M580 Quick Start Training Manual

M580 Quick Start Version 1.0



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Quick Start Training Manual

INTRODUCTION AND LEGAL NOTICE

Your purchase of this official Quick Start Training Manual entitles you to undertake the Quick Start training course.

Satisfactory completion of the course evaluation is mandatory for you to obtain a Schneider Electric certificate of completion of the training course.

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Validity Note

The present documentation is intended for qualified technical personnel responsible for the implementation, operation and maintenance of the products described. It contains information necessary for the proper use of the products.

About Us

Members of Schneider Electric's team of Instructional Designers have tertiary qualifications in Education, Educational Course Development and are also experienced Instructors. Currently, the team is supporting a range of Schneider Electric courses in multiple languages and multiple software environments.

Authors

Sebastien ARRIBE

Safety Information

Important Information

PLEASE NOTE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety alert messages that follow this symbol to avoid possible injury or death.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

AWARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Important Information	PLEASE NOTE
(cont.)	Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Before youDo not use this product on machinery lacking effective point-of-operation
guarding. Lack of effective point-of-operation guarding on a machine can result in
serious injury to the operator of that machine.

UNGUARDED EQUIPMENT

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of- operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.



Coordination of safeties and mechanical/electrical interlocks for point-ofoperation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

ACAUTION

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- · Remove tools, meters and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- > Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- > Perform all start-up tests recommended by the manufacturer.

Operation and
AdjustmentsThe following precautions are from the NEMA Standards Publication ICS 7.1-
1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

Before the Course Begins

Scope of this Training	This training manual is a supplement to the authorised training. In order to make proper use of the software students should also refer to the documentation that has
Manual	been provided with the product such as the Help Files, User Guides or Knowledge Base.

The graphics displaying screen captures were taken using the Windows[®] 7 operating system. If students are running a different version of Windows then screen images may differ slightly from those shown in the training manual.

Some screen captures may have been taken from beta versions of the software and may vary slightly from release screen captures.

Conventions Used in this Manual

Objectives	These are the skills to be achieved by the end of each chapter. An overview providing a brief synopsis of the topic begins each section. Often, examples are given to illustrate the conceptual overview.
	Example -
	The configuration environment consists of several toolbars, browser windows and programming editors. This chapter introduces the user to the configuration environment using an example project with pre-defined elements.
	This Chapter Covers These Topics:
	> Topic A1-2
	> Topic B
	> Topic C
Exercises	After a concept is explained students will be given exercises that practice the skills just learned. These exercises begin by explaining the general concept of each exercise and then step-by-step procedures are listed to guide students through each exercise.
	Example - Paste an object from a library onto a test page called Utility .
	Run the Milk_Upgrade project then trigger and view some alarms. Use the following template settings:
User Input	Whenever information is to be typed into a field or dialog box it will be written in this font:
	KETTLE_TEMP/25
	Note that some exercises will show a fragment of information already typed into a Unity Pro screen and then ask students to add extra lines of configuration. In this instance, the previously entered material will be given to the student as light grey italic text.
	KETTLE_TEMP/25
	OVEN_TEMP/5

Conventions Used in this Manual (cont.)

Hints & Tips	This heading will provide students with useful or helpful information that will make configuring the project easier.
	Example -
	Hints & Tips:
	To go to the next field, use the mouse cursor or press the TAB key.
Note	A note will refer to a feature which may not be obvious at first glance but something that should always be kept in mind.
	Example -
	Note:
	Any events named GLOBAL are enabled automatically when events are enabled.
Menus and Menu Options	Text separated by the double arrow symbol "»" indicates that students are to select a menu.
	Example -
	File » New
	Open a menu "File" then select the menu option "New"
Horizontal and Vertical Tabs	Text written this way indicates the Horizontal then the (Vertical) tab is to be selected.
	Example -
	Appearance (General)

Conventions Used in this Manual (cont.)

See Also	Text written in this way indicates further references about the current topic.
	Example -
	Os See Also:
	For further information about Templates , see Quick Start <i>Help - Using Page Templates</i> .
Further Training	This heading describes topics that are covered in more advanced courses.
	Example -
	Further Training:
	Trend Table Maths is a topic in the Customisation and Design Course .

Course Overview

What is Quick Start?	Quick Start is "hands on" oriented training that presents how to configure the common features of the M580. The training focuses on configuration, thus PLC programming is not taught in this course.	
	The training is divided into three chapters:	
	1. The first chapter will show how to create a basic configuration with local I/O.	
	2. The second chapter allows training on bigger architectures. As M580's have numerous types of I/O and modules, most of the training can be run in simulation mode. However, in case the exercises are required with Equipment this chapter is designed in such a way that allows for the use of Equipment.	
	The last chapter refers to the most advanced features of the M580, as these are more complex to implement, this chapter will only describe the features and not implement them.	
Course Objectives	By the completion of this training course the student will be able to:	
Objectives	Connect Unity Pro to an M580 through USB and an Ethernet (RJ45) cable	
	Describe the different types of I/O	
	➢ Configure local I/O	
	Change the security features of the M580	
	Describe the use of the M580 Ethernet ports	
	Configure a DTM device	
	Configure a Remote I/O drop	
	Configure a local Premium I/O drop, extending a local M580 drop	
	Configure a NOC	
	 Configure a basic M580 Hot Standby (HSBY) architecture 	
	Describe other features of the M580	

Course Overview (cont.)

Target Audience	Quick Start is designed for anyone having basic PLC programming skills and willing to discover the M580 features.
	This includes people with no experience with the M580, people migrating from Premium/Quantum to the M580 as well as staff familiar with the M580 that want a "How to" guide.
Prerequisite Knowledge	The only prerequisite knowledge is to be familiar with PLC programming through Unity Pro v8.1 or later.
	Further Training:
	For those not familiar with Unity Pro, the free eLearning " Unity Pro - Click and Start " will provide all the knowledge required to go through M580 Quick Start: <u>Link to Click and Start eLearning</u> .
Equipment	A computer with a valid version of Unity Pro v8.0 or later (This includes demo versions).
	Most exercises of this training can be carried out in Unity Pro's SimulationMode . Nevertheless, the Equipment required to perform the training in Standard Mode is listed at the beginning of each exercise.

Course Overview (cont.)

Support

If support or additional information about any concepts or products in the course is required, students should ask the Instructor who will either address the question or obtain additional technical assistance as required.

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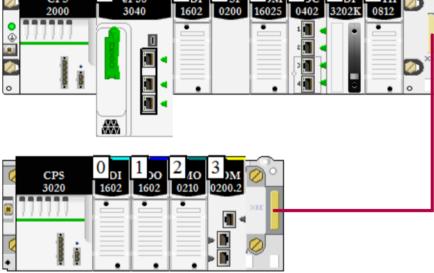
Chapter 1: M580 Basics

Overview

Introduction This part of the training covers the basic features of the M580: An introduction to the different types of I/O. • Two types of M580 CPU: • 1. Part Number Series **20 2. Part Number Series **40 The different types of I/O available between these CPU's • Connection via Ethernet Connection via USB • Configuring a local I/O device Cyber Security features of the M580. • At the end of this chapter the student will be able to configure a basic M580 architecture.

Different Types of M580 I/O

Introduction	M580's have three types of I/O.
Topic Objectives	By the end of this section the student will be able to:➤ Describe the three types of I/O
Different Types of I/O	In Automation architecture, the heart of a system is a PAC. Information coming from the field (sensors, push buttons, etc.) and commands sent to the devices (motor control, variable speed drive references, etc.) are often linked to the PAC via digital or analogue inputs and outputs. These inputs and outputs are physically connected through wiring between field devices and input and output modules. These modules can be located in different positions: Locally , Remotely , or Distributed .
Local I/O	Local I/O consists of input and output modules that are located in the local rack of the PAC. The internal backplane is used as a medium of communication. This structure can achieve very high performances in terms of response time.

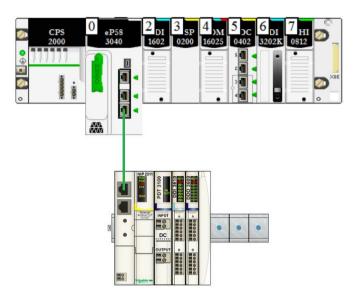


I/O modules located on Extension racks are also considered as Local I/O.

