



Zen RTU

Logix Integration User Manual



Document No. ZEN-RTU-EIP-MAN-15V03

June 2015

Revision 15V03

CONTENTS

1. Preface	4
1.1. Introduction.....	4
1.2. Configuration.....	4
2. Configuration Using EDS AOP	5
2.1. Installing the EDS AOP.....	5
2.2. Configuring Module.....	9
2.3. Mapping Data	12
3. Configuration Using the Generic Profile	17
3.1. Configuring Module.....	17
3.2. Mapping Data	20
4. Operation	24
4.1. Module Connection Status.....	24
4.2. Module Operation.....	24
4.3. Input Assembly Description	25
4.3.1. Communication Status.....	25
4.3.2. Digital Outputs	25
4.3.3. Counters.....	25
4.3.4. Totalisers.....	25
4.3.5. Analog inputs	25
4.3.6. Digital Inputs	25
4.4. Output Assembly Description	26
4.4.1. Communication Control.....	26
4.4.2. Digital Outputs	26
5. Assembly Structure	27
5.1. Input Assembly.....	27
5.2. Output Assembly.....	34

Revision History

Revision	Date	Comment
15V02	5 June 2015	Initial document
15V03	16 June 2015	Updated figures with new EDS Icon.

1. PREFACE

1.1. INTRODUCTION

This manual describes the steps required to integrate the Zen RTU device into a Rockwell Automation Logix system.

The Zen RTU is capable of accepting an EtherNet/IP™ Class 1 IO connection from Logix, allowing the cyclic data exchange between the device and Logix.

1.2. CONFIGURATION

The Zen RTU device can be added into the Logix environment, using either a Generic Module Profile, or by using the EDS Add-on-Profile (AOP) mechanism. The latter requires Studio 5000 (previously known as RSLogix 5000) version 20 or higher.

Complete example code is available for both options, in ACD and L5X format.

2. CONFIGURATION USING EDS AOP

This chapter covers the integration of the Zen RTU device using the EDS Add-on-Profile method.

This method requires Studio 5000 Version 20 or higher.

2.1. INSTALLING THE EDS AOP

The Zen RTU EDS file must be first be installed and registered. The *EDS Hardware Installation Tool*, can be launched from inside Studio5000's Logix Designer UI, by selecting its shortcut under the Tools menu.

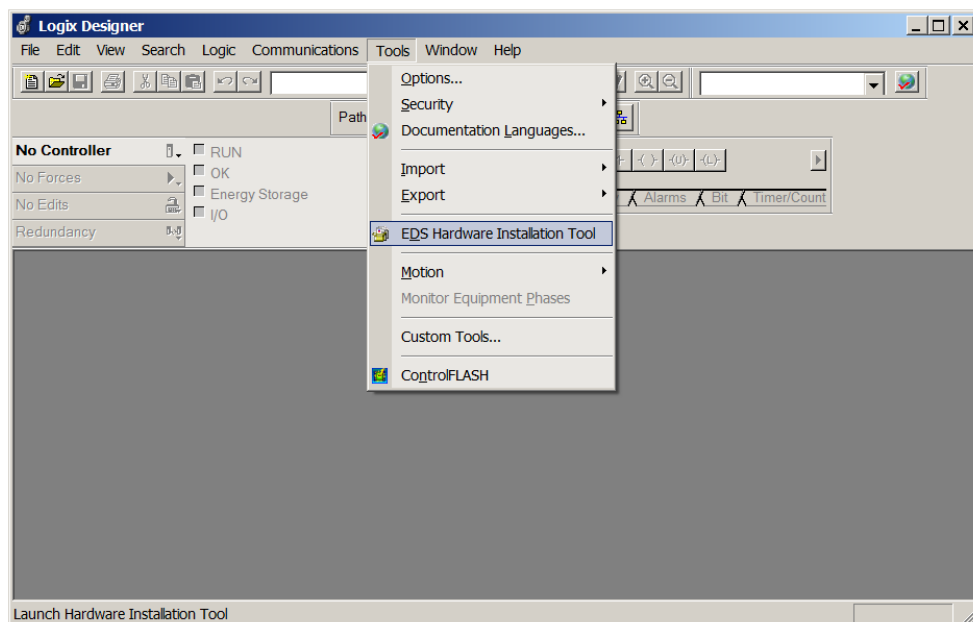


Figure 2.1 - Launch EDS Hardware Tool

The EDS Wizard will launch. Select the “Register an EDS file(s)” option as shown below. Then browse to the EDS file. The name of the EDS file is:

