COMMS055

Knowledge Base Document

Technical Support Department, U79, Newtown

Title: **Configuring the Unidrive M for EtherNet/IP communication with an Allen-Bradley ControlLogix5555 PLC**

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Revision History

Revision	Date	Revising Author	Authorised By	Comments
1.0	10/08/2016	Keith Morrison		Initial release

Summary of Contents

This document is a step-by-step guide for configuring EtherNet/IP communications between a Unidrive M700/M701/M702 and an Allen-Bradley ControlLogix5555 PLC

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1. Project Requirements

The following hardware and software are required for setting up Ethernet and EtherNet/IP communications between an Allen-Bradley Logix5555 PLC and a Unidrive M700/M702 or the Unidrive M701 with the SI-Ethernet option module.

Although this document refers to the Unidrive M700 series, the same setup procedure can be applied to the other drive variants/derivatives (e.g. M200, M300, M400, M600, E300, etc.), however, the SI-Ethernet option module must be used if the drive variant does not offer the onboard Ethernet interface as standard.

1.1. Hardware

1	Allen-Bradley Logix5555 PLC with 1756-L55 CPU Part No. 97060574 C01	
2	Allen Bradley EtherNet/IP card Part No. 96347274 A01	
3	Programming PC	
4	Ethernet non cross-over (1:1) cable for programming the PLC and connecting EtherNet/IP card to the Unidrive M	
5	Control Techniques' Unidrive M700/M701/M702	
6	Control Techniques' SI-Ethernet option module	
7	Industrial Ethernet Switch Emerson SW100-5	

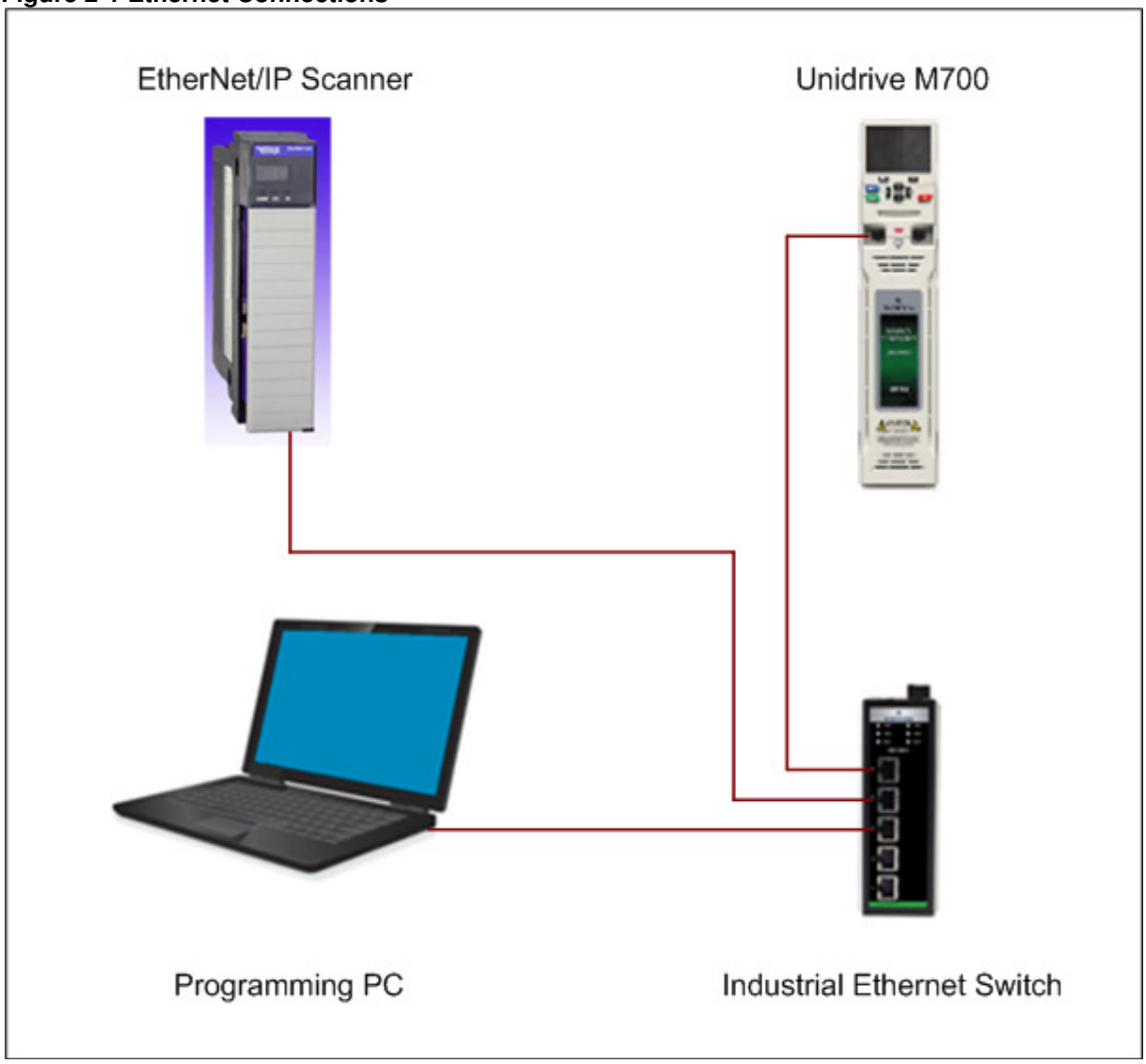
1.2. Software

- RS Logix 5000 version 15 (or above).
- RS Linx Communications Service.
- Unidrive M Connect.

2. Ethernet Connections

The following diagram shows the Ethernet connections between the programming PC, EtherNet/IP scanner and Unidrive M.

Figure 2-1 Ethernet Connections



3. Configuring the RSLinx Ethernet driver

This setup uses the Ethernet communication driver for programming the PLC.

3.1. Install the RS Logix 5000 software

3.2. Open RSLinx

3.3. Click **Configure Drivers** from the **Communications** menu

Figure 3-1 Configuring RSLinx Communication Driver

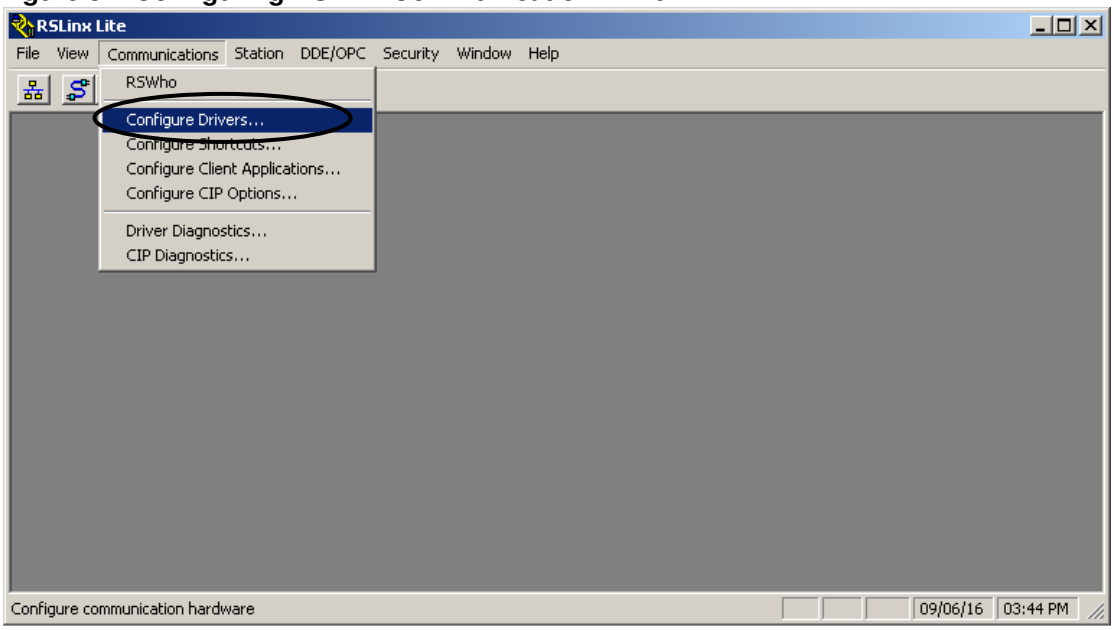
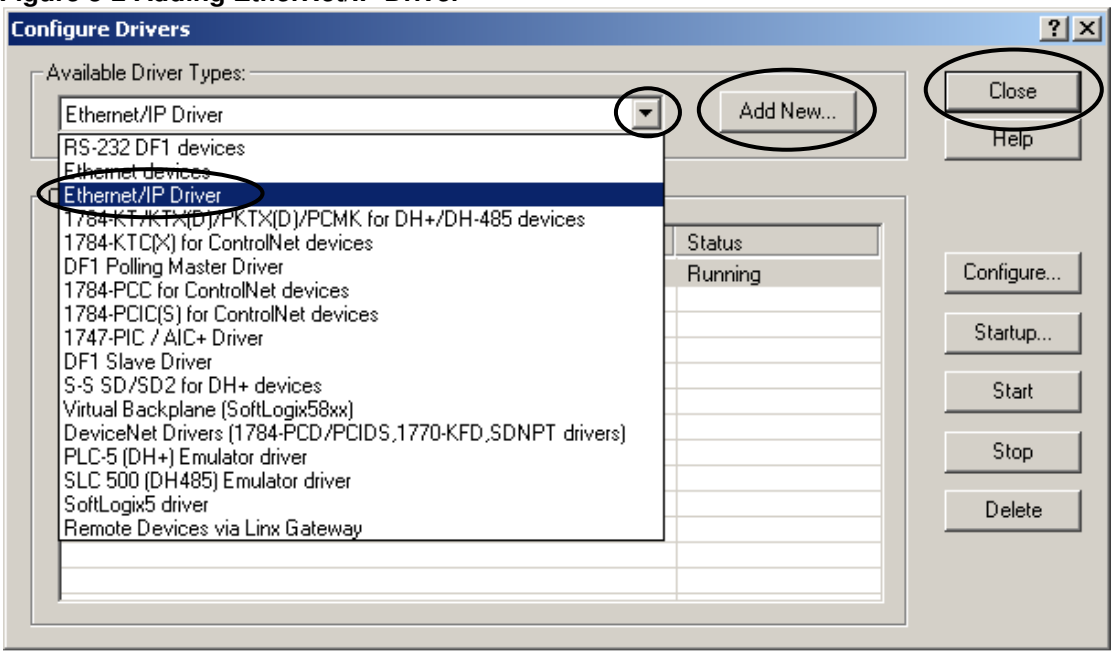