Different Types of M580 I/O (cont.)

Distributed I/O

To achieve greater distances and flexibility, Distributed I/O ia a reasonable option. Distributed I/O consists of input and output modules but also specific modules (to better integrate devices) located on an island which communicate with the PAC over a **fieldbus** or **network**.

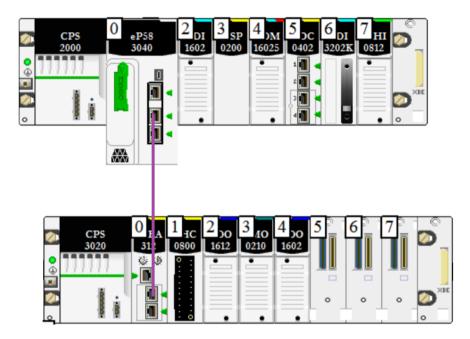


Due to the fieldbus communication over the network, Distributed I/O has a limitation in terms of performance depending on the medium used between them and the PAC.

M580 Remote I/O

Remote I/O

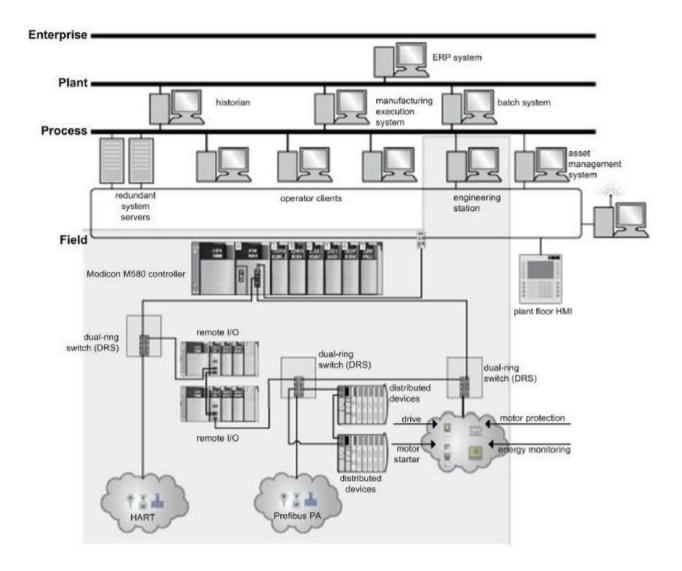
Remote I/O consists of input and output modules located separate to the Local PAC and Local I/O rack. Remote I/O uses specific / proprietary communications which allows for similar performance to Local I/O because data acquisition from them is asynchronous to the CPU scan. Remote I/O eliminates expensive point-to-point wires by networking just a few (or thousands) of process signals onto one digital communication link.



One of the main advantages of Remote I/O is that the entire configuration is often completed using one unique software tool.

M580 Remote I/O (cont.)

M580 Remote I/O The M580 Remote I/O offer provides reliability and performance with the availability to integrate Distributed Remote I/O drops over the Ethernet network. The system uses Ethernet/IP technology based on the reliable CIP object model. The figure below shows an example of a PlantStruxure system with M580 as a global automation solution:



Modicon X80 I/O Modules

The **M580** system uses **Modicon X80 I/O modules**, many of which are used in an M340 system. The system also supports several Ethernet-based **eX80 I/O modules**, which can be installed on both the main local rack and main remote racks. The local rack can also support an extension rack of Premium I/O modules.

Exercise - Recognise the Different Types of I/O

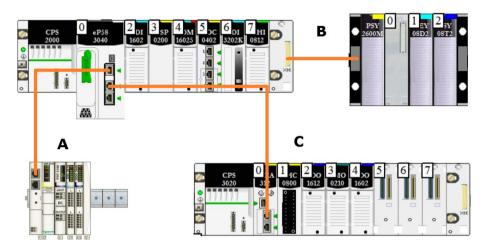
Learning Outcomes

By the completion of this exercise the student will be able to:

➢ Identify the different types of I/O

Identify the types.

i. For each part of the following picture, select which kind of I/O is used:



- A: Local / Remote / Distributed
- B: Local / Remote / Distributed
- C: Local / Remote / Distributed

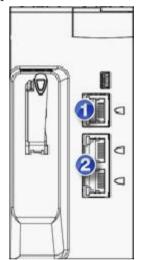
M580 Embedded Ethernet Ports

IntroductionIn the previous topic the different types of I/O were explained.
The M580 has 3 ports which, depending on the part number, allows for different
types of I/O.
Thus this chapter will present the different ports of the M580, and which of these
ports can be used for Remote I/O (RIO) or Distributed I/O (DIO).Topic ObjectivesBy the end of this section the student will be able to:
> Identify the different ports of the M580
> Describe their roles depending on the part number

M580 Ports

First let's look at the M580 ports.

All M580s have two types of ports, the **Service Port** and the **Device Ports**.



- 3. The port at the top is the Service Port.
- 4. The two below are the **Device Ports.**

Role of theThe Service Port is mainly used to connect to Unity Pro, a SCADA system, or any
other external tool.

The Service Port may also be used to connect to a DIO drop.

Finally it can be used for port mirroring.

M580 Embedded Ethernet Ports (cont.)

Role of the
Device PortThis is where there is a big difference between the 2 types of CPU.If the CPU's type is **20 then the Device Ports are used to connect DIO drops. A
DIO drop can be composed of almost any device including non Schneider-Electric
devices.If the CPU's type is **40 then the Device Ports are used to connect RIO drops.

In both cases the supported architectures are wired star or ring.

Connect to the M580

Introduction	We now know which port we can use to connect to the M580.	
	In this chapter the user will learn how to connect to the M580, via Simulation Mode , USB and of course Ethernet .	
	Connecting to the PLC will allow the project to be downloaded to the PLC and provide relevant information for troubleshooting.	
	Remember that unless specified, exercises can be done through both Simulation Mode or connected directly to a PLC (provided that the student has the required Equipment	
Topic Objectives	By the end of this section the student will be able to:	
	Connect to a simulator	
	Connect to a PLC via USB	
	Connect to a PLC via Ethernet	
	Monitor the PLC status	

Exercise - Connect to the Simulation Mode

Learning Outcomes	By the completion of this exercise the student will:
	Connect to an emulated M580
Equipment Required	None

Start Unity Pro

i. The Unity Pro configuration window will pop-up

Unity Pro XL	Part of Stationer and		
e View Tools PLC Help			
	- 4 回 第 上 の 出 出 目 日 日 日 日 ス ス A	- 12 12 10 2 17 7 0 20 5 18 8 0 1 9 19	
			_
(≤ ≥ ≥ ∧ Build λ Import/export ∧ User	errons λ FDT log event λ Search /Replace /		
ly .	HMLR/W mode OFFLINE	TCPIP:127.0.0.1	INS

ii. Select PLC»Set Address then in the newly opened window, under **Simulator**, make sure that the **Media** is TCPIP and the **Address** is 127.0.0.1.

Set Address		? X
>LC Address 192.168.10.1	✓ šimulator Address 127.0.0.1	Bandwidth Test Connection
TCPIP +	TCPIP	ОК
Communication Parameters	Communication Parameters	Cancel
Speed rate auto-adaptation at the end of downloa	ıd	Help

iii. Click **OK**.

Exercise - Connect to the Simulation Mode (cont.)

iv. Select Simulation Mode



v. Then click Connect

	X		-										
] = = = = ? *?		?	R	Ţ		1	600 (¢¢	STOP	2		ð Si	1

vi. Note that the **OFFLINE** status has been replaced by **DIFFERENT** with a red background.

)Tlog event	Search/Replace		
HMI R/W m	ode DIFFERENT	NO CONF NO UPLOAD INFO	TCPIP:127.0.0.1

This means that the project in Unity Pro (which is now empty, as we did not create anything) is different from the one in the **Simulator**.