03AC000C00C90100.EDS

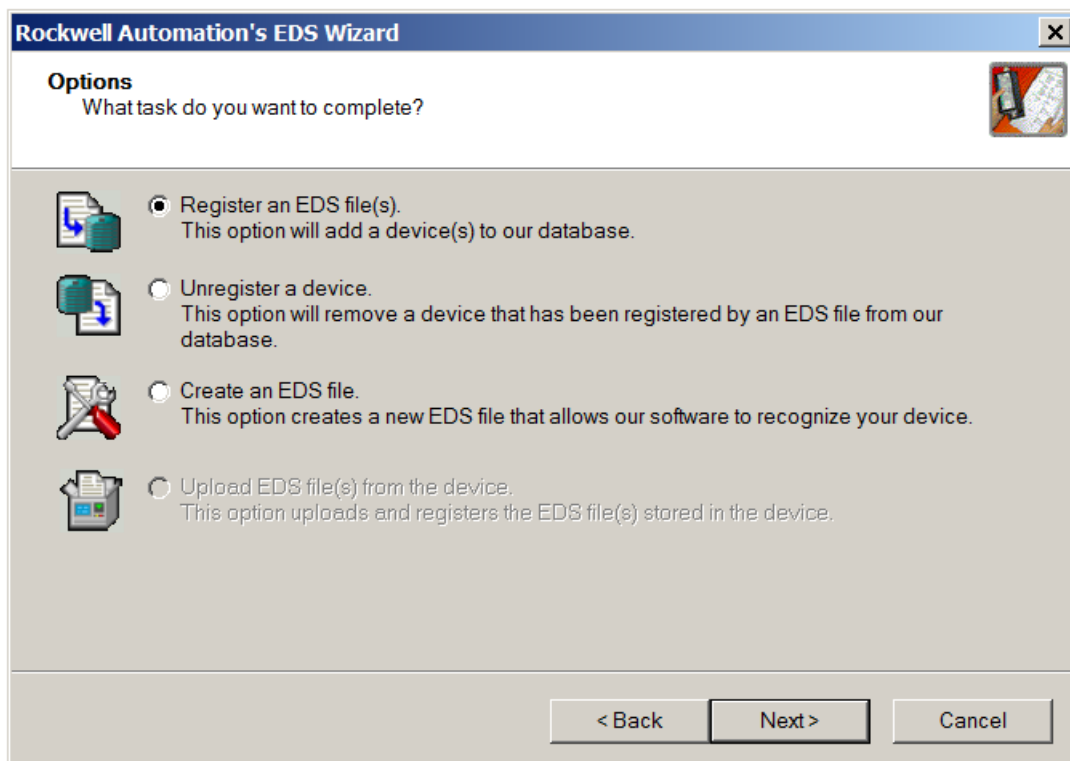


Figure 2.2- Register an EDS File

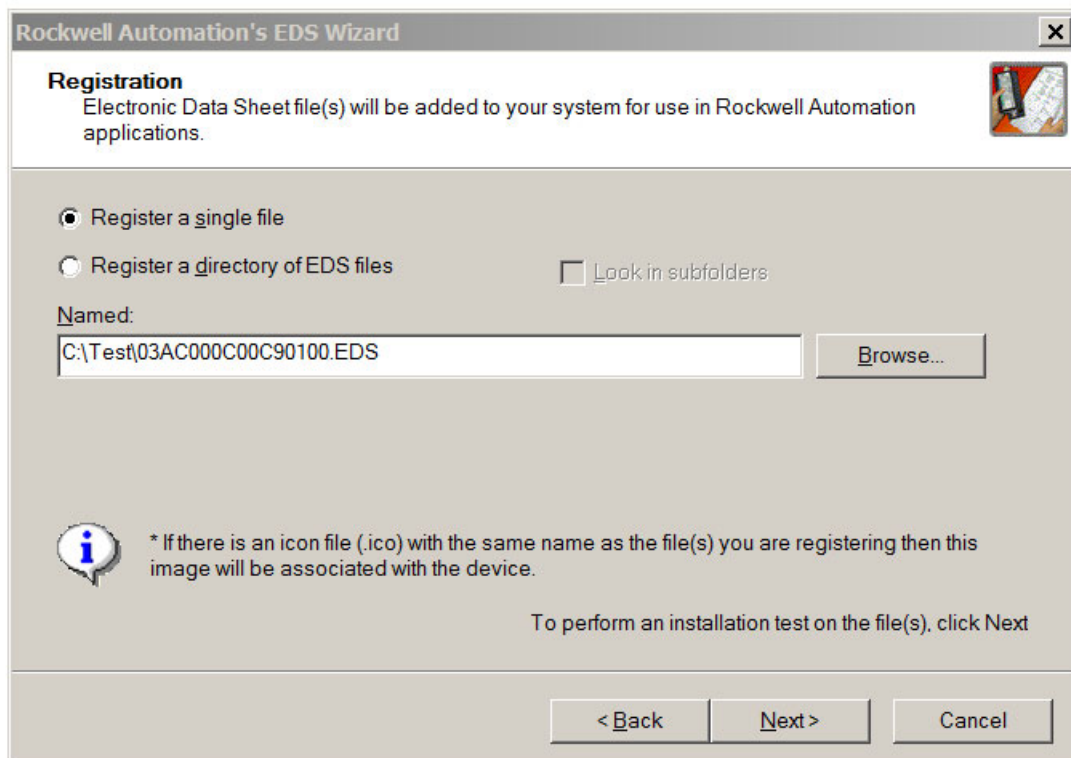


Figure 2.3 - EDS file selection

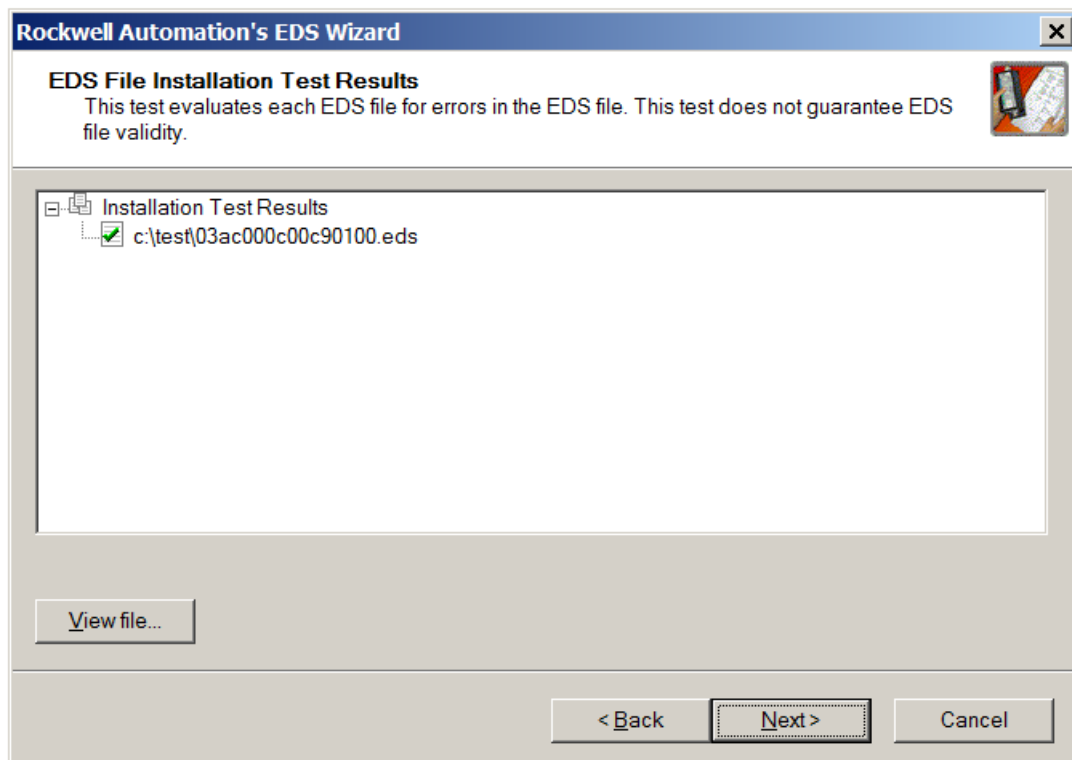


Figure 2.4 - EDS File validation

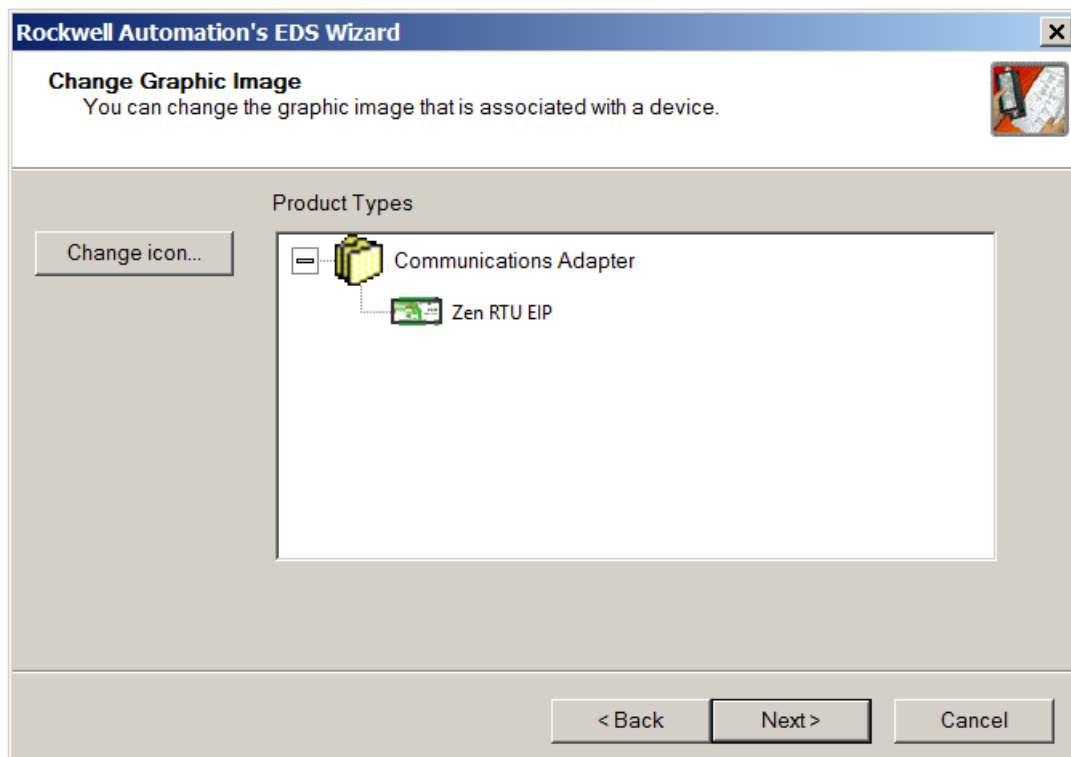


Figure 2.5 - EDS File Icon

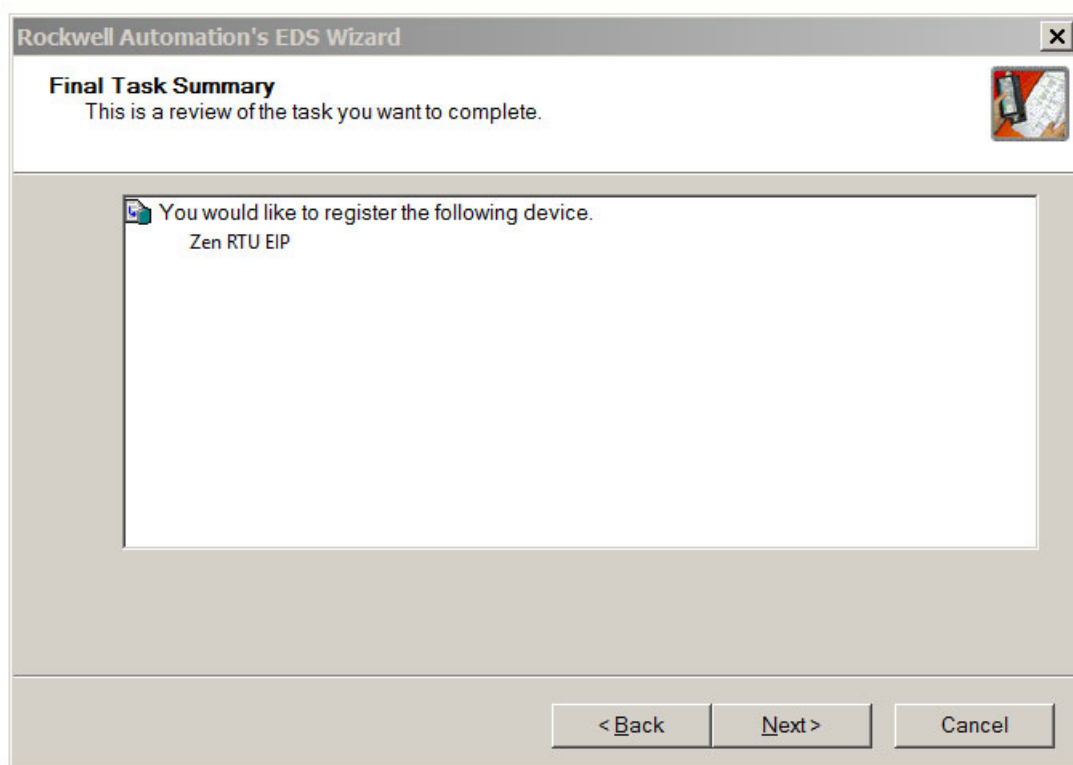


Figure 2.6 - EDS File Installation Confirmation

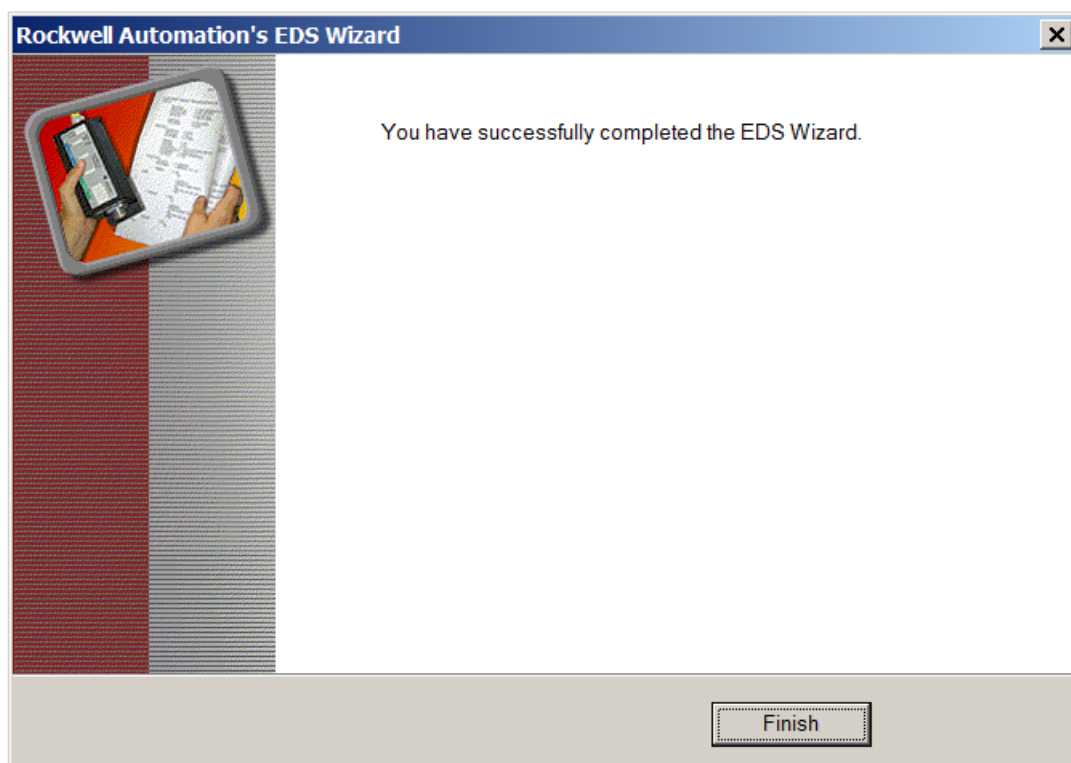


Figure 2.7 - EDS File Installation Complete

2.2. CONFIGURING MODULE

Once the EDS file has been installed the module can be added into the IO tree. Connection to the Zen RTU device is achieved via EtherNet/IP™, therefore the device must be added under a suitable Ethernet bridge. Right click on the Ethernet network item, under the preferred Ethernet bridge and select “New Module”.

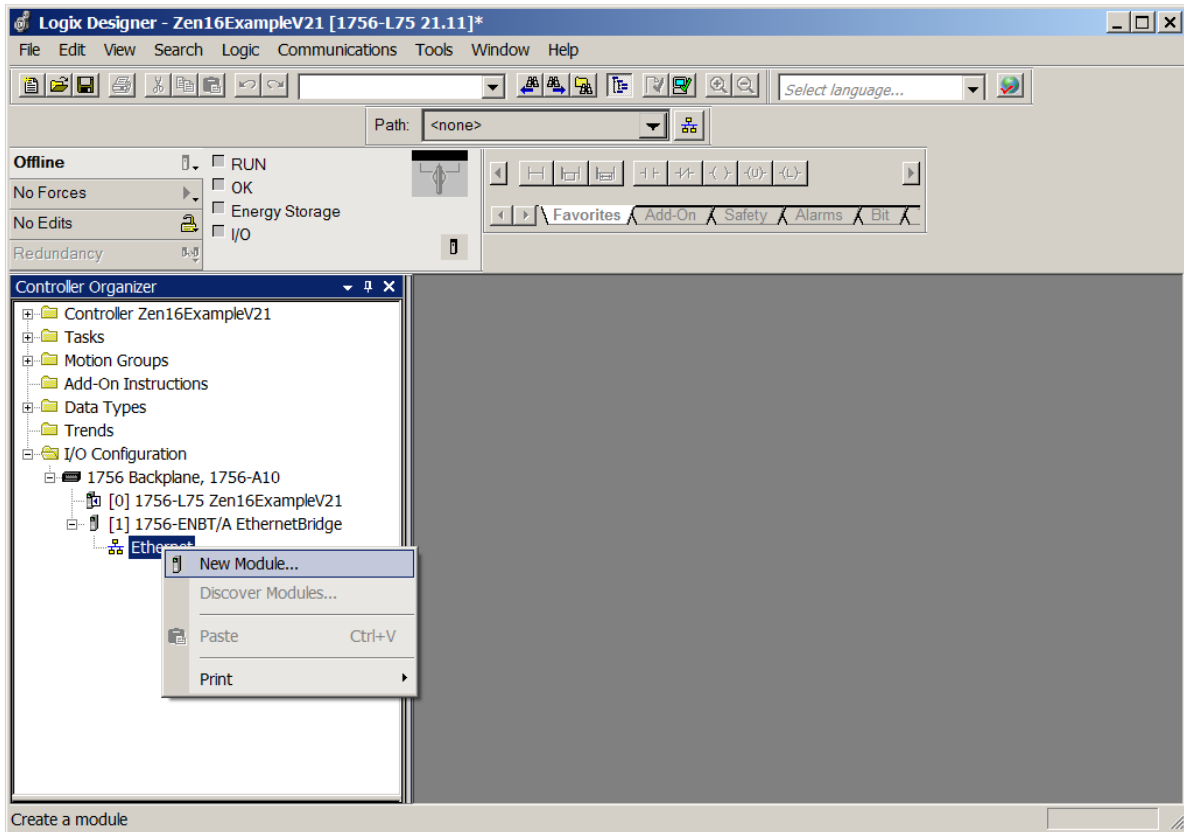


Figure 2.8 - Select New Module

A window will appear showing all the available IO module profiles. Select the “ZEN-16-ETH-IP” module and then click on the *Create* button.

