Remote I/O (RIO)

Introduction

The first chapter explained how to configure local I/O.

This chapter will show that configuring an RIO drop is quite similar to a local.

This makes the configuration of RIO much easier than DIO drops.

Other advantages of RIO over DIO are:

- The rapidity of communication between the devices and the M580
- The possibility to use FDR (Fast Device Replacement)
- The use of RSTP

See the M580 Configuration Course for more details in these features.

The main limitation of RIO is that only some X80 modules support it.

If you have a Quantum PLC with X80 modules, you can configure these modules as an M580 RIO drop.

Topic Objectives

By the end of this section the student will be able to:

- Configure a RIO drop

Exercise - Implement a Remote I/O Drop

Learning Outcomes

By the completion of this exercise you will:

- Deploy a Simple Daisy Chain Loop architecture with Unity Pro
- Implement an eX80 series remote I/O drop
- Use both FDT/DTM and DDTs to retrieve diagnostic information

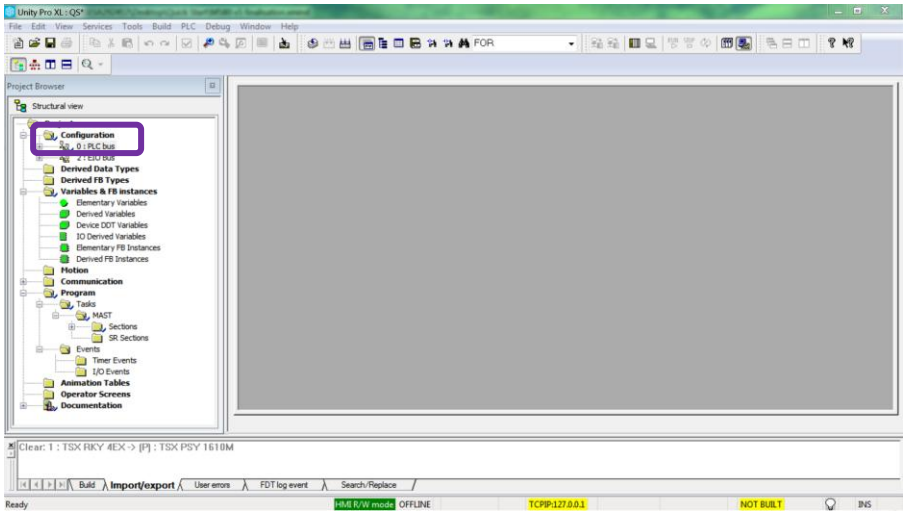
Equipment Required

To complete this exercise on a PLC the following equipment is required:

- **One DDO1602**
- **One M580 **40**
- **One compatible rack**
- **On compatible power supply**
- **One Ethernet cable**

Make sure you have a **40 part number M580.

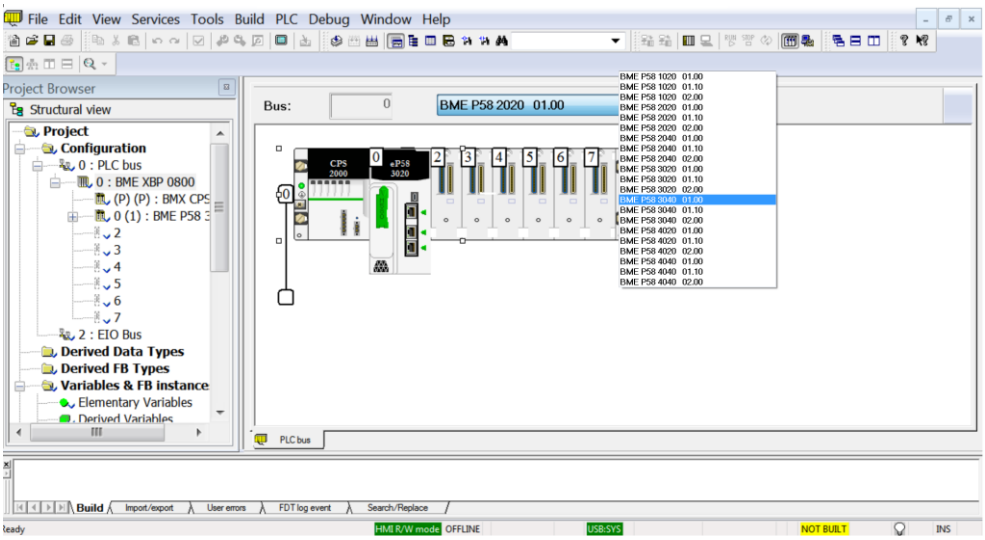
i. In the **Project Browser**, double-click the **PLC bus**.



ii. The main rack window will pop-up

iii. Make sure the part number ends in 40.

iv. If it is not the case click the drop down list and select a **40 CPU.