Exercise - Connect Through USB

Learning Outcomes	By the completion of this exercise the student will:
0	Install M580 USB drivers
	> Test the USB connection
	Connect to an M580 via USB
Equipment Required	To complete this exercise on a PLC, the student will need
-	One M580 PLC (any CPU)
	➢ A BMX or BME rack
	A compatible power supply
	➢ A mini USB cable (see picture below)

Install the M580 USB drivers.

- i. Download the latest Schneider PLC USB driver Suite available on Schneider Electric Website: http://www.schneider-electric.com/download/ww/en
- ii. Double click the executable to install the drivers.

Exercise - Connect Through USB (cont.)

Test the USB connection

- i. If not already open, start **Unity Pro**.
- ii. Plug the USB cable into the computer and the PLC.
- iii. In Unity Pro's menu bar, select PLC » Set Address

<u>C</u> onnect	Ctrl+K
Set <u>A</u> ddress	
🕮 Standard Mode	
Simulation Mode	
C <u>o</u> mpare	
≟ <u>∎</u> Transfer Project to PLC	Ctrl+L
Transfer Project from PLC	Ctrl+Shift+L
Transfer Project from Primary to S	StandBy PLC
Save Data from PLC to <u>F</u> ile	
Restore <u>D</u> ata from File to PLC	
Safety/Maintenance	Ctrl+Shift+M
Run/ <u>S</u> top	Ctrl+R
Init	
Update <u>U</u> pload Information	
Update Init <u>V</u> alues with Current Va	alues.
Update Local Init Values with PLC	
Project <u>B</u> ackup	•
Memory Consumption	
State Ram Viewer	

Exercise - Connect Through USB (cont.)

iv. The **Set Address** window will pop-up:

v.

vii.

√ PLC	Simulator		Bandwidth
Address	Address		
192.168.10.1	127.0.0.1	- 🗇	Test Connection
Media	Media		
TCPIP	TCPIP	•	ОК
Communication Para	Comm	nunication Parameters	Cancel
Speed rate auto-adaptation at the	and of download		Help

vi. On the **PLC** side; Select the **Media** as **USB** from the drop down list, and type sys in the **Address** field as shown below:

	Simulator Address 127.0.0.1	● Bandwidth ● 【窗】
Media. USB	TCPIP	• OK
Communication Paramete		ion Parameters Cancel Help

viii. Click the Button **Test Connection**. If successful, a message will confirm that the connection is working.

чLС	UnityXL		Bandwidth
Address			Test Connection
SYS		Successfully connected to the currently selected target.	Test Connection
Media		,	
USB			ОК
Commu		ОК	Cancel

ix. Close the pop-up and click **OK** to validate the changes.

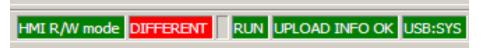
Exercise - Connect Through USB (cont.)

Connect to the PLC

i. Once the connection has been tested confirm **Standard Mode** operation by viewing the raised **PLC** icon in the Shortcut bar.



iii. Note that the **Status** is now **ONLINE**, and the **Media** is **USB**.



Exercise - Configure the Embedded Ethernet Ports

Learning Outcomes

By the completion of this exercise the student will:

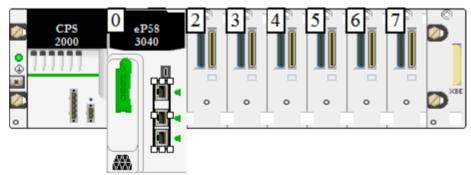
- > Be able to configure the embedded Ethernet ports of the M580 CPU
- ➤ Use the default DDT to display data from the M580 CPU

Create a new project.

- i. If not already open, start Unity Pro
- ii. Select File » New.
- iii. Select any M580 CPU / rack then click OK.

Configure the IP addresses.

- i. Expand **PLC bus**, and double click the **rack**, the **main rack** configuration should pop.
- ii. Double click the embedded Ethernet modules of the CPU.



iii. In the IPConfig tab, enter the following Main IP Address: 192.168.10.1.

IP address configuration		
Main IP address	192.168.10.1	

Exercise - Configure the Embedded Ethernet Ports (cont.)

- iv. Set IP Address A to: 192.168.11. 1
- v. This is the Remote I/O (RIO) Scanner and will be used later in the course.
- vi. Set the Subnet Mask to: 255.255.0.0 and change the Default Gateway to 192.168.10. 1.
- vii. In the **Security** tab, click **Unlock Security**.
- viii. This will disable all **Cyber Security** features which will be covered in more detail in **Cyber Security** (page 2-1).

	Enforce Security		Unlock Security
Services			
FTP :	Enabled	DHCP / BOOTP :	Enabled
TFTP :	Enabled	SNMP :	Enabled
HTTP :	Enabled	EIP :	Enabled
Access Control			
Disabled	•		

- ix. Validate 🗹 the changes.
- x. **Build** the application.
- xi. **Connect**, **Transfer** (using USB) and **Run** the application.
- xii. **Disconnect** from the PLC.

Exercise - Configure the Embedded Ethernet Ports (cont.)

Connect via Ethernet (Equipment is required for this step)

- i. Take the **RJ45** cable and connect it between the **PC** network adaptor and the **SERVICE** port of the M580.
- ii. Configure the IP Address of the PC to be: **192.168.10.10**.

Internet Protocol Version 4 (TCP/IPv4)	Properties 🛛 🖗 🔀
General	
You can get IP settings assigned autom this capability. Otherwise, you need to for the appropriate IP settings.	
Obtain an IP address automaticall	у
Ose the following IP address:	
IP address:	192 . 168 . 10 . 10
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address autom	natically
Our contract of the server add out of the	resses:
Preferred DNS server:	
Alternate DNS server:	
Validate settings upon exit	Advanced
	OK Cancel

iii. Open a **DOS Prompt**, by clicking the Windows **Start** button, selecting **Run** and entering the command cmd.

Exercise - Configure the Embedded Ethernet Ports (cont.)

iv. In the DOS Prompt, enter the command: ping 192.168.10.1.

C:\Users\SESA292457>ping 192.168.10.1

The M580 should respond.

v. In **Unity Pro**, change the **Set Address** settings to connect via **TCPIP** with the new **IP Address** (192.168.10.1), **Test** the connection.

✓ PLC	Simulator	Bandwidth
Address	UnityXL	Danawiaa
192.168.10.1	Successfully connected to the currently selected target.	Test Connection
Media	Successfully connected to the currently selected target.	
TCPIP		OK
Commu	nicatiç	Cancel

vi. **Connect** to the PLC.

Exercise - View the M580 State from Unity Pro

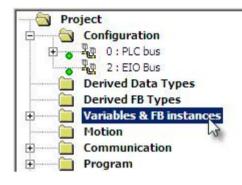
Learning Outcomes	By the completion of this exercise the student will:
o uteomes	> Be able to monitor the M580 CPU from Unity Pro

Connect to the PLC.

i. Via USB, Ethernet or Simulation Mode.

View data from the Device DDT.

i. From the **Project Browser**, double-click the **Variables & FB Instances** item.



The **Data Editor** opens and shows the **BMEP58_ECPU** variable.

👽 Data Editor				
Variables DDT Types Function Blocks	DFB Types			
Filter		ED.	V DD. 🔨 IOD	D ⁻ V Device DDT
Name BMEP58_ECPU_EXT	▼ Type ▼ T_BMEP		Value	Comment -
· · · · · · · · · · · · · · · · · · ·				Þ

ii. Select the **BMEP58_ECPU** variable. Press **CTRL + T** on the keyboard, this will open an **Animation Table** and add the **BMEP58_ECPU** variable to it.

<u>M</u> odification	<u>F</u> orce	•	¥	Æ	₹.	F	迷	۶	[→]	舸
Name	• .	Value		Туре			nment			
BMEP58_ECP	U_EXT			T_BM	EP58_E					
b										

Exercise - View the M580 State from Unity Pro (cont.)

iii. Expand the variable, and inspect the available properties. The picture below has been taken in simulation mode; if connected to a PLC different values would be shown.