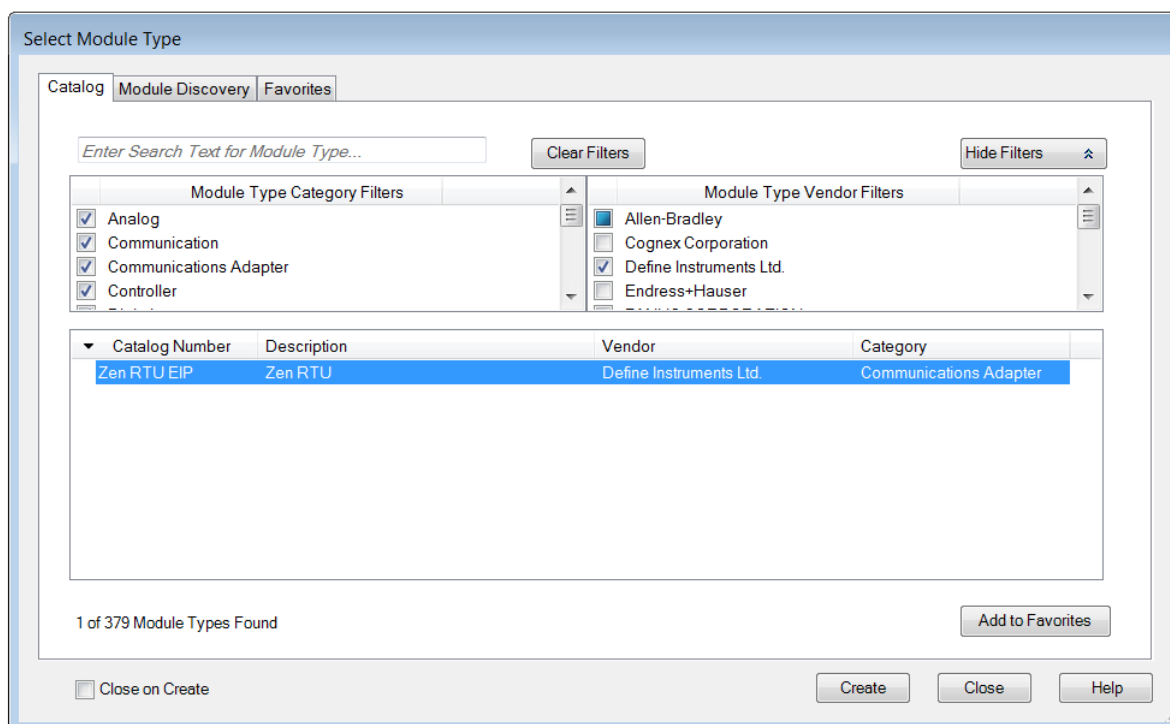


Figure 2.9 - Select Module Profile

The module's EDS Add On Profile (AOP) window will open. Configure a suitable Name and IP Address for the module.

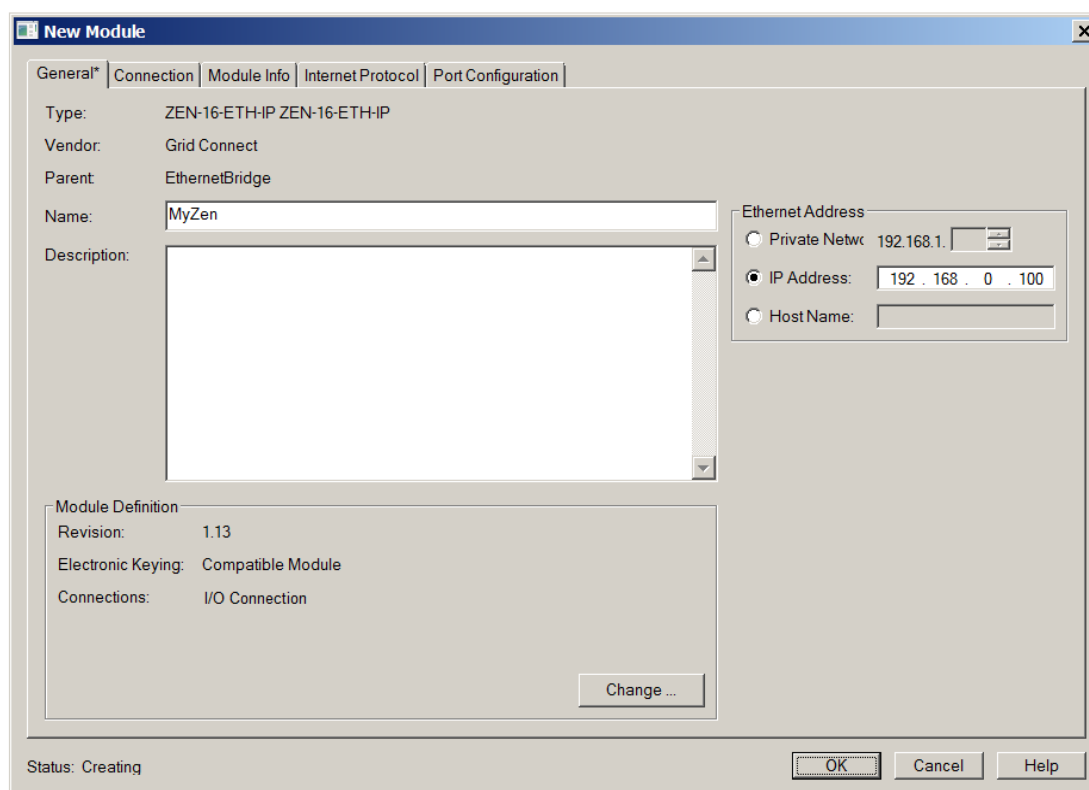


Figure 2.10 - Configure General Properties

The second tab of the module's profile can be used to configure the connection properties. The RPI (requested packet interval) defines the rate at which the data is exchanged between the Zen RTU device and Logix. It is pre-set to 100ms.

The input data can be exchanged using either *Unicast* or *Multicast* messaging. The default, and recommended setting, is *Unicast*.

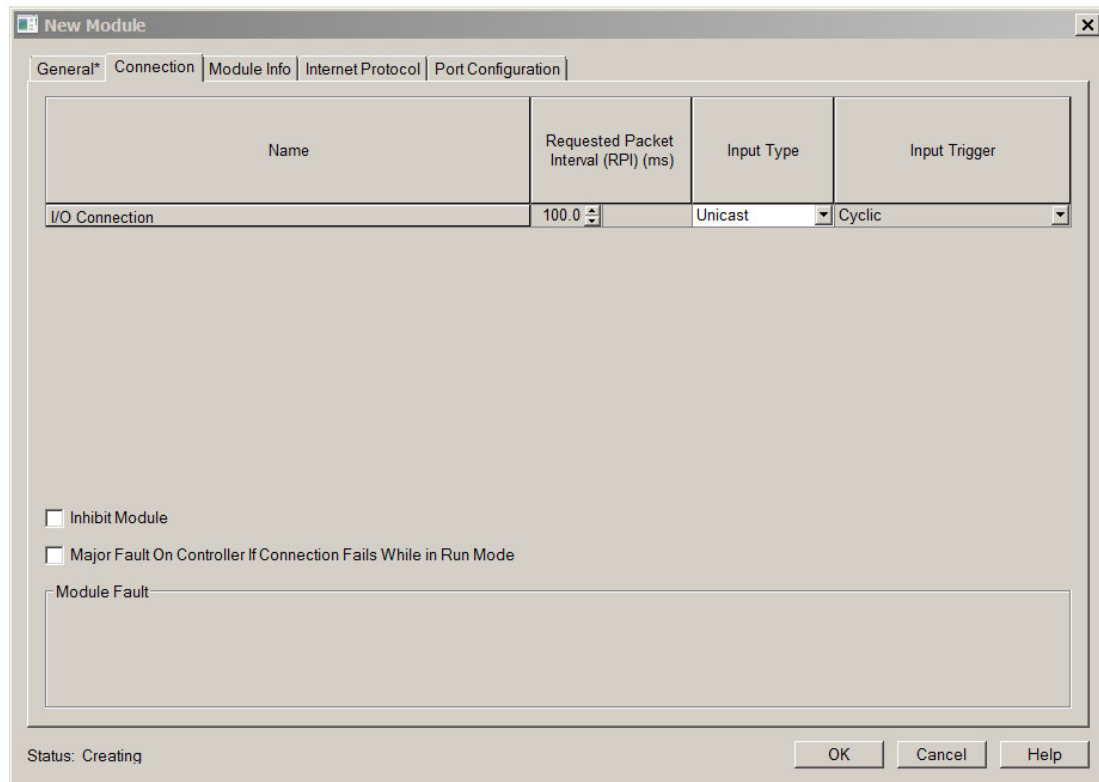


Figure 2.11 - Configure Connection Properties

After this instantiation process is complete, the module will appear in the Studio 5000 IO tree.

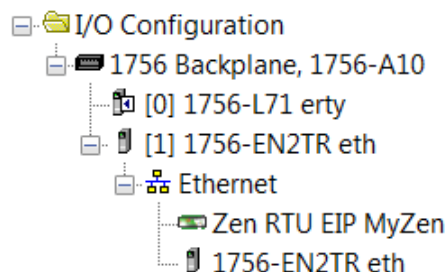


Figure 2.12 – Studio 5000 IO Tree

2.3. MAPPING DATA

A number of UDTs (User Defined Data Types) have been defined to structure the Zen RTU input and output data. These UDTs and the required mapping logic, is defined in the **Zen16MappingEDSAOP.L5X** partial import file.

To import this file, right click on the preferred destination Program and select *Import Routine*.

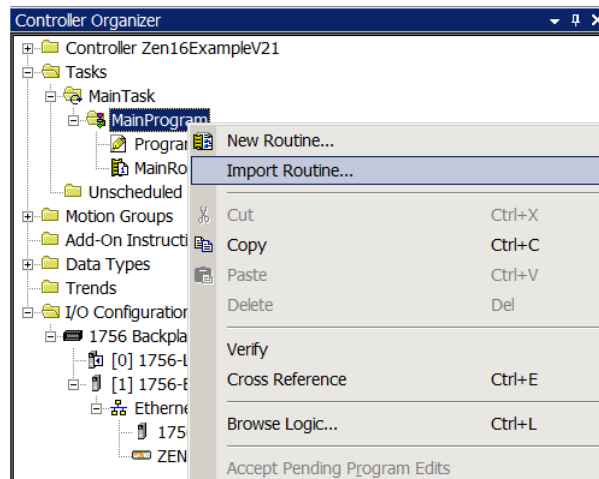


Figure 2.13 - Import Mapping Routine

Then select the **Zen16MappingEDSAOP.L5X** file, and click on *Import*.

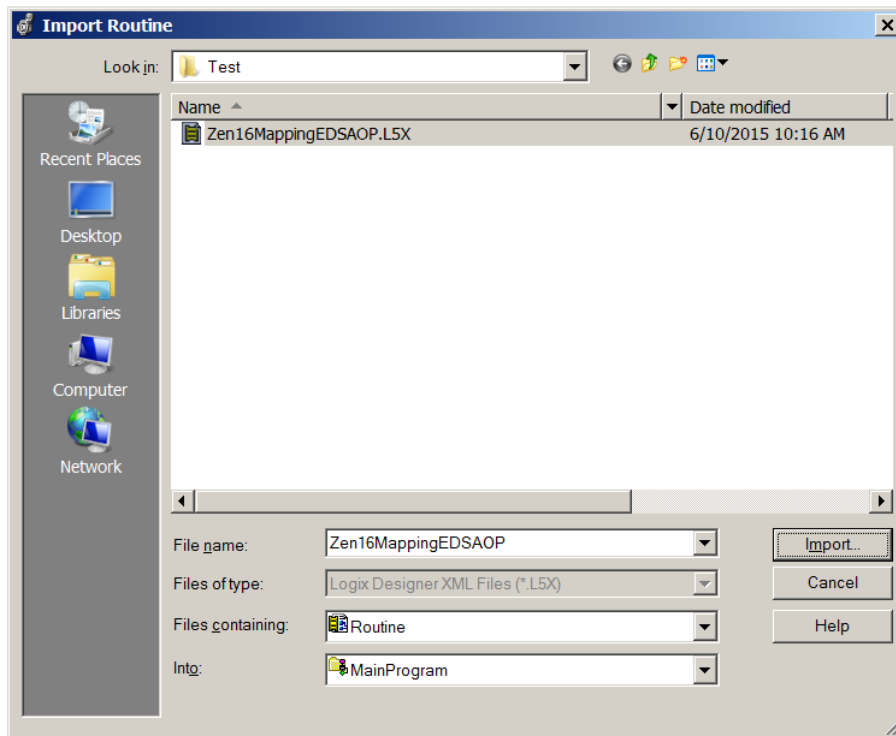


Figure 2.14 - Select Import File

The import file will then be validated.

