable or disable the selected ports using the State field and set the port speed using the Set Speed field.

Figure 3-6 **Port Statistics Screen**

Field Source Information

Field	MIB	Object(s)	Syntax	Access
Port	AR2224	**ar2ArchIfacePort**	**Integer32**	N-A
ifIndex	AR2224	**ar2ArchIfaceIfIndex**	**Integer32**	R-O
State	AR2224	**ar2ArchIfaceEnable**	**TruthValue**	R-W
Set Speed	AR2224	**ar2ArchIfaceDuplexSpeedSet**	**INTEGER**	R-W
STP State	RFC1493	**dot1dStpPortState**	**INTEGER**	R-O
Link	AR2224	**ar2ArchIfaceLink**	**INTEGER**	R-O
Actual Speed	AR2224	**ar2ArchIfaceDuplexSpeedGet**	**INTEGER**	R-O
type	AR2224	**ar2ArchIfaceType**	**INTEGER**	R-O
DropEvents	RFC1757	**etherStatsDropEvents**	**Counter**	R-O
Octets	RFC1757	**etherStatsOctets**	**Counter**	R-O
Pkts	RFC1757	**etherStatsPkts**	**Counter**	R-O
BroadcastPkts	RFC1757	**etherStatsBroadcastPkts**	**Counter**	R-O
MulticastPkts	RFC1757	**etherStatsMulticastPkts**	**Counter**	R-O
CRCAlignErrors	RFC1757	**etherStatsCRCAlignErrors**	**Counter**	R-O
UndersizePkts	RFC1757	**etherStatsUndersizePkts**	**Counter**	R-O
OversizePkts	RFC1757	**etherStatsOversizePkts**	**Counter**	R-O
Fragments	RFC1757	**etherStatsFragments**	**Counter**	R-O
Jabbers	RFC1757	**etherStatsJabbers**	**Counter**	R-O
Collisions	RFC1757	**etherStatsCollisions**	**Counter**	R-O
Pkts64Octets	RFC1757	**etherStatsPkts64Octets**	**Counter**	R-O
Pkts65to127Octets	RFC1757	**etherStatsPkts65to127Octets**	**Counter**	R-O
Pkts128to255Octets	RFC1757	**etherStatsPkts128to255Octets**	**Counter**	R-O
Pkts256to511Octets	RFC1757	**etherStatsPkts256to511Octets**	**Counter**	R-O
Pkts512to223Octets	RFC1757	**etherStatsPkts512to223Octets**	**Counter**	R-O
Pkts224to1518Octets	RFC1757	**etherStatsPkts224to1518Octets**	**Counter**	R-O

Field Toggle Information

Field	Toggle Values	Notes

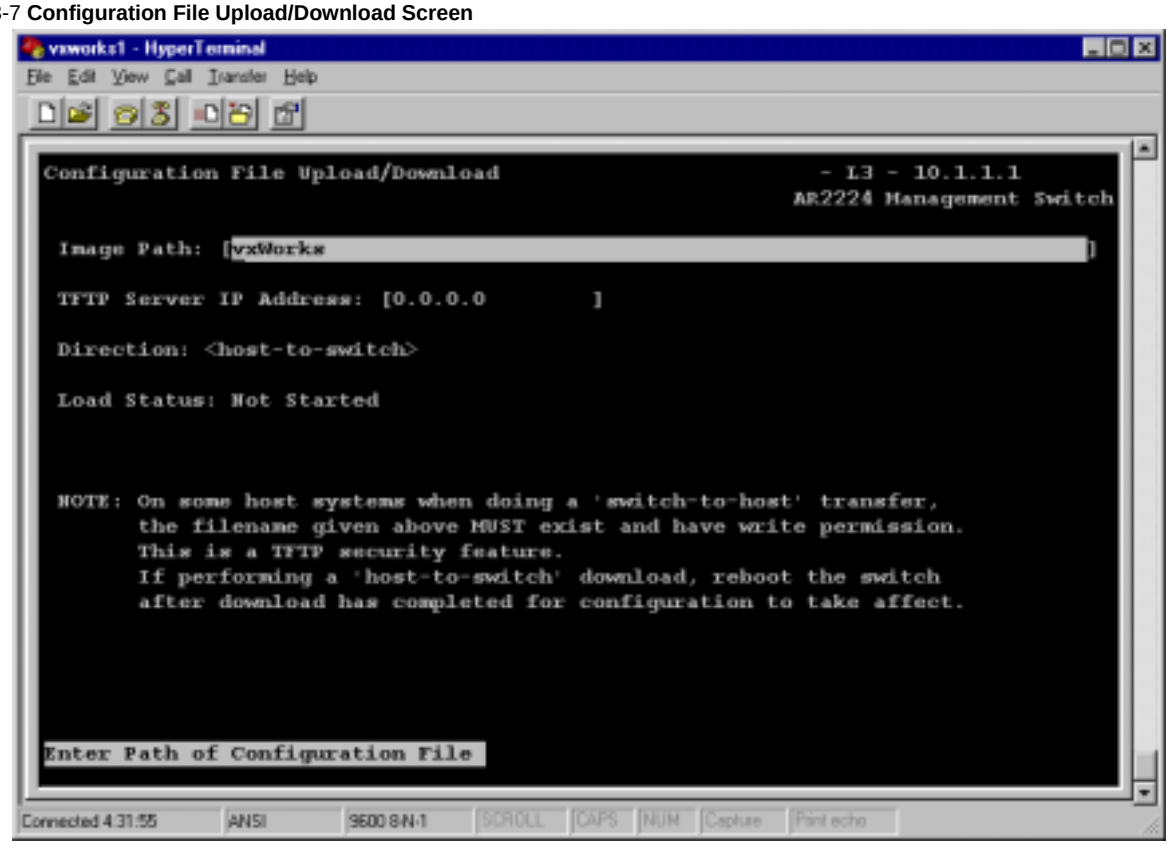
Port	1, 2, ..., 26	Default: 1
State	enable, disable	Default: enable
Set Speed (FE,VDSL ports)	autonegotiate, half-10, full-10, half-100, full-100	Based on port type (ports 1 to 24)
Set Speed (Gbps ports)	full-1000	Based on port type (ports 25 and 26)

3.6.5 Configuration File Upload/Download Screen

Figure 3-7 shows the Configuration File Upload/Download screen. Enter the file name of the configuration file in the Image Path field; this file is assumed to be in the **/tftpboot** directory unless specified otherwise. Enter the IP address of the location of the file in the TFTP Server IP Address field. The Direction field supports switch-to-host (upload) or host-to-switch (download). Note: this is not the TMS image file as described in section 3.6.6.

During an upload, only the **Durable** objects are uploaded from NVM; **Persistent** objects are not uploaded.

Figure 3-7 **Configuration File Upload/Download Screen**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Image Path	**TMS-Common**	**tmsCommonLoadTftpFileName**	**DisplayString**	R-W	Includes full path and file name
TFTP Server IP Address	**TMS-Common**	**tmsCommonLoadTftpAddress**	**IpAddress**	R-W	
Direction	**TMS-Common**	**tmsCommonLoadExecute**	**INTEGER**	R-W	
Load Status	**TMS-Common**	**tmsCommonLoadExecuteStatus**	**INTEGER**	R-O	

Field Toggle Information

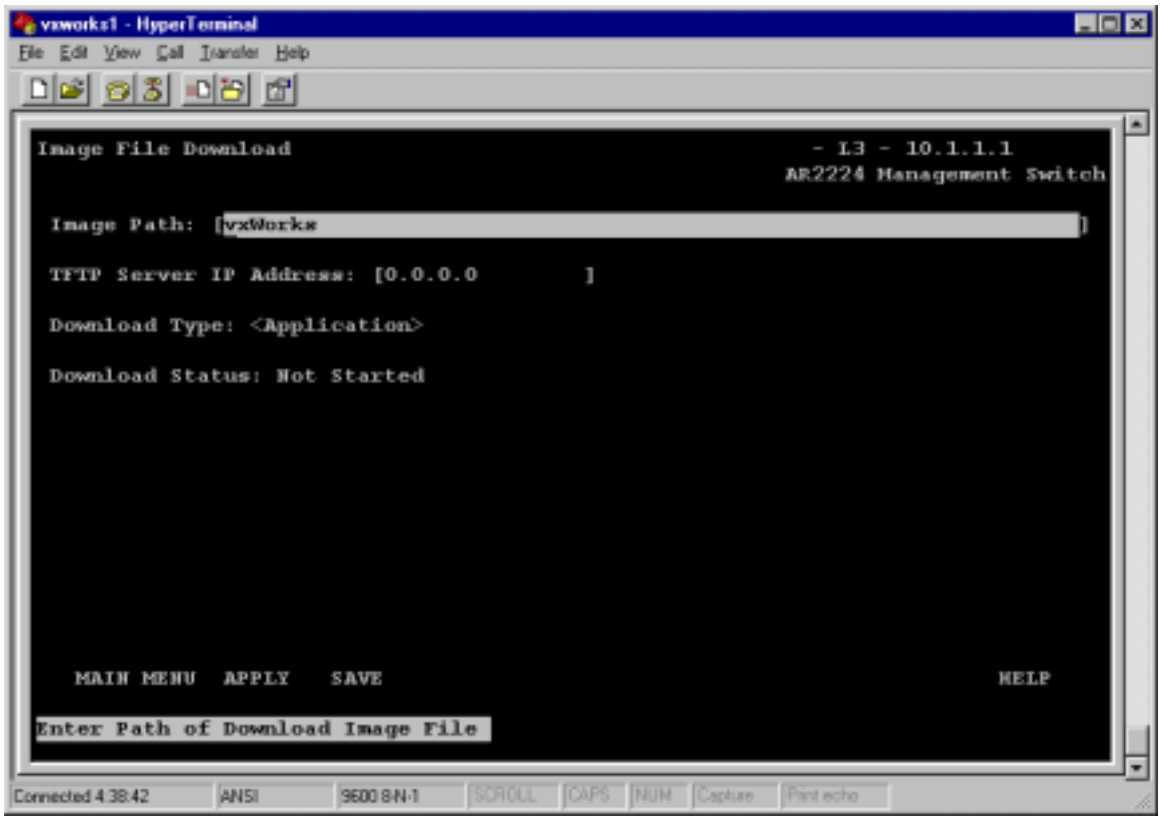
Field	Toggle Values	Notes
Load Type	switch-to-host, host-to-switch	Default: switch-to-host

3.6.6 Image File Download Screen

Figure 3-8 shows the Image File Download screen. This screen allows you to download the Boot ROM or TMS Application Image to Flash.

NOTE: You must turn off the switch manually after the download completes before the changes will take effect. Enter vxWorks.Z exactly in the Image Path field, and enter TFTP Server IP address which is your PC's IP address. Refer to the Installtion Section 2.3.2 for details.

Figure 3-8 **Image File Download Screen**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Image Path	**TMS-Common**	**tmsCommonLoadTftpFileName**	**DisplayString**	R-W	Includes full path and file name
TFTP Server IP Address	**TMS-Common**	**tmsCommonLoadTftpAddress**	**IpAddress**	R-W	
Download Type	**TMS-Common**	**tmsCommonLoadType**	**INTEGER**	R-W	

Download Status	**TMS-Common**	**tmsCommonLoadExecuteStatus**	**INTEGER**	R-O

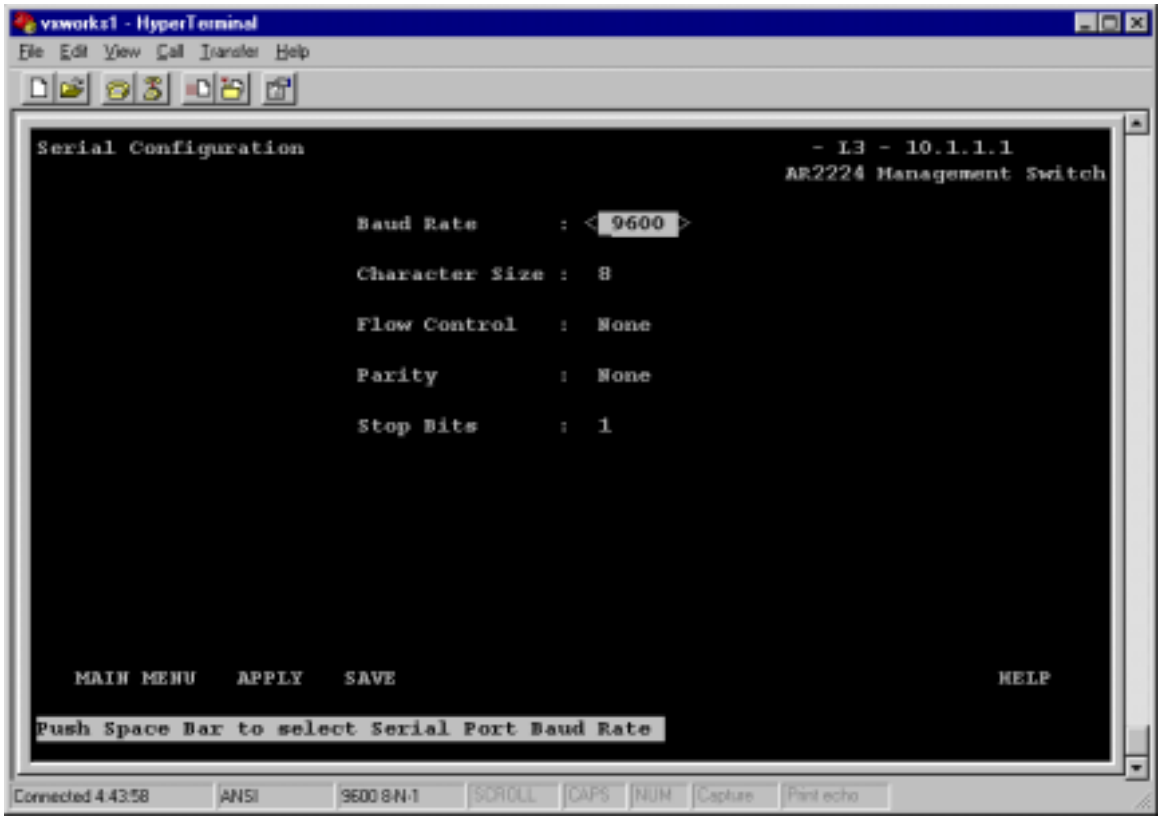
Field Toggle Information

Field	**Toggle Values**	**Notes**
Download Type	Application, Boot ROM	Default: Application

3.6.7 Serial Configuration Screen

Figure 3-9 shows the Serial Configuration screen. Select a baud rate for the serial interface using the toggle field. The page also displays read-only information about the serial interface. For serial communication to work properly, the setting needs to be 9600, N, 8, 1 with No flow control.