Figure 3-2 Adding EtherNet/IP Driver



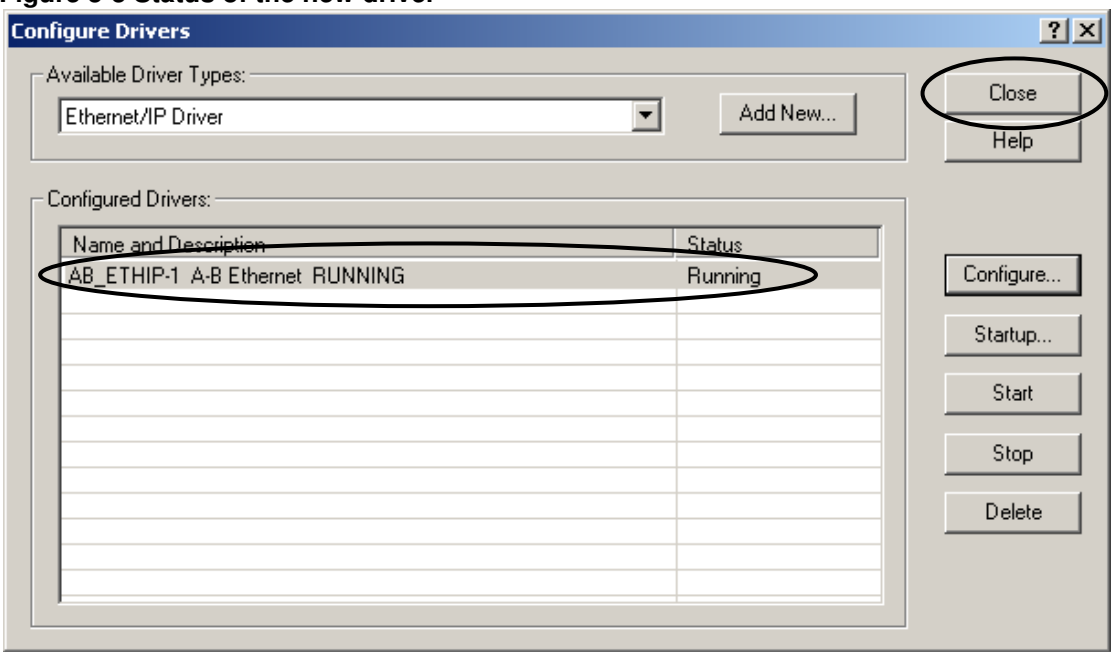
3.4. Click on the drop-down arrow and select **Ethernet/IP Driver**