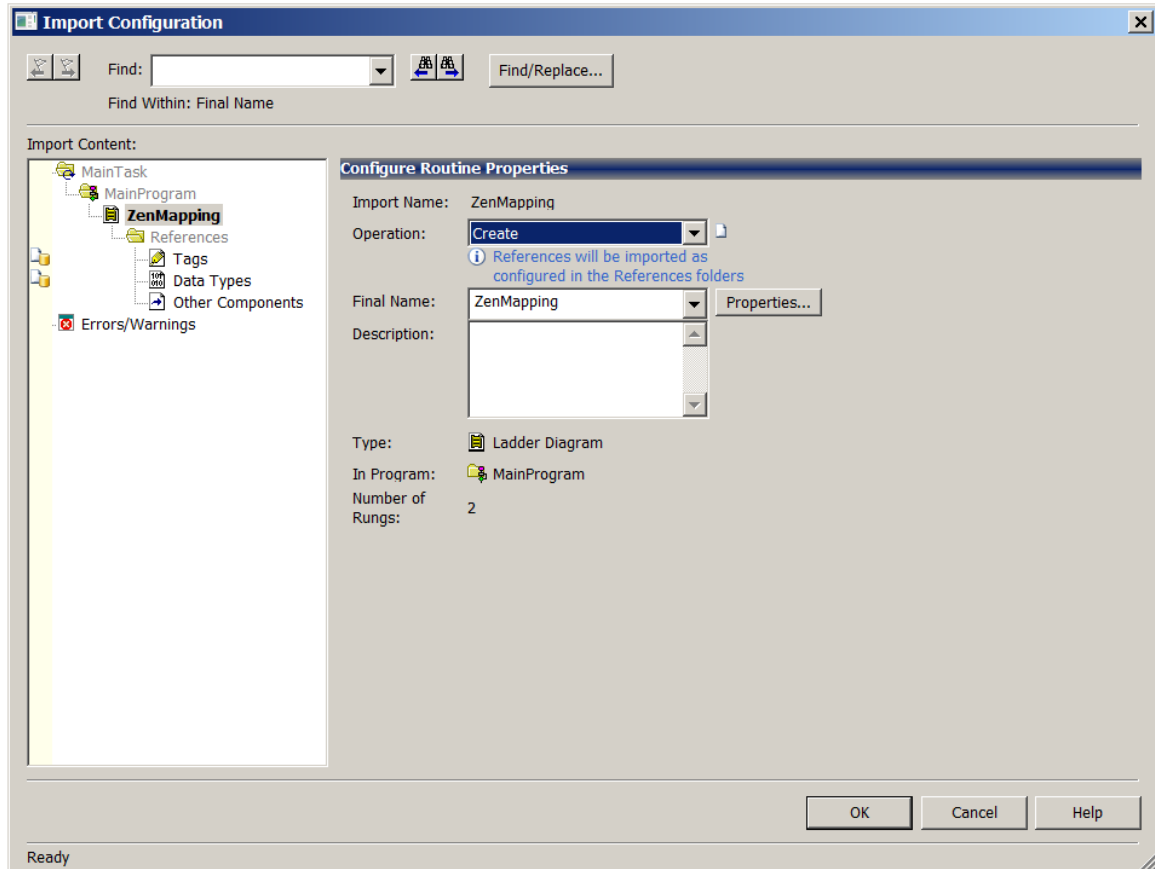


Figure 2.15 - Import File Validation

Once the file has been validated and imported, the following will be automatically created:

- 9 x UDTs
- 2 x Tags (Representing the input and output assemblies respectively)
- 1 x Routine “ZenMapping” (Mapping the raw IO module assemblies to the above structured assemblies)

These items are highlighted in red below.

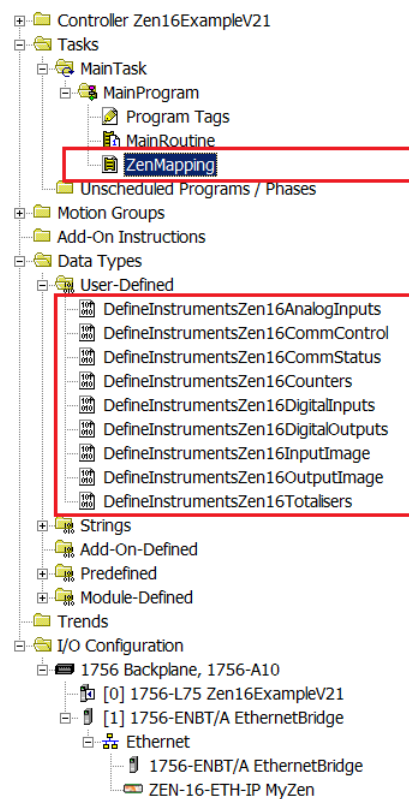


Figure 2.16 – Imported Items

The mapping routine consists of two copy (COP) instructions, moving data between the IO assembly and the structured tags.

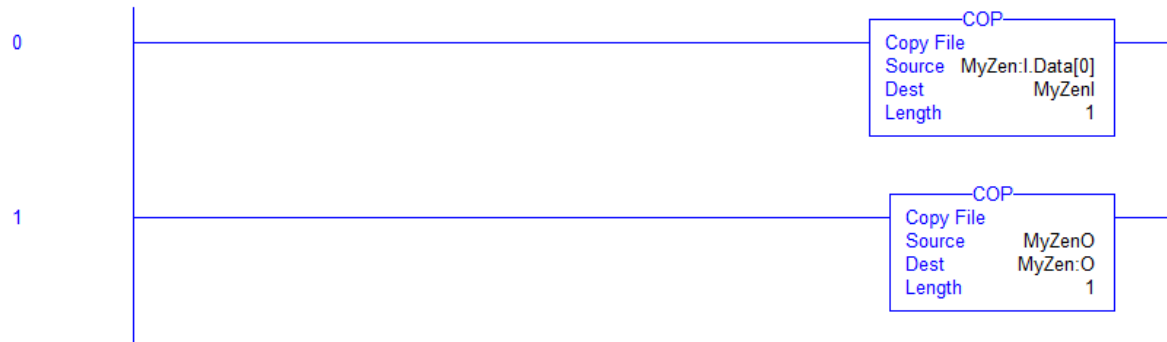


Figure 2.17 - Mapping Routine

The mapping routine must be called in order to execute. This can be achieved by using the JSR instruction in the *MainRoutine* of that program, as shown below.

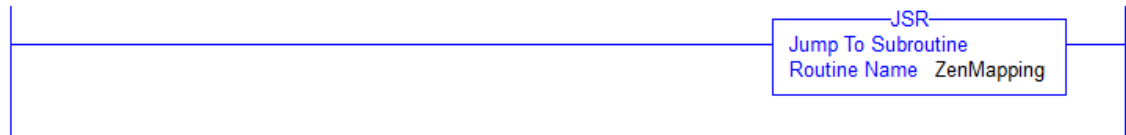


Figure 2.18 - Calling the Mapping Routine

The structured tags will then be populated with the Class 1 data from the Zen RTU device.

Name	Value	Data Type
MyZenI	{ ... }	DefineInstrumentsZen16InputImage
MyZenI.CommunicationStatus	{ ... }	DefineInstrumentsZen16CommStatus
MyZenI.CommunicationStatus.ModbusErrorFromSlave	0	BOOL
MyZenI.CommunicationStatus.ModbusErrorSlaveTimeOut	0	BOOL
MyZenI.CommunicationStatus.ModbusErrorSlaveNoConnection	0	BOOL
MyZenI.CommunicationStatus.Reserved00	0	BOOL
MyZenI.CommunicationStatus.Reserved01	0	BOOL
MyZenI.CommunicationStatus.Reserved02	0	BOOL
MyZenI.CommunicationStatus.Reserved03	0	BOOL
MyZenI.CommunicationStatus.Reserved04	0	BOOL
MyZenI.CommunicationStatus.ConfigurationAtFactoryDefault	0	BOOL
MyZenI.CommunicationStatus.ConfigurationPendingReboot	0	BOOL
MyZenI.DigitalOutputs	{ ... }	DefineInstrumentsZen16DigitalOutputs
MyZenI.DigitalOutputs.OnboardRelay01	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay02	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay03	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay04	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay05	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay06	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay07	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay08	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay09	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay10	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay11	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay12	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay13	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay14	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay15	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay16	0	BOOL
MyZenI.DigitalOutputs.ExternalOutput01	0	BOOL

Figure 2.19 - Structured Zen RTU Data Example

3. CONFIGURATION USING THE GENERIC PROFILE

This chapter covers the integration of the Zen RTU device using the Generic Module Profile method.

This method can be used with any RSLogix5000 or Studio5000 version.

3.1. CONFIGURING MODULE

Connection to the Zen RTU device is achieved via EtherNet/IP™, therefore the device must be added under a suitable Ethernet bridge. Right click on the Ethernet network item, under the preferred Ethernet bridge, and select “New Module”.

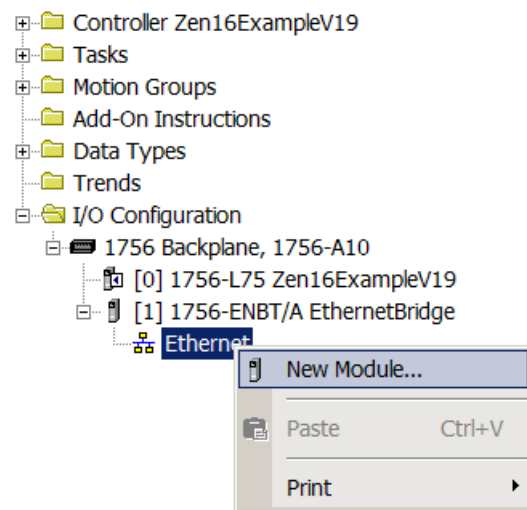


Figure 3.1 - Select New Module

A window will appear showing all the available IO module profiles. Select the generic **ETHERNET-MODULE**, and press the Ok button.

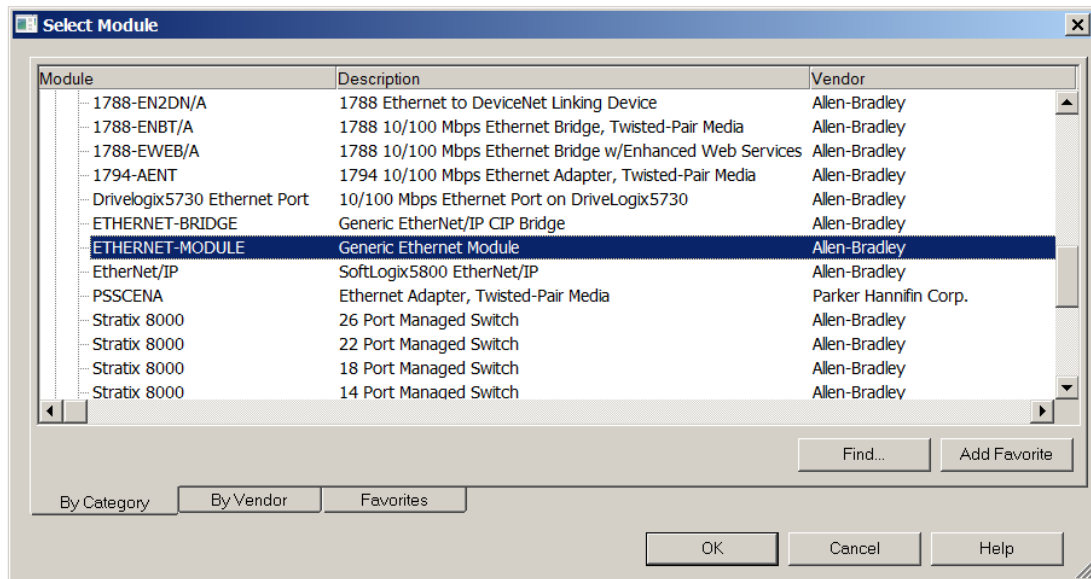


Figure 3.2 – Select Generic ETHERNET-MODULE Profile

The user must enter a suitable name and IP address of the ZEN RTU device. The assembly instances and sizes for the input, output, and configuration must be configured correctly. These parameters are as follows:

Connection Parameter	Assembly Instance	Size
Input	101	156 (8-bit)
Output	102	20 (8-bit)
Configuration	128	0 (8-bit)

Table 3.1 - Connection Parameters

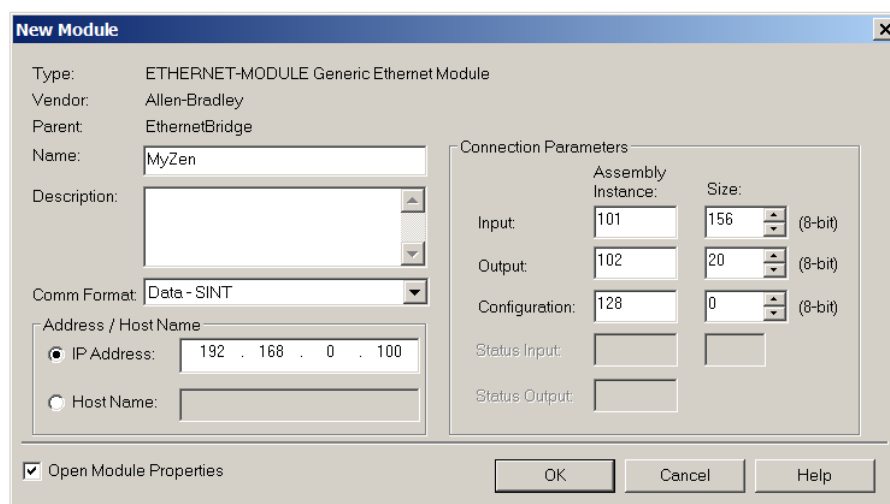


Figure 3.3 - Configure General Properties

The second tab of the module's profile can be used to configure the connection properties. The RPI (requested packet interval) defines the rate at which the data is exchanged between the Zen RTU device and Logix. The RPI should be set to 100ms.

The input data can be exchanged using either Unicast or Multicast messaging. The default, and recommended, setting is Unicast.

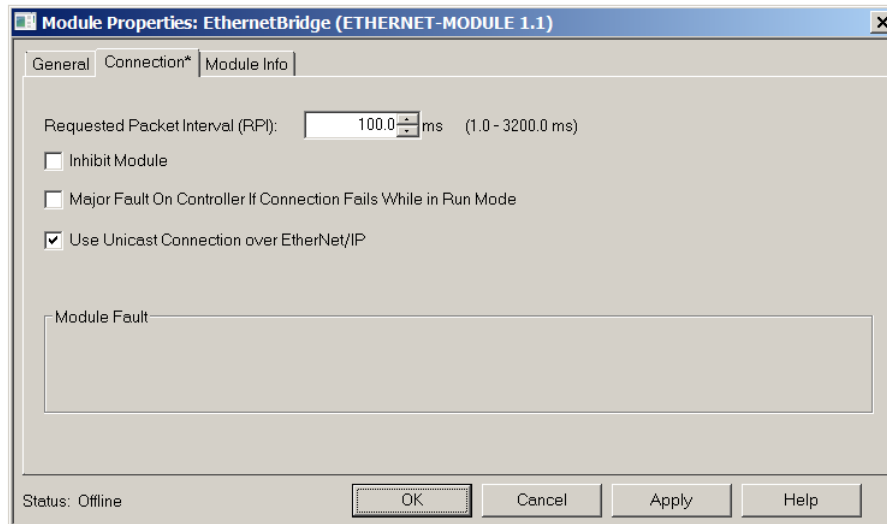


Figure 3.4 - Configure Connection Properties

The module will now be visible in the RSLogix 5000 / Studio 5000 IO tree.

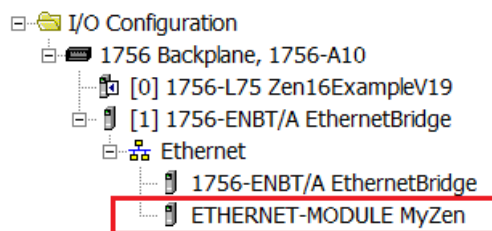


Figure 3.5 - Studio 5000 IO tree

3.2. MAPPING DATA

A number of UDTs (User Defined Data Types) have been defined to structure the Zen RTU input and output data. These UDTs and the required mapping logic is defined in the **Zen16MappingGeneric.L5X** partial import file.

To import this file, right click on the destination Program and select Import Routine.

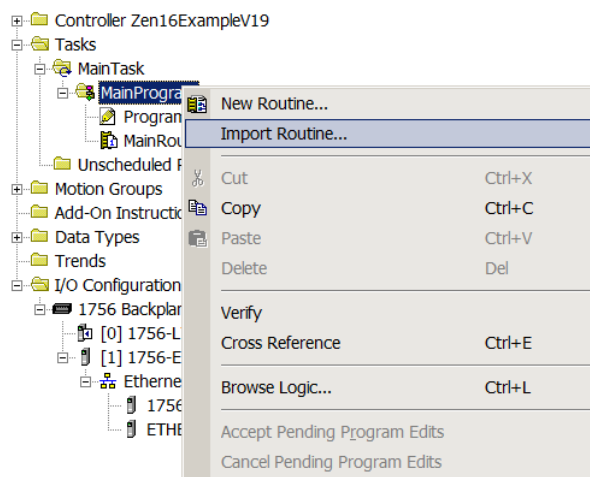


Figure 3.6 - Import Mapping Routine

Then select the **Zen16MappingGeneric.L5X** file, and click on *Import*.

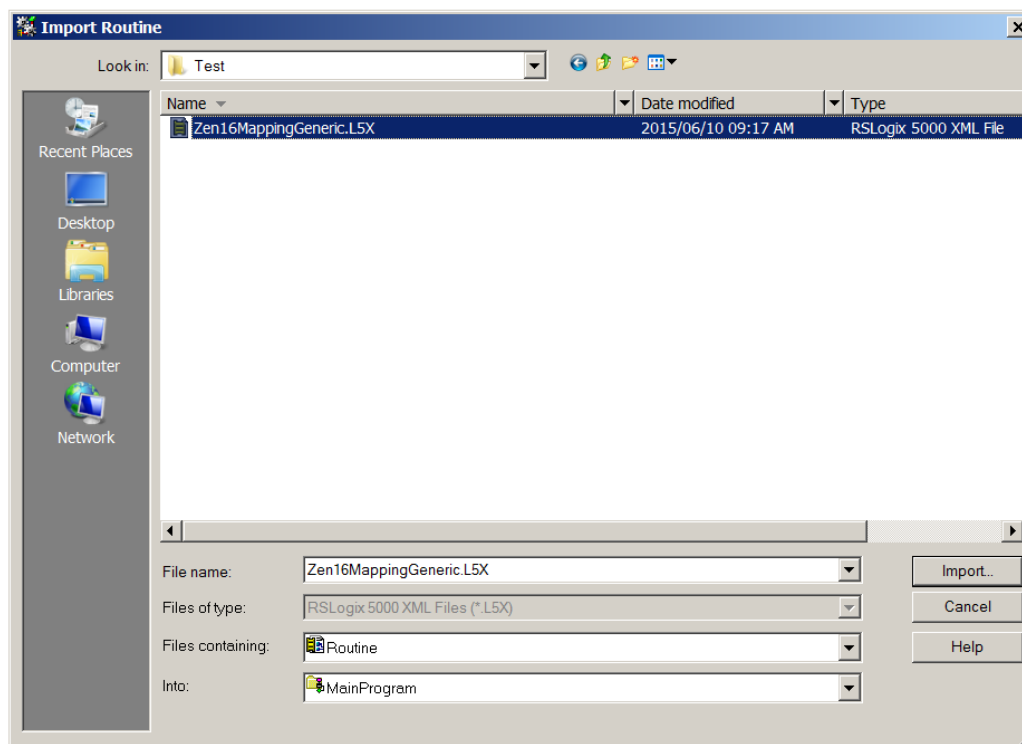


Figure 3.7 - Select Import File

The import file will then be validated. Press Ok.

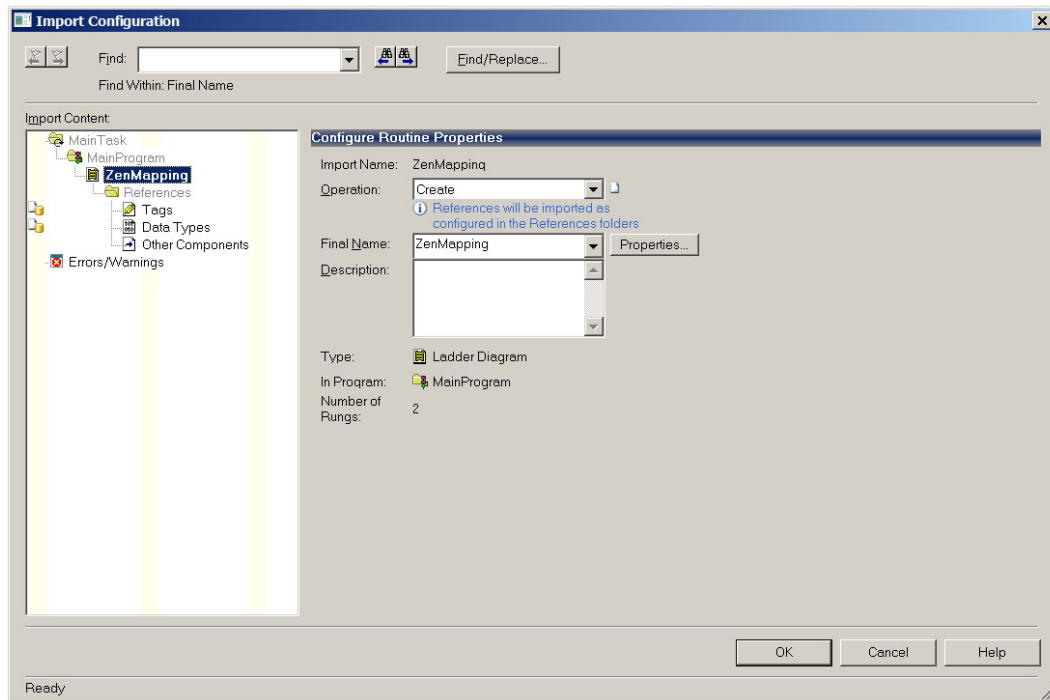


Figure 3.8 - Import File Validation

Once the file has been validated and imported, the following will be automatically created:

- 9 x UDTs
- 2 x Tags (Representing the input and output assemblies respectively)
- 1 x Routine “ZenMapping” (Mapping the raw IO module assemblies to the above structured assemblies)

These items are shown below.

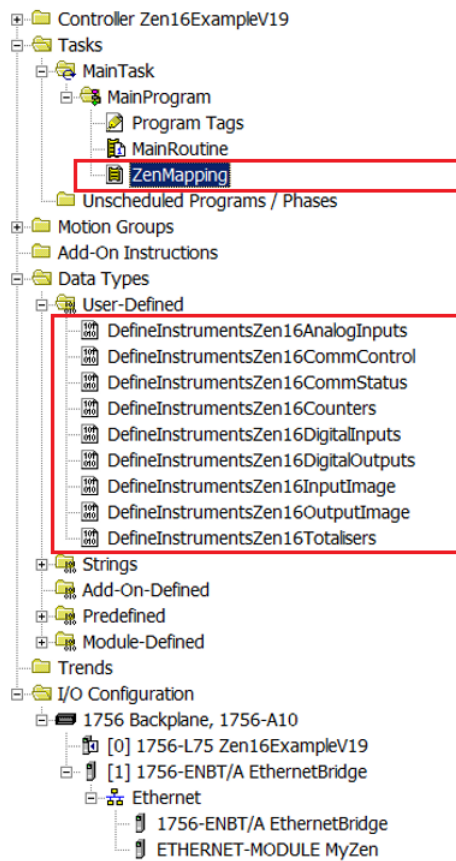


Figure 3.9 - Imported Items

The mapping routine consists of two copy (COP) instructions, moving data between the IO assembly and the structured tags.