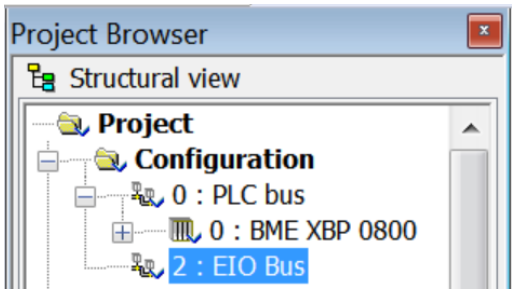


v. If a **40 CPU is not available then this exercise can be run in Simulation Mode.

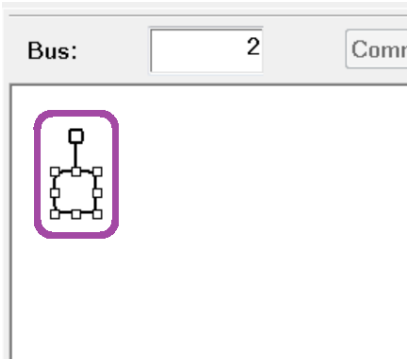
Exercise - Implement a Remote I/O Drop (cont.)

Create the Remote drop.

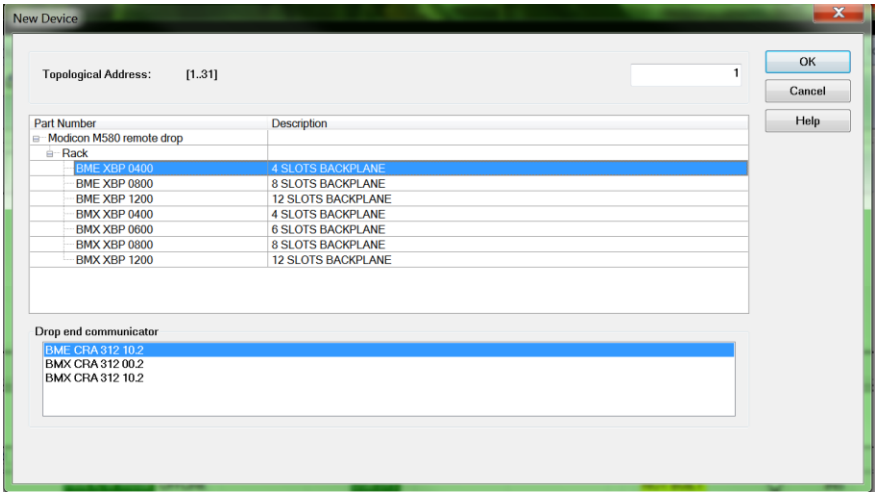
i. From the **Project Browser**, double-click the **EIO Bus** item.



ii. Double-click the **Bus** place holder

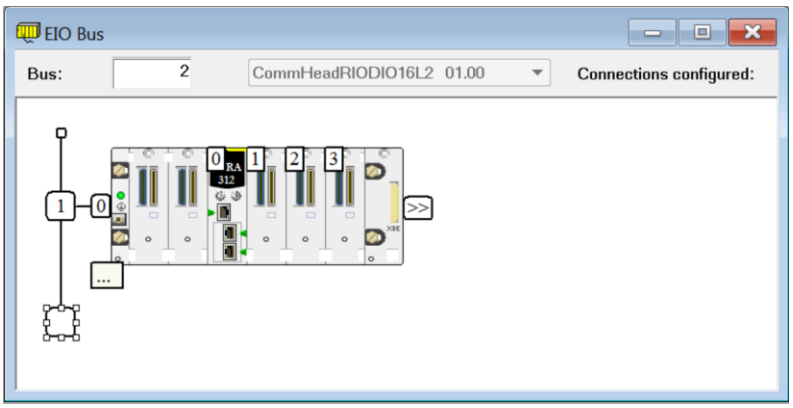


iii. Select the correct **Ethernet Rack** and **Drop End Communicator** to match the simulator. Click the **OK** button.