Figure 3-9 **Serial Configuration Screen**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Baud Rate	**TMS-Common**	**tmsCommonMiscBaud**	**INTEGER**	R-W	
Character Size	none	----------	----------	--------	hard coded to 8
Parity	none	----------	----------	--------	hard coded to None
Stop Bits	none	----------	----------	--------	hard coded to 1
Flow Control	none	----------	----------	--------	hard coded to None

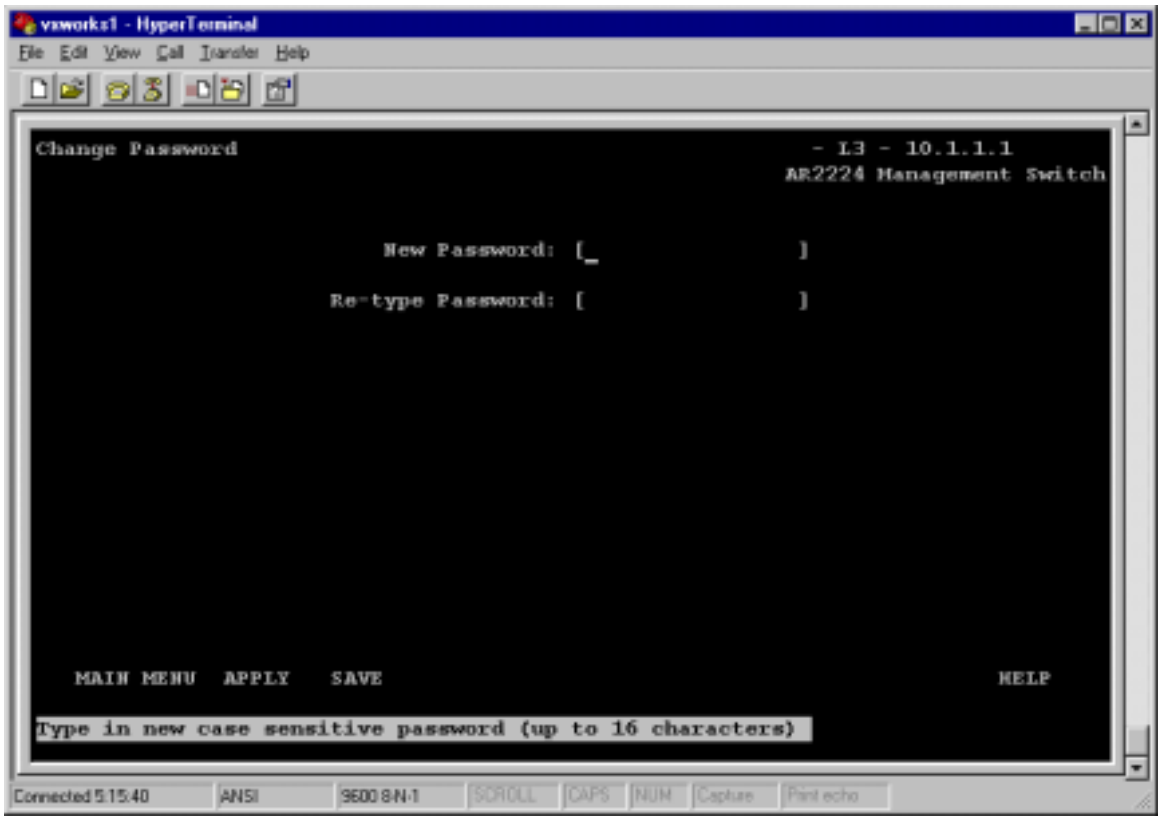
Field Toggle Information

Field	Toggle Values	Notes
Baud Rate	2400, 9600, 19200, 38400	Default: 38400

3.6.8 Change Password Screen

Figure 3-10 shows the Change Password screen. The password is a maximum of 16 case-sensitive characters. To change the password, enter the new password, then type the same new password into the Re-type Password field. Defaul password is password.

Figure 3-10 **Change Password Screen**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
New Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-W
Re-type Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-W

4.0 Ar2224 Managed Switch- Web Browser Interface

The Web pages provide network and switch management functions by using industry standard Web browsers. The following Web browser providers and versions are known to work (others may also work):

Netscape Communicator 4.5 and 4.6

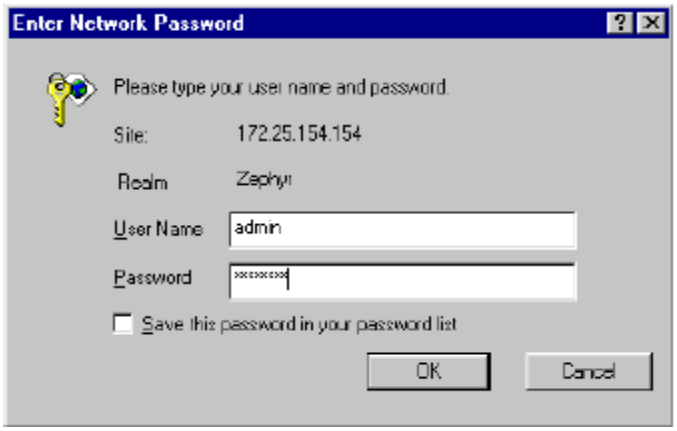
Microsoft Internet Explorer 4.0 and 5.0

All sample screens are shown as displayed on Microsoft© Internet Explorer 5.

4.1 Login Dialog Box

Figure 4-1 shows the Login dialog box. The Login dialog box is displayed the first time you access the Web pages. Enter the user name and password in the appropriate fields, then press **ENTER** (or click OK) to log in to the Web server. The password is case sensitive and can be up to 16 characters in length. The default user name is "**admin**" with password "**password**". WindWeb server allows the use of multiple user names and passwords. The TMS implementation currently uses only a single user name and password.

Figure 4-1 **Login Dialog Box**



Field Source Information

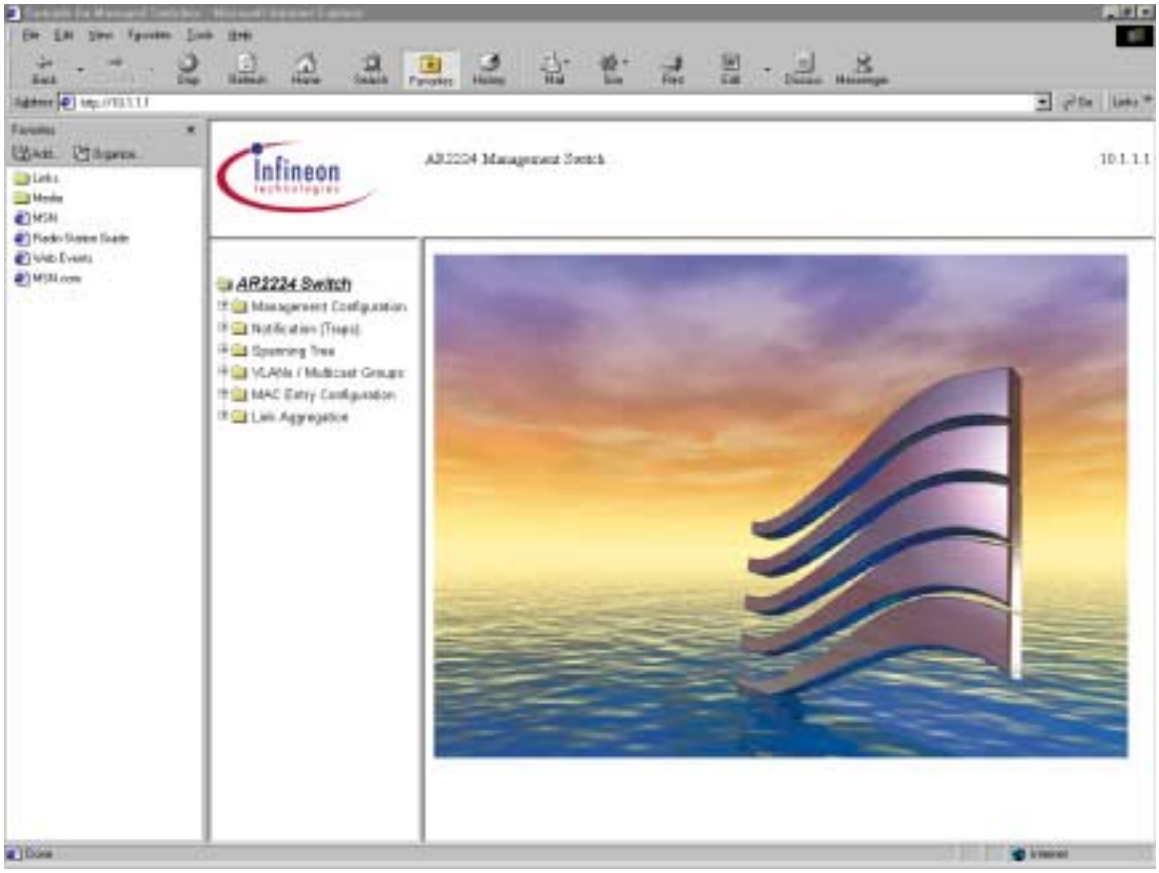
Field	MIB	Object(s)	Syntax	Access	Notes
User Name	---	---	---	---	Hard-coded to admin

Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-W

4.2 Home Page

Figure 4-2 shows the Home page. This screen is shown after you log in or when you click on AR2224-Switch in the navigation tree.

Figure 4-2 **Home Page**



4.3 Switch Configuration

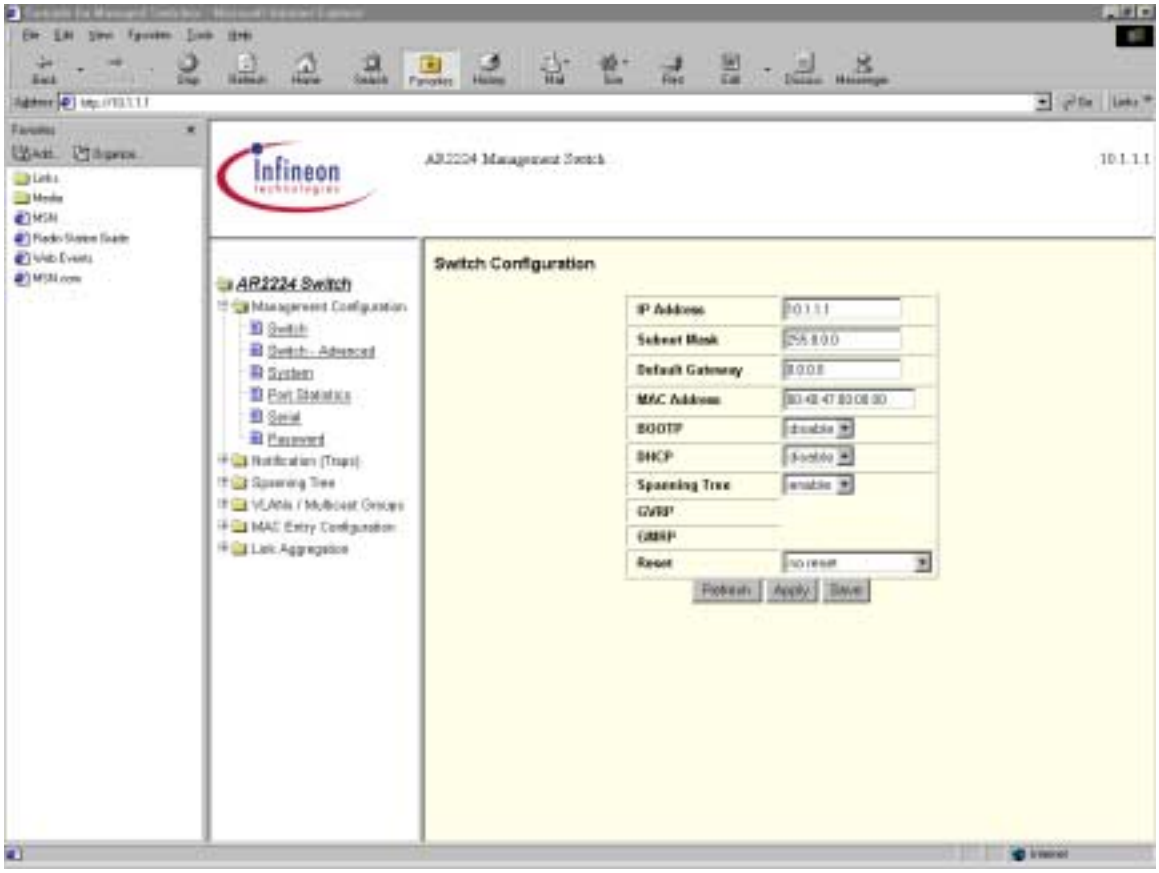
Figure 4-3 shows the Switch Configuration page. This page allows you to edit

general switch configuration. Enter the IP address of the Switch, subnet mask, and default gateway in decimal dot format. Enter the MAC address in hex format. To reset the switch, select reset or reset factory defaults from the Reset drop-down box, then

This section carries similar display as shown on section 3.6.3, but with the Web Browser style. User should follow the same procedure as described in section 3.6.3 wheile saving the Switch Configuration Page.

Defatult settings for BootP, DHCP are disable, for Spanning Tree is enable.

Figure 4-3 **Switch Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
IP Address	**TMS-Common**	**tmsCommonIPIpAddress**	**IpAddress**	R-W
Subnet Mask	**TMS-Common**	**tmsCommonIPNetMask**	**IpAddress**	R-W
Default Gateway	**TMS-Common**	**tmsCommonIPGateAddress**	**IpAddress**	R-W
MAC Address	**TMS-Common**	**tmsCommonIPMACAddr**	**MacAddress**	R-W
BOOTP	**TMS-Common**	**tmsCommonMiscBOOTPOnOff**	**INTEGER**	R-W
DHCP	**TMS-Common**	**tmsCommonMiscDHCPOnOff**	**INTEGER**	R-W
Spanning Tree	**TMS-Common**	**tmsCommonMiscSpanOnOff**	**INTEGER**	R-W
Reset	**TMS-Common**	**tmsCommonMiscReset**	**INTEGER**	R-W

Reset Dialog Boxes

On the Switch Configuration Web page(Figure 4-3), when you select reset then click Apply or Save, you will need to respond to a series of three dialog boxes.

The Reset Confirmation dialog box in Figure 4-4 is the first dialog box displayed. The Reset Confirmation box confirms that you actually want to reset the switch. If you click Cancel, you are returned to the Switch Configuration page and the Reset field is set to no reset. If you click OK, you proceed to the Save dialog box.(Figure 4-5)

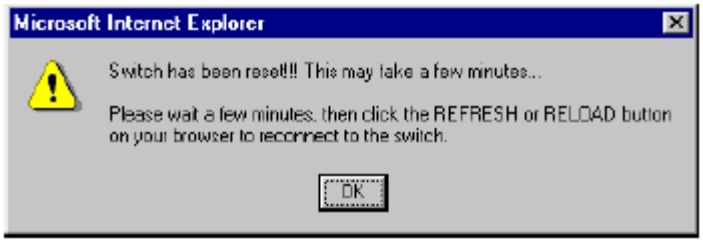
Figure 4-4 **Reset Confirmation Dialog Box**

The Save dialog box in Figure 4-5 confirms that you want to save all configuration changes before the switch resets. If you click OK, the configuration is saved and then the switch resets. If you click Cancel, the switch resets without saving, and you lose any unsaved changes.

Figure 4-5 **Save Dialog Box**

Once the switch starts resetting, the Reset dialog box in Figure 4-6 is displayed. This box tells you that the switch is being reset, to wait a few minutes while the switch resets, then click Refresh or Reload on your browser to reconnect to the switch. You must click OK before you can access your browser.