<u>M</u> odification							
Vame	▼ .	Value	Туре 🔹	Comment			
BMEP58_EC	PU_EXT		T_BMEP58_E				
ETH_STA	TUS	0	WORD	Ethernet status			
	INK	0	BOOL	Link up/down for Ethernet port 1			
PORT2_LI	INK	0	BOOL	Link up/down for Ethernet port 2			
PORT3_LI	INK	0	BOOL	Link up/down for Ethernet port 3			
ETH_BKP	_PORT_LI	0	BOOL	Link up/down for Ethernet bac			
- IN REDUND	ANCY_ST	0	BOOL	Redundancy status / backup p			
SCANNEF	₹_OK	0	BOOL	Scanner OK and scanning at I			
→ GLOBAL_	STATUS	0	BOOL	0: one or more services not op			
SERVICE	_STATUS	0	WORD	One bit for each user-observa			
	RVICE	0	BOOL	0: service not operating normal			
→ PORT502_	SERVICE	0	BOOL	0: service not operating normal			
SNMP_SE	RVICE	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_SCAN	NER	0	BOOL	0: service not operating normal			
HODBUS	SCANNER	0	BOOL	0: service not operating normal			
→ NTP_SER	VER	0	BOOL	0: service not operating normal			
SNTP_CL	ENT	0	BOOL	0: service not operating normal			
WEB_SEF	RVER	0	BOOL	0: service not operating normal			
FIRMWAF	RE_UPGR	0	BOOL	0: service not operating normal			
FTP		0	BOOL	0: service not operating normal			
	₹VER	0	BOOL	0: service not operating normal			
BIP_ADA	PTER	0	BOOL	EIP adapter (server) service 0:			
SERVICE	STATUS2	0	WORD	One bit for each user-observa			
→ A_B_IP_A	DDRESS	0	BOOL	IP address A/B status (0 in ca			
	RVICE	0	BOOL	LLDP service status			
- SVENT_L	OG_STAT	0	BOOL	0: event log service not operati			
IOG_SEF	VER_NO	0	BOOL	1: No acknowledgement receiv			
ETH_POR	T_1_2_S	0	BYTE	Ethernet port 1 and 2 status			
ETH_POR	T3_BKP	0	BYTE	Ethernet port 3 and backplane			
> FDR_USA	\GE	0	BYTE	% of FDR server usage			
IN_PACKE	ETS	0	UINT	Number of packets received o			
IN_ERRO	RS	0	UINT	Number of inbound packets th			
OUT_PAC	KETS	0	UINT	Number of packets sent on int			
OUT_ERF	RS	0	UINT	Number of outbound packets t			
CONF_SIC	G	0	UDINT	Signature of all files on local m			
B DROP_HE	ALTH		ARRAY[131]	DROP health bits (Drop 1 to 31)			
B RIO_HEA	LTH		ARRAY[257	RIO health bits (1 bit per RIO			
B LS_HEAL			ARRAY[13]	Local Slave health bits (Local			
B DIO HEA			ARRAY[513	DIO health bits (1 bit per DIO			
B DROP CT			ARRAY[131]	DROP control bits (Drop 1 to 3			
			ARRAY[257	RIO control bits (1 bit per RIO			
			ARRAY[513	DIO control bits (1 bit per DIO			

- iv. For more information about the information displayed by the **M580 Device DDT**, have a look at the **M580** documentation.
- v. Save the project.

Local I/O

Introduction This chapter provides information on how to create a new Project, connect to the PLC and download the Project to the PLC. This Project will include Local I/O.

Local I/O modules are on the same rack as the M580.

They are the most basic type of I/O and the easiest to configure.

To simplify I/O mapping most of the M580 I/O modules are configured via a Device DDT.

Exercise - Configure Local I/O

Learning Outcomes	By the completion of this exercise the student will:
	Create a new M580 application
	Configure a local I/O
	Name and use a Device DDT variable
	Check the status of the local I/O drop
Equipment Required	To complete this exercise on a PLC the student will need
-	➢ One M580 PLC (any CPU)
	A compatible rack and power supply
	➤ A DDO1602
	Create a new Project
	i. Using the Windows Start Menu open Unity Pro :
	Start » All Programs » Schneider Electric » So Collaborative » Unity Pro » Unity Pro XL
	The Alexandream Alexandream Alexandream Alexandream Alexandream Alexandream Alexandream Alexandream Alexandream

ii. Create a **New Project** by selecting **File** » **New** from the Unity Pro menu, or clicking the **New Project** button on the toolbar.

File	Edit	View	Services
睝 <u>N</u> ew	<i>I</i>		Ctrl+N
<mark>≌́О</mark> ре	en		Ctrl+O
<u>C</u> los	e		
⊟ <u>S</u> ave	e		Ctrl+S
Save	e <u>A</u> s		
Expo	or <u>t</u> Projec	ct	
Save	e Archi <u>v</u> e		
<i>⊜</i> <u>P</u> rint	t		Ctrl+P
E <u>x</u> it			
<u>1</u> M	580 Dem	no Modifie	ed.STU
<u>2</u> DI	EMOUNI	TYPRO_M	580.STU

Exercise - Configure a Local I/O (cont.)

iii. Select the appropriate **M580 Processor** and **Rack** according to the equipment available. Or select any option if there isn't an **M580 Processor** or **Rack** available.

Show all versions			ОК
PLC	Min.OS Version	Description	Cancel
Modicon M340			Cancer
Modicon M580			Help
BME P58 1020	02.00	CPU 580-1 ETH distributed IO	Tiop
BME P58 2020	02.00	CPU 580-2 ETH distributed IO	
BME P58 2040	02.00	CPU 580-2 ETH remote and distributed IO	
	02.00	CPU 580-3 ETH distributed IO	
BME P58 3040	02.00	CPU 580-3 ETH remote and distributed IO	
BME P58 4020	02.00	CPU 580-4 ETH distributed IO	
BME P58 4040	02.00	CPU 580-4 ETH remote and distributed IO	
Momentum Unity			
Premium			
Quantum			
	Description		
Modicon M580 local drop	Description		
Modicon M580 local drop			
Modicon M580 local drop	4 SLOTS BACKPLA		
Modicon M580 local drop Rack BME XBP 0400 BME XBP 0800	4 SLOTS BACKPLA 8 SLOTS BACKPLA	NE	
Modicon M580 local drop Rack BME XBP 0400 BME XBP 0800 BME XBP 1200	4 SLOTS BACKPLA 8 SLOTS BACKPLA 12 SLOTS BACKPL	NE ANE	
BME XBP 0400 BME XBP 0800 BME XBP 1200 BMX XBP 0400	4 SLOTS BACKPLA 8 SLOTS BACKPLA 12 SLOTS BACKPL 4 SLOTS BACKPLA	NE ANE NE	
Modicon M580 local drop Rack BME XBP 0400 BME XBP 0800 BME XBP 1200	4 SLOTS BACKPLA 8 SLOTS BACKPLA 12 SLOTS BACKPL	NE NE	
	4 SLOTS BACKPLA 8 SLOTS BACKPLA 12 SLOTS BACKPL 4 SLOTS BACKPLA 6 SLOTS BACKPLA	NE NE	

iv. Click the **OK** button to create the application.

 $\ensuremath{\textbf{Unity}}\xspace \ensuremath{\textbf{Pro}}\xspace$ will create the new project and populate it with default items.

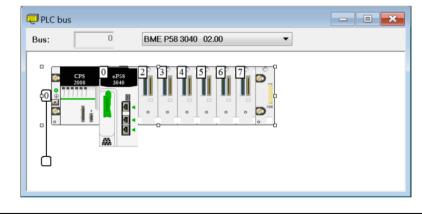


The **Project Browser** will display to show the project contents.

- Project Browser E Structural view 🗟, Project S. Configuration R. 2 : EIO Bus Derived Data Types Derived FB Types Variables & FB instances Elementary Variables Derived Variables Device DDT Variables IO Derived Variables Elementary FB Instances . Derived FB Instances D. Motion Communication
 Ethernet Network -🔍 Program 🔍 Animation Tables Operator Screens B. Documentation ÷.
- v. Double-click the 0: PLC Bus item from the Project Browser.



The Local Rack will be displayed, pre-populated with the CPU and the Power Supply.