Exercise - Implement a Remote I/O Drop (cont.)

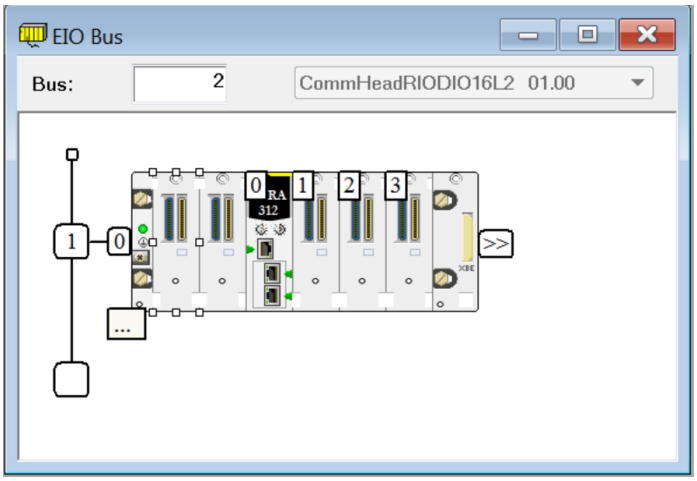
The **Drop** is created and the **CRA** is added by default.



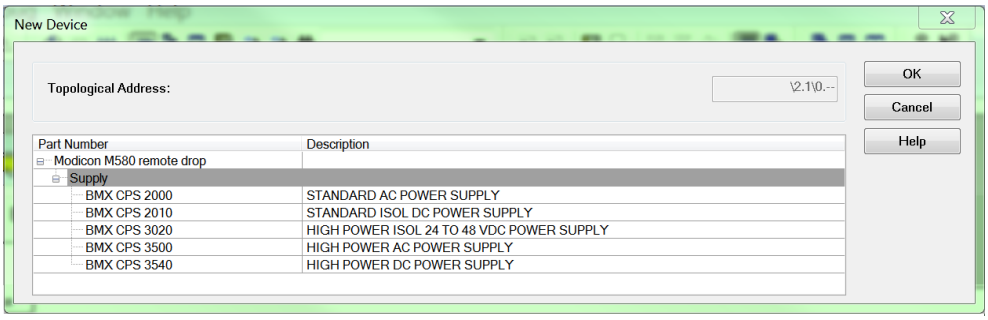
Exercise - Implement a Remote I/O Drop (cont.)

Add the Power Supply to the Rack.

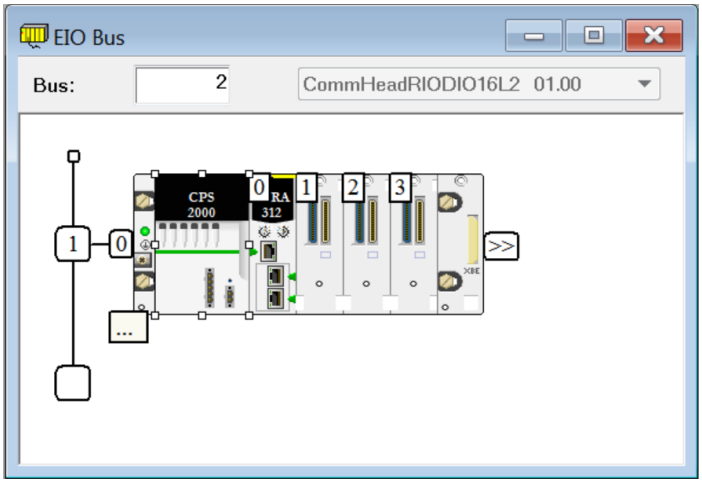
i. Double click **Slot 0** or **Slot 1.**



ii. Select the appropriate **Power Supply**. Click the **OK** button.



iii. The Power Supply is added to the Rack:

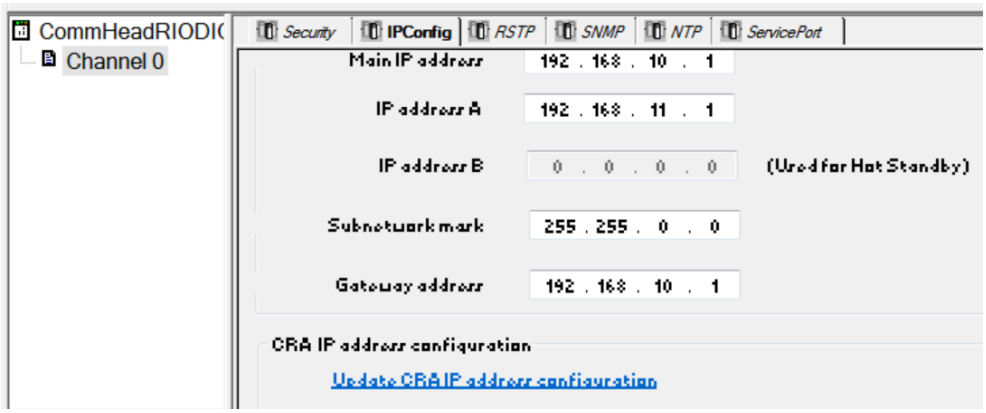


Exercise - Implement a Remote I/O Drop (cont.)

Configure the IP Address for the drop.

i. Open the **Ethernet Port** properties of the M580 CPU from the **PLC Bus** by clicking the port of the M580 on the main rack.

ii. Click the **IP Config** tab, and click Udate `CRAIP address configuration` link.

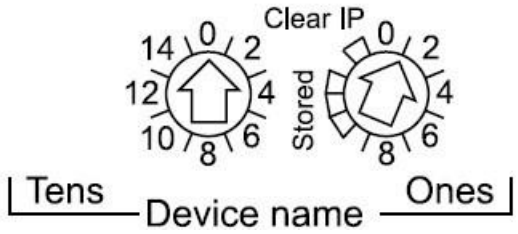


iii. By default the new drop has been added and should be set to **IP Address A** + 1, if this is not the case change it accordingly. It should be: **192.168.11. 2**. NOTE if you have a new project make sure that as in the basic exercise you set an address for the M580 I/O scanner.

Name	Type	Subtype CRA	Profiles	Topo address	DHCP Enable	IP Address	Subnet Mask
BMECRA_001	Module	CRA	Remote	2.1/0.0	Yes	192.168.11.2	255.255.0.0

iv. **Validate** the configuration  .

v. If you have the hardware, use a screwdriver, set the role name of the CRA. As there is only 1 CRA configured, the role name is **BMECRA_001** which means that 001 has to be set on the rotary switches.



vi. Power cycle the **CRA** every time the rotary switch positions are changed.

Exercise - Implement a Remote I/O Drop (cont.)

Add the DDO1602.

i. Add a **DDO1602** in the Remote rack.

Note:
This time Device DDT is automatically chosen as the type of I/O cannot be selected NOTE: This time Device DDT is automatically chosen as the type of I/O cannot be selected.

ii. Change the device name to `Obi2` and un-tick the **Supply Monitoring** box.

iii. Open the test ST section created in the basic exercise,or create a new one if you started a new project.

iv. Type in this code:

```
FOR i:=0 TO 15 BY 2 DO
          Obi2.DIS_CH_OUT[i].VALUE := TRUE;
END_FOR;
```

Note:
Note the difference in the name of the device between this code and the code used in the basic exercise.

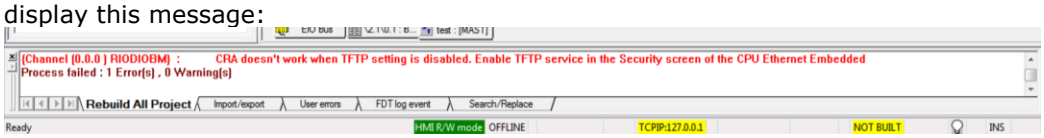
Exercise - Implement a Remote I/O Drop (cont.)

Test the functioning of the RIO drop.

i. If the equipment is available, wire one of the M580 device ports to one of the CRA device ports.