3.5. Click the **Add New** button

3.6. Name the new driver as required (the default name of the EtherNet/IP driver is AB_ETHIP-1).

3.7. The **Configure Drivers** window will display the status of the driver as Running (see figure 3-3).

Figure 3-3 Status of the new driver



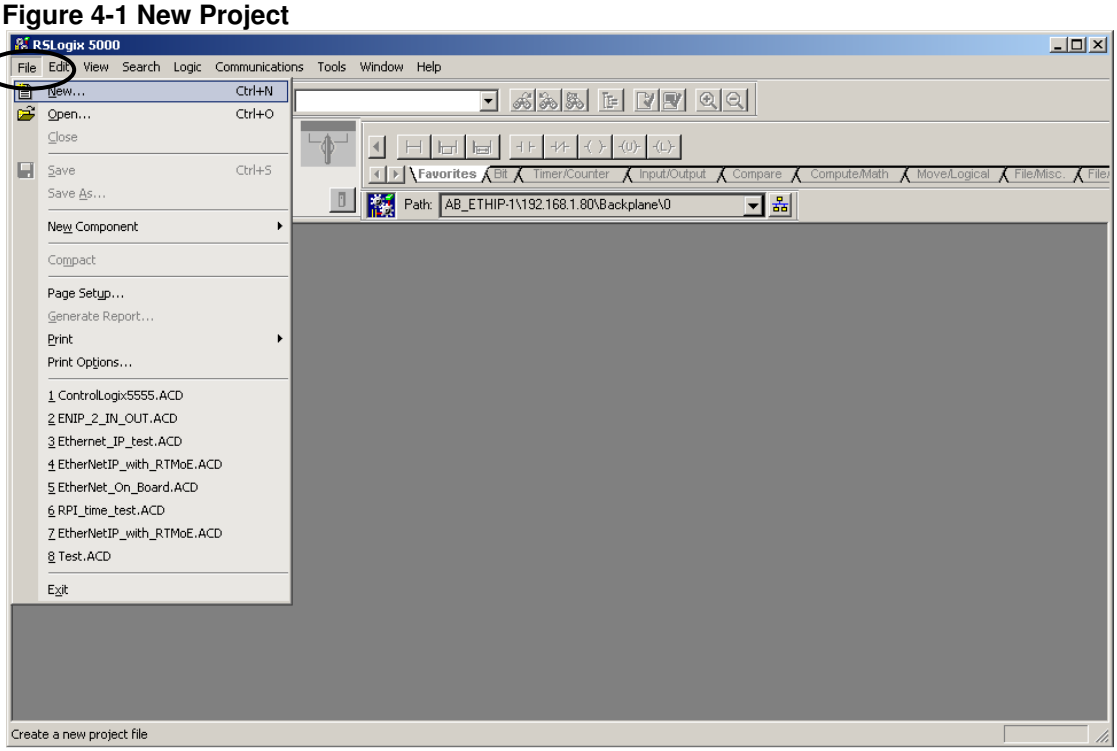
3.8. Click **Close**

4. Creating A New Project

4.1. Open the RS Logix 5000 software

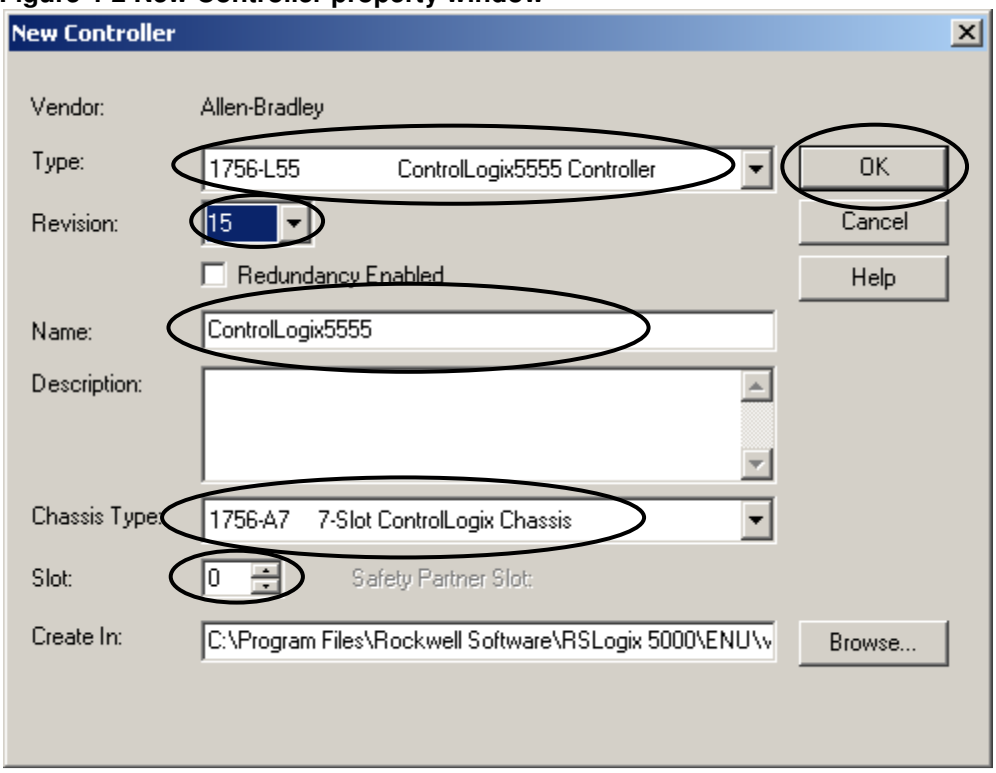
4.2. Select **File>New…** or click the **New Project** icon 

Figure 4-1 New Project



4.3. Set the appropriate Controller Type, Revision, Name, Chassis type and Slot number for the new controller.

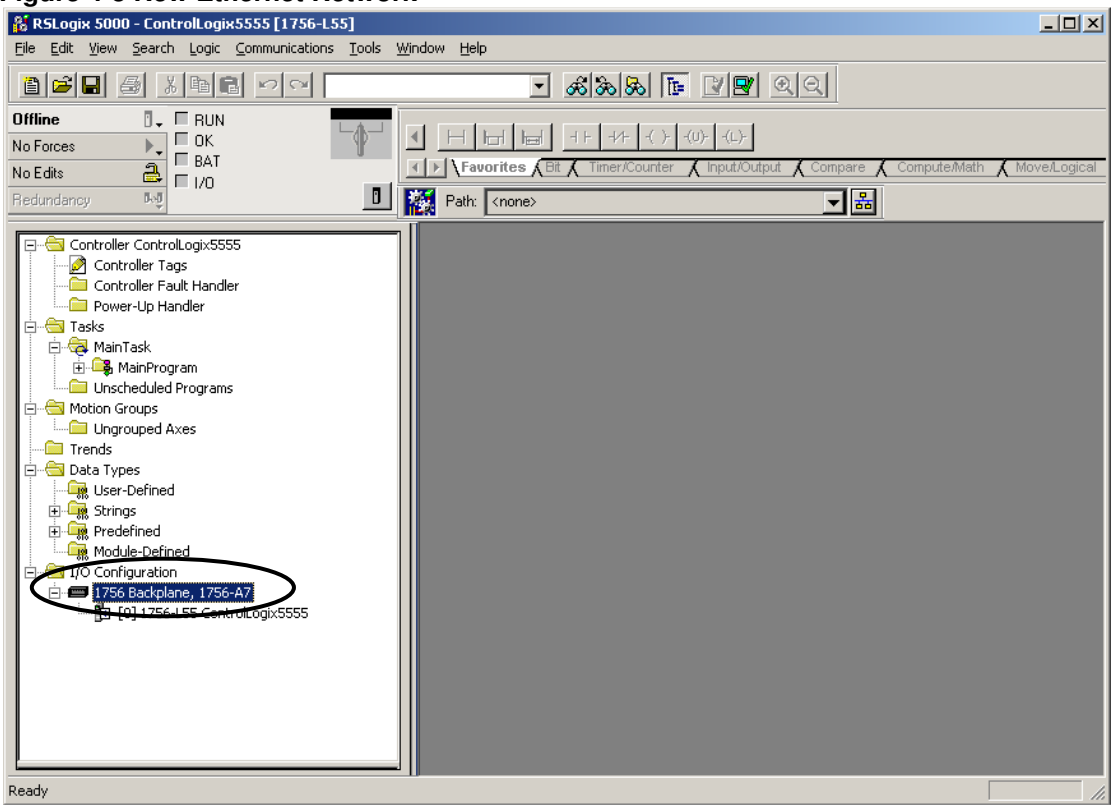
Figure 4-2 New Controller property window



4.4. Click **OK**

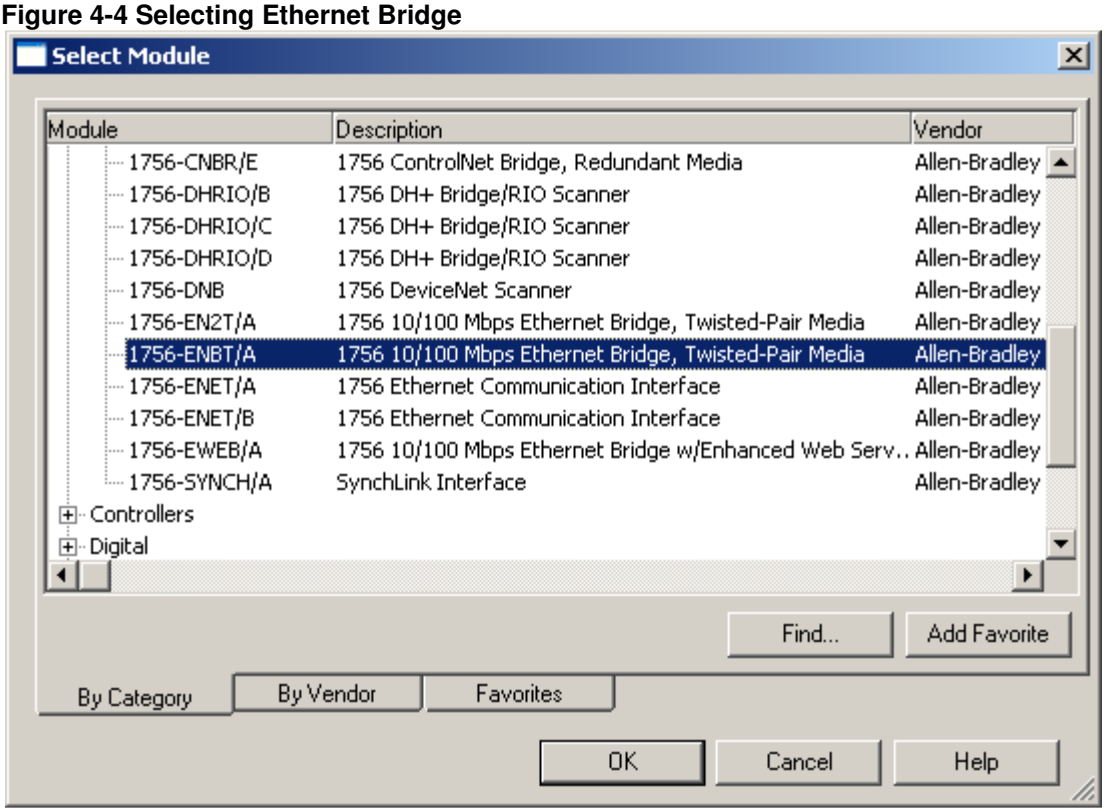
4.5. Right-click the **1756 Backplane** and select **New Module…**