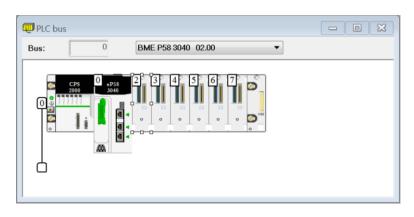


Hints & Tips

Note the addition of the new Ethernet slot in Blue on the image of the Rack.

Add the DDO Module to the Local Rack.

i. Double-click the spare slot representing the physical location of the **BMX DDO 1602** module.



- ii. From the New Device window, select the Discrete group and then select the BMX DDO 1602 module. Make sure that the I/O data type is Device DDT at the bottom.
- iii. Click the **OK** button.

	0.2	Cancel
Description		Help
Dig 8I 220 Vac		
Dig 64I 24 Vdc Sink		
Dig 8I 24 Vdc 8Q Relays		
Dig 16I 24 Vdc 16Q Sour Tr		
Dig 16Q Trans Source 0.5A		
Dig 64Q Trans Source 0.1A		
Dig 8Q 125 Vdc		
Dig 8Q Isolated Relays		
Dig 16Q Relays		
DIG 16I 24/125VDC TSTAMP		
	Dig II 201 Vier. Dig III 201 Vier. Dig III 201 Vier. Dig IIII 201 Vier. Dig IIII 201 Vier. Dig IIIII 201 Vier. Dig IIIII 201 Vier. Dig IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Description Op B 220 Vinc Op B-11 10 Ito 1200nc Industed Op B-11 10 Ito 1200nc Ito 120 Ito 1

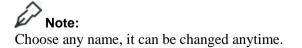
The module appears in the Local Rack.

Bus:	0	Ø Ø B B B B N N BME P58 3040 02.00 ▼	- 43 20 20 70 70 70 80 80 80 8 80 10 8 88

Name the DDO 1602 Device DDT

- i. Double-click the **BMX DDO 1602** module.
- ii. In the module's window, un-tick **Supply monitoring**.
- iii. Double click the BMX DDO 1602 icon in the left hand side window.

BMX DDD 1602 (MOD_DIS Channel 0 Channel 8	Configuration				
and a second	Synhol	Fallback value			
	0 MOD_DIS_%_1DIS_CH_OUT(0)VALUE	•			
	1 MOD_DIS_%_LDIS_CH_OUT[I] VALUE	0			
	2 MOD_DIS_16_LDIS_CH_OUT[23 VALUE 3 MOD_DIS_16_LDIS_CH_OUT[33 VALUE	0			
	3 MOD_DIS_%_1DIS_CH_OUT(3) VALUE 4 MOD_DIS_%_1DIS_CH_OUT(4) VALUE				
	5 MOD_DIS_6_1DIS_CH_OUT(5) VALUE	0			
	6 MOD_DIS_16_1DIS_CH_OUT[6] VALUE	0			
	7 MOD_DIS_%_LDIS_CH_OUT[7] VALUE	0			
	8 MOD_DIS_%_1DIS_CH_OUT(8) VALUE	0			
m	9 MOD_DIS_%_LDIS_CH_OUT[9] VALUE	0			
	10 MOD_DIS_%_LDIS_CH_OUT[10].VALUE	0			
unction:	11 MOD_DIS_%_1DIS_CH_OUT[19;VALUE	0			
Discrete outputs +	12 MOD_DIS_16_LDIS_CH_OUT[12].VALUE	0			
ask:	13 MOD_DIS_16_1DIS_CH_OUT[13].VALUE	0			
MAST +	14 MOD_DIS_%_LDIS_CH_OUT[14].VALUE	0			
MMOT Y	15 MOD_DIS_%_LDIS_CH_OUT[15],VALUE	0			
Supply monitoring					
Reactivate					
Programmed •					
allback mode					
Fallback +					



- iv. Select the **Device DDT** Tab, rename the module Obi1.
- v. Validate the changes, by clicking the tick box.

Dig 16Q Trans Source 0,5/	Overview Device DDT		
Channel 0 Re Channel 8	Implicit device DDT		
	Name :	Type :	
	Obi1	 T_U_DIS_STD_OUT_16 	
	Goto details		

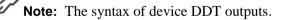
Create a Test Section

- i. Create a new ST Section under the Master (MAST) Task called test.
- ii. Type in the following code:

FOR i:=0 TO 15 BY 2 DO
 Obi1.DIS_CH_OUT[i].VALUE := TRUE;
END_FOR;

(create the variable i as an Integer)

- iii. This code will turn on every even output.
- iv. Build the application.



Exercise - Configure a Local I/O (cont.)

Observe the DDO 1602 Device DDT

- i. Transfer and run the application (either to Simulation mode or Standard mode if the equipment is available).
- ii. In the project browser, double click **Variables & FB instances**.
- iii. Right click **Obi1**, and initialise a new animation table.
- iv. Click the + to extend the structure.
- v. Extend the **DIS_CH_OUT** item.
- vi. Finally extend a few channels and check their states.
- vii. Odd numbers should be OFF, and even numbers should be ON, as on the picture:

Name 👻	Value	Туре 🔻	Comment
🖃 🗐 Obi1		T_U_DIS_STD	
MOD_HEALTH	0	BOOL	Module health
MOD_FLT	0	BYTE	Module faults
DIS_CH_OUT		ARRAY[015] 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

viii. Save the project.

Exercise - Configure a Local I/O (cont.)

Check the DDO 1602 Device Outputs (Hardware Required)

- i. The Hardware described at the beginning of the exercise is required to complete this section.
- ii. Check that every other output is ON as in the picture:



Note:

If I/O is red, it probably means that Supply monitoring in "3 name your DDDT" is unchecked.

Cyber Security

Introduction

The project is now properly running in the PLC (or Simulator). This chapter explains how to make sure that someone will not disrupt its normal functioning via a Cyber Attack; such as <u>Stuxnet</u>?

The M580 is one of the first PLC with enabled security features that make it a harder target for cyber attacks.

This exercise explains how to enable these features and how they will affect the architecture.



1) To make the system even more secure; refer to the cyber security topic in the second chapter.

2) The Schneider Electric document; <u>Cyber Security for Automation Systems(Unity</u> <u>Pro v8.0)</u>

Topic Objectives By the end of this chapter the student will be able to:

- ▶ Identify Cyber Security measures within the M580.
- > Deploy Cyber Security measures in M580 architecture.

Cyber Security (cont.)

Securing Services Along with the Achilles Level 2 implementation, a key feature of the M580 is the ability to prevent certain Ethernet based services from running.

The majority of settings are located on the CPU Embedded Ethernet port **Security** tab:

CommHeadRIODI(Channel 0	C Security	PConfig	RSTP	NTP ServicePort							
	Global po	licy									
			Enforce S	Security				Unlock Sec	urity		
	Services										
		FTP :	Disabled	•	DHCP / BO	OOTP :	Disat	oled		•	
		TFTP :	Disabled	•	:	SNMP :	Disat	oled		•	
		UTTD .	Disphlad	_		ETD .	Dical	alad		_	
	Access Co	HTTP :	Disabled			EIP :	Disat	bled		•	
	Access Co	ontrol	Disabled	·		EIP :	Disat	bled		•	
		ontrol		¥ Subset mark	PTP	EIP :	Disat	Pert592	EIP	SRMP	
	Enabled	I	•		917						
		ntrol	TP Address	Subnet musk		TFTP	нтр	Port502	EIP	SIMP	
	Enabled Subnet Yes	introl	TP Address	Subnet musk		4171P	нтр	Port502	913	SIMP	
	Enabled Subnet Yes 3 No 3		TP Address	Subnet musk		тир	ЧТТР	Port502	913	SIMP	
	Enabled Subset Yes No		TP Address	Subnet musk			чттн 	Port502	913	SNMP	
	Enabled Yes No No		TP Address	Subnet musk				Pert592		SRMP	
	Enabled Yes 3 No 3 No 3 No 3		TP Address	Subnet musk				Pert592		SRMP	

¥ Hints & Tips

The Schneider Electric recommendation is to disable all unused Services.

Cyber Security (cont.)