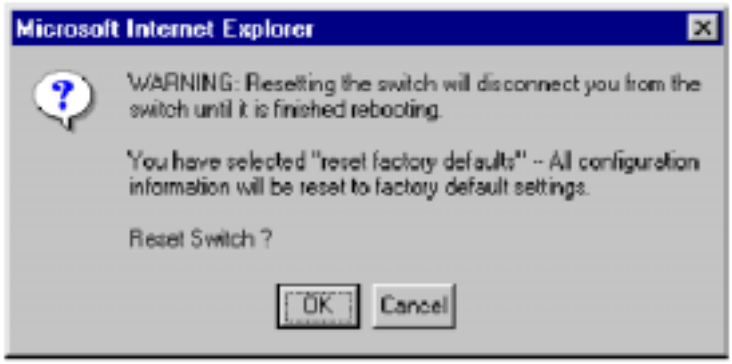
Figure 4-6 **Reset Dialog Box**



Reset Factory Defaults Dialog Boxes

On the Switch Configuration Web page, when you select reset factory defaults then click Apply or Save, you will need to respond to a series of two dialog boxes.
The Reset Factory Defaults Warning dialog box in Figure 4-7 is the first dialog box displayed. The Reset Factory Defaults Warning box confirms that you actually want to reset the factory default settings on the switch. If you click Cancel, you are returned to the Switch Configuration page and the Reset field is set to no reset. If you click OK, the factory default settings are loaded and the switch resets.

Figure 4-7 **Reset Factory Defaults Warning Dialog Box**



Once the switch starts resetting, the Reset dialog box in Figure 4-6 is displayed. This box tells you that the switch is being reset, to wait a few minutes while the switch resets, then click Refresh or Reload on your browser to reconnect to the switch. You must click OK before you can access your browser.

4.4 Advanced Switch Configuration Page

Figure 4-8 shows the Advanced Switch Configuration page. This page allows user to change many of the settings in Ar2224, therefore, altering the Switch behavior. For more details on the setting, refer to Register0x00 and 0x08 in the Ar2224 data sheet.

Link Aggregation Method: multiple links can be aggregated together to achieve 1)higher bandwidth, 2)if a link within the aggregated links is broken, traffic can be redirected to other links. This field sets the mechanism for the Switch to distribute the aggregated frames based on frames' Source Address, or Destination Address, or Both(Ex-OR of SA and DA), or None. After a particular distribution mechanism is selected, the Switch will distribute traffic according to the selection of 2 ports, or 4 ports, or 8 ports aggregation in the Link Aggregation Page. Default is None.

Packet Prioritization: Outgoing packets, in this case the Ethernet frames, can be assigned a high priority by application, based on the originating Source Port, or its Destination MAC address, or either or disabled. To set a source port in high priority, user also needs to go to the Port Statistics Page to select that port, then set it to high or normal in the Port Priority field. To set a specific Destination MAC address in high priority, you also need to go to the MAC Entry Page and select high priority for that address. Default is disabled.

MAC Address Table Updating: when Freeze_None is selected, it means that all MAC entry can be updated by the Switch. When Freeze_New is selected, it means only a port change with an existing MAC address can be recorded, so a new port will display after pinging. When Freeze_All is selcted, it means no new MAC entry is learned and recorded.

Oversized Packet: this bit conrols if the Swtich will forward or discard an oversized packet.(more than 1518 bytes). When select Forward, the oversized packet is forwarded to the destination port as long as its CRC is still valid.

VLAN filtering: enable or disable. If VLAN function wants to be activated, user should enable this field first before setting up the VLAN.

Frame Paused: this bit controls the Switch to Process or Discard the received Pause Frame. If select Process, the received Pauls Frames will be forewarded as a regular frame.

Aging Time: default is 5 min. This means the MAC entry in the MAC Entry Table will remain in the Tablefor 5 min. After the time is up, the entry will disappear if REFRESH is hit.

Bandwidth Ratio: this field allocated packets to leave the Switch based on priority. When 16/0 is selected, it means all packets with high priority will go out first. When 8/8 is selected, it means high priority packets go out evenly with normal proirty packets.

LED Flashing: user can select enable or disable the LED to flash during active tx/rx data.

LED Display Mode: user can select the Display Mode to be Port Feature Based or Port Speed Based.

When selecting Port Featur Based(defalt mode), refer to the following table:

1st LED-on:full-duplex mode.	Off: half-duplex mode.
2nd LED-on:100Mbps	Off : 10Mbps

When selecting Port Speed Based, refer to the following table:

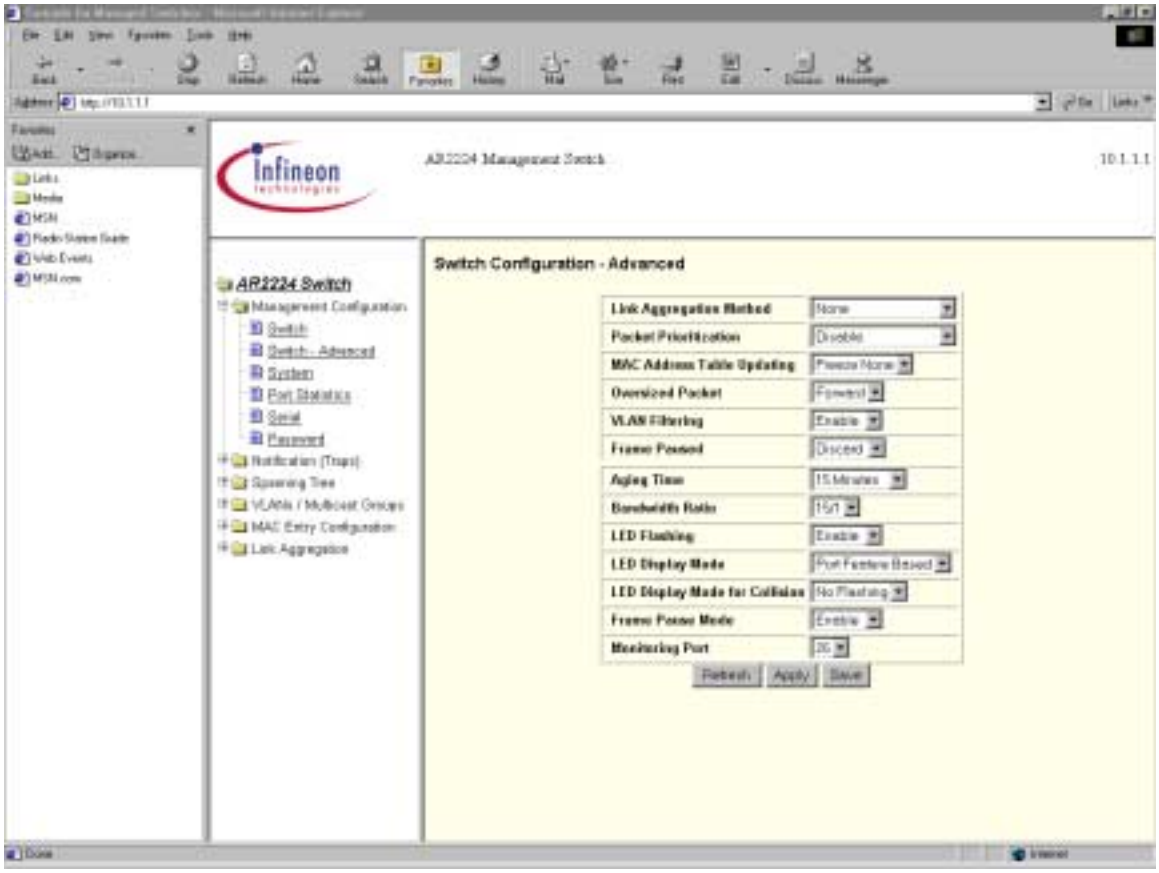
NO LED on: 10Mbps, half-duplex.	One LED on: 10Mbps, full-duplex
Two LEDs on: 100Mbps, half-duplex.	Three LEDs on: 100Mbps, full-duplex

LED Display Mode for Collision: Enable or disable to flash the LED upon collision. Default is Enable.

Frame Pause Mode: this bit in bit28 in register0x00. Enable means special Pause Frames are generated if Auto-negotiation and Full-duplex are set, per 802.3x flow control specification. Disable is the default mode.

Monitoring Port: any port can be selected as a monitoring port, as well as a monitored port if it is enabled in the Port Statistics Page.

Figure 4-8 **Advanced Switch Configuration Page**



Field Source Information

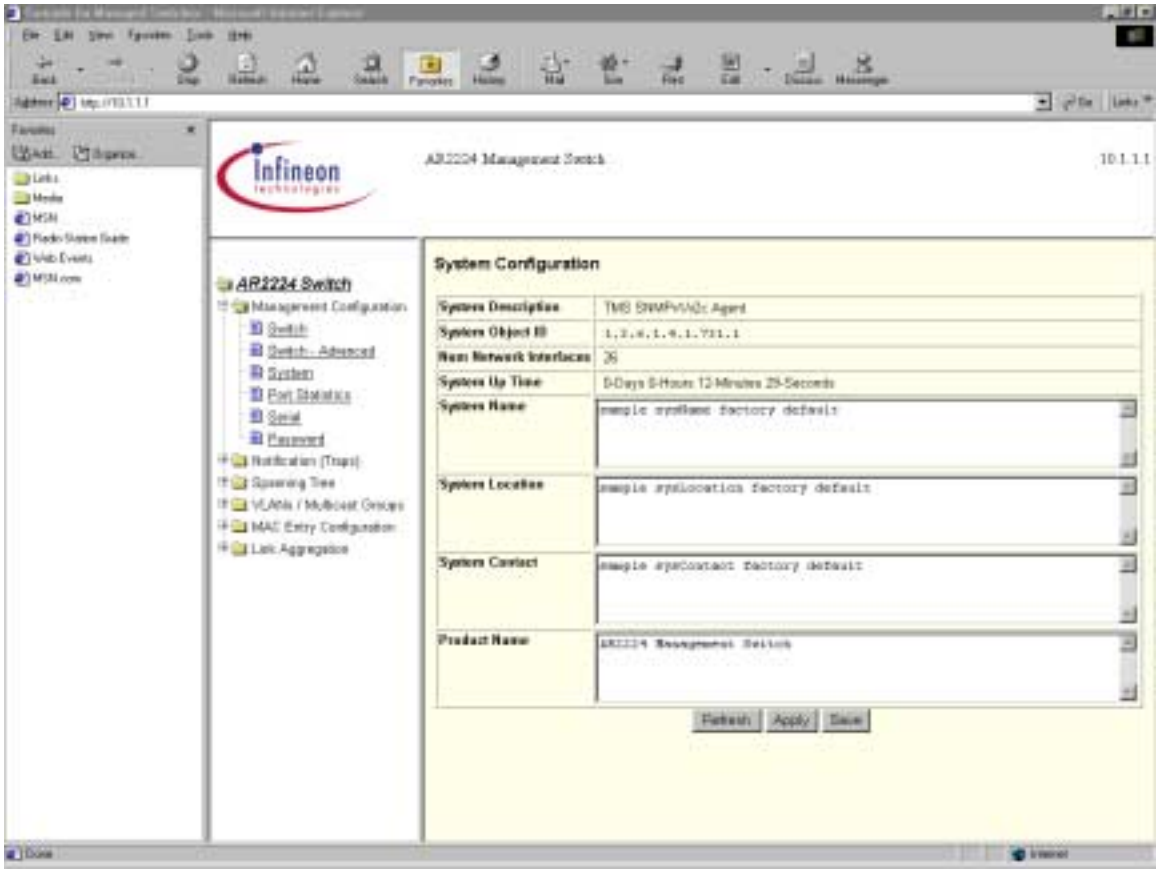
Field	MIB	Object(s)	Syntax	Access
Link Aggregation Method	**ar2224-oem**	**ar2TrunkingMethod**	**INTEGER**	
Packet Prioritization	**ar2224-oem**	**ar2PacketPrioritization**	**INTEGER**	
MAC Address Table Updating	**ar2224-oem**	**ar2MacAddressFreezing**	**INTEGER**	
Oversized Packet	**ar2224-oem**	**ar2ForwardOversizedPacket**	**INTEGER**	
VLAN Filtering	**ar2224-oem**	**ar2VlanFiltering**	**INTEGER**	
Frame Paused	**ar2224-oem**	**ar2PauseFrameControl**	**INTEGER**	
Aging Time	**ar2224-oem**	**ar2AgingTimeSelection**	**INTEGER**	
Bandwidth Ratio	**ar2224-oem**	**ar2BandwidthRatio**	**INTEGER**	
LED Flashing	**ar2224-oem**	**ar2EnableTxLED**	**INTEGER**	

LED Display Mode	**ar2224-oem**	**ar2LedDisplayMode**	**INTEGER**
LED Display Mode for Collision	**ar2224-oem**	**ar2LedShowCollision**	**INTEGER**
Frame Pause Mode	**ar2224-oem**	**ar2DisablePause**	**INTEGER**
Monitoring Port	**ar2224-oem**	**ar2 ArchIfaceMonitoringPort**	**Integer32**

4.5 System Configuration Page

Figure 4-9 shows the System Configuration page. This page allows you to view and modify some of the MIB II System Group objects, as well as the OEM Product/ MIB Product Name displayed on each Console screen and Web page. All four fields(System Name, System Location, Sustem Contact, Product Name) can be modified by user.

Figure 4-9 **System Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
System Description	RFC1907	**sysDescr**	**DisplayString**	R-O
System Object ID	RFC1907	**sysObjectID**	**OBJECTIDENTIFIER**	R-O
Num Network Interfaces	RFC2233	**ifNumber**	**Integer32**	R-O
System Up Time	RFC1907	**sysUpTime**	**TimeTicks**	R-O
System Name	RFC1907	**sysName**	**DisplayString**	R-W
System Location	RFC1907	**sysLocation**	**DisplayString**	R-W
System Contact	RFC1907	**sysContact**	**DisplayString**	R-W
Product Name	**TMS-Common**	**tmsCommonMiscProductName**	**DisplayString**	R-W

4.6 Port Configuration / Statistics Page

Figure 4-10 shows the Port Configuration / Statistics page. This page allows user to enable or disable ports, to set port speed(auto-negotiate:default), to enable or disable port in monitored mode, to set port in high or normal priority, and displays link condition with various statistics on each port.