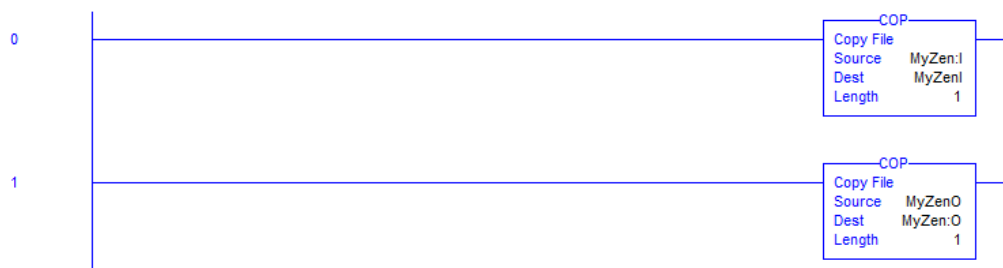


Figure 3.10 - Mapping routine

The mapping routine must be called in order to execute. This can be achieved by using the JSR instruction in the *MainRoutine* of that program, as shown below.

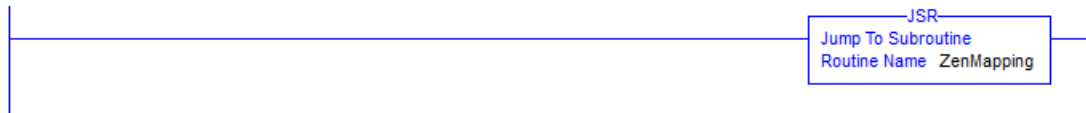


Figure 3.11 - Calling the Mapping routine

The structured tags will then be populated with the Class 1 data from the Zen RTU device.

Name	Value	Data Type
MyZenI	{ ... }	DefineInstrumentsZen16InputImage
MyZenI.CommunicationStatus	{ ... }	DefineInstrumentsZen16CommStatus
MyZenI.CommunicationStatus.ModbusErrorFromSlave	0	BOOL
MyZenI.CommunicationStatus.ModbusErrorSlaveTimeOut	0	BOOL
MyZenI.CommunicationStatus.ModbusErrorSlaveNoConnection	0	BOOL
MyZenI.CommunicationStatus.Reserved00	0	BOOL
MyZenI.CommunicationStatus.Reserved01	0	BOOL
MyZenI.CommunicationStatus.Reserved02	0	BOOL
MyZenI.CommunicationStatus.Reserved03	0	BOOL
MyZenI.CommunicationStatus.Reserved04	0	BOOL
MyZenI.CommunicationStatus.ConfigurationAtFactoryDefault	0	BOOL
MyZenI.CommunicationStatus.ConfigurationPendingReboot	0	BOOL
MyZenI.DigitalOutputs	{ ... }	DefineInstrumentsZen16DigitalOutputs
MyZenI.DigitalOutputs.OnboardRelay01	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay02	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay03	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay04	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay05	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay06	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay07	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay08	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay09	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay10	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay11	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay12	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay13	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay14	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay15	0	BOOL
MyZenI.DigitalOutputs.OnboardRelay16	0	BOOL
MyZenI.DigitalOutputs.ExternalOutput01	0	BOOL

Figure 3.12 - Structured Zen RTU Data Example

4. OPERATION

4.1. MODULE CONNECTION STATUS

A connection failure between Logix and the Zen RTU device is indicated in Studio 5000 by a yellow triangle placed over the device icon.

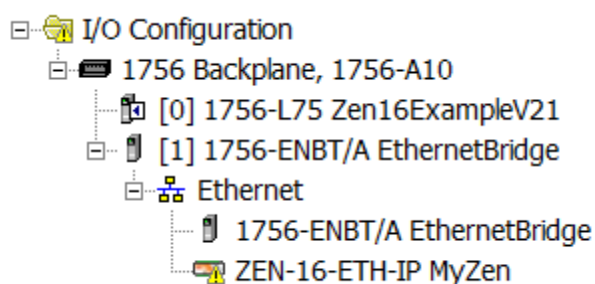


Figure 4.1 - Faulted IO Tree

It is also indicated by the *ConnectionFaulted* bit the module input assembly being set. (A zero value indicates the connection is healthy.)

Name	Value
MyZen:I	{ ... }
MyZen:I.ConnectionFaulted	0
MyZen:I.Data	{ ... }

Figure 4.2 – Connection Faulted Status

4.2. MODULE OPERATION

In order for the EtherNet/IP™ – Modbus exchange to execute, the *ModbusRun* bit, in the *CommunicationControl* section of the structured output assembly must be set.

MyZenO	{ ... }
MyZenO.CommunicationControl	{ ... }
MyZenO.CommunicationControl.ModbusRun	1
MyZenO.DigitalOutputs	{ ... }

Figure 4.3 - Communication Control

4.3. INPUT ASSEMBLY DESCRIPTION

The input assembly is divided into the following sections:

4.3.1. COMMUNICATION STATUS

Item	Description
ModbusErrorFromSlave	The Modbus slave is responding with errors.
ModbusErrorSlaveTimeOut	The Modbus slave was connected, but then timed-out.
ModbusErrorSlaveNoConnection	Connection with the Modbus slave could not be connected.
ConfigurationAtFactoryDefault	Unit is active with communication factory defaults.
ConfigurationPendingReboot	New configuration requires a reboot to take effect.

4.3.2. DIGITAL OUTPUTS

Item	Description
OboardRelay01 ... 02	The status of the On-board Relays.
ExternalOutput01 ... 96	The status of the External Digital Outputs.
AdvancedSetPointOutput01 ... 16	The status of the Advanced Set-point Outputs.

4.3.3. COUNTERS

Item	Description
Counter01 ... 04	The current floating-point value of the internal Counters.

4.3.4. TOTALISERS

Item	Description
Total01 ... 10	The current floating-point value of the internal Totalisers.

4.3.5. ANALOG INPUTS

Item	Description
Analog01 ... 16	The current floating-point value of the Analog Inputs.

4.3.6. DIGITAL INPUTS

Item	Description
OboardInput01 ... 16	The status of the On-board Digital Inputs.
ExternalInput01 ... 96	The status of the External Digital Inputs.
ExternalControlInput01 ... 16	The status of the External Control Inputs.

4.4. OUTPUT ASSEMBLY DESCRIPTION

The output assembly is divided into the following sections:

4.4.1. COMMUNICATION CONTROL

Item	Description
ModbusRun	Controls the EtherNet/IP™ – Modbus data exchange. Must be set to 1 for normal operation.

4.4.2. DIGITAL OUTPUTS

Item	Description
OboardRelay01 ... 02	Command of the On-board Relays.
ExternalOutput01 ... 96	Command of the External Digital Outputs.
AdvancedSetPointOutput01 ... 16	Command of the Advanced Set-point Outputs.

5. ASSEMBLY STRUCTURE

5.1. INPUT ASSEMBLY

MyZenI		DefineInstrumentsZen16InputImage
	MyZenI.CommunicationStatus	DefineInstrumentsZen16CommStatus
	MyZenI.CommunicationStatus.ModbusErrorFromSlave	BOOL
	MyZenI.CommunicationStatus.ModbusErrorSlaveTimeOut	BOOL
	MyZenI.CommunicationStatus.ModbusErrorSlaveNoConnection	BOOL
	MyZenI.CommunicationStatus.Reserved00	BOOL
	MyZenI.CommunicationStatus.Reserved01	BOOL
	MyZenI.CommunicationStatus.Reserved02	BOOL
	MyZenI.CommunicationStatus.Reserved03	BOOL
	MyZenI.CommunicationStatus.Reserved04	BOOL
	MyZenI.CommunicationStatus.ConfigurationAtFactoryDefault	BOOL
	MyZenI.CommunicationStatus.ConfigurationPendingReboot	BOOL
	MyZenI.DigitalOutputs	DefineInstrumentsZen16DigitalOutputs
	MyZenI.DigitalOutputs.OnboardRelay01	BOOL
	MyZenI.DigitalOutputs.OnboardRelay02	BOOL
	MyZenI.DigitalOutputs.OnboardRelay03	BOOL
	MyZenI.DigitalOutputs.OnboardRelay04	BOOL
	MyZenI.DigitalOutputs.OnboardRelay05	BOOL
	MyZenI.DigitalOutputs.OnboardRelay06	BOOL
	MyZenI.DigitalOutputs.OnboardRelay07	BOOL
	MyZenI.DigitalOutputs.OnboardRelay08	BOOL
	MyZenI.DigitalOutputs.OnboardRelay09	BOOL
	MyZenI.DigitalOutputs.OnboardRelay10	BOOL
	MyZenI.DigitalOutputs.OnboardRelay11	BOOL
	MyZenI.DigitalOutputs.OnboardRelay12	BOOL
	MyZenI.DigitalOutputs.OnboardRelay13	BOOL
	MyZenI.DigitalOutputs.OnboardRelay14	BOOL
	MyZenI.DigitalOutputs.OnboardRelay15	BOOL
	MyZenI.DigitalOutputs.OnboardRelay16	BOOL
	MyZenI.DigitalOutputs.ExternalOutput01	BOOL
	MyZenI.DigitalOutputs.ExternalOutput02	BOOL
	MyZenI.DigitalOutputs.ExternalOutput03	BOOL
	MyZenI.DigitalOutputs.ExternalOutput04	BOOL
	MyZenI.DigitalOutputs.ExternalOutput05	BOOL
	MyZenI.DigitalOutputs.ExternalOutput06	BOOL
	MyZenI.DigitalOutputs.ExternalOutput07	BOOL
	MyZenI.DigitalOutputs.ExternalOutput08	BOOL
	MyZenI.DigitalOutputs.ExternalOutput09	BOOL
	MyZenI.DigitalOutputs.ExternalOutput10	BOOL

	MyZenI.DigitalOutputs.ExternalOutput11	BOOL
	MyZenI.DigitalOutputs.ExternalOutput12	BOOL
	MyZenI.DigitalOutputs.ExternalOutput13	BOOL
	MyZenI.DigitalOutputs.ExternalOutput14	BOOL
	MyZenI.DigitalOutputs.ExternalOutput15	BOOL
	MyZenI.DigitalOutputs.ExternalOutput16	BOOL
	MyZenI.DigitalOutputs.ExternalOutput17	BOOL
	MyZenI.DigitalOutputs.ExternalOutput18	BOOL
	MyZenI.DigitalOutputs.ExternalOutput19	BOOL
	MyZenI.DigitalOutputs.ExternalOutput20	BOOL
	MyZenI.DigitalOutputs.ExternalOutput21	BOOL
	MyZenI.DigitalOutputs.ExternalOutput22	BOOL
	MyZenI.DigitalOutputs.ExternalOutput23	BOOL
	MyZenI.DigitalOutputs.ExternalOutput24	BOOL
	MyZenI.DigitalOutputs.ExternalOutput25	BOOL
	MyZenI.DigitalOutputs.ExternalOutput26	BOOL
	MyZenI.DigitalOutputs.ExternalOutput27	BOOL
	MyZenI.DigitalOutputs.ExternalOutput28	BOOL
	MyZenI.DigitalOutputs.ExternalOutput29	BOOL
	MyZenI.DigitalOutputs.ExternalOutput30	BOOL
	MyZenI.DigitalOutputs.ExternalOutput31	BOOL
	MyZenI.DigitalOutputs.ExternalOutput32	BOOL
	MyZenI.DigitalOutputs.ExternalOutput33	BOOL
	MyZenI.DigitalOutputs.ExternalOutput34	BOOL
	MyZenI.DigitalOutputs.ExternalOutput35	BOOL
	MyZenI.DigitalOutputs.ExternalOutput36	BOOL
	MyZenI.DigitalOutputs.ExternalOutput37	BOOL
	MyZenI.DigitalOutputs.ExternalOutput38	BOOL
	MyZenI.DigitalOutputs.ExternalOutput39	BOOL
	MyZenI.DigitalOutputs.ExternalOutput40	BOOL
	MyZenI.DigitalOutputs.ExternalOutput41	BOOL
	MyZenI.DigitalOutputs.ExternalOutput42	BOOL
	MyZenI.DigitalOutputs.ExternalOutput43	BOOL
	MyZenI.DigitalOutputs.ExternalOutput44	BOOL
	MyZenI.DigitalOutputs.ExternalOutput45	BOOL
	MyZenI.DigitalOutputs.ExternalOutput46	BOOL
	MyZenI.DigitalOutputs.ExternalOutput47	BOOL
	MyZenI.DigitalOutputs.ExternalOutput48	BOOL
	MyZenI.DigitalOutputs.ExternalOutput49	BOOL
	MyZenI.DigitalOutputs.ExternalOutput50	BOOL
	MyZenI.DigitalOutputs.ExternalOutput51	BOOL
	MyZenI.DigitalOutputs.ExternalOutput52	BOOL
	MyZenI.DigitalOutputs.ExternalOutput53	BOOL
	MyZenI.DigitalOutputs.ExternalOutput54	BOOL
	MyZenI.DigitalOutputs.ExternalOutput55	BOOL
	MyZenI.DigitalOutputs.ExternalOutput56	BOOL