Restricting Connection to Some Devices

From this tab the student can also decide which IP addresses are allowed/not allowed to communicate with the M580.

Restricting access to some IP addresses makes hacking much more difficult.

This table explains the functionality of the settings on the **Security** tab:

Summary of the M580's Security Tab

FTP	Default value: Disabled
	Schneider Electric recommends disabling this service when not in use. This setting disables:
	- firmware upgrade
	- SD memory card data storage
	- device configuration management using the FDR service
TFTP	Default value: Disabled
	Schneider Electric recommends disabling this service when not in use. This setting disables:
	- the ability to read RIO drop configurations
	- the ability to manage device configurations using the FDR service
HTTP	Default value: Disabled
	Schneider Electric recommends disabling this service when not in use. This setting disables Web access.
Achilles level 2	Default value: Enabled
	- Setting the feature to Enabled increases Ethernet frame filtering to improve the level of security and robustness.
	- Setting the feature to Disabled increases system performance by reducing the Ethernet frame filtering capability.
Access Control	Default value: Enabled
	When Enabled, you can restrict access from specific devices to specific devices and define the devices that allow traffic only.
Enforce Security	Click to set:
	- FTP, TFTP, and HTTP to Disabled
	- Achilles level 2 and Access Control to Enabled
Unlock Security	Click to set:
	- FTP, TFTP, and HTTP to Enabled
	- Achilles level 2 and Access Control to Disabled
Authorized	Enter the addresses that you want the system to authorize:
addresses	- IP Address: 0.0.0.0 255.255.255.255
	- Subnet: Yes / No
	- Subnet mask: 0.0.0.0 255.255.255.255
	NOTE: This field can be edited when Access Control is set to Disabled .

Cyber Security (cont.)

Note:

1) Be very careful when activating the security features, especially IP restriction because the PLC can become inaccessible: by IP, SD card and USB! In that case the PLC is useless. Thus be careful experimenting with these features at the same time.

2) It is advised that all protocols are disabled and Achilles 2 Cyber Security is enabled when a project is started. Unity Pro will then request protocols to be activated when they are required. Only the features the project requires are therefore enabled, which improves Cyber Security. Once the configuration is working access to specific IP addresses can then also be restricted.

Cyber Secured NOC

Quite often NOCs are connected to a SCADA system, making them indirectly connected to an internet network and away from cyber attacks.

Note:

To avoid intrusion from the NOC a new secured NOC module will be released soon. It will include Cyber Security features similar to the ones of the M580.

Exercise – Cyber Security

Learning Outcomes	By the completion of this exercise the student will:					
	Activate the Achilles level 2 feature					
	Enable/disable services					
Equipment Required	To complete this exercise on a PLC the student will need					
_	➢ One M580 PLC (any CPU)					
	➢ A BMX or BME rack					
	A compatible power supply					
	A micro USB cable or an RJ45 cable					
	Modify the cyber security settings.					
	i. Open the main rack configuration window.					
	ii. Double click the M580 ports ; making sure to not click the PLC .					

- iii. From the newly opened window, click the **Security** tab.
- iv. From this tab disable the all services, as well as access control.

CommHeadRIODIC	Global policy	RSTP 0 SNMP 0 NTP	ServicePat			
		Enforce Securi	ity		Unlock Security	
	Services					
	FTP :	Disabled	•	DHCP / BOOTP :	Disabled	
	TFTP :	Disabled	•	SNMP :	Disabled 👻	
	HTTP :	Disabled	•	EIP :	Disabled	
	Access Control					
Function:	Disabled	•				

v. Relevant services will now be activated for each exercise.

Summary

Summary	In this chapter the following topics have been covered:				
	> The different types of IO				
	> The M580 Ethernet ports				
	Connect to the M580				
	> Configure a local I/O device				
	> Device DDT				
	Cyber security				
Questions	The following questions will help to check understanding of the topics covered in this chapter:				
	➢ What are the three types of I/O? Which ones are faster to configure?				
	What are the purposes of the SERVICE port?				
	> What is the advantage of Device DDT over topological addressing?				
	➢ What is the purpose of observing the M580 Device DDT?				
	➢ How to access the security parameters of the M580?				
	> To ensure higher cyber security; which services should be disabled?				

Chapter 2: Advanced Architecture Configuration

Overview

Introduction

The basics to design an architecture have now been carried out.

In this chapter we will reuse what we have previously learned to design more sophisticated M580 architectures, including the following:

- > RIO
- > DIO.
- ➢ Hot Standby

Migration paths from:

- ➢ Premium I/O
- Quantum PLC with X80 I/O (same case as RIO)

As well as configuration of NOCs and advanced security features.

This section is modular which means that you can carry out the exercises in any order, as long as the prerequisites are followed (represented by arrows).

See the chart below for more information:

Note:

Kindly note that the RIO exercise is similar to migration from a Quantum PLC with X80 modules to a M580 PLC with X80 modules.

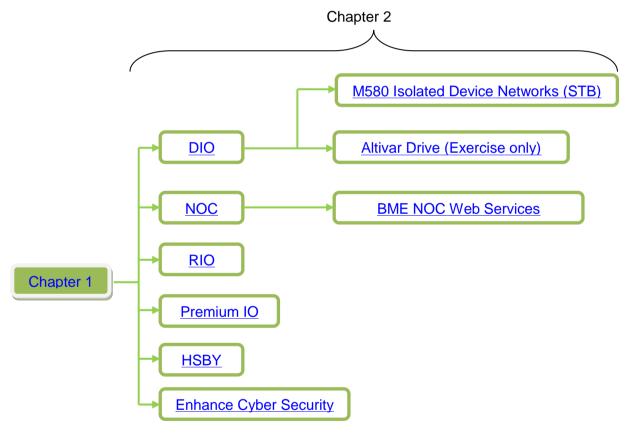
You can click the different items to jump directly to the topic.

Overview (cont.)

Use the same application for all exercises or base the new project on the one created in the first chapter.

Most exercises can be fulfilled in Simulation Mode; however some require the user to have some hardware to complete steps. When this is the case it will be stated at the beginning of the exercise.

Once familiar with the features of chapter two; you can discover the other possibilities of the M580 in Chapter 3. These features will only be mentioned, in case you want to implement them, you may go through the M580 configuration course.



DIO

Introduction	Device Type Manager (DTM) through Ethernet allows DIO drop integration with almost any device to the architecture.
	Configuring a DTM device is done in two steps:
	Installing the DTM in Unity Pro common to all FDT/DTM devices
	Configuration of the device through Unity Pro's DTM window specific to each device.
	As a generic configuration for all devices cannot be provided DTM configuration is illustrated through one of the most advanced examples of device integration: The integration of an Altivar drive through Unity Pro.
Topic Objectives	By the end of this section the student will be able to:
	Install and add a DTM in Unity Pro
	 Configure the basic settings of an Altivar drive
	Test the communication with an Altivar drive

Exercise - Install a DTM in Unity Pro

Learning Outcomes	By the completion of this exercise the student will:
	Install a DTM library in Unity Pro
	Add a DTM device in a Unity Pro project
Equipment Required	This exercise is purely software based, so the student will only need Unity Pro v8.0 or later version, and an internet connection.

Install the DTM on the computer.

i. Obtain the DTM from the device vendor.

Note:

If using a Schneider-Electric device, its DTM can be obtained from the Schneider-Electric website.

For instance you can download the Altivar Process DTM here.

- ii. Double click the file, and follow the instructions to install the DTM.
- iii. If **Unity Pro** was closed restart it.
- iv. If the install went well this message will be seen when Unity Pro starts.
- v.



vi. Click Yes.

vii. Note that the catalogue has been updated:

viii.

Information: The Update of the Dtm catalog is finished

Add the device in Unity Pro project.

i. Open the DTM window by selecting **Tools DTM Browser**.