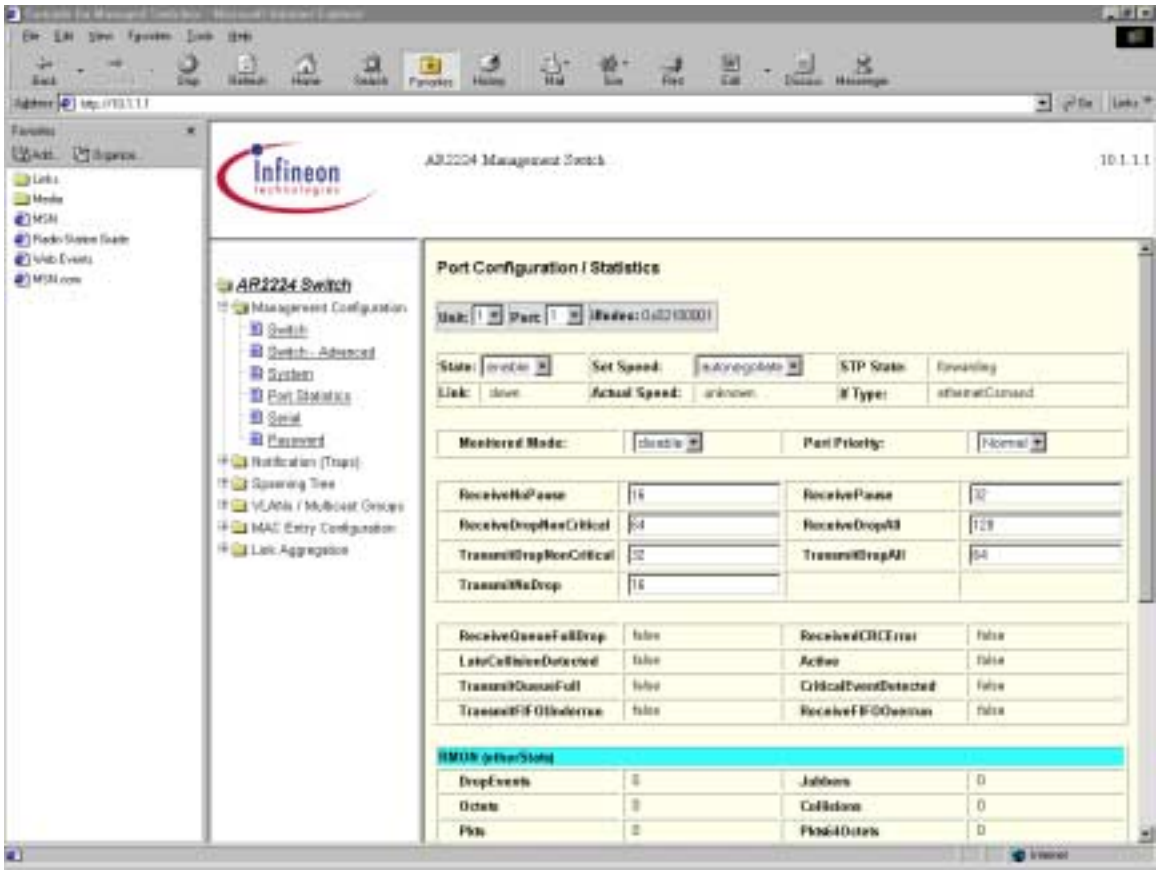
To select a particular port to configure or view, select the appropriatenumbers from the Unit and Port drop-down boxes. If a specific speed wants to be selected, then select the speed and hit APPLY. If its link partner honors the speed, the link will be up. Otherwise, the link will be down. Therefore, select Auto-negotiation is recommended. When Spanning Tree is enabled in the Advanced-System page, the STP State

Filed on a port will be active.

Port Prioity can be set to high or normal, which means that packets go out based on this priority setting, if the Source Port is selected in the Packet Prioitization field under the System-Advanced page. Setting high or normal priority in this Port Priority field also sets the Priority field in the VLAN/GVRP page.

Note: depending on the Ethernet PHY's used in the link, including its link partner, the reading of the link status can take extended period of time. To ensure the Link Status is read correctly, wait until the LEDs display on the link are on, then hit REFRESH button to get the reading.

Figure 4-10 **Port Configuration / Statistics Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A
Port	**ar2224-oem**	**ar2ArchIfacePort**	**Integer32**	N-A
ifIndex	**ar2224-oem**	**ar2ArchIfaceIfIndex**	**Integer32**	R-O
State	**ar2224-oem**	**ar2ArchIfaceEnable**	**TruthValue**	R-W
Set Speed	**ar2224-oem**	**ar2ArchIfaceDuplexSpeedSet**	**INTEGER**	R-W
STP State	**stpMib**	**stpDot1dStpPortState**	**INTEGER**	R-O
Link	**ar2224-oem**	**ar2ArchIfaceLink**	**INTEGER**	R-O
Actual Speed	**ar2224-oem**	**ar2ArchIfaceDuplexSpeedGet**	**INTEGER**	R-O
type	**ar2224-oem**	**ar2ArchIfaceType**	**INTEGER**	R-O
Monitored Mode	**ar2224-oem**	**ar2ArchIfaceMonitorEnable**	**TruthValue**	
Port Priority	**ar2Swapi**	**sDot1dPortDefaultUserPriority**	**INTEGER**	
ReceiveNoPause	**ar2224-oem**	**ar2PortWaterMarkReceiveNoPause**	**INTEGER**	
ReceivePause	**ar2224-oem**	**ar2PortWaterMarkReceivePause**	**INTEGER**	
ReceiveDropNonCritical	**ar2224-oem**	**ar2PortWaterMarkReceiveDropNonCritical**	**INTEGER**	
ReceiveDropAll	**ar2224-oem**	**ar2PortWaterMarkReceiveDropAll**	**INTEGER**	
TransmitDropNonCritical	**ar2224-oem**	**ar2PortWaterMarkTransmitDropNonCritical**	**INTEGER**	
TransmitDropAll	**ar2224-oem**	**ar2PortWaterMarkTransmitDropAll**	**INTEGER**	
TransmitNoDrop	**ar2224-oem**	**ar2PortWaterMarkTransmitNoDrop**	**INTEGER**	
ReceiveQueueFullDrop	**ar2224-oem**	**ar2PortStatusReceiveQueueFullDrop**	**TruthValue**	
ReceivedCRCError	**ar2224-oem**	**ar2PortStatusReceivedCRCError**	**TruthValue**	
LateCollisionDetected	**ar2224-oem**	**ar2PortStatusLateCollisionDetected**	**TruthValue**	
Active	**ar2224-oem**	**ar2PortStatusActive**	**TruthValue**	
TransmitQueueFull	**ar2224-oem**	**ar2PortStatusTransmitQueueFull**	**TruthValue**	
CriticalEventDetected	**ar2224-oem**	**ar2PortStatusCriticalEventDetected**	**TruthValue**	
TransmitFIFOUnderrun	**ar2224-oem**	**ar2PortStatusTransmitFIFOUnderrun**	**TruthValue**	

ReceiveFIFOOverrun	**ar2224-oem**	**ar2PortStatusReceiveFIFOOverrun**	**TruthValue**	
DropEvents	**ar2Swapi**	**sEtherStatsDropEvents**	**Counter**	R-O
Octets	**ar2Swapi**	**sEtherStatsOctets**	**Counter**	R-O
Pkts	**ar2Swapi**	**sEtherStatsPkts**	**Counter**	R-O
BroadcastPkts	**ar2Swapi**	**sEtherStatsBroadcastPkts**	**Counter**	R-O
MulticastPkts	**ar2Swapi**	**sEtherStatsMulticastPkts**	**Counter**	R-O
CRCAlignErrors	**ar2Swapi**	**sEtherStatsCRCAlignErrors**	**Counter**	R-O
UndersizePkts	**ar2Swapi**	**sEtherStatsUndersizePkts**	**Counter**	R-O
OversizePkts	**ar2Swapi**	**sEtherStatsOversizePkts**	**Counter**	R-O
Fragments	**ar2Swapi**	**sEtherStatsFragments**	**Counter**	R-O
Jabbers	**ar2Swapi**	**sEtherStatsJabbers**	**Counter**	R-O
Collisions	**ar2Swapi**	**sEtherStatsCollisions**	**Counter**	R-O
Pkts64Octets	**ar2Swapi**	**sEtherStatsPkts64Octets**	**Counter**	R-O
Pkts65to127Octets	**ar2Swapi**	**sEtherStatsPkts65to127Octets**	**Counter**	R-O
Pkts128to255Octets	**ar2Swapi**	**sEtherStatsPkts128to255Octets**	**Counter**	R-O
Pkts256to53Octets	**ar2Swapi**	**sEtherStatsPkts256to53Octets**	**Counter**	R-O
Pkts512to223Octets	**ar2Swapi**	**sEtherStatsPkts512to223Octets**	**Counter**	R-O
Pkts224to1518Octets	**ar2Swapi**	**sEtherStatsPkts224to1518Octets**	**Counter**	R-O
In Octets	**rfc2233**	**ifInOctets**	**Counter32**	R-O
In Ucast Pkts	**rfc2233**	**ifInUcastPkts**	**Counter32**	R-O
In NUcast Pkts	**rfc2233**	**ifInNUcastPkts**	**Counter32**	R-O
In Discards	**rfc2233**	**ifInDiscards**	**Counter32**	R-O
In Errors	**rfc2233**	**ifInErrors**	**Counter32**	R-O
In Unknown Protos	**rfc2233**	**ifInUnknownProtos**	**Counter32**	R-O
Out Octets	**rfc2233**	**ifOutOctets**	**Counter32**	R-O
Out Ucast Pkts	**rfc2233**	**ifOutUcastPkts**	**Counter32**	R-O
Out NUcast Pkts	**rfc2233**	**ifOutNUcastPkts**	**Counter32**	R-O
Out Discards	**rfc2233**	**ifOutDiscards**	**Counter32**	R-O
Out Errors	**rfc2233**	**ifOutErrors**	**Counter32**	R-O

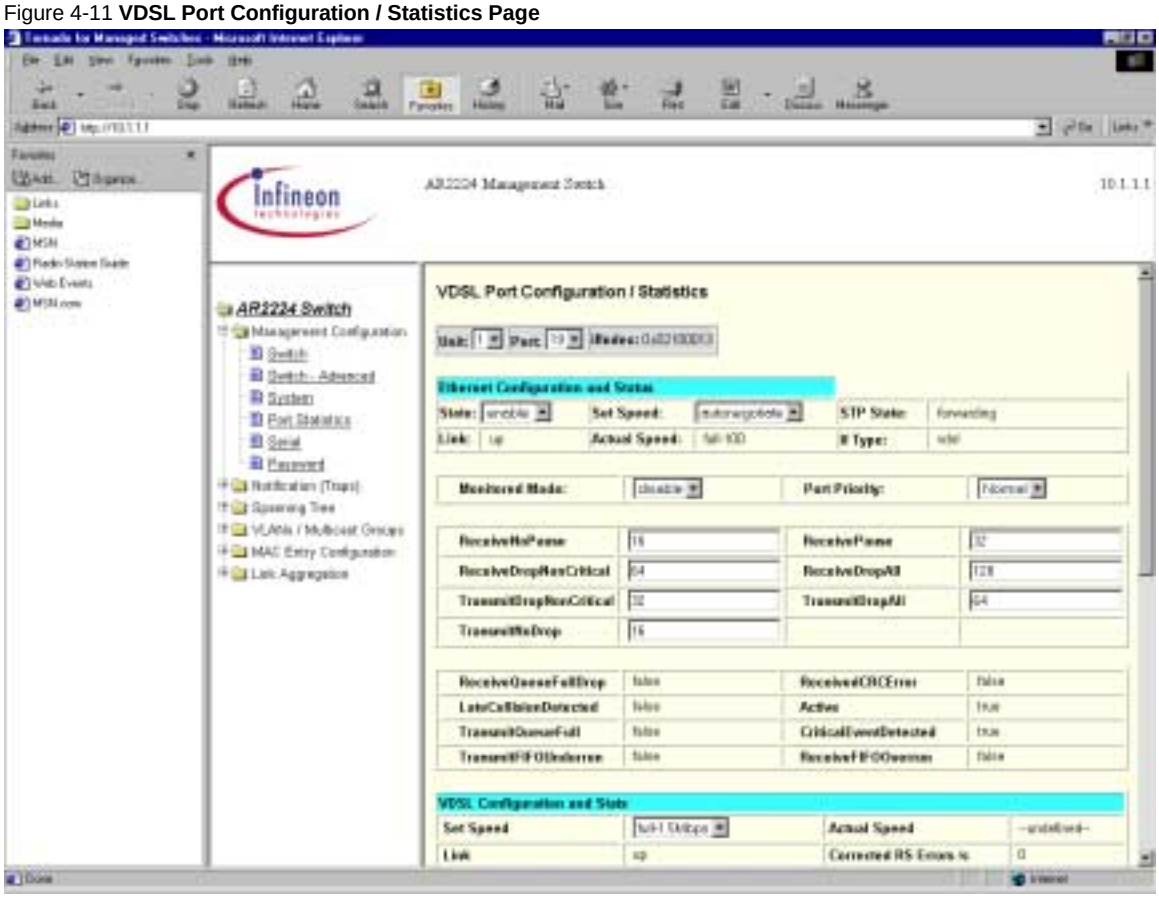
Drop-down Box Information

Field	Drop-down Box Values	Note
Unit	1	Will change when stacking is supported
Port	1, 2, …, 26	Default: 1
State	enable, disable	Default: enable
Set Speed (FE ports)	autonegotiate, half-10, full-10, half-100, full-100	Based on port type (ports 1 to 24)
Set Speed (Gbps ports)	full-1000	Based on port type (ports 25 and 26)

Note: When a VDSL port is selected, there is a VDSL Port Configuration / Statistics page display.(Fig.4-11). There are two fileds which are user configurable: Ethernet Configuration and VDSL Configuration. User can set the speed of the Ethernet PHY in the LT modem chip(22822) via the Swtich. The default is auto-negotiate, and Actual Speed reading should normally be 100Mbps. This is the Ethernet connection between the Switch and the Ethernet PHY within the VDSL modedem.

In the VDSL Configuration setting, the default VDSL speed is 10Mbps. However, if the link condition can't support this speed, it will come down to an agreed-upon speed with its link partner.

Figure 4-11 **VDSL Port Configuration / Statistics Page**

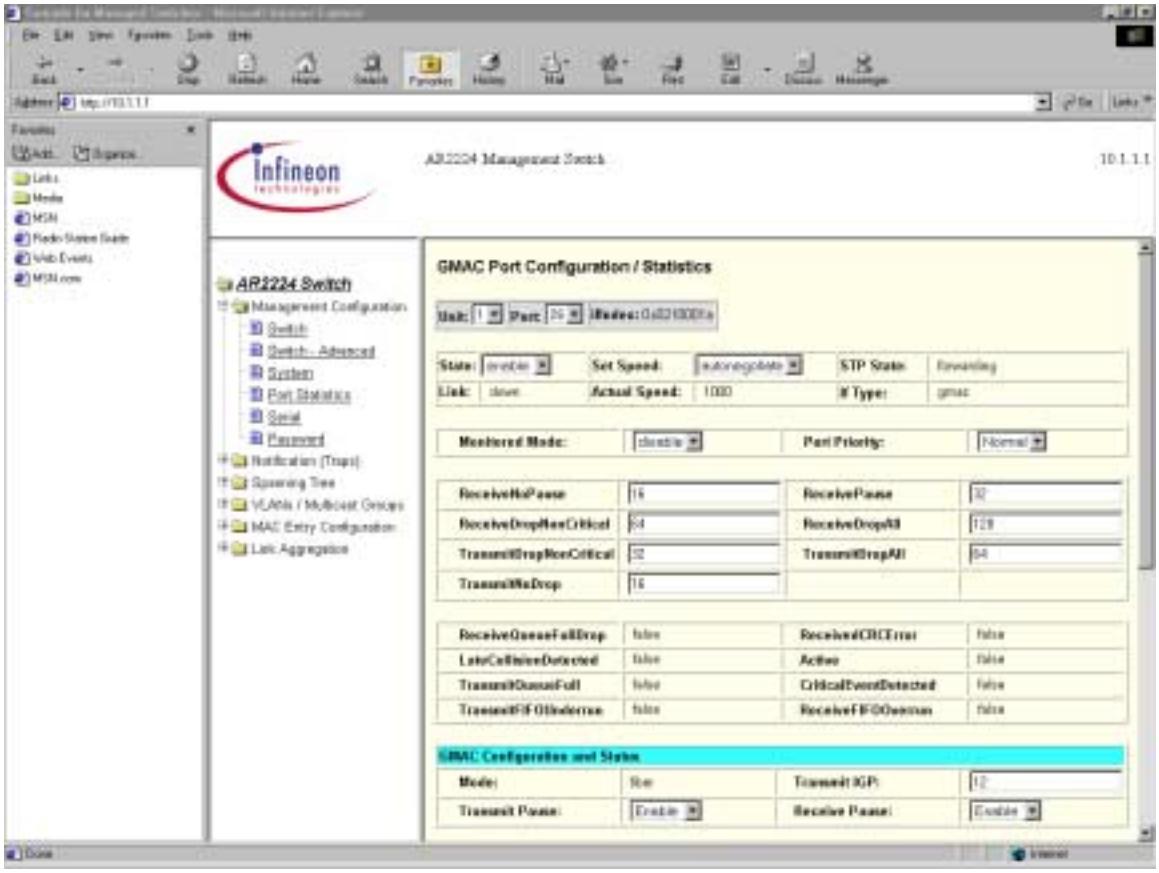


Field Source Information

Field	MIB	Object(s)	Syntax	Access
Set Speed	**ar2224-oem**	**ar2 VDSLDuplexSpeedSet**	**INTEGER**	R-W
Link	**ar2224-oem**	**ar2VDSLLink**	**INTEGER**	R-O
Actual Speed	**ar2224-oem**	**ar2VDSLDuplexSpeedGet**	**INTEGER**	R-O
Corrected RS Errors	**ar2224-oem**	**ar2VDSLCorrectedRSErrors**	**Counter32**	R-O
Frequency DS (MHz)	**ar2224-oem**	**ar2VDSLFrequencyDS**	**INTEGER**	R-O
Frequency US (MHz)	**ar2224-oem**	**ar2VDSLFrequencyUS**	**INTEGER**	R-O
Constellation DS	**ar2224-oem**	**ar2VDSLConstellationDS**	**INTEGER**	R-O
Constellation US	**ar2224-oem**	**ar2VDSLConstellationUS**	**INTEGER**	R-O

When port type is GMAC, this page will swap to GMAC Port Configuration / Statistics page.