Figure 4-3 New Ethernet Network



4.6. Expand the **Communications** category and select **1756-ENBT/A Ethernet Bridge**

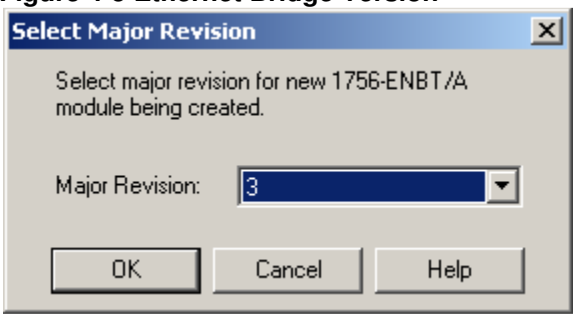
Figure 4-4 Selecting Ethernet Bridge



4.7. Click **OK**

4.8. Select the version number of the Ethernet Bridge (in this example we are using version 3)

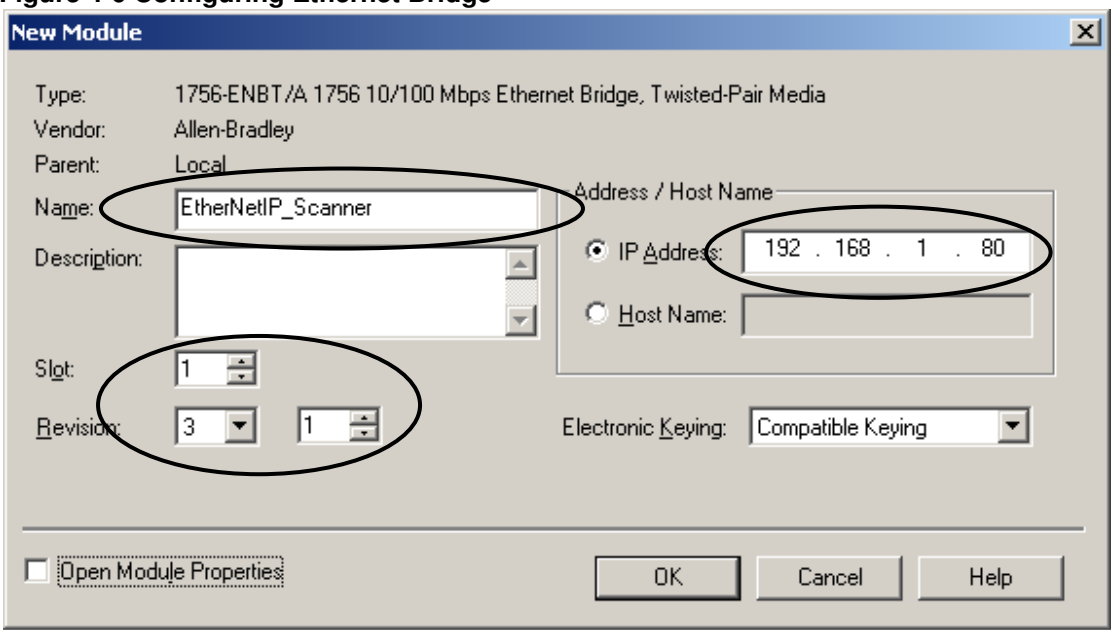
Figure 4-5 Ethernet Bridge Version



4.9. Click **OK**

4.10. Enter a suitable name for the Ethernet Bridge along with the correct slot, and IP address.

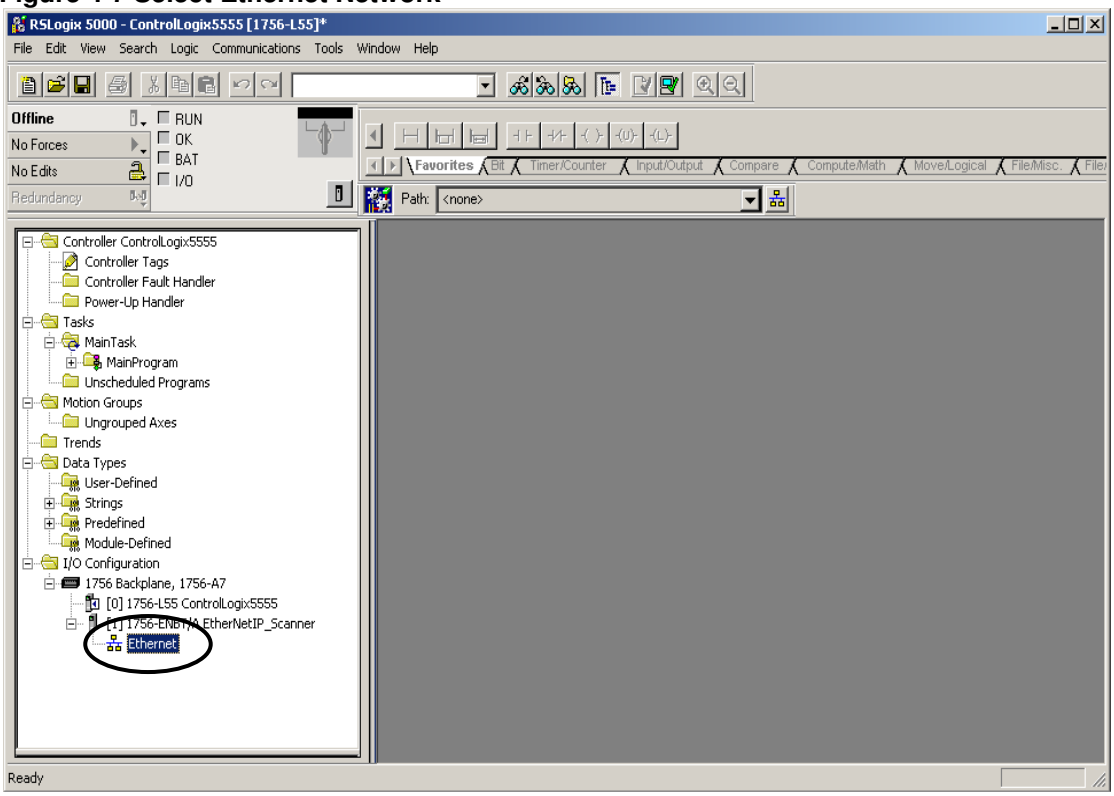
Figure 4-6 Configuring Ethernet Bridge



4.11. Click **OK**

4.12. Select the **Ethernet** network

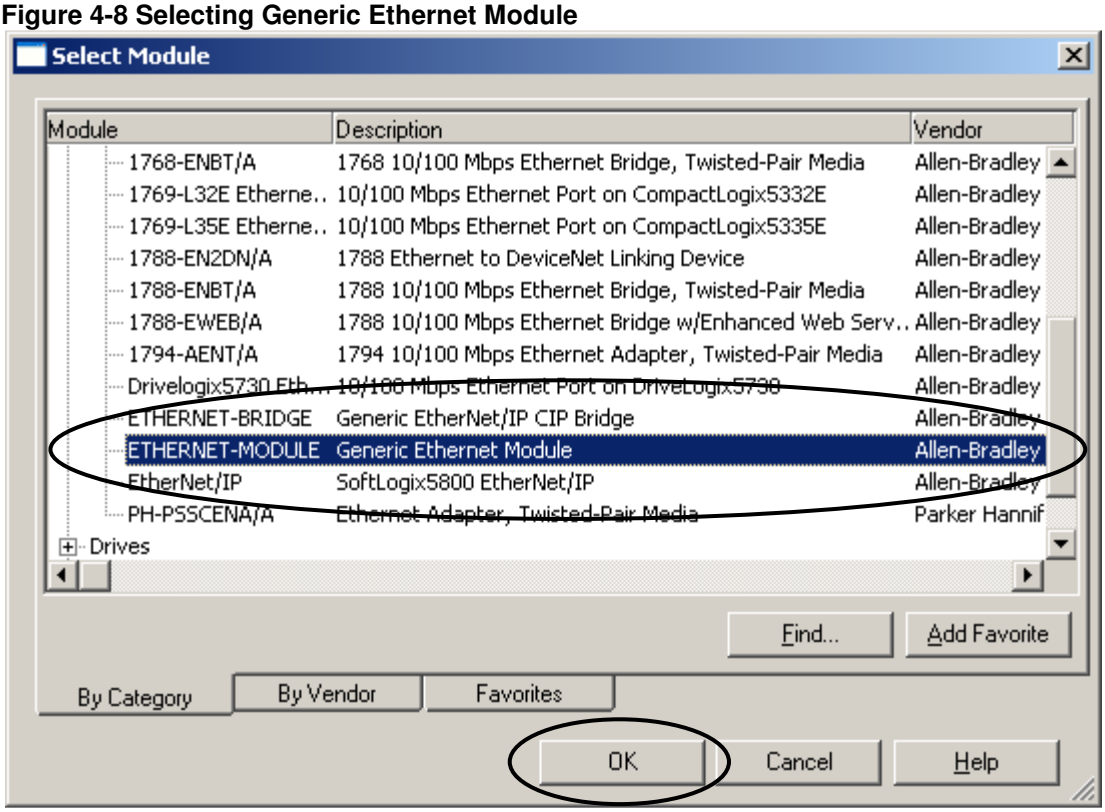
Figure 4-7 Select Ethernet Network



4.13. Right-click and select **New Module…**

4.14. Open the **Communications** category and select **Generic Ethernet Module**

Figure 4-8 Selecting Generic Ethernet Module



4.15. Click **OK**

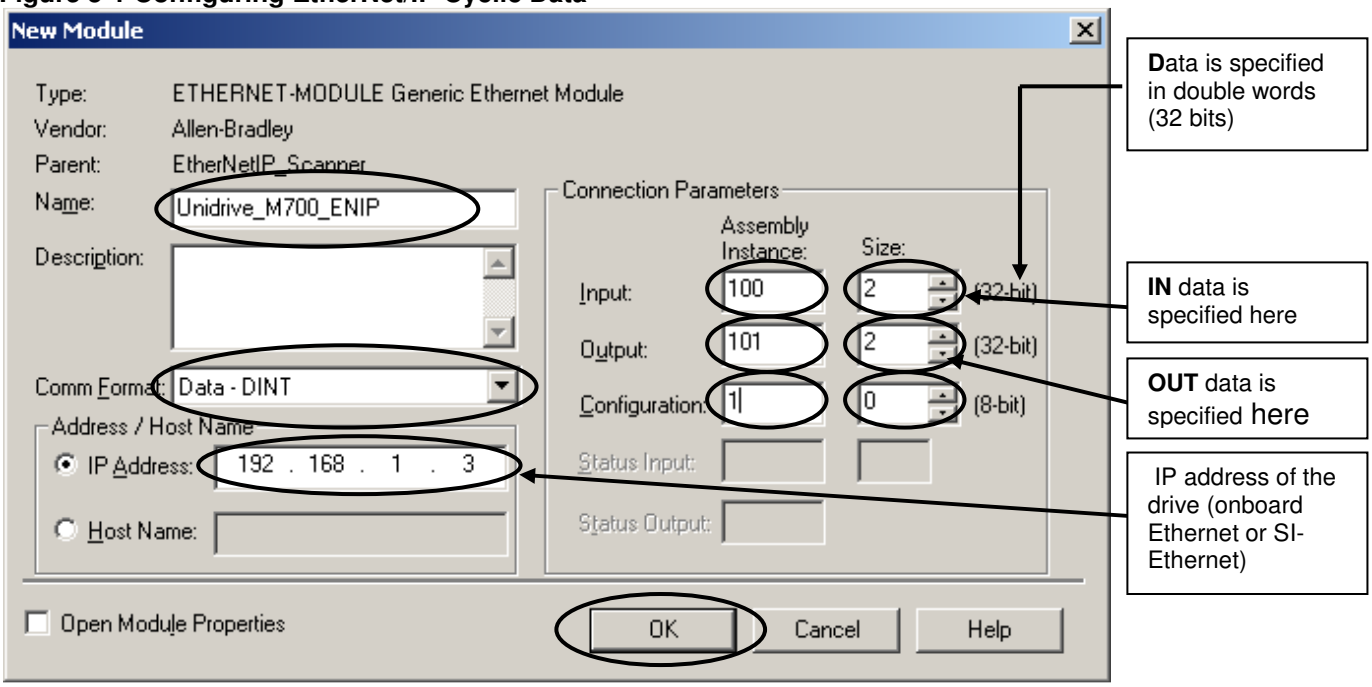
5. Configuring the EtherNet/IP Scanner Cyclic Data