Tools Build PLC Debug	g Window	He	
✓ Project <u>B</u> rowser	Alt+1		
Hardware Catalog	Alt+2		
Types Library Browser	Alt+3		
Operator Screen Library	Alt+4		
Search / Replace	Alt+5		
Diagnostic Viewer	Alt+6		
PLC Screen	Alt+7		
Variable Window	Alt+8		
✓ <u>D</u> ata Editor	Alt+9		
DTM Browser	Alt+Shift+1		
Book <u>m</u> arks	Alt+Shift+2		
<u>T</u> rending tool			
Project Comparison			
Convert Partially			
Network Inspector			
E Types Library Manager			
<u>C</u> ustomize			
Options			
Project Settings			

- ii. In the DTM window right click the M580, and click Add
- iii. The following window should pop-up, select the ATV6xx and click **Add DTM**.

Device	Type	Vendor	Version	Date
140NOC77100 (from EDS)	Device	Schneider Electric	1.1	0010
140NOC77101 (from EDS)	Device	Schneider Electric	1.1	
140NOC78000 (from EDS)	Device	Schneider Electric	1.52	
140NOC78100 (from EDS)	Device	Schneider Electric	1.52	
Advanced Generic EDS	Device	Schneider Electric	1.1.19.0	
ALTIVAR61 Revision 1.5 (from E	Device	Schneider Electric	1.5	
ALTIVAR61 Revision 2.1 (from E	Device	Schneider Electric	2.1	
ALTIVAR71 Revision 1.6 (from E	Device	Schneider Electric	1.6	
ALTIVAR71 Revision 2.7 (from E	Device	Schneider Electric	2.7	
ALTIVAR71 Revision 3.3 (from E	Device	Schneider Electric	3.3	
ATV6xx	Device	Schneider Electric	1.3.28.5	2015-04-20
BME AHI 0812	Gateway	Schneider Electric	1.1.2.0	2015-06-26
BME AHO 0412	Gateway	Schneider Electric	1.1.2.0	2015-06-26
BMEH582040 (from EDS)	Device	Schneider Electric	2.1	
BMEH584040 (from EDS)	Device	Schneider Electric	2.1	
BMEH586040 (from EDS)	Device	Schneider Electric	2.1	
BMENOC0301 (from EDS)	Device	Schneider Electric	1.1	
BMENOC0301 Revision 2.2 (from	Device	Schneider Electric	2.2	
BMENOC0311 (from EDS)	Device	Schneider Electric	1.1	
BMENOC0311 Revision 2.2 (from	Device	Schneider Electric	2.2	
BMEP581020 (from EDS)	Device	Schneider Electric	1.3	
RMED591020 Dovision 2.1 (from	Douico	Schnoidor Electric	21	
Add DTM				Close

iv. If the Device does not appear in the list something probably went wrong when installing the DTM in Window.

Exercise - Install a DTM in Unity Pro (cont.)

Note:

6

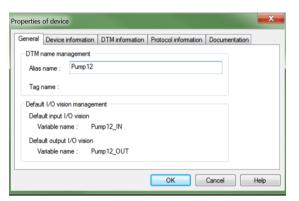
The following points may be different if a different device is being configured.

- v. In the case of the Altivar drive select which protocol will be used between the M580 and the drive
- vi. For this exercise select **Modbus over TCP**.
- vii. Call the device Pump12, and click **OK**.

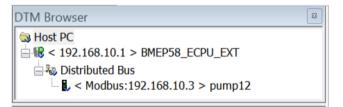


It is recommended not to change the device name after configuration, so be careful when typing in the name.

viii. The name of the variable will be used in the next exercise so make sure it is exactly pump12 otherwise errors will be seen when importing the section.



ix. The device now appears in the DTM browser, below the device it is connected to:



Exercise - Configure an Altivar Drive

Overview	The DTM is now installed in Unity Pro .
	This means that the specific parameters of the device now need now need to be configured through Unity Pro.
	The configuration of this drive will take less than 30 minutes, which is much shorter than the usual time to configure a drive.
Learning Outcomes	By the completion of this exercise the student will:
	Configure an Altivar drive
	Test the functioning of an Altivar drive
Equipment Required	To complete this exercise on a PLC the student will need
-	➢ One M580 PLC (any CPU)
	➢ A compatible rack and power supply
	➢ An Altivar drive
	An Ethernet cable
	Select the drive

Select the drive

- i. Double click the device in the DTM browser.
- ii. Select the drive required using the various filters. (This can be changed later at any time).
- iii. For this exercise use an **ATV630D11M3**.
- iv. Click **OK**.



Exercise - Configure an Altivar Drive (cont.)

Create the DFB controlling the drive

- i. Double click the drive in the DTM window.
- ii. In the newly opened window click the Parameter List tab

My Device	My Dash	board	Parameters List		Diagnostics ×	Parameters Layout	×	Display	×	Scop
		r Process te Device Tepplogy	Characteri Reference Hardware Supply Vol Nominal Pi Nominal Ci Device Nat Alias Name	Type tage ower urrent me	ATV630D11M3 IP21/P212 200_240V/ThreePhase 11KW15HP 46.8A Pump12					
Structure										
Card	Reference	Serial Number	Fieldbus	Address	Version					
Device	ATV630D11M3				V1.3/EXX					
Control Board										
Power Board										

- iii. Scroll down the list on the left;
- iv. Expand Port Modbus TCP
- v. Click Protocol and Drive Profiles:

Pump		1	Parameters List	Parameters Layou	 X Diagno Search 	atics ×	Display	
-Pump Funct								Canad Contract Contract
Pump Monit	onng	Code	Long Label	Current Value	Default Value	Min Value	Max Value	Logical address
Fieldbus		BFR	Basic frequency	50Hz IEC	50Hz IEC			3015
Pon - Modo	us Senai	NPR	Nominal motor power	11 KW	11 KW	2.2 KW	18.5 kW	9613
B Port - Modb	us TCP	UNS	Nominal motor voltage	230 V	230 V	100 V	240 V	9601
Generic	Sattings	NCR	Nominal motor current	36.9 A	36.9 A	11.7 A	70.2 A	9603
	& Drive Profiles	FRS	Nominal Motor Frequency	50 Hz	50 Hz	40 Hz	500 Hz	9602
	& Unive Prohies	NSP	Nominal motor speed	1450 rpm	1450 rpm	0 rpm	65535 rpm	9604
-FDR		COS	Motor 1 Cosinus Phi	0.85	0.85	0.5	1	9606
DNS		TCC	2/3-wire control	2-wire control	2-wire control			11101
SNTP		TFR	Max frequency	60 Hz	60 Hz	10 Hz	500 Hz	3103
SNMP		ITH	Motor Thermal Current	35.9 A	36.9 A	9.36 A	51.48 A	9622
		ACC	Acceleration ramp time	10 s	10 s	0 s	999.9 s	9001
Security		DEC	Deceleration ramp time	10 s	10 s	0 s	999.9 s	9002

- vi. Select the I/O Profile drop down list and click Altivar DFB.
- vii. This will automatically create a DDT controlling the drive upon the next Building of the project.

Exercise - Configure an Altivar Drive (cont.)

viii. Click **OK** to validate the changes.

9 ? device not connected		□
My Device My Dashboar	Parameters List Parameters Layout × Diagnostics	× Display × Scope
Fieldbus Port - Modbus Serial Port - Modbus TCP Generic Settings Protocol & Drive Profiles PR DW	Protocols & Drive Profiles	The FLC must be stopped before a change of the IO Profile is taken
- SNMP	inputs (Drive to Controller) Connol Connol Controller	Outputs (Controller to Drive)
Disconnected 0 Data Set		OK Cancel Apply

- ix. Build the project to instantiate the DDT.
- x. A DDT called Pump12 has now been added to the variable list:

	DDT Types	Function Blocks	DFB Types				
Filter	T 🖏	Name 🔳 🏌		V EDT	DDT		»
Name				• ,	Туре		
. ; 🔶 i					INT		
÷	MOD_COM	_1			T_M_CR	A_EXT_IN	
÷	Pump12				T_Pump		
÷	BMEP58_E	CPU			T_BMEP	58_ECPU	
4	111						- P

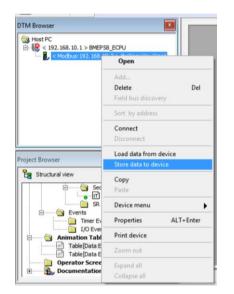
Transfer the project to the drive and the PLC

i. Plug the Ethernet cable into the Drive and in a port of the M580 that allows connections to DIO drops.