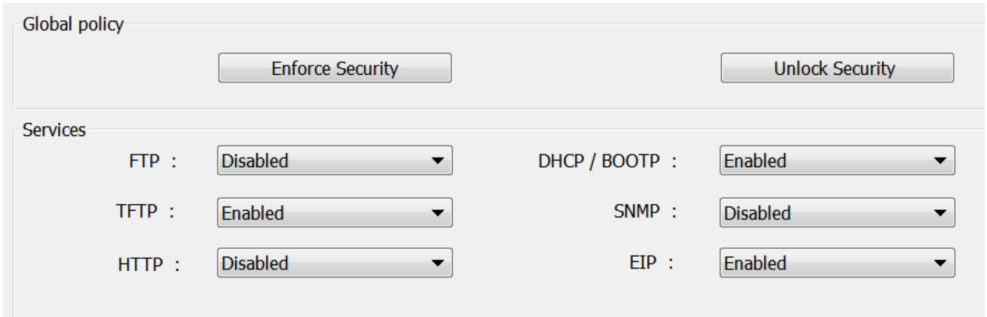
ii. **Build all, Transfer**, and **Run** the project.

iii. If you did not enable the TFTP, Unity Pro will prevent you from building and display this message:



iv. This is a typical message Unity Pro shows when a project is built that uses a protocol not allowed by the Cyber Security settings.

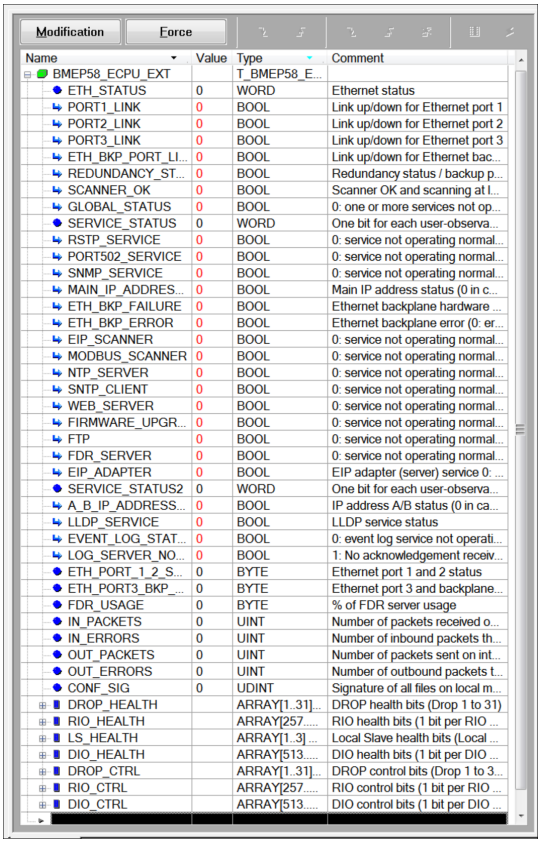
v. If this message is seen go to the security tab of the **M580**, and enable the **TFTP**, **EIP** and **DHCP/BOOTP**:



vi. **Build all, Transfer**, and **Run** the project again. This time there should not be any error message.

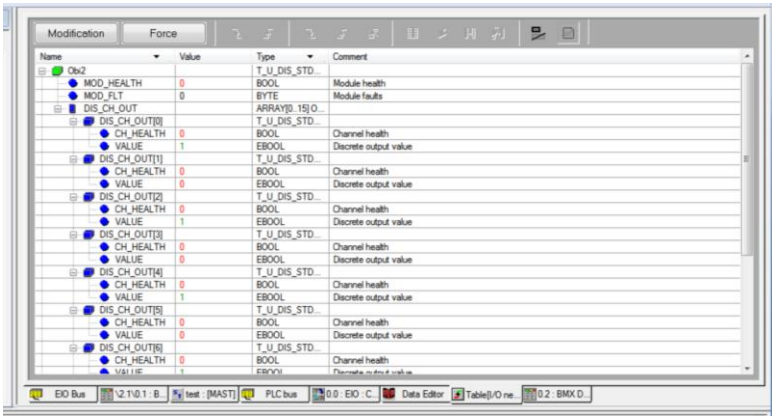
Exercise - Implement a Remote I/O Drop (cont.)

i. Once the project is running an animation table can be created to monitor the CRA Device DDT:



Name	Value	Type	Comment
BMEP58_ECPU_EXT		T_BMEP58_E...	
ETH_STATUS	0	WORD	Ethernet status
PORT1_LINK	0	BOOL	Link up/down for Ethernet port 1
PORT2_LINK	0	BOOL	Link up/down for Ethernet port 2
PORT3_LINK	0	BOOL	Link up/down for Ethernet port 3
ETH_BKP_PORT_LI...	0	BOOL	Link up/down for Ethernet bac...
REDUNDANCY_ST...	0	BOOL	Redundancy status / backup p...
SCANNER_OK	0	BOOL	Scanner OK and scanning at l...
GLOBAL_STATUS	0	BOOL	0: one or more services not op...
SERVICE_STATUS	0	WORD	One bit for each user-observa...
RSTP_SERVICE	0	BOOL	0: service not operating normal...
PORT502_SERVICE	0	BOOL	0: service not operating normal...
SNMP_SERVICE	0	BOOL	0: service not operating normal...
MAIN_IP_ADDRES...	0	BOOL	Main IP address status (0 in c...
ETH_BKP_FAILURE	0	BOOL	Ethernet backplane hardware ...
ETH_BKP_ERROR	0	BOOL	Ethernet backplane error (0: er...
EIP_SCANNER	0	BOOL	0: service not operating normal...
MODBUS_SCANNER	0	BOOL	0: service not operating normal...
NTP_SERVER	0	BOOL	0: service not operating normal...
SNTP_CLIENT	0	BOOL	0: service not operating normal...
WEB_SERVER	0	BOOL	0: service not operating normal...
FIRMWARE_UPGR...	0	BOOL	0: service not operating normal...
FTP	0	BOOL	0: service not operating normal...
FDR_SERVER	0	BOOL	0: service not operating normal...
EIP_ADAPTER	0	BOOL	EIP adapter (server) service 0: ...
SERVICE_STATUS2	0	WORD	One bit for each user-observa...
A_B_IP_ADDRESS...	0	BOOL	IP address A/B status (0 in ca...
LLDP_SERVICE	0	BOOL	LLDP service status
EVENT_LOG_STAT...	0	BOOL	0: event log service not operati...
LOG_SERVER_NO...	0	BOOL	1: No acknowledgement receiv...
ETH_PORT_1_2_S...	0	BYTE	Ethernet port 1 and 2 status
ETH_PORT3_BKP_...	0	BYTE	Ethernet port 3 and backplane...
FDR_USAGE	0	BYTE	% of FDR server usage
IN_PACKETS	0	UINT	Number of packets received o...
IN_ERRORS	0	UINT	Number of inbound packets th...
OUT_PACKETS	0	UINT	Number of packets sent on int...
OUT_ERRORS	0	UINT	Number of outbound packets t...
CONF_SIG	0	UDINT	Signature of all files on local m...
DROP_HEALTH		ARRAY[1..31]...	DROP health bits (Drop 1 to 31)
RIO_HEALTH		ARRAY[257.....	RIO health bits (1 bit per RIO ...
LS_HEALTH		ARRAY[1..3]....	Local Slave health bits (Local ...
DIO_HEALTH		ARRAY[513.....	DIO health bits (1 bit per DIO ...
DROP_CTRL		ARRAY[1..31]...	DROP control bits (Drop 1 to 3...
RIO_CTRL		ARRAY[257.....	RIO control bits (1 bit per RIO ...
DIO_CTRL		ARRAY[513.....	DIO control bits (1 bit per DIO ...

ii. As well as the DDO1602.



Name	Value	Type	Comment
Obj2		T_U_DIS_STD...	
MOD_HEALTH	0	BOOL	Module health
MOD_FLT	0	BYTE	Module faults
DIS_CH_OUT		ARRAY[0..15]O...	
DIS_CH_OUT[0]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	1	EBOOL	Discrete output value
DIS_CH_OUT[1]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	0	EBOOL	Discrete output value
DIS_CH_OUT[2]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	1	EBOOL	Discrete output value
DIS_CH_OUT[3]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	0	EBOOL	Discrete output value
DIS_CH_OUT[4]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	1	EBOOL	Discrete output value
DIS_CH_OUT[5]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health
VALUE	0	EBOOL	Discrete output value
DIS_CH_OUT[6]		T_U_DIS_STD...	
CH_HEALTH	0	BOOL	Channel health

Exercise - Implement a Remote I/O Drop (cont.)

iii. If you have the equipment, check the DDO1602 outputs:

iv. The exercise is now over click the link to go back to the Chapter 2 Organisation Chart or to the Table of Contents.