Figure 4-12 **GMAC Port Configuration / Statistics Page**



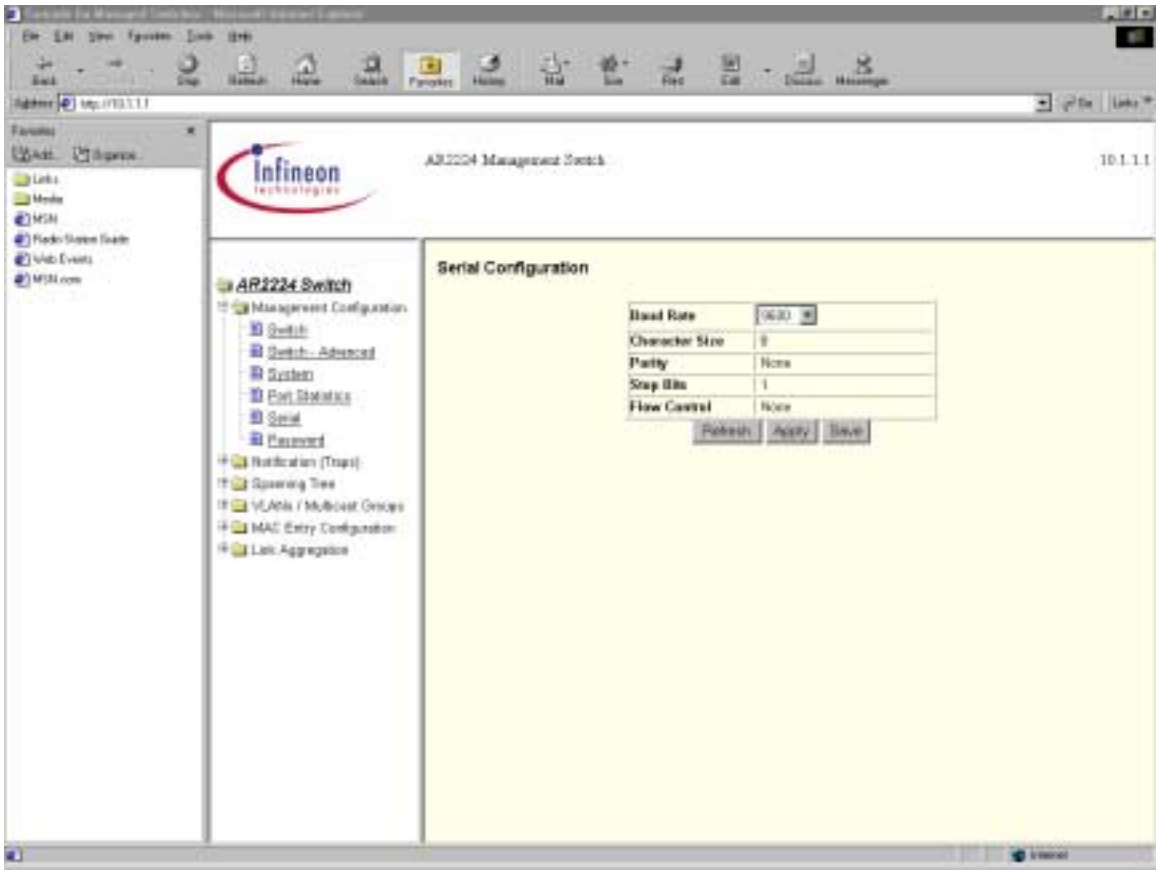
Field Source Information

Field	MIB	Object(s)	Syntax	Access
Set Speed	**ar2224-oem**	**ar2GmacSpeed**	**INTEGER**	R-W
	ar2224-oem	**ar2GmacAutoNegotiateEnable**	**TruthValue**	R-W
Link	**ar2224-oem**	**ar2GmacLinkOK**	**TruthValue**	R-O
Actual Speed	**ar2224-oem**	**ar2GmacSpeed**	**INTEGER**	R-O
type	**ar2224-oem**	**ar2ArchIfaceType**	**INTEGER**	R-O
Mode	**ar2224-oem**	**ar2GmacMode**	**Integer32**	R-O
Transmit Pause	**ar2224-oem**	**ar2GmacTransmitPauseEnable**	**TruthValue**	R-W
Transmit IGP	**ar2224-oem**	**ar2GmacTransmitIGP**	**INTEGER**	R-O
Receive Pause	**ar2224-oem**	**ar2GmacReceivePauseEnable**	**TruthValue**	R-W

4.7 Serial Configuration Page

Figure 4-13 shows the Serial Configuration page. This page allows user to edit the baud rate and view other information about the serial interface.

Figure 4-13 **Serial Configuration Page**



Field Source Information

Field MIB	Object(s)	Syntax	Access	Notes
Baud Rate	**TMS-Common**	**tmsCommonMiscBaud**	**INTEGER**	R-W
Character Size	none ----------	----------	--------	hard coded to 8
Parity	none ----------	----------	--------	hard coded to None
Stop Bits	none ----------	----------	--------	hard coded to 1
Flow Control	none ----------	----------	--------	hard coded to None

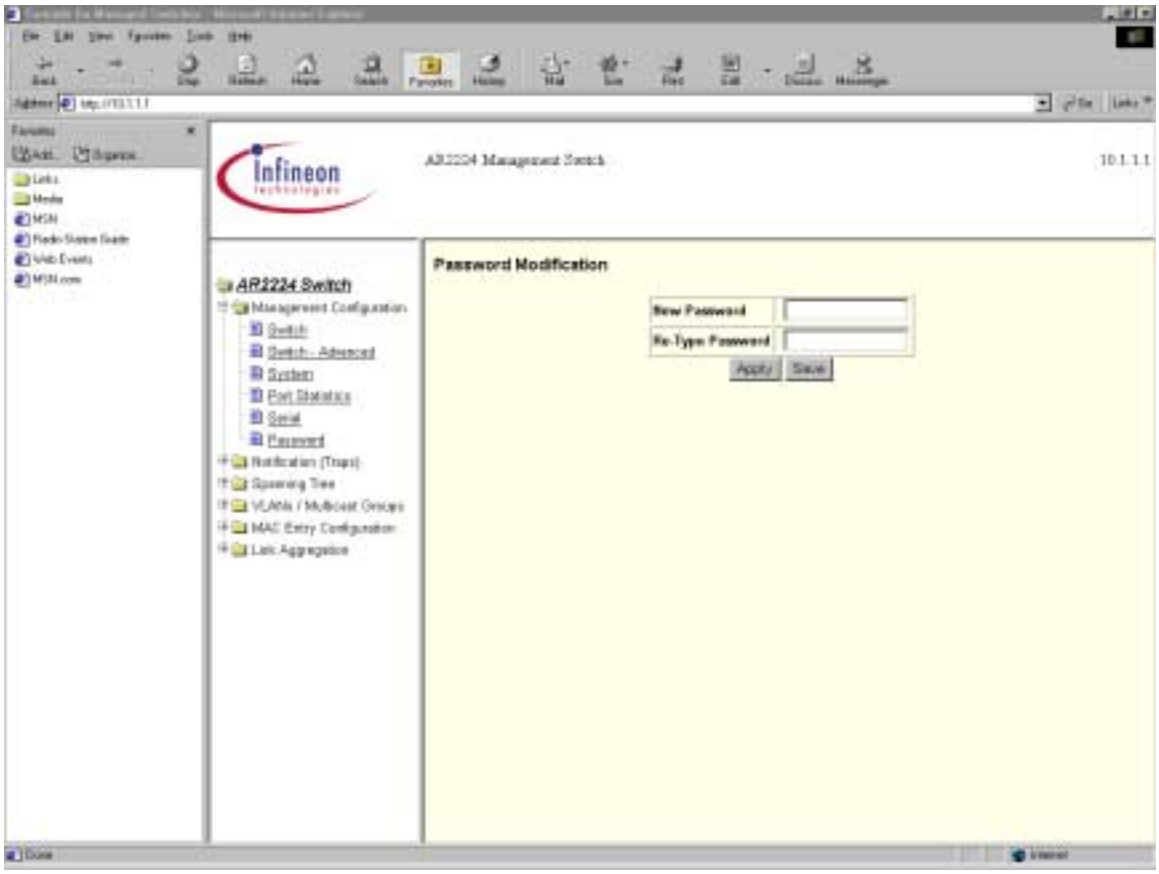
Drop-down Box Information

Field	Drop-down Box Values	Note
Baud Rate	2400, 9600, 19200, 38400	Default: 38400

4.8 Password Modification Page

Figure 4-14 shows the Password Modification page. The password, which is case sensitive, can be up to 16 characters. To change the password, enter the new password, then re-enter the password for confirmation. Once you click Apply or Save, the new password is active and the Login Dialog box (shown in Figure 4-15) is displayed. To return to the Web page, user must enter the new password then click OK.

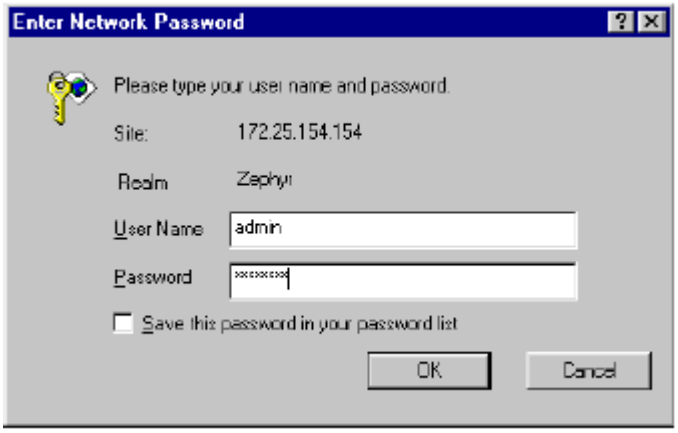
Figure 4-14 **Password Modification Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
New Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-W
Re-type Password	**TMS-Common**	**tmsCommonMiscPassword**	**DisplayString**	R-W

Figure 4-15 **Login Dialog Box**



4.9 SNMP Target Page

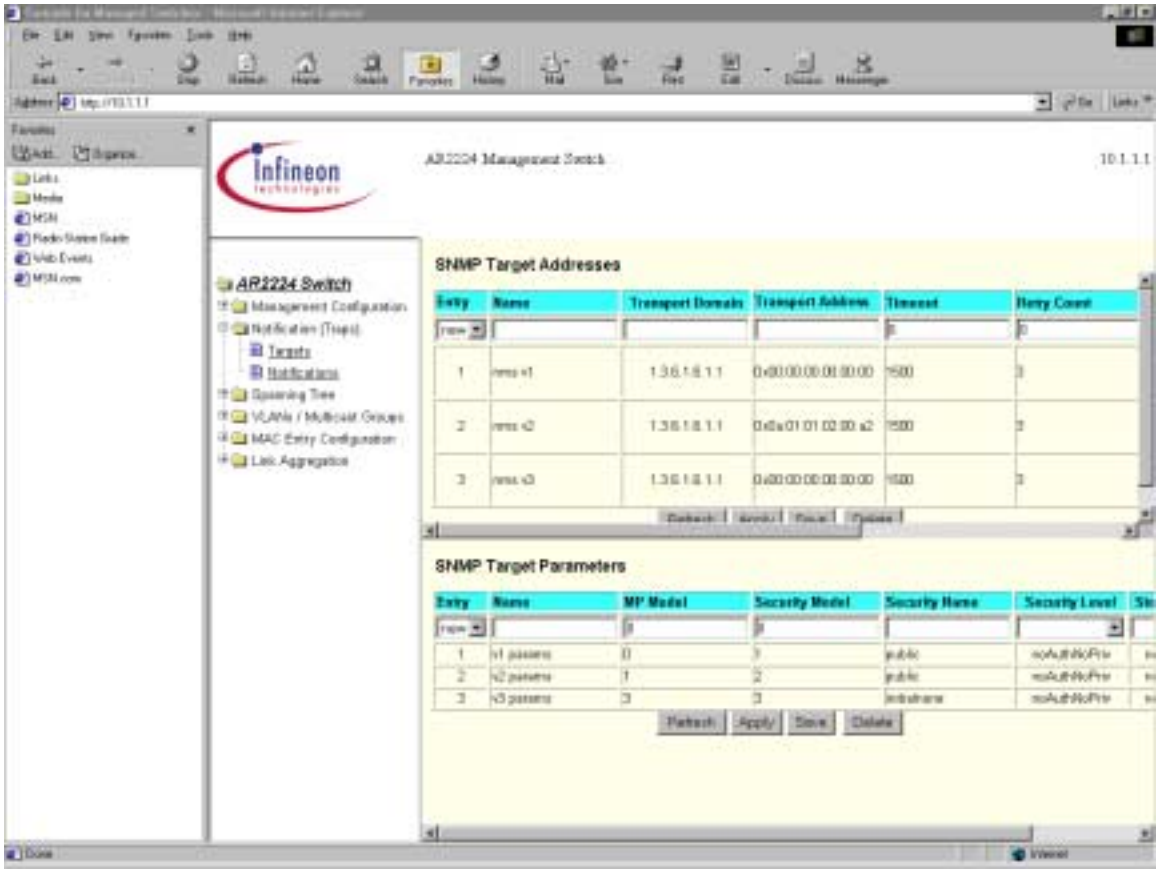
Figure 4-16 shows the SNMP Target page. This page allows you to view and modify some of the **SNMP-TARGET-MIB** objects. The page displays the Target Addresses and Target Address Parameters tables. The tables are each in a separate frame on the page, so they scroll independently. The titles for each of the tables are in their own non-scrolling frames, so title is always visible as you scroll through the table. When creating an SNMP Target Address, user should enter a 6-byte address in decimal notation under the Transport Address Field. These 6 bytes are composed of the IP address which is the first 4 bytes, and the well-known port number in byte 5 and 6. The Target address is the PC address(e.g.10.1.1.5) and the well-known port for the SNMP trap is 162. Therefore, the entire Transport Address can be entered as 10.1.1.5.0.162.