The EtherNet/IP cyclic data must now be configured before downloading to the PLC.

5.1. Select a suitable name for the target drive (in this example we will use 'Unidrive_M700_ENIP')

5.2. Select the correct data size, host IP address and EtherNetIP cyclic data objects as shown in figure 5-1

Figure 5-1 Configuring EtherNet/IP Cyclic Data



5.3. Click **OK**

Note:	The IP address of the EtherNet/IP card should be set so that both the drive onboard Ethernet interface (or SI-Ethernet option module) and the EtherNet/IP scanner will be on the same subnet.

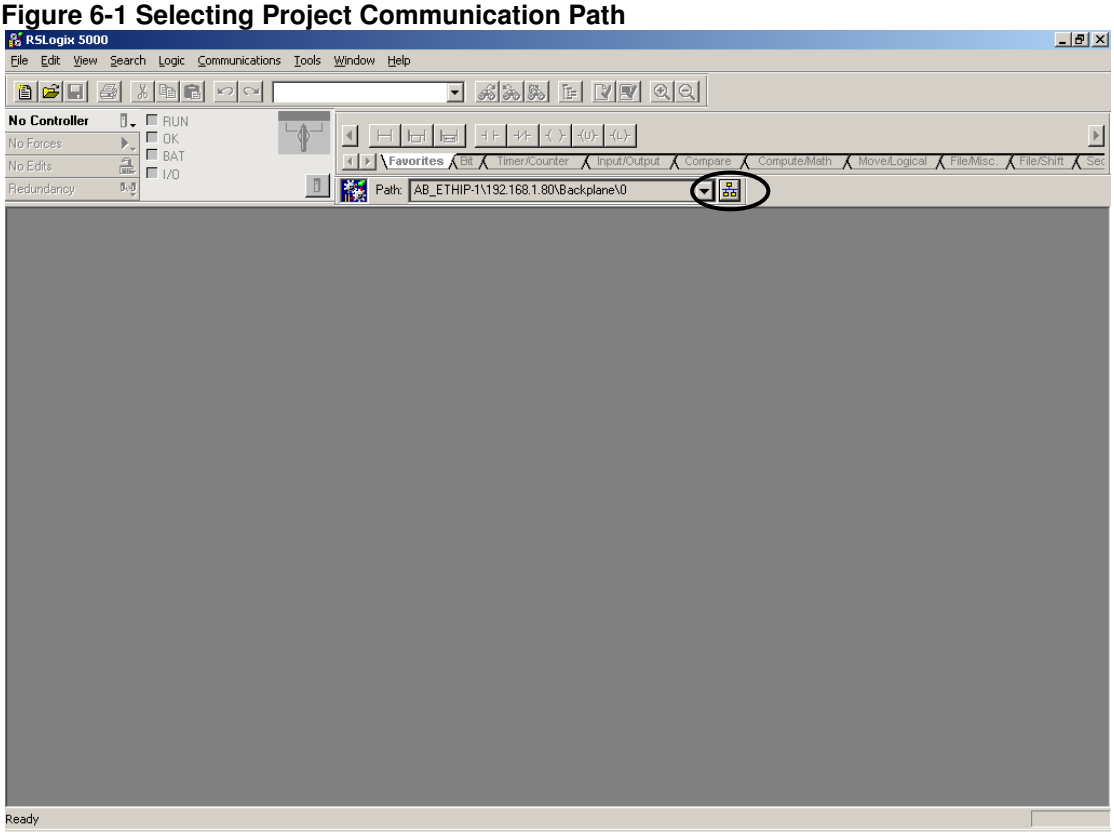
Note:	The Assembly Instance terms 'Input' and 'Output' refer to direction of the cyclic data with respect to the PLC, 'Input' data is data transmitted from the Unidrive M700 to the PLC and 'Output' data is transmitted from the PLC to the Unidrive M700.

6. Setting the PLC Communication Path

Before the EtherNet/IP cyclic data setup can be downloaded to the PLC, the project communication path must be set.