	MyZenI.DigitalOutputs.ExternalOutput57	BOOL
	MyZenI.DigitalOutputs.ExternalOutput58	BOOL
	MyZenI.DigitalOutputs.ExternalOutput59	BOOL
	MyZenI.DigitalOutputs.ExternalOutput60	BOOL
	MyZenI.DigitalOutputs.ExternalOutput61	BOOL
	MyZenI.DigitalOutputs.ExternalOutput62	BOOL
	MyZenI.DigitalOutputs.ExternalOutput63	BOOL
	MyZenI.DigitalOutputs.ExternalOutput64	BOOL
	MyZenI.DigitalOutputs.ExternalOutput65	BOOL
	MyZenI.DigitalOutputs.ExternalOutput66	BOOL
	MyZenI.DigitalOutputs.ExternalOutput67	BOOL
	MyZenI.DigitalOutputs.ExternalOutput68	BOOL
	MyZenI.DigitalOutputs.ExternalOutput69	BOOL
	MyZenI.DigitalOutputs.ExternalOutput70	BOOL
	MyZenI.DigitalOutputs.ExternalOutput71	BOOL
	MyZenI.DigitalOutputs.ExternalOutput72	BOOL
	MyZenI.DigitalOutputs.ExternalOutput73	BOOL
	MyZenI.DigitalOutputs.ExternalOutput74	BOOL
	MyZenI.DigitalOutputs.ExternalOutput75	BOOL
	MyZenI.DigitalOutputs.ExternalOutput76	BOOL
	MyZenI.DigitalOutputs.ExternalOutput77	BOOL
	MyZenI.DigitalOutputs.ExternalOutput78	BOOL
	MyZenI.DigitalOutputs.ExternalOutput79	BOOL
	MyZenI.DigitalOutputs.ExternalOutput80	BOOL
	MyZenI.DigitalOutputs.ExternalOutput81	BOOL
	MyZenI.DigitalOutputs.ExternalOutput82	BOOL
	MyZenI.DigitalOutputs.ExternalOutput83	BOOL
	MyZenI.DigitalOutputs.ExternalOutput84	BOOL
	MyZenI.DigitalOutputs.ExternalOutput85	BOOL
	MyZenI.DigitalOutputs.ExternalOutput86	BOOL
	MyZenI.DigitalOutputs.ExternalOutput87	BOOL
	MyZenI.DigitalOutputs.ExternalOutput88	BOOL
	MyZenI.DigitalOutputs.ExternalOutput89	BOOL
	MyZenI.DigitalOutputs.ExternalOutput90	BOOL
	MyZenI.DigitalOutputs.ExternalOutput91	BOOL
	MyZenI.DigitalOutputs.ExternalOutput92	BOOL
	MyZenI.DigitalOutputs.ExternalOutput93	BOOL
	MyZenI.DigitalOutputs.ExternalOutput94	BOOL
	MyZenI.DigitalOutputs.ExternalOutput95	BOOL
	MyZenI.DigitalOutputs.ExternalOutput96	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput01	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput02	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput03	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput04	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput05	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput06	BOOL

	MyZenI.DigitalOutputs.AdvancedSetPointOutput07	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput08	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput09	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput10	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput11	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput12	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput13	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput14	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput15	BOOL
	MyZenI.DigitalOutputs.AdvancedSetPointOutput16	BOOL
	MyZenI.Counters	DefineInstrumentsZen16Counters
	MyZenI.Counters.Counter01	REAL
	MyZenI.Counters.Counter02	REAL
	MyZenI.Counters.Counter03	REAL
	MyZenI.Counters.Counter04	REAL
	MyZenI.Totalisers	DefineInstrumentsZen16Totalisers
	MyZenI.Totalisers.Total01	REAL
	MyZenI.Totalisers.Total02	REAL
	MyZenI.Totalisers.Total03	REAL
	MyZenI.Totalisers.Total04	REAL
	MyZenI.Totalisers.Total05	REAL
	MyZenI.Totalisers.Total06	REAL
	MyZenI.Totalisers.Total07	REAL
	MyZenI.Totalisers.Total08	REAL
	MyZenI.Totalisers.Total09	REAL
	MyZenI.Totalisers.Total10	REAL
	MyZenI.AnalogInputs	DefineInstrumentsZen16AnalogInputs
	MyZenI.AnalogInputs.Analog01	REAL
	MyZenI.AnalogInputs.Analog02	REAL
	MyZenI.AnalogInputs.Analog03	REAL
	MyZenI.AnalogInputs.Analog04	REAL
	MyZenI.AnalogInputs.Analog05	REAL
	MyZenI.AnalogInputs.Analog06	REAL
	MyZenI.AnalogInputs.Analog07	REAL
	MyZenI.AnalogInputs.Analog08	REAL
	MyZenI.AnalogInputs.Analog09	REAL
	MyZenI.AnalogInputs.Analog10	REAL
	MyZenI.AnalogInputs.Analog11	REAL
	MyZenI.AnalogInputs.Analog12	REAL
	MyZenI.AnalogInputs.Analog13	REAL
	MyZenI.AnalogInputs.Analog14	REAL
	MyZenI.AnalogInputs.Analog15	REAL
	MyZenI.AnalogInputs.Analog16	REAL
	MyZenI.DigitalInputs	DefineInstrumentsZen16DigitalInputs
	MyZenI.DigitalInputs.OnboardInput01	BOOL
	MyZenI.DigitalInputs.OnboardInput02	BOOL

	MyZenI.DigitalInputs.OnboardInput03	BOOL
	MyZenI.DigitalInputs.OnboardInput04	BOOL
	MyZenI.DigitalInputs.OnboardInput05	BOOL
	MyZenI.DigitalInputs.OnboardInput06	BOOL
	MyZenI.DigitalInputs.OnboardInput07	BOOL
	MyZenI.DigitalInputs.OnboardInput08	BOOL
	MyZenI.DigitalInputs.OnboardInput09	BOOL
	MyZenI.DigitalInputs.OnboardInput10	BOOL
	MyZenI.DigitalInputs.OnboardInput11	BOOL
	MyZenI.DigitalInputs.OnboardInput12	BOOL
	MyZenI.DigitalInputs.OnboardInput13	BOOL
	MyZenI.DigitalInputs.OnboardInput14	BOOL
	MyZenI.DigitalInputs.OnboardInput15	BOOL
	MyZenI.DigitalInputs.OnboardInput16	BOOL
	MyZenI.DigitalInputs.ExternalInput01	BOOL
	MyZenI.DigitalInputs.ExternalInput02	BOOL
	MyZenI.DigitalInputs.ExternalInput03	BOOL
	MyZenI.DigitalInputs.ExternalInput04	BOOL
	MyZenI.DigitalInputs.ExternalInput05	BOOL
	MyZenI.DigitalInputs.ExternalInput06	BOOL
	MyZenI.DigitalInputs.ExternalInput07	BOOL
	MyZenI.DigitalInputs.ExternalInput08	BOOL
	MyZenI.DigitalInputs.ExternalInput09	BOOL
	MyZenI.DigitalInputs.ExternalInput10	BOOL
	MyZenI.DigitalInputs.ExternalInput11	BOOL
	MyZenI.DigitalInputs.ExternalInput12	BOOL
	MyZenI.DigitalInputs.ExternalInput13	BOOL
	MyZenI.DigitalInputs.ExternalInput14	BOOL
	MyZenI.DigitalInputs.ExternalInput15	BOOL
	MyZenI.DigitalInputs.ExternalInput16	BOOL
	MyZenI.DigitalInputs.ExternalInput17	BOOL
	MyZenI.DigitalInputs.ExternalInput18	BOOL
	MyZenI.DigitalInputs.ExternalInput19	BOOL
	MyZenI.DigitalInputs.ExternalInput20	BOOL
	MyZenI.DigitalInputs.ExternalInput21	BOOL
	MyZenI.DigitalInputs.ExternalInput22	BOOL
	MyZenI.DigitalInputs.ExternalInput23	BOOL
	MyZenI.DigitalInputs.ExternalInput24	BOOL
	MyZenI.DigitalInputs.ExternalInput25	BOOL
	MyZenI.DigitalInputs.ExternalInput26	BOOL
	MyZenI.DigitalInputs.ExternalInput27	BOOL
	MyZenI.DigitalInputs.ExternalInput28	BOOL
	MyZenI.DigitalInputs.ExternalInput29	BOOL
	MyZenI.DigitalInputs.ExternalInput30	BOOL
	MyZenI.DigitalInputs.ExternalInput31	BOOL
	MyZenI.DigitalInputs.ExternalInput32	BOOL

	MyZenI.DigitalInputs.ExternalInput33	BOOL
	MyZenI.DigitalInputs.ExternalInput34	BOOL
	MyZenI.DigitalInputs.ExternalInput35	BOOL
	MyZenI.DigitalInputs.ExternalInput36	BOOL
	MyZenI.DigitalInputs.ExternalInput37	BOOL
	MyZenI.DigitalInputs.ExternalInput38	BOOL
	MyZenI.DigitalInputs.ExternalInput39	BOOL
	MyZenI.DigitalInputs.ExternalInput40	BOOL
	MyZenI.DigitalInputs.ExternalInput41	BOOL
	MyZenI.DigitalInputs.ExternalInput42	BOOL
	MyZenI.DigitalInputs.ExternalInput43	BOOL
	MyZenI.DigitalInputs.ExternalInput44	BOOL
	MyZenI.DigitalInputs.ExternalInput45	BOOL
	MyZenI.DigitalInputs.ExternalInput46	BOOL
	MyZenI.DigitalInputs.ExternalInput47	BOOL
	MyZenI.DigitalInputs.ExternalInput48	BOOL
	MyZenI.DigitalInputs.ExternalInput49	BOOL
	MyZenI.DigitalInputs.ExternalInput50	BOOL
	MyZenI.DigitalInputs.ExternalInput51	BOOL
	MyZenI.DigitalInputs.ExternalInput52	BOOL
	MyZenI.DigitalInputs.ExternalInput53	BOOL
	MyZenI.DigitalInputs.ExternalInput54	BOOL
	MyZenI.DigitalInputs.ExternalInput55	BOOL
	MyZenI.DigitalInputs.ExternalInput56	BOOL
	MyZenI.DigitalInputs.ExternalInput57	BOOL
	MyZenI.DigitalInputs.ExternalInput58	BOOL
	MyZenI.DigitalInputs.ExternalInput59	BOOL
	MyZenI.DigitalInputs.ExternalInput60	BOOL
	MyZenI.DigitalInputs.ExternalInput61	BOOL
	MyZenI.DigitalInputs.ExternalInput62	BOOL
	MyZenI.DigitalInputs.ExternalInput63	BOOL
	MyZenI.DigitalInputs.ExternalInput64	BOOL
	MyZenI.DigitalInputs.ExternalInput65	BOOL
	MyZenI.DigitalInputs.ExternalInput66	BOOL
	MyZenI.DigitalInputs.ExternalInput67	BOOL
	MyZenI.DigitalInputs.ExternalInput68	BOOL
	MyZenI.DigitalInputs.ExternalInput69	BOOL
	MyZenI.DigitalInputs.ExternalInput70	BOOL
	MyZenI.DigitalInputs.ExternalInput71	BOOL
	MyZenI.DigitalInputs.ExternalInput72	BOOL
	MyZenI.DigitalInputs.ExternalInput73	BOOL
	MyZenI.DigitalInputs.ExternalInput74	BOOL
	MyZenI.DigitalInputs.ExternalInput75	BOOL
	MyZenI.DigitalInputs.ExternalInput76	BOOL
	MyZenI.DigitalInputs.ExternalInput77	BOOL
	MyZenI.DigitalInputs.ExternalInput78	BOOL