User can add new Target Addresses/Parameters to the existing three (v1, v2,v3) entries. However, the Name can't exceed 6 characters long. If any entry is invalid or the SNMP Target is not configured properly to receive uers-entered MIB objects, the s/w will not warn.

The SNMP Target simply won't recognize the Trap sent by the Switch. It is recommended to use the default settings first before adding or changing any entries in these two screens.

An example to see how SNMP trap would work it to install a SNMP server s/w on your PC, the s/w can be purchased from a number of SNMP vendors. After it is setup properly, disconnect a cable from any ports, you should see link up/down messages showing on the PC.

Figure 4-16 **SNMP Target Page**



Field Source Information for SNMP Target Addresses

Field	MIB	Object	Syntax	Access	Notes
Entry	--- --- --- --- Selects active row				
Name	RFC2573	**snmpTargetAddrName**	**SnmpAdminString**	N-A	

Transport Domain	RFC2573 **snmpTargetAddrTDomain**	**TDomain**	R-C	
Transport Address	RFC2573 **snmpTargetAddrTAddress**	**TAddress**	R-C	
Timeout	RFC2573 **snmpTargetAddrTimeout**	**TimeInterval**	R-C	Default: 1500
Retry Count	RFC2573 **snmpTargetAddrRetryCount**	**Integer32**	R-C	Default: 3
Tag List	RFC2573 **snmpTargetAddrTagList**	**SnmpTagList**	R-C	Default:""
Parameters	RFC2573 **snmpTargetAddrParams**	**SnmpAdminString**	R-C	
Storage Type	RFC2573 **snmpTargetAddrStorageType**	**StorageType**	R-C	Default:nonvolatile
Status	RFC2573 **snmpTargetAddrRowStatus**	**RowStatus**	R-C	

Drop-down Box Information for SNMP Target Addresses

Field	**Drop-down Box Values**
Entry	1, 2, …, *(total number of rows)*
Storage Type	other, volatile, nonVolatile, permanent, readOnly

Field Source Information for SNMP Target Parameters

Field	**MIB**	**Object**	**Syntax**	**Access**	**Notes**
Entry	---	---	---	---	Selects active row
Name	RFC2573	**snmpTargetParamsName**	**SnmpAdminString**		N-A
MP Model	RFC2573	**snmpTargetParamsMPModel**	**SnmpMessageProcessingModel**		R-C
Security Model	RFC2573	**snmpTargetParamsSecurityModel**	**SnmpSecurityModel**		R-C
Security Name	RFC2573	**snmpTargetParamsSecurityName**	**SnmpAdminString**		R-C
Security Level	RFC2573	**snmpTargetParamsSecurityLevel**	**SnmpSecurityLevel**		R-C

Storage Type	RFC2573	**snmpTargetParamsStorageType**	**StorageType**	R-C	Default:nonVolatile
Status	RFC2573	**snmpTargetParamsRowStatus**	**RowStatus**	R-C	

Drop-down Box Information for SNMP Target Parameters

Field	**Drop-down Box Values**
Entry	1, 2, …, *(total number of rows)*
Security Level	noAuthNoPriv, authNoPriv, authPriv
Storage Type	other, volatile, nonVolatile, permanent, readOnly

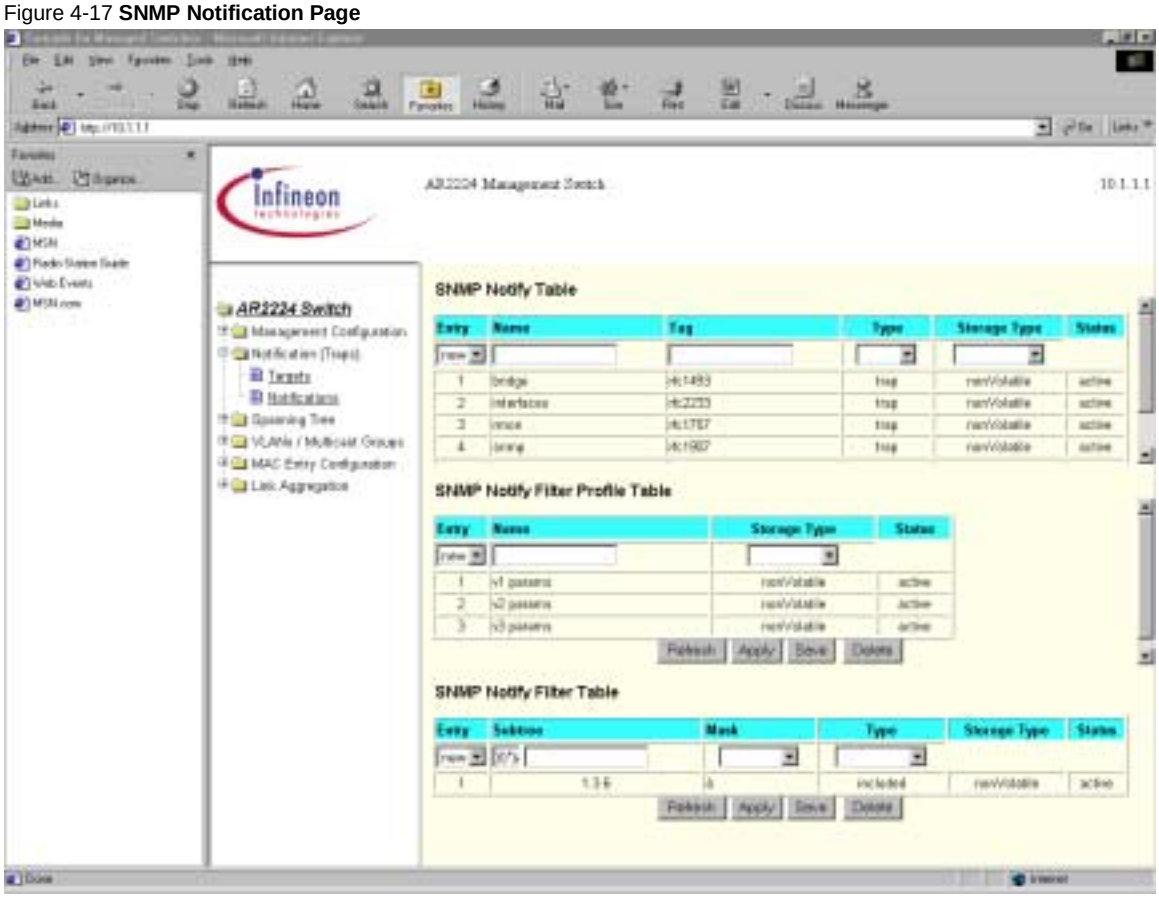
4.10 SNMP Notification Page

Figure 4-17 shows the SNMP Notification page. This page allows you to view and add/modify some of the **SNMP-NOTIFICATION-MIB** objects. The page displays the SNMP Notify Table, SNMP Notify Filter Profile, and SNMP Notify Filter Table. The tables are each in a separate frame on the page, so they scroll independently. The titles for each of the tables are in their own non-scrolling frames, so title is always visible as you scroll through the table. After adding/modifying an entry, user must hit APPLY button and ensure the entry is active where it displays at the end of the row.

In the Notify Table, user can set Tag parameters by adding or removing rfcs. For example, if you remove rfc2233, you will not be able to see the link up/down trap. If you remove rfc1907, you will not be able to see the authentication trap.

In the SNMP Notify Filter Table, user can change the Subtree, Mask and Type MIB to set different filter criteria. For example, if Subtree is changed to from 1.3.6.1 to 1.3.6.2, Mask is oxff, type is include, then link up/down trap will not be sent. User can play with different Maks bits and Type field to see the effect. However, before changing any parameters in the tables, record the default settings. Note that the Subtree fields in the SNMP Notify Filter Table may be empty, with no lines around those cells in the table. This is because an empty string is a valid subtree value and HTML tables translate empty strings in this manner. The Subtree number is entirely user-editable; however, because of the filtering function of the Mask bits and include/exclude type, it can makeTrap MIB not reachable to the SNMP Manager.

Figure 4-17 **SNMP Notification Page**



Field Source for SNMP Notify Table

Field	MIB	Object	Syntax	Access	Notes
Entry	---	--- --- ---			Selects active row
Name	RFC2573	**snmpNotifyName**	**SnmpAdminString**	N/A	
Tag	RFC2573	**snmpNotifyTag**	**SnmpTagValue**	R-C	
Type	RFC2573	**snmpNotifyType**	**INTEGER**	R-C	Default: trap(1)
Storage Type	RFC2573	**snmpNotifyStorageType**	**StorageType**	R-C	
Status	RFC2573	**snmpNotifyRowStatus**	**RowStatus**	R-C	

Drop-down Box Information for SNMP Notify Table

Field	Drop-down Box Values
Entry	1, 2, …, *(total number of rows)*
Type	trap, inform
Storage Type	other, volatile, nonVolatile, permanent, readOnly

Field Source for Notify Filter Profile Table

Field	MIB	Object		Syntax	Access	Notes
Entry	---	---	---	---	Selects active row	
Name	RFC2573	**snmpNotifyFilterProfileName**		**SnmpAdminString**	R-C	
Storage Type	RFC2573	**snmpNotifyFilterProfileStorType**		**StorageType**	R-C	
Status	RFC2573	**snmpNotifyFilterProfileRowStatus**		**RowStatus**	R-C	

Drop-down Box Information for Notify Filter Profile Table

Field	Drop-down Box Values
Entry	1, 2, …, *(total number of rows)*
Storage Type	other, volatile, nonVolatile, permanent, readOnly

Field Source for Notify Filter Table

Field	MIB	Object	Syntax	Access	Notes
Entry	---	---	---	---	Selects active row
Subtree	RFC2573	**snmpNotifyFilterSubtree**	**OBJECT IDENTIFIER**	N/A	
Mask	RFC2573	**snmpNotifyFilterMask**	**OCTET STRING**	R-C	
Type	RFC2573	**snmpNotifyFilterType**	**INTEGER**	R-C	
Storage Type	RFC2573	**snmpNotifyFilterStorageType**	**StorageType**	R-C	

Drop-down Box Information for Notify Filter Table

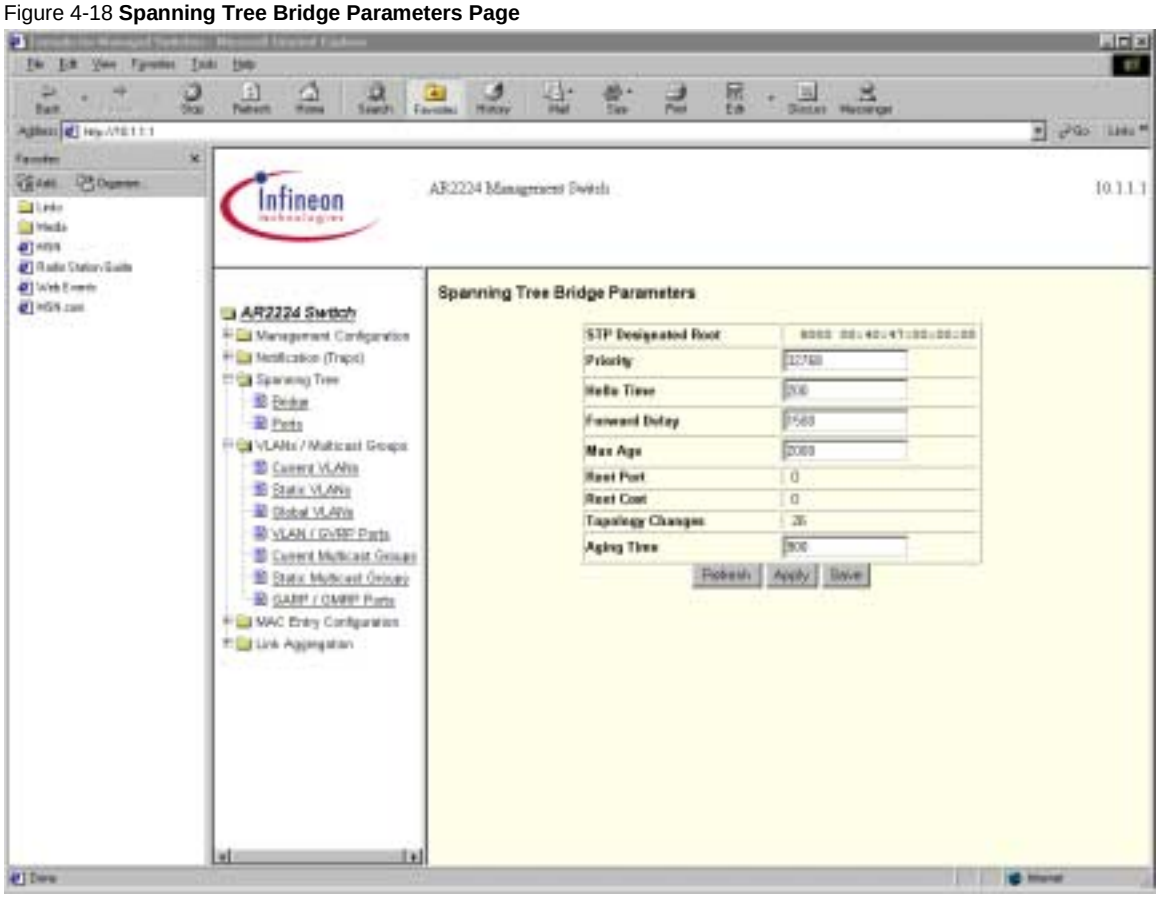
Field	Drop-down Box Values
Entry	1, 2, …, *(total number of rows)*
Type	included, excluded
Storage Type	other, volatile, nonVolatile, permanent, readOnly

4.11 Spanning Tree Bridge Parameters Page

Figure 4-18 shows the Spanning Tree Bridge Parameters page. This page allows user to view and edit spanning tree bridge parameters. Settimgs such as Proirty, Hello Time, Forward Delay, Aging Time can all be edited or changed, but normally It is not necessary to change these settings.

Default Priority is set to 32768 which is the midpoint of 65536(16-bit) to calculate Root. Hello Time 200 means STP packets will be sent out every 2 seconds by the CPU.