6.1. From the main RSLogix 5000 screen, select **RSWho** from the **Communications** menu (or click the **Who Active** icon)

Figure 6-1 Selecting Project Communication Path



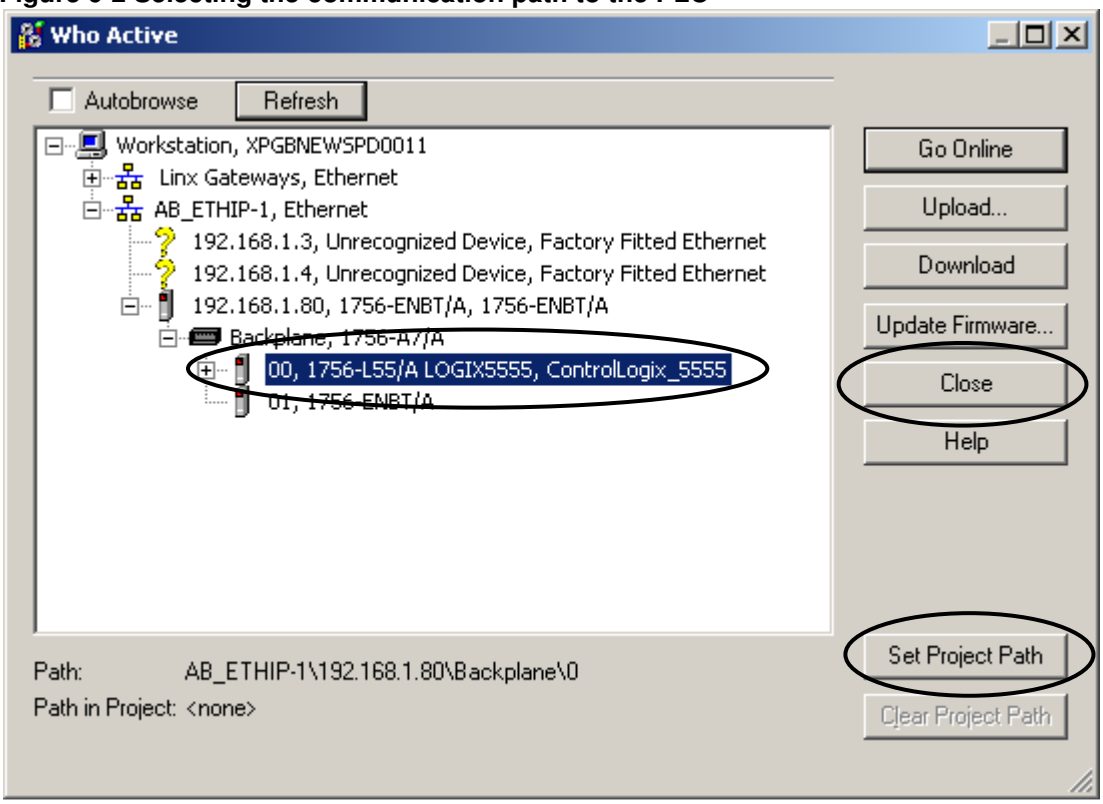
6.2. Expand the **Ethernet** network branch

6.3. Expand the **1756-ENBT/A EtherNet/IP** scanner branch

6.4. Expand the **Backplane** branch

6.5. Select the **1756-L55/A** controller

Figure 6-2 Selecting the communication path to the PLC



6.6. Click **Set Project Path**

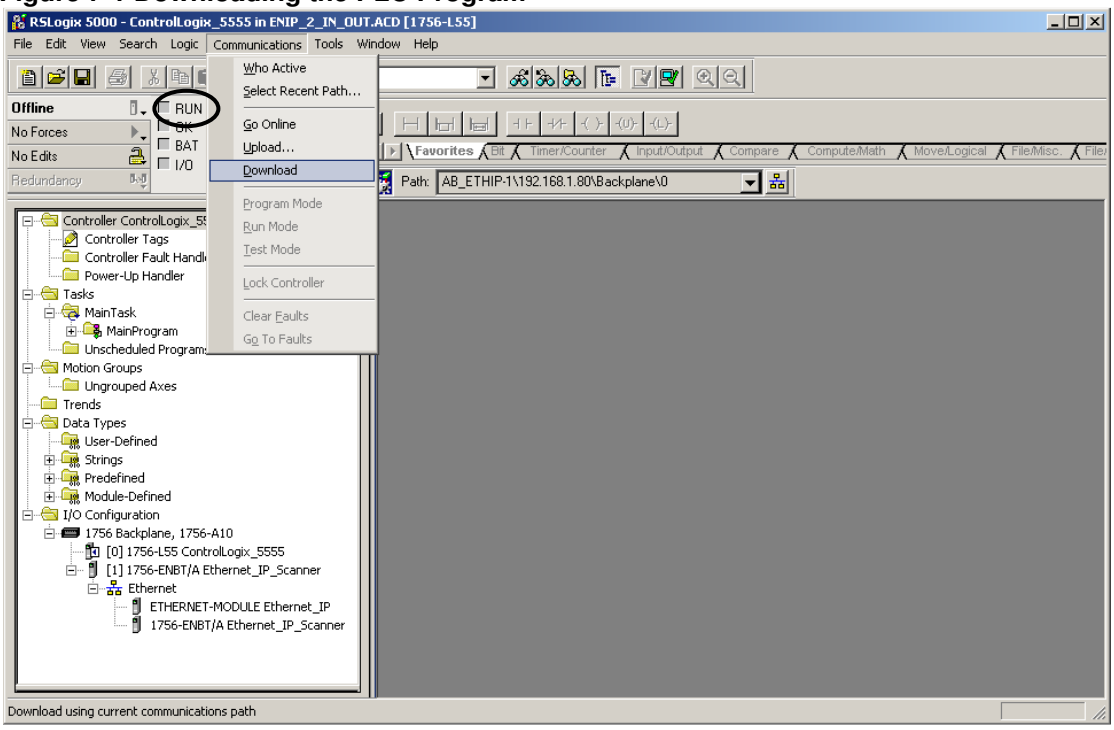
6.7. Click **Close**, the communication path is now set within the project.

7. Downloading the PLC Program

Note: To download the PLC program, the PLC keyswitch must be in either the PROG or REM position, if in the REM position the PLC will be automatically set to PROG before the download starts.

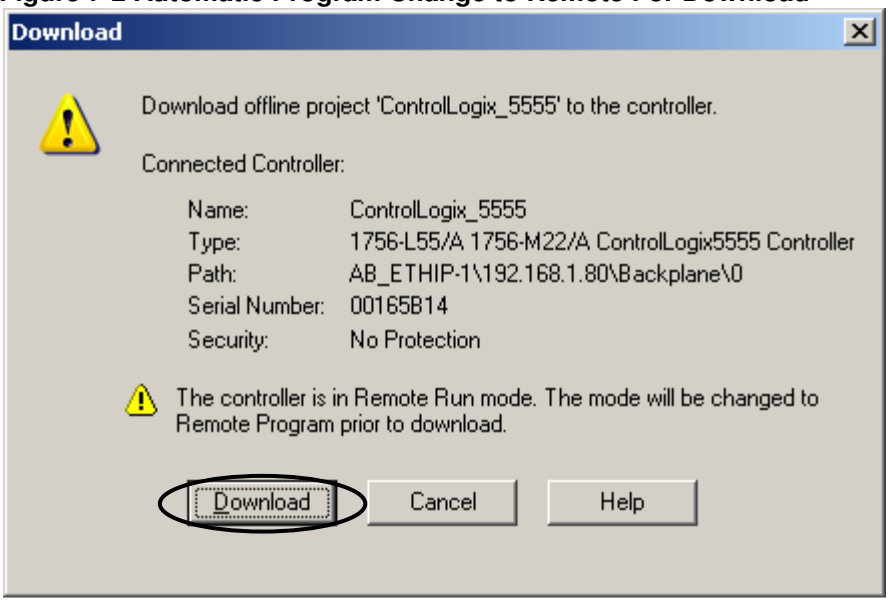
7.1. From the **Communications** menu, select **Download** (or click **Offline** and then select **Download**)

Figure 7-1 Downloading the PLC Program



7.2. If the PLC keyswitch is in the REM position (Remote) then the following prompt will be shown:

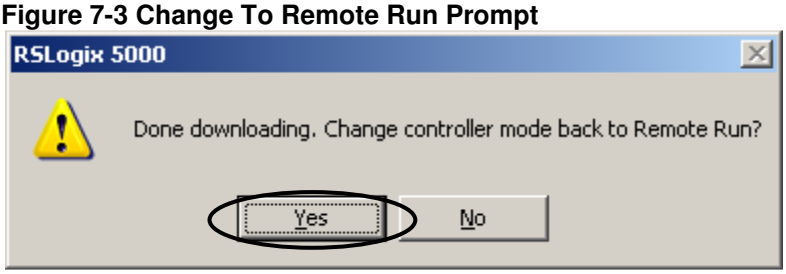
Figure 7-2 Automatic Program Change to Remote For Download



7.3. Click **Download** to continue with the download.

7.4. Following the download, if the controller keyswitch is in the REM position, the following prompt to return the PLC to Remote Run is displayed:

Figure 7-3 Change To Remote Run Prompt



7.5. Click **Yes**, the PLC program should now run.

8. Configuring the Unidrive M700 EtherNet/IP Mappings

By default, the drive EtherNet/IP mappings are set as shown in the following table:

Table 8-1 Drive Default EtherNet/IP Mappings

Parameter	Description	Value	Function
S.21.001	Input mapping parameter 1	0.10.040	Status Word
S.21.002	Input mapping parameter 2	0.02.001	Post Ramp Reference
S.22.001	Output mapping parameter 1	0.06.042	Control Word
S.22.002	Output mapping parameter 2	0.01.021	Preset Reference 1

8.1. To allow the EtherNet/IP cyclic data to control the drive, the drive control word must be enabled; using Unidrive M Connect or the drive keypad, set *Control Word Enable* (**0.06.043**) = On (save the drive parameters if required).