	MyZenI.DigitalInputs.ExternalInput79	BOOL
	MyZenI.DigitalInputs.ExternalInput80	BOOL
	MyZenI.DigitalInputs.ExternalInput81	BOOL
	MyZenI.DigitalInputs.ExternalInput82	BOOL
	MyZenI.DigitalInputs.ExternalInput83	BOOL
	MyZenI.DigitalInputs.ExternalInput84	BOOL
	MyZenI.DigitalInputs.ExternalInput85	BOOL
	MyZenI.DigitalInputs.ExternalInput86	BOOL
	MyZenI.DigitalInputs.ExternalInput87	BOOL
	MyZenI.DigitalInputs.ExternalInput88	BOOL
	MyZenI.DigitalInputs.ExternalInput89	BOOL
	MyZenI.DigitalInputs.ExternalInput90	BOOL
	MyZenI.DigitalInputs.ExternalInput91	BOOL
	MyZenI.DigitalInputs.ExternalInput92	BOOL
	MyZenI.DigitalInputs.ExternalInput93	BOOL
	MyZenI.DigitalInputs.ExternalInput94	BOOL
	MyZenI.DigitalInputs.ExternalInput95	BOOL
	MyZenI.DigitalInputs.ExternalInput96	BOOL
	MyZenI.DigitalInputs.ExternalControlInput01	BOOL
	MyZenI.DigitalInputs.ExternalControlInput02	BOOL
	MyZenI.DigitalInputs.ExternalControlInput03	BOOL
	MyZenI.DigitalInputs.ExternalControlInput04	BOOL
	MyZenI.DigitalInputs.ExternalControlInput05	BOOL
	MyZenI.DigitalInputs.ExternalControlInput06	BOOL
	MyZenI.DigitalInputs.ExternalControlInput07	BOOL
	MyZenI.DigitalInputs.ExternalControlInput08	BOOL
	MyZenI.DigitalInputs.ExternalControlInput09	BOOL
	MyZenI.DigitalInputs.ExternalControlInput10	BOOL
	MyZenI.DigitalInputs.ExternalControlInput11	BOOL
	MyZenI.DigitalInputs.ExternalControlInput12	BOOL
	MyZenI.DigitalInputs.ExternalControlInput13	BOOL
	MyZenI.DigitalInputs.ExternalControlInput14	BOOL
	MyZenI.DigitalInputs.ExternalControlInput15	BOOL
	MyZenI.DigitalInputs.ExternalControlInput16	BOOL

Figure 5.1 - Input Assembly Structure

5.2. OUTPUT ASSEMBLY

MyZenO		DefineInstrumentsZen16OutputImage
	MyZenO.CommunicationControl	DefineInstrumentsZen16CommControl
	MyZenO.CommunicationControl.ModbusRun	BOOL
MyZenO.DigitalOutputs		DefineInstrumentsZen16DigitalOutputs
	MyZenO.DigitalOutputs.OnboardRelay01	BOOL
	MyZenO.DigitalOutputs.OnboardRelay02	BOOL
	MyZenO.DigitalOutputs.OnboardRelay03	BOOL
	MyZenO.DigitalOutputs.OnboardRelay04	BOOL
	MyZenO.DigitalOutputs.OnboardRelay05	BOOL
	MyZenO.DigitalOutputs.OnboardRelay06	BOOL
	MyZenO.DigitalOutputs.OnboardRelay07	BOOL
	MyZenO.DigitalOutputs.OnboardRelay08	BOOL
	MyZenO.DigitalOutputs.OnboardRelay09	BOOL
	MyZenO.DigitalOutputs.OnboardRelay10	BOOL
	MyZenO.DigitalOutputs.OnboardRelay11	BOOL
	MyZenO.DigitalOutputs.OnboardRelay12	BOOL
	MyZenO.DigitalOutputs.OnboardRelay13	BOOL
	MyZenO.DigitalOutputs.OnboardRelay14	BOOL
	MyZenO.DigitalOutputs.OnboardRelay15	BOOL
	MyZenO.DigitalOutputs.OnboardRelay16	BOOL
	MyZenO.DigitalOutputs.ExternalOutput01	BOOL
	MyZenO.DigitalOutputs.ExternalOutput02	BOOL
	MyZenO.DigitalOutputs.ExternalOutput03	BOOL
	MyZenO.DigitalOutputs.ExternalOutput04	BOOL
	MyZenO.DigitalOutputs.ExternalOutput05	BOOL
	MyZenO.DigitalOutputs.ExternalOutput06	BOOL
	MyZenO.DigitalOutputs.ExternalOutput07	BOOL
	MyZenO.DigitalOutputs.ExternalOutput08	BOOL
	MyZenO.DigitalOutputs.ExternalOutput09	BOOL
	MyZenO.DigitalOutputs.ExternalOutput10	BOOL
	MyZenO.DigitalOutputs.ExternalOutput11	BOOL
	MyZenO.DigitalOutputs.ExternalOutput12	BOOL
	MyZenO.DigitalOutputs.ExternalOutput13	BOOL
	MyZenO.DigitalOutputs.ExternalOutput14	BOOL
	MyZenO.DigitalOutputs.ExternalOutput15	BOOL
	MyZenO.DigitalOutputs.ExternalOutput16	BOOL
	MyZenO.DigitalOutputs.ExternalOutput17	BOOL
	MyZenO.DigitalOutputs.ExternalOutput18	BOOL
	MyZenO.DigitalOutputs.ExternalOutput19	BOOL
	MyZenO.DigitalOutputs.ExternalOutput20	BOOL
	MyZenO.DigitalOutputs.ExternalOutput21	BOOL

	MyZenO.DigitalOutputs.ExternalOutput22	BOOL
	MyZenO.DigitalOutputs.ExternalOutput23	BOOL
	MyZenO.DigitalOutputs.ExternalOutput24	BOOL
	MyZenO.DigitalOutputs.ExternalOutput25	BOOL
	MyZenO.DigitalOutputs.ExternalOutput26	BOOL
	MyZenO.DigitalOutputs.ExternalOutput27	BOOL
	MyZenO.DigitalOutputs.ExternalOutput28	BOOL
	MyZenO.DigitalOutputs.ExternalOutput29	BOOL
	MyZenO.DigitalOutputs.ExternalOutput30	BOOL
	MyZenO.DigitalOutputs.ExternalOutput31	BOOL
	MyZenO.DigitalOutputs.ExternalOutput32	BOOL
	MyZenO.DigitalOutputs.ExternalOutput33	BOOL
	MyZenO.DigitalOutputs.ExternalOutput34	BOOL
	MyZenO.DigitalOutputs.ExternalOutput35	BOOL
	MyZenO.DigitalOutputs.ExternalOutput36	BOOL
	MyZenO.DigitalOutputs.ExternalOutput37	BOOL
	MyZenO.DigitalOutputs.ExternalOutput38	BOOL
	MyZenO.DigitalOutputs.ExternalOutput39	BOOL
	MyZenO.DigitalOutputs.ExternalOutput40	BOOL
	MyZenO.DigitalOutputs.ExternalOutput41	BOOL
	MyZenO.DigitalOutputs.ExternalOutput42	BOOL
	MyZenO.DigitalOutputs.ExternalOutput43	BOOL
	MyZenO.DigitalOutputs.ExternalOutput44	BOOL
	MyZenO.DigitalOutputs.ExternalOutput45	BOOL
	MyZenO.DigitalOutputs.ExternalOutput46	BOOL
	MyZenO.DigitalOutputs.ExternalOutput47	BOOL
	MyZenO.DigitalOutputs.ExternalOutput48	BOOL
	MyZenO.DigitalOutputs.ExternalOutput49	BOOL
	MyZenO.DigitalOutputs.ExternalOutput50	BOOL
	MyZenO.DigitalOutputs.ExternalOutput51	BOOL
	MyZenO.DigitalOutputs.ExternalOutput52	BOOL
	MyZenO.DigitalOutputs.ExternalOutput53	BOOL
	MyZenO.DigitalOutputs.ExternalOutput54	BOOL
	MyZenO.DigitalOutputs.ExternalOutput55	BOOL
	MyZenO.DigitalOutputs.ExternalOutput56	BOOL
	MyZenO.DigitalOutputs.ExternalOutput57	BOOL
	MyZenO.DigitalOutputs.ExternalOutput58	BOOL
	MyZenO.DigitalOutputs.ExternalOutput59	BOOL
	MyZenO.DigitalOutputs.ExternalOutput60	BOOL
	MyZenO.DigitalOutputs.ExternalOutput61	BOOL
	MyZenO.DigitalOutputs.ExternalOutput62	BOOL
	MyZenO.DigitalOutputs.ExternalOutput63	BOOL
	MyZenO.DigitalOutputs.ExternalOutput64	BOOL
	MyZenO.DigitalOutputs.ExternalOutput65	BOOL
	MyZenO.DigitalOutputs.ExternalOutput66	BOOL
	MyZenO.DigitalOutputs.ExternalOutput67	BOOL

	MyZenO.DigitalOutputs.ExternalOutput68	BOOL
	MyZenO.DigitalOutputs.ExternalOutput69	BOOL
	MyZenO.DigitalOutputs.ExternalOutput70	BOOL
	MyZenO.DigitalOutputs.ExternalOutput71	BOOL
	MyZenO.DigitalOutputs.ExternalOutput72	BOOL
	MyZenO.DigitalOutputs.ExternalOutput73	BOOL
	MyZenO.DigitalOutputs.ExternalOutput74	BOOL
	MyZenO.DigitalOutputs.ExternalOutput75	BOOL
	MyZenO.DigitalOutputs.ExternalOutput76	BOOL
	MyZenO.DigitalOutputs.ExternalOutput77	BOOL
	MyZenO.DigitalOutputs.ExternalOutput78	BOOL
	MyZenO.DigitalOutputs.ExternalOutput79	BOOL
	MyZenO.DigitalOutputs.ExternalOutput80	BOOL
	MyZenO.DigitalOutputs.ExternalOutput81	BOOL
	MyZenO.DigitalOutputs.ExternalOutput82	BOOL
	MyZenO.DigitalOutputs.ExternalOutput83	BOOL
	MyZenO.DigitalOutputs.ExternalOutput84	BOOL
	MyZenO.DigitalOutputs.ExternalOutput85	BOOL
	MyZenO.DigitalOutputs.ExternalOutput86	BOOL
	MyZenO.DigitalOutputs.ExternalOutput87	BOOL
	MyZenO.DigitalOutputs.ExternalOutput88	BOOL
	MyZenO.DigitalOutputs.ExternalOutput89	BOOL
	MyZenO.DigitalOutputs.ExternalOutput90	BOOL
	MyZenO.DigitalOutputs.ExternalOutput91	BOOL
	MyZenO.DigitalOutputs.ExternalOutput92	BOOL
	MyZenO.DigitalOutputs.ExternalOutput93	BOOL
	MyZenO.DigitalOutputs.ExternalOutput94	BOOL
	MyZenO.DigitalOutputs.ExternalOutput95	BOOL
	MyZenO.DigitalOutputs.ExternalOutput96	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput01	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput02	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput03	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput04	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput05	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput06	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput07	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput08	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput09	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput10	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput11	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput12	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput13	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput14	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput15	BOOL
	MyZenO.DigitalOutputs.AdvancedSetPointOutput16	BOOL

Figure 5.2 - Output Assembly Structure



Define Instruments

New Zealand (Head Office)

10B Vega Place, Rosedale,
Auckland 0632, New Zealand

PO Box 245 Westpark Village,
Auckland 0661, New Zealand

Ph: +64 (9) 835-1550

Aus: 1800 810 820

Fax: +64 (9) 835-1250

sales@defineinstruments.co.nz

www.defineinstruments.co.nz

United States (Dallas, TX)

Ph: (214) 926 4950

sales@defineinstruments.com

www.defineinstruments.com

South Africa (Pretoria)

sales@defineinstruments.co.za

www.defineinstruments.co.za