Figure 4-18 **Spanning Tree Bridge Parameters Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
Designated Root	**stpMib**	**stpDot1dStpDesignatedRoot**	**BridgeId**	R-O

Priority	**stpMib**	**stpDot1dStpPriority**	**INTEGER**	R-W
Hello Time	**stpMib**	**stpDot1dStpBridgeHelloTime**	**Timeout**	R-W
Forward Delay	**stpMib**	**stpDot1dStpBridgeForwardDelay**	**Timeout**	R-W
Max Age	**stpMib**	**stpDot1dStpBridgeMaxAge**	**Timeout**	R-W
Root Port	**stpMib**	**stpDot1dStpRootPort**	**INTEGER**	R-O
Root Cost	**stpMib**	**stpDot1dStpRootCost**	**INTEGER**	R-O
Topology Changes	**stpMib**	**stpDot1dStpTopChanges**	**Counter**	R-O
Aging Time	**ar2Swapi**	**sDot1dTpAgingTime**	**INTEGER**	R-W

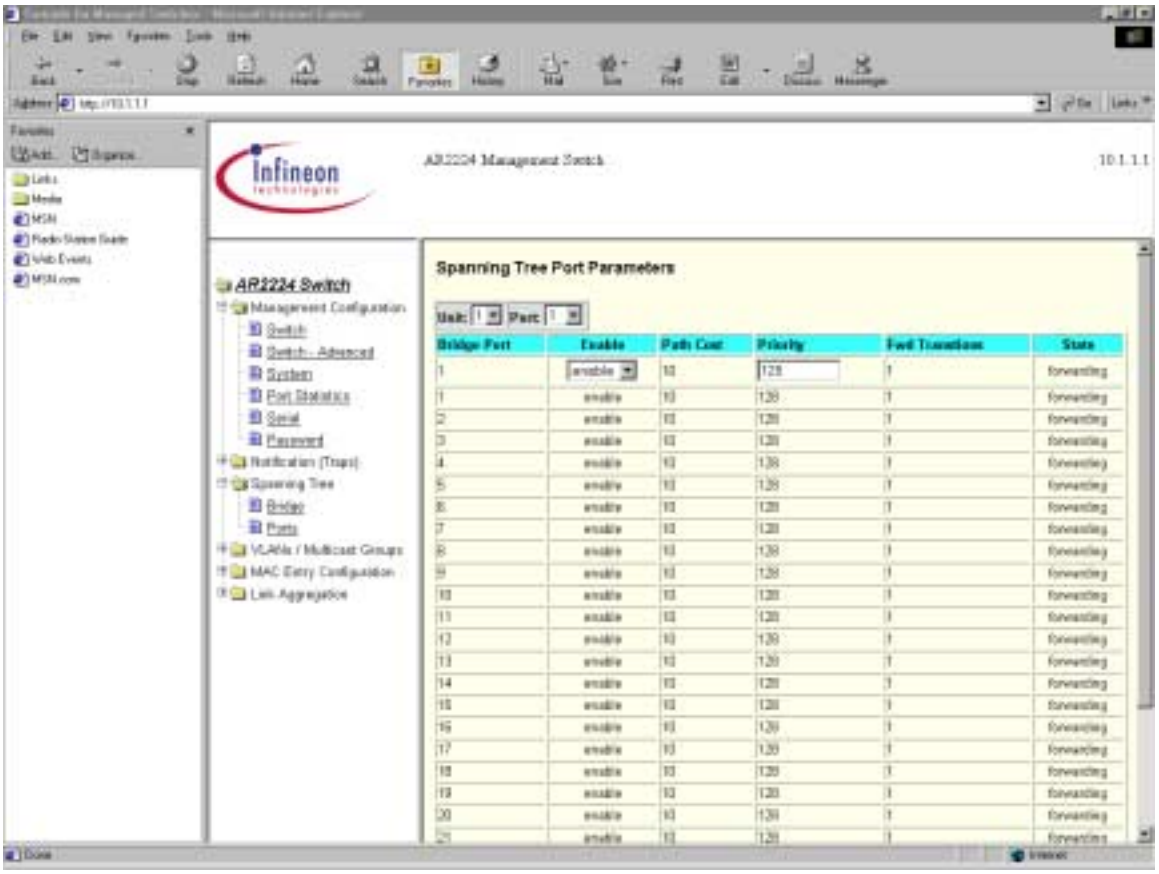
4.11 Spanning Tree Port Parameters Page

Figure 4-19 shows the Spanning Tree Port Parameters page. The Spanning Tree Port Parameters page allows you to view and edit spanning tree port status and parameters. Use the Enable field to enable or disable Spanning Tree on a port. In order to enable this page, the Spanning Tree must be enabled on the Switch Configuration page first. Use the drop-down boxes to select the unit and port you want to edit.

To test if the Switch indeed processes the STP, the easiest way is to connect two ports together, which create a loop. After REFRESH, you should see the higher port # is either in blocked mode or learn mode. Therefore, only the lower-numbered port is in the forward state.

In the event that user wants to override the lower-numbered port wins scheme, a lower priority number can be given in the Priority field(default is 128). When a lower priority number is given to the high-numbered port, it will allow the port to be elected as the designated port.

Figure 4-19 **Spanning Tree Port Parameters Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A	
Port	**ar2224-oem**	**ar2ArchIfacePort**	**Integer32**	N-A	
Bridge Port	**stpMib**	**stpDot1dStpPort**	**INTEGER**	R-O	Linear with holes, 1 to 26 for a single unit
Enable	**ar2224-oem**	**ar2ArchIfaceSTPEnable**	**TruthValue**	R-W	STP per interface
Path Cost	**stpMib**	**stpDot1dStpPortPathCost**	**INTEGER**	R-O	Read-only
Priority	**stpMib**	**stpDot1dStpPortPriority**	**INTEGER**	R-W	
Forward Transitions	**stpMib**	**stpDot1dStpPortForwardTransitions**	**Counter**	R-O	
State	**stpMib**	**stpDot1dStpPortState**	**INTEGER**	R-O	

Field	Drop-down Box Values	Notes
Unit	1	Will change for stacking
Port	1, 2, …, 26	Default: 1
Enable	enable, disable	Default: enable

4.12 VLAN /Multicast Groups:

This section allows user to set up Vlan domains, and IGMP Multicast groups to allow IGMP snooping. In order to establish a port-based vlan properly, follow the instruction in 4.12.1 and 4.12.2. For IGMP snooping, follow instructions in 4.12.3. Note: Current VLANs, Global VLAN, Current Multicast Groups, Static Multicast Groups, and GARP/GMRP pages are not implemented in Ar2224 s/w.

4.12.1 Static VLAN Configuration Page

Figure 4-20 shows the Static VLAN Configuration page. This read-write page allows user to edit/add Vlans for the Swtich. There are two main parts on this page: the active row and the list box. The active row is the top row, which is editable. The list box below the editable row contains a list of the available static VLANs, identified by VID and Name.

To add a new VLAN, enter the data into the active row, then click Apply or Save. The VID and Name of the new row created will be added to the list box.
To edit an existing VLAN, click the appropriate VLAN in the list box. That VLAN will appear in the active row, where you can edit it as needed. When you are finished editing, click Apply or Save.

To delete a VLAN, click the appropriate VLAN in the list box. That VLAN will appear in the active row. Click Delete to delete that VLAN. It will then be removed from the list box.

After VLAN tables are created, you **must** also go to the VLAN/GVRP Configuration

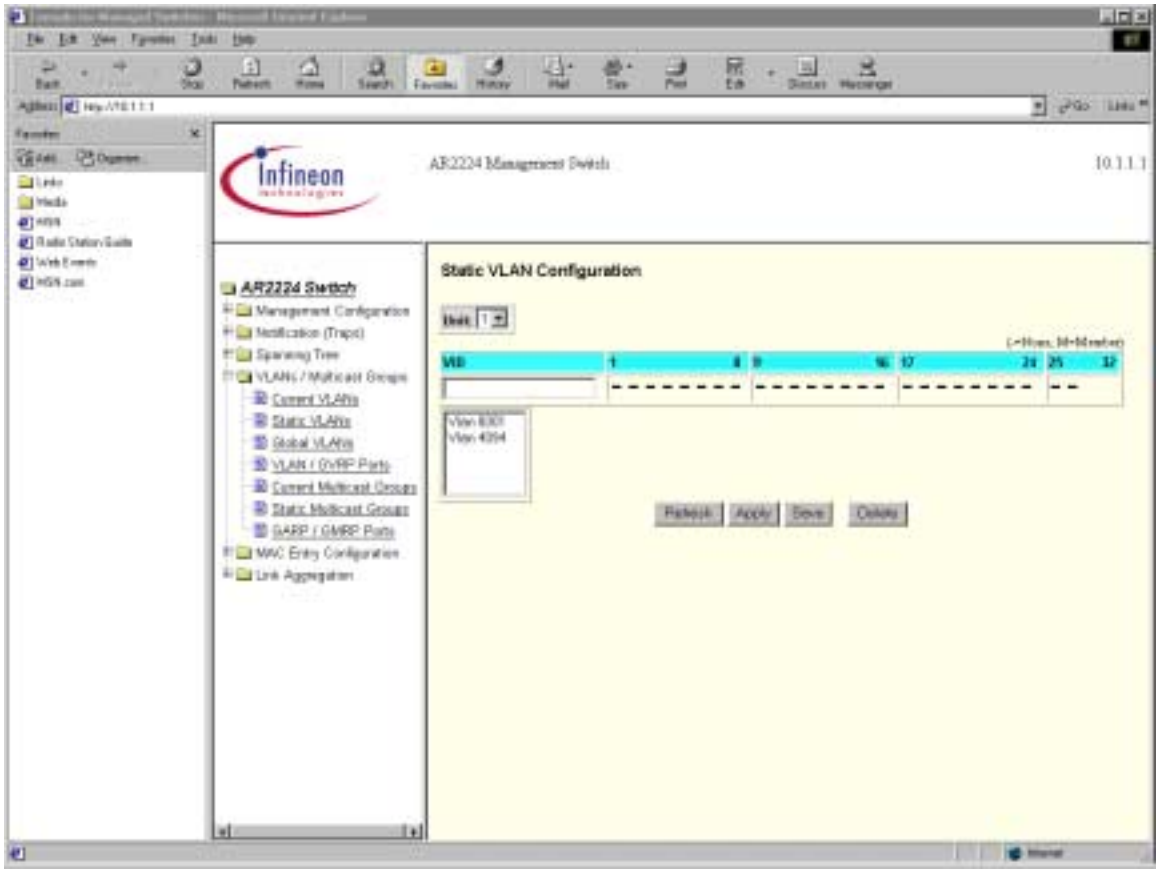
page to assign each port a PVID number, which is the VLAN number you have created .
Only after both are created, and VLAN Filtering bit is enabled in the System-Advanced page,
VLAN becomes effective. If you entered an invalid PVID number which does not exist
in the VLAN table, you will not get a warning, but the PVID will always stay on 1.

Multi-VLANs assigned to a port:
There are situations where a port(i.e. a printer port) must service several VLANs.
Since in the PVID field, only one vlan # can be entered. Therefore, user must create
a new vlan # that contains this multi-vlan port, **AND** include those ports, having its vlan
number, in the new vlan. After the new vlan is created in the Static VLAN table,
go to the VLAN/GVRP port page, enter the newly created vlan # in the PVID field
for that multi-vlan port. Don't change the PVID on those ports that
have its own vlan number. After these two steps are done, user can ping from
the multi-vlan port to any individual vlan port or vice versa. However, the individual
vlan ports can't ping across its vlan boundry.

On each mouse click the value toggles to one of the following values:

Character	**Translation**	**Meaning**
-	Non-member	For each port that is NOT a member of this VLAN
M	Member	For each port that is a permanent member of this VLAN

Figure 4-20 **Static VLAN Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A
VID	**ar2Swapi**	**sDot1qVlanIndex**	**VlanIndex**	N-A
Egress Ports	**ar2Swapi**	**sDot1qVlanStaticEgressPorts**	**PortList**	R-C
(not labeled)				
Status	**ar2Swapi**	**sDot1qVlanStaticRowStatus**	**RowStatus**	R-O

Drop-down Box/Toggle Information

Field	Drop-down Box/Toggle Values	Notes
Unit	1	Will change for stacked switch
VID	valid values	

Egress Ports	-, M	Toggle available for each port

Note that the default VLAN #1 which includes all the ports is not deletable or changeable.

Ar2224 allows up to 4094 port-based VLAN's.

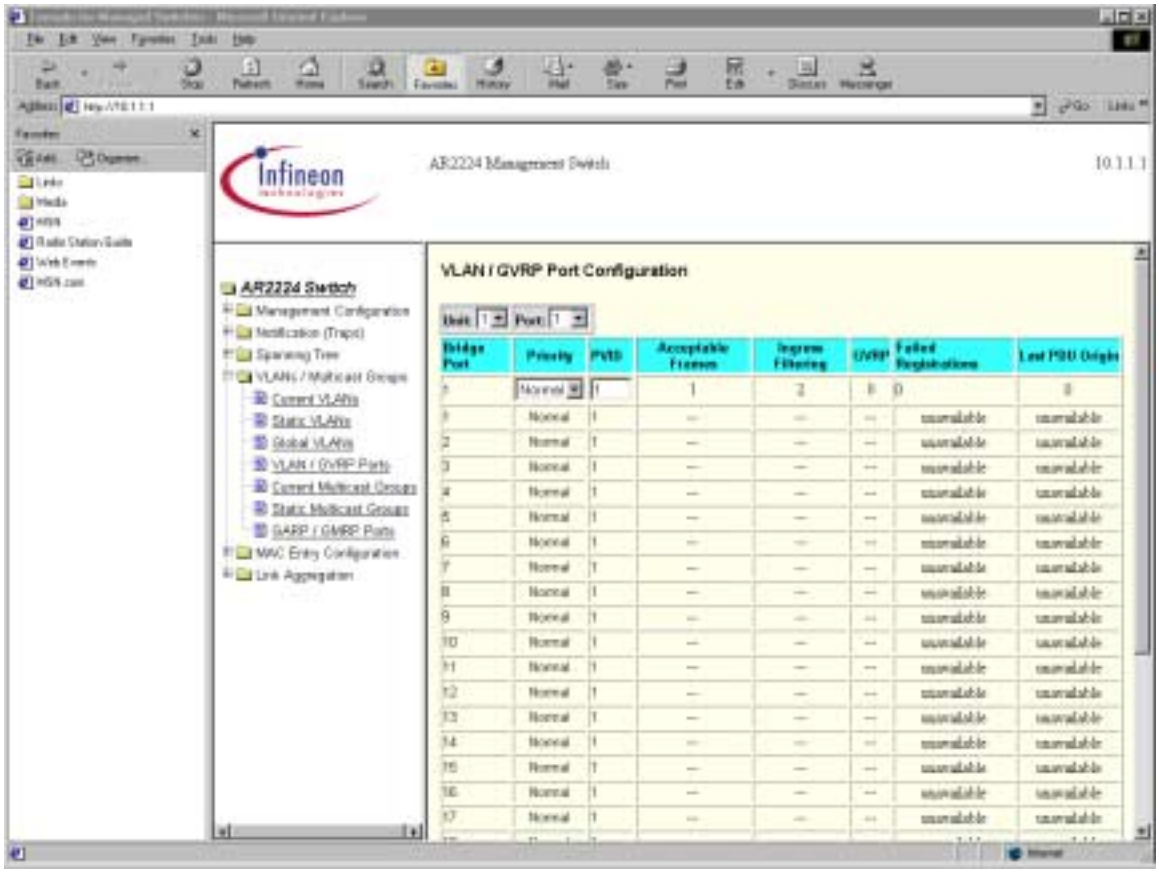
4.12.2 VLAN / GVRP Port Configuration Page

Figure 4-21 shows the VLAN and GVRP Port Configuration page. Select a VLAN port to configure using the Unit and Port drop-down boxes. After a VLAN table is established in the Static VLAN page, user must enter a PVID(port-based vlan ID) for each port. The default setting is every port set to PVID=1. A port can be assigned to Normal or High priority for packet processing. A VLAN membership (VLAN#) must be established prior to the assignment of PVID; otherwise, a PVID entry won't be recognized by this page. Only after this page is properly established, port-based VLAN will become effective.