8.2. To use the preset speed reference, the drive must be configured for the preset speeds; using Unidrive M Connect or the drive keypad, set *Reference Selector* (**0.01.014**) = Preset (save the drive parameters if required).

9. Confirming EtherNet/IP Cyclic Data Messages

By default the EtherNet/IP cyclic data messages are transmitted every 10ms, to check the EtherNet/IP configuration is working, the Ethernet interface parameter *Cyclic Data Transfers/s* (**S.20.007**) shows the number of cyclic messages being processed per second.

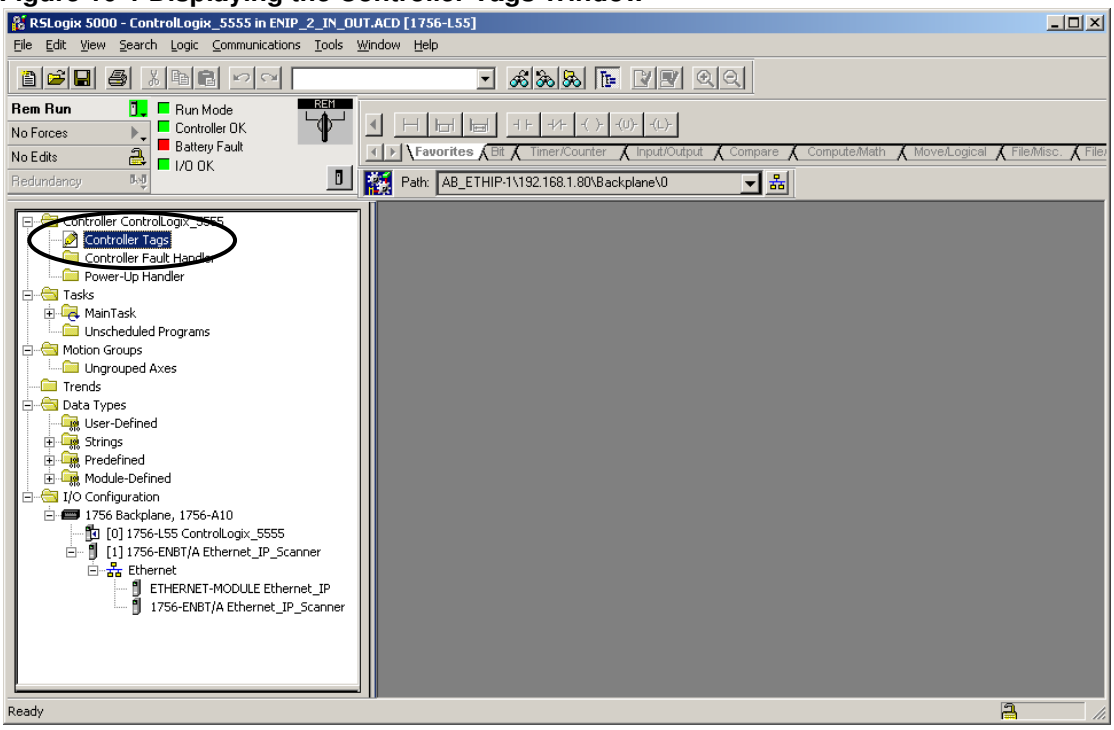
At 10ms this parameter will indicate approximately 200 (100 messages from PLC + 100 messages from the M700 drive = 200 messages).

10. Accessing the EtherNet/IP Cyclic Data

The EtherNet/IP cyclic data can be monitored (Inputs) and changed (Outputs) using the PLC Controller Tags window via the RS Logix 5000 programming environment.

10.1. From the RS Logix 5000 main window, double-click the **Controller Tags** item within the **Controller** section.

Figure 10-1 Displaying the Controller Tags Window



10.2. The **Controller Tags** window will be shown.

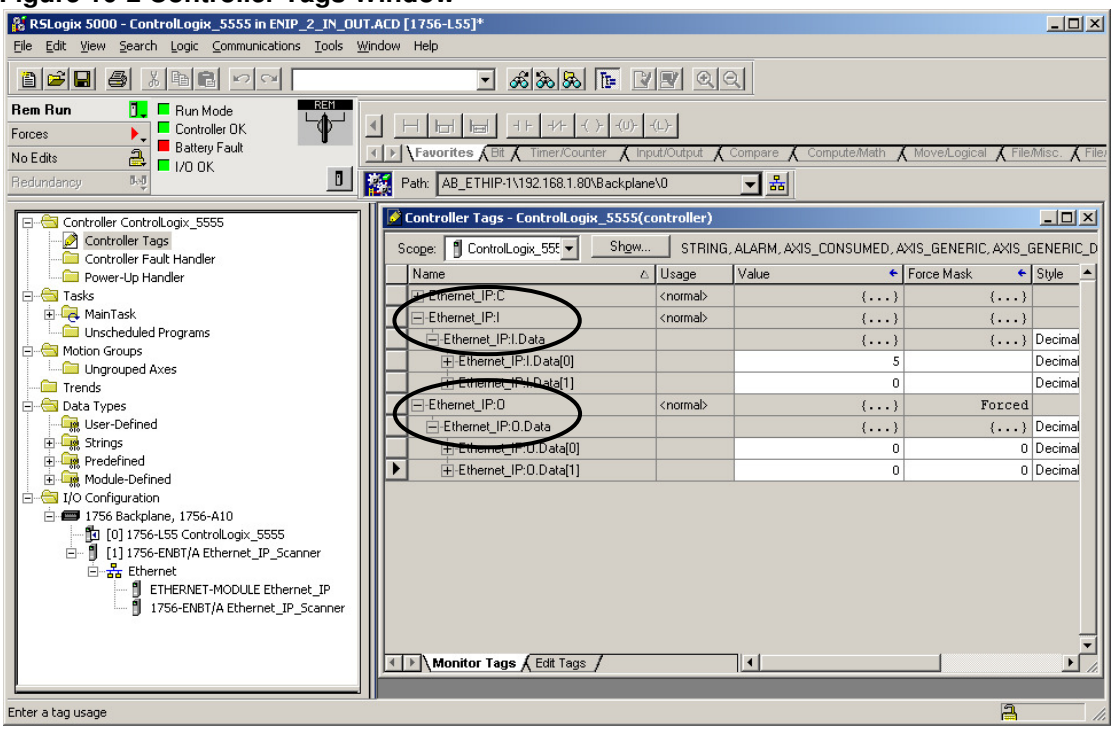
10.3. Expand the **Ethernet_IP.I** item.