Note: port priority can be set either from this page, or from the Port Cofiguration page.

Note: the Acceptable Frames, Ingress Filtering, Failed Registration fields are not available forAr2224 s/w.

Figure 4-21 **VLAN / GVRP Port Configuration PagedfvsdfsaDCAS**



Field Source Information

Field	MIB	Object(s)	Syntax	Access	Notes
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A	
Port	**ar2224-oem**	**ar2ArchIfacePort**	**Integer32**	N-A	
Bridge Port stpMib		**stpDot1dBasePort**	**INTEGER**	R-O	
	ar2Swapi	**sDot1dBasePort**	**INTEGER**	R-O	
Priority	**ar2Swapi**	**sDot1dPortDefaultUserPriority**	**INTEGER**	R-W	0 to 1
PVID	**ar2Swapi**	**sDot1qPvid**	**VlanIndex**	R-W	1 – 4094

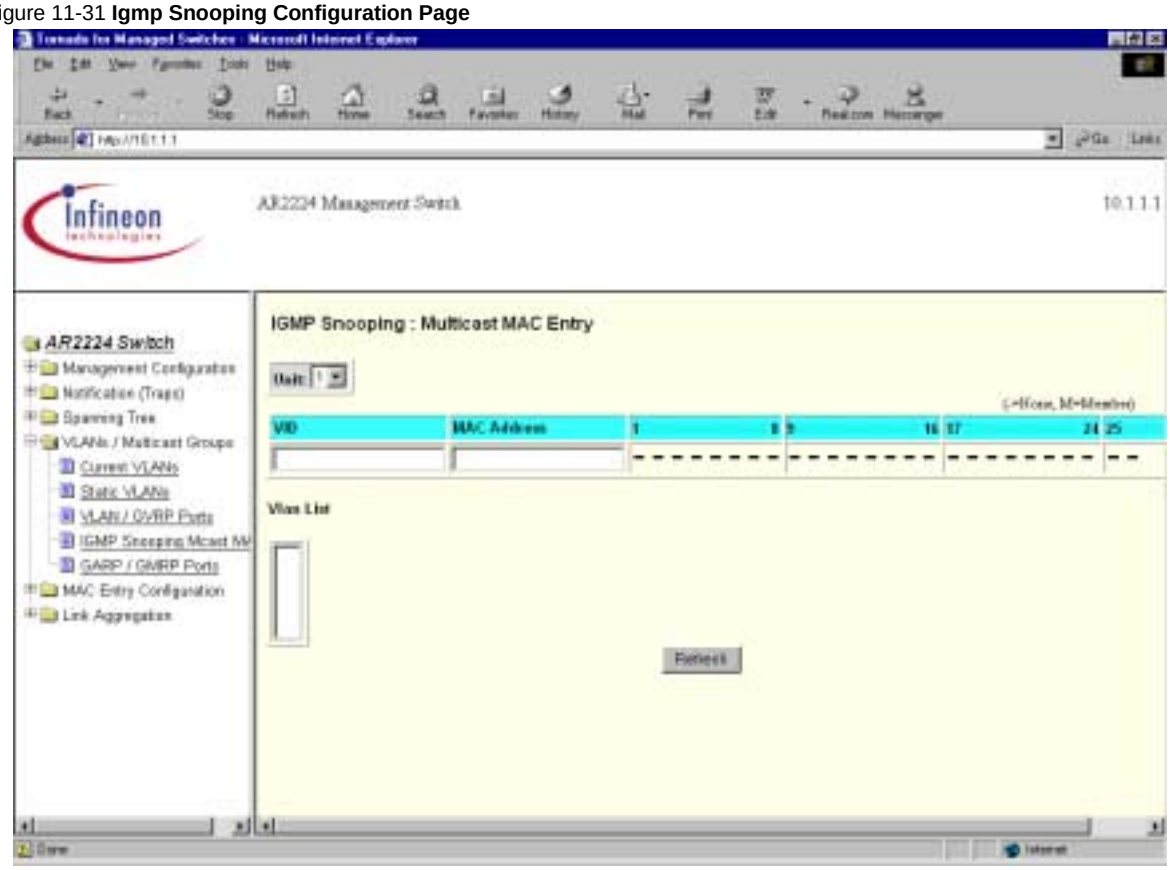
Field	Drop-down Box Values	Notes
Unit	1	Will change for stacking
Port	1, 2, ..., *(total number of ports)*	All valid ports
Priority	0, 1	
PVID	1 to 4094	Default: 1

4.12.3 IGMP Snooping Multicast

This is a read-only page in which the managed Switch diplays any IGMP Membership (Multicast) Report Messages (MRM) sent by the host via snooping the IGMP multicast traffic over the network. However, the membership information will be aged out by the Switch if it is not re-newed.(default:2 minutes). After a host sends in the MRM, the display will show which VLAN this host belongs to, and displays the multicast address that the host sent to the Switch.

Note: For Ar2224, the IGMP MRM doesn't go across the VLAN boundry. This means for Snooping to work properly, all hosts sending the Multicast Report Messages must reside in the same VLAN.

Figure 11-31 **Igmp Snooping Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A
VID	**swApi**	**dot1qVlanIndex**	**INTEGER**	N-A
MacAddr	**swApi**	**dot1qStaticMulticastAddress**	**MacAddress**	R-W
PortList	**tmsMib**	**tmsCommonIgmpSnoopEgressPort**	**portlist**	R-W

4.13 MAC Entry Configuration Page

Figure 4-23 shows the MAC Entry Configuration Page. This page allows user to add or delete MAC entry. Normally, the MAC entries are updated automatically by self- learning.

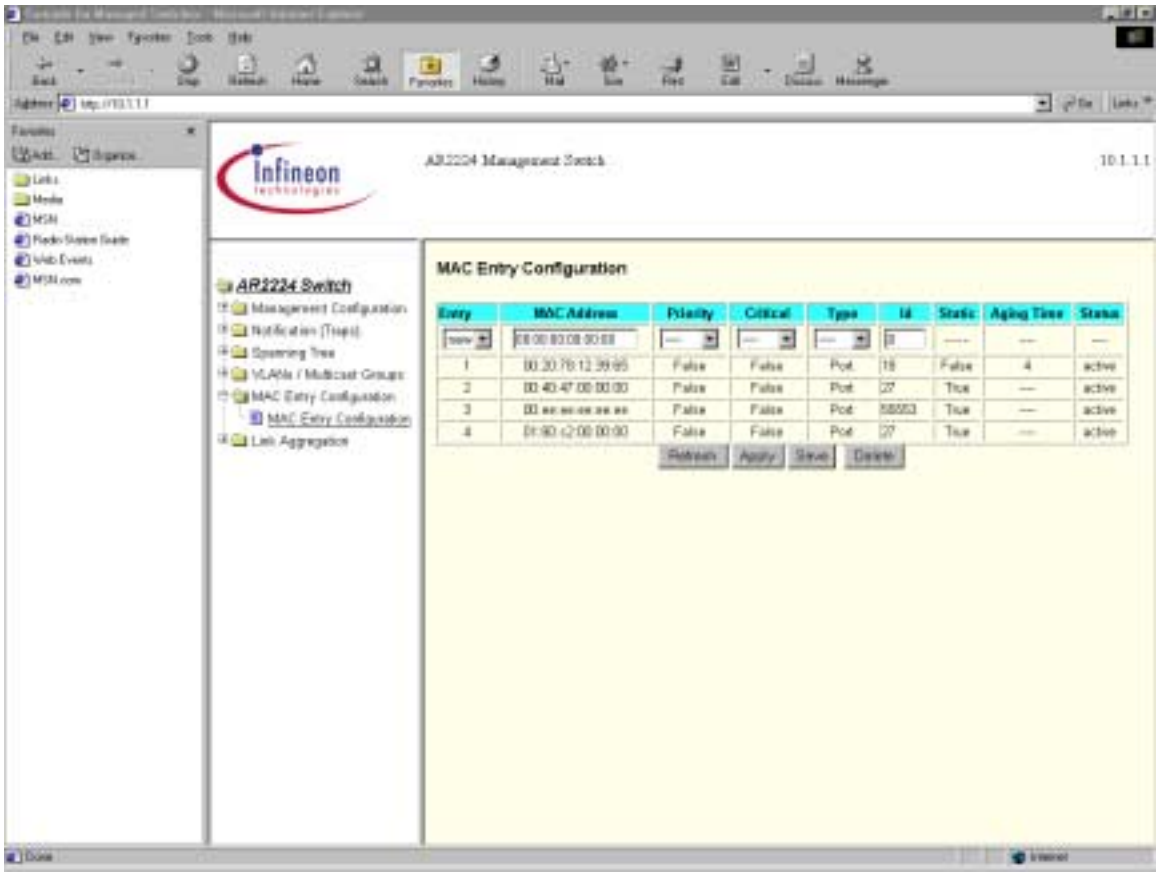
After the entry is recorded in the table, it can be aged out by seleting the desirable

aging time in the MAC Address Table Updating fied in the System-Advanced page. The default is 5 minutes which means the entry will disappear after 5 min if no activity, after the REFRESH button is hit.

When a packet is sent to the Switch or a ping event occurred, a MAC entry is updated. Set Priority to True in the MAC table would allow packets to go out based on the Destination Address as discussed in the Packet Priority field in the System-Advanced page. If an entry has the Critical field set to True or user enters a MAC address, it can't be aged out by the Switch automatically.

Note: when a cable is removed from a port and re-inserted to another port, with the old MAC address already entered in the table but not expired, also the Freeze_none or Freeze_all is selected, a user must ping or send a packet to the Switch in order to see the new MAC entry is updated.

Figure 4-23 **MAC Entry Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
MAC Address	**ar2224-oem**	ar2MacAddress	MacAddress,	R-W
Priority	**ar2224-oem**	ar2MacPriority	TruthValue,	R-W
Critical	**ar2224-oem**	ar2MacCritical	TruthValue,	R-W
Type	**ar2224-oem**	ar2MacType	INTEGER,	R-W
Id	**ar2224-oem**	ar2MacId	INTEGER,	R-W
Static	**ar2224-oem**	ar2MacStatic	TruthValue,	R-O
AgingTime	**ar2224-oem**	ar2MacAgingTime	INTEGER,	R-O
Status	**ar2224-oem**	ar2MacRowStatus	RowStatus	R-O

4.14 LINK Aggregation Page

Figure 4-24 shows the Link Aggregation Page. This page allows user to edit static LA configurations for one LA ID at a time. There are two main parts to the interface on this page: the active row and the list box. The active row is the top row, which is editable. The list box below the editable row contains a list of the active static LAs, identified by LA ID.

To add a new LA, select a desired trunking pattern from the LA ID drop-down box into the active row, then click Apply or Save. The new LA ID is added to the list box. To delete a LA, select the desired LA from the LA ID drop-down box. Click Delete, the LA is removed from the list box.

Character	**Translation**	**Meaning**
-	Non-member	Port is NOT a member of this LA
M	Member	Port is a member of this LA

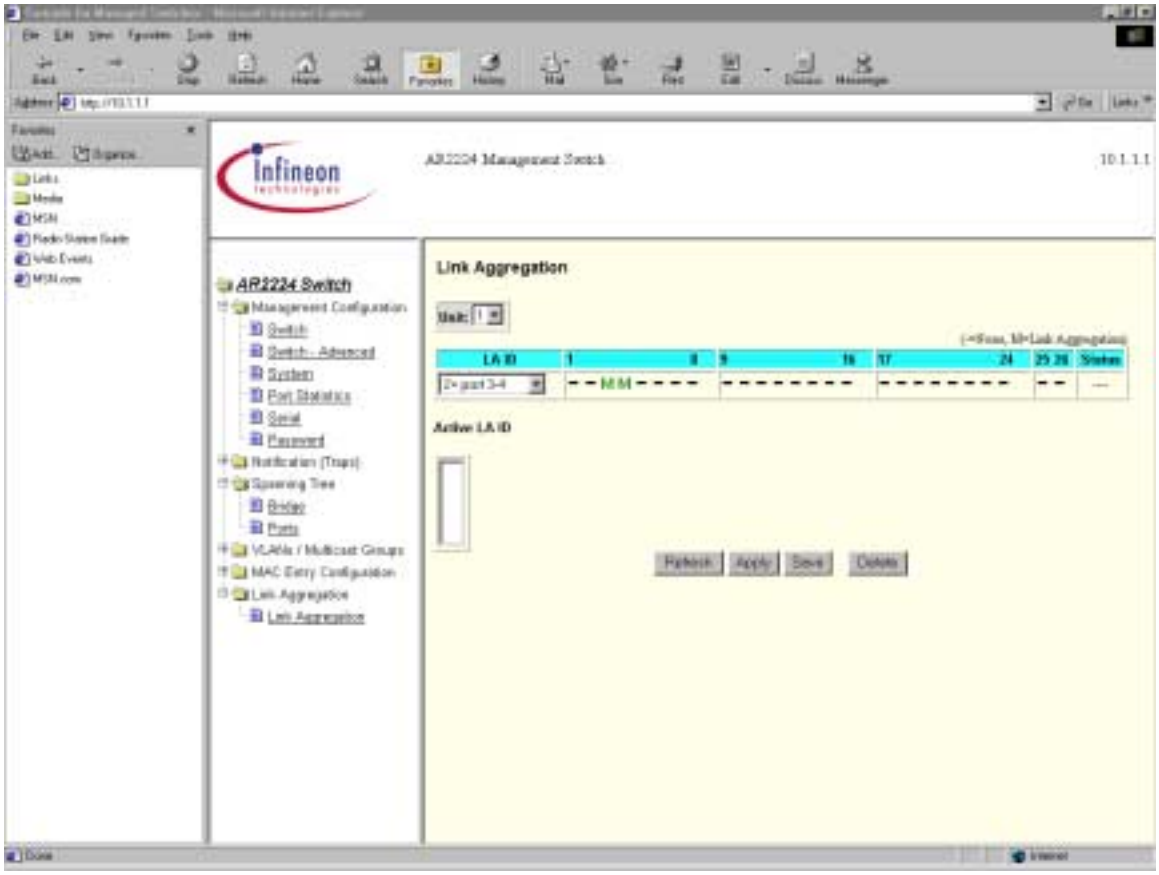
The Ar2224 Swtich allows 2, 4, 8 ports to be aggregated. The distribution of the traffic on the aggregated link is set by the Link Aggregation Method in System-Advanced Page, from which packets are distributed according to frames' SA, or DA, or SA ex-or with DA, or none. For example, If two ports are aggregated, the distribution of the traffic is based on the last bit in the SA or DA etc.. If four ports are aggregated, the distribution is then based

on the last two bits in the SA or DA., etc..

Note 1: Dissimilar links can not be aggregated together.(GE ports/FE/VDSL ports).

Note 2: 10BASE-S ports can not be aggregated together.

Figure 4-24 **Link Aggregation Configuration Page**



Field Source Information

Field	MIB	Object(s)	Syntax	Access
Unit	**ar2224-oem**	**ar2ArchIfaceUnit**	**Integer32**	N-A
LA ID	**ar2224-oem**	**ar2LinkAggregationGroup**	**INTEGER**	R-W
Status	**ar2224-oem**	**ar2LinkAggregationRowStatus**	**RowStatus**	R-C

Drop-down Box Information

Field	**Drop-down Box Values**	**Notes**
Unit	1	Will change for stacking
LA ID	1, 2, …, 26	port 8,16,24 are not selectable