10.4. Expand the **Ethernet_IP.I.Data** item.

10.5. Expand the **Ethernet_IP.O** item.

10.6. Expand the **Ethernet_IP.O.Data** item.

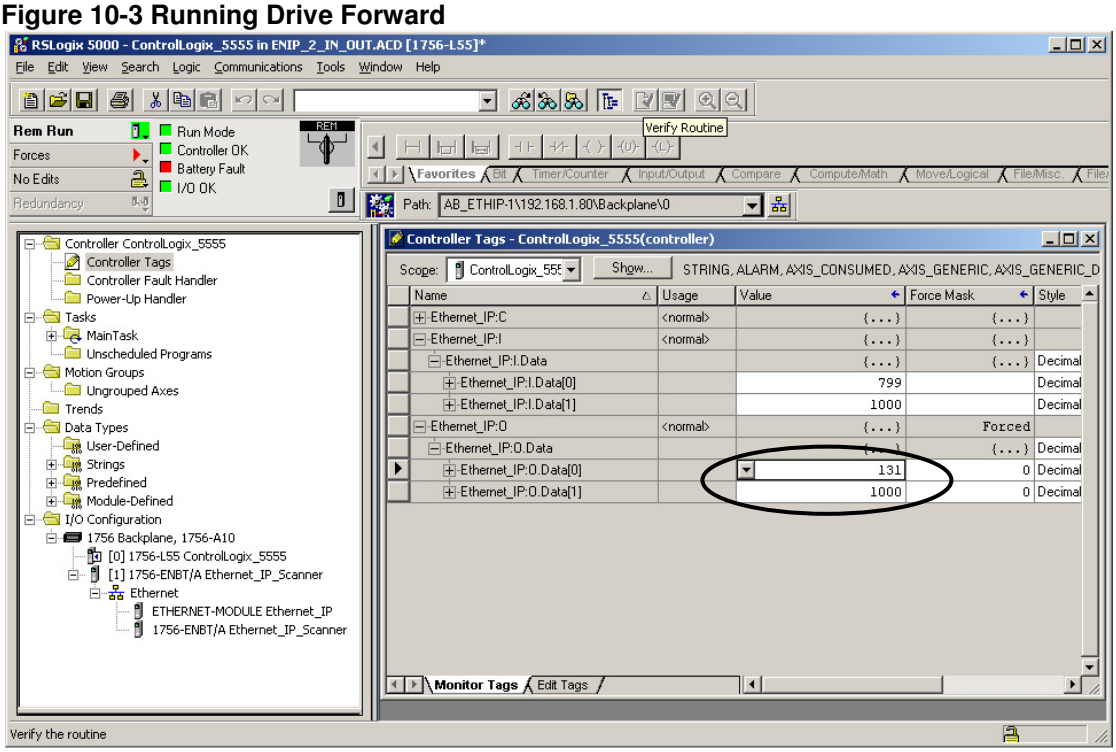
Figure 10-2 Controller Tags Window



10.7. Enter a value (e.g. 1000) for **Ethernet_IP.O.Data[1]**, this sets the *Preset Speed Reference 1* (**0.01.021**) to 100.0 rpm.

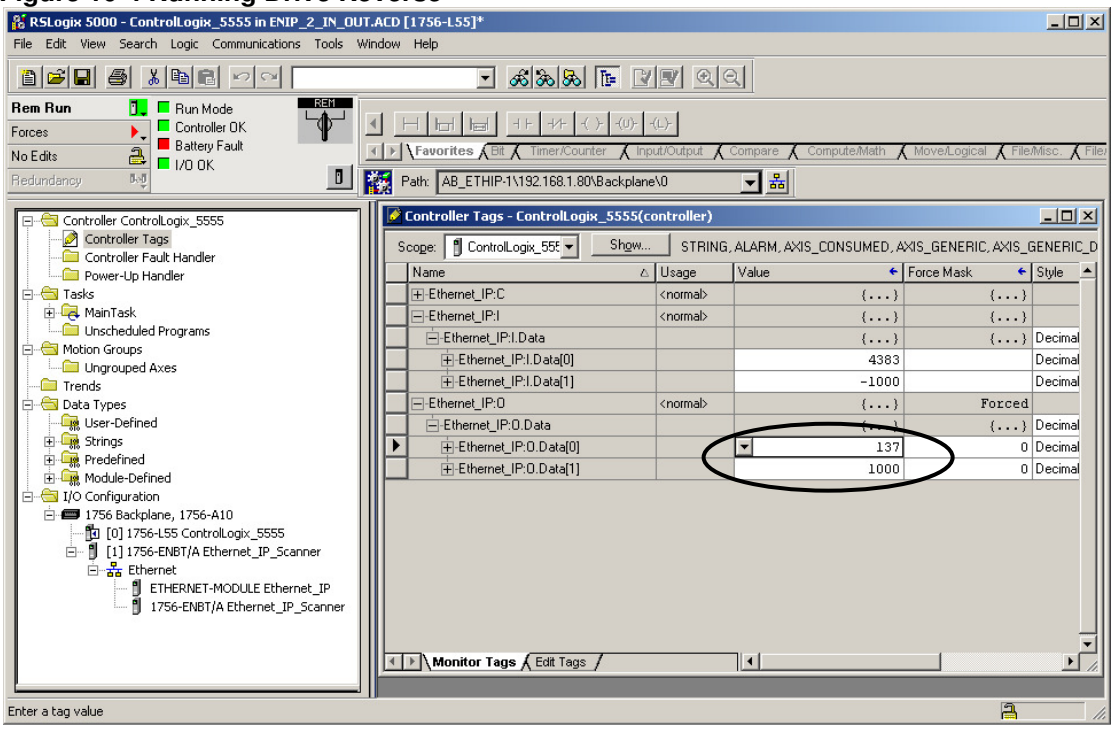
10.8. Enter the value 131 for **Ethernet_IP.O.Data[0]**, this sets the *Control word* (**0.06.042**) to run the drive in the forward direction at the set speed reference.

Figure 10-3 Running Drive Forward



10.9. To run the drive in reverse, set the **Ethernet_IP.O.Data[0]** value to 137.

Figure 10-4 Running Drive Reverse



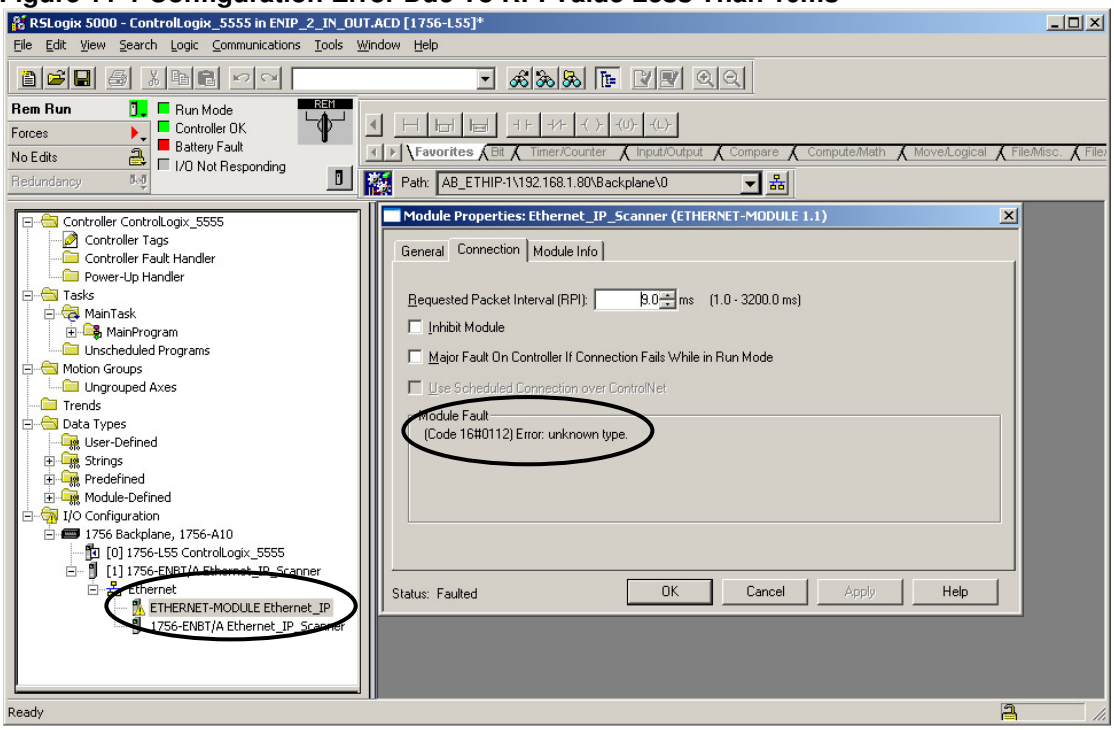
11. Setting the Requested Packet Interval

The Requested Packet Interval (RPI) is the period, in milliseconds, at which the EtherNet/IP cyclic data is transmitted.

By default the RPI is set to 10ms, this can be changed within the RS Logix 5000 programming environment to any value from 1ms to 3200ms.

Note: The current Ethernet interface on the Unidrive M supports a minimum RPI value of 10ms, setting a value lower than this will result in a configuration error.

Figure 11-1 Configuration Error Due To RPI Value Less Than 10ms



11.1. To change the RPI setting, double-click **ETHERNET-MODULE Ethernet_IP**, the EtherNet/IP scanner properties are shown as in figure 11-2.

11.2. Set the desired RPI value

11.3. Click **OK**

Figure 11-2 Changing the RPI Setting