If you are un sure of which port is required, refer to M580 embedded Ethernet Prots in first chapter p 25.

- ii. Build transfer and run the project to the PLC as usual.
- iii. We also need to transfer the project to the drive;
- iv. Right click the M580 in the DTM window, and select connect to the M580 via the FDT/DTM technology.
- v. Then right click the drive and select store data to device.



vi. Read the following warning message and press the key combination asked in the message.

alog Box: SafetyPopup.FirstActivationDangerScreen	
UNINTENDED EQUIPMENT OPERATION	
A machine controlled by this software can be prone to unintended operation. This software is for set-up and commissioning purposes only.	
Do not use this software for real size control of the devices of The user much threes hardwise 50° devices of disconcet stuchts to arrays it is possible to stop the equipment. When the second study of th	
Failure to follow these instructions will result in death or serious injury.	
If you agree to follow these instructions, press 'Alt+F'.	
Cancel	

Test the communication using the Device DDT (Hardware is required for this section)

i. From the animation table make sure that the **SCANNER_OK** has a value of 1. This means that the M58 is properly connected to a device.

Modification	Force	2		
lame	• .	Value	Туре •	Comment
BMEP58_EC	PU		T_BMEP58_E	
ETH_STAT	TUS	195	WORD	Ethernet status
PORT1_LINK		1	BOOL	Link up/down for Et
PORT2_LI	NK	1	BOOL	Link up/down for Et
PORT3_LI	NK	0	BOOL	Link up/down for Et
ETH_BKP	PORT_LI	0	BOOL	Link up/down for Et
	IK	0	BOOL	Link up/down for HS
- REDUND	ANCY ST	0	BOOL	Redundancy status
SCANNER	OK	1	BOOL	Scanner OK and sc.
GLOBAL	STATUS	1	BOOL	0: one or more servi.
 SERVICE 		65437	WORD	One bit for each use
		1	BOOL	0: service not operat
PORT502	SERVICE	1	BOOL	0: service not operat
SNMP_SE	RVICE	1	BOOL	0: service not operat
MAIN IP	ADDRES	1	BOOL	Main IP Address St.
> ETH_BKP	FAILURE	0	BOOL	Ethernet backplane
ETH BKP	ERROR	0	BOOL	Ethernet backplane
BIP_SCAN	INER	1	BOOL	0: service not operat
MODBUS	SCANNER	1	BOOL	0: service not operat
NTP_SER	VER	1	BOOL	0: service not operat
SNTP CLI	ENT	1	BOOL	0: service not operat
WEB_SEF	RVER	1	BOOL	0: service not operat
FIRMWAR	E UPGR	1	BOOL	0: service not operat
		1	BOOL	0: service not operat
FDR_SER	VER	1	BOOL	0: service not operat
EIP_ADAF	TER	1	BOOL	EIP Adapter (Server
SERVICE	STATUS2	3	WORD	One bit for each use
	DDRESS	1	BOOL	0 in case of duplicat.
LLDP SEP	RVICE	1	BOOL	LLDP service status
-> ETH_POR	T_1_2_S	177	BYTE	Ethernet port 1 and
-> ETH_POR	T3_BKP	51	BYTE	Ethernet port 3 and
IN_PACKE	TS	57093	UINT	Number of packets r
IN_ERROR	RS	0	UINT	Number of Inbound
OUT_PAC	KETS	38526	UINT	Number of packets .
- OUT_ERR	ORS	0	UINT	Number of Outboun
CONF_SIC		0	UDINT	Signature of all files
B CRA CNX	HEALTH		ARRAY[116]	
			ARRAY[07]	DIO Connection he.
			T DIO CTRL	CTRL Bits for DIO O

This means that the communication between the Altivar drive and the PLC is good.

Exercise - Configure an Altivar Drive (cont.)

Control and diagnose the drive from the DTM window (Hardware is required for this section)

- i. Double click the drive in the DTM window.
- ii. Enable the command from the DTM window by clicking **enable**:



iii. Set a speed by moving the scale button, and run the drive by clicking run.



- iv. The drive should now start and the value of the speed displayed in the DTM window should change.
- v. Go to the diagnostic tab to ensure all parameters are **OK**.

	Parameters List Parameters Layout	Diagnostics × Display Scope ×
3- Drive Summary	Save Errors status and History as part of the project	
- Errors - Active Warning - Warning History	Last error :	Embedded Ethernet communication interruption [ETHF]
Warning Groups	Last Warning :	Fan Feedback Warning [FFDA] 00/00/0000 00:00
G: Embedded Elhernet	- Warning Group 1 :	: Active
	- Warning Group 2 :	: Inactive
	- Warning Group 3 :	: Inactive
	- Warning Group 4 :	: Inactive
	- Warning Group 5	: Inactive
	Drive state (HMIS) :	: Ready
	Drive running time (PTH) :	: 1:00:23
	Motor running time (RTH) :	: 0:02:02
	Number of motor starts (NSM) :	: 6
		OK Cancel Apply
Command Motor Enable Run Disable Stop	Direction Speed Perword 0 Hz 19.4 + 50 Hz Reverse	z 0 rpm NOF Clear Device Visual Localization RDY

vi. Go back to the my device tab to disable the command from the DTM window

Connect the Device DDT to the DFB

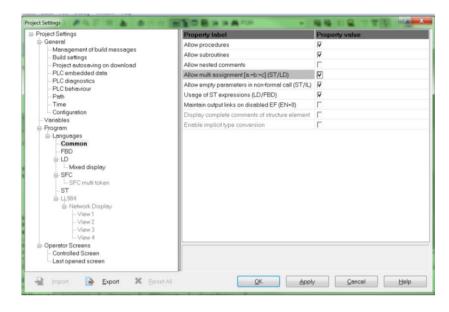
- i. Import the Pump12FDB.xbd section And the Pump12OS.xcr Operator screen located here into the project.
- ii. Build the project.

Tools Build PLC Debug	Window	He
✓ Project Browser	Alt+1	
<u>H</u> ardware Catalog	Alt+2	
Types Library Browser	Alt+3	
Operator Screen Library	Alt+4	
Search / Replace	Alt+5	
Diagnostic Viewer	Alt+6	
PLC Screen	Alt+7	
Variable Window	Alt+8	
<u>D</u> ata Editor	Alt+9	
✓ DTM Browser	Alt+Shift+1	
Book <u>m</u> arks	Alt+Shift+2	
Trending tool		
Project Comparison		
Convert Partially		
Network Inspector		
E Types Library Manager		
<u>C</u> ustomize		
Options		
<u>P</u> roject Settings		

Note:

If the following error is seen: "E1203 usage of multi assignment statements is disabled" refer to Tools Project Settings

iii. In /Program/Languages/Common and tick the Allow multi assignment box.



Note:

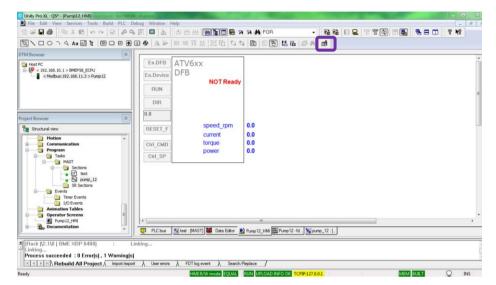
If you have "E1208 usage of dynamic arrays is disabled", in the project settings click variables and tick "allow dynamic arrays".

Project Settings	Property label	Property value
⊜-General	Allow leading digits	Г
 Management of build messages Build settings 	Character set	Standard
 Project autosaving on download 	Allow usage of EBOOL edge	2
- PLC embedded data	Allow INT/DINT in place of ANY_BIT	2
- PLC diagnostics	Allow bit extraction of INT, WORD and BYTE	2
- PLC behaviour - Path	Directly represented array variables	Γ
Time	Allow dynamic arrays (ANY_ARRAY_XXX)	
Configuration	Disable array size compatibility check	r.
Variables	Enable fast scanning for trending	Г
Program Anguages	Force references intialization	V

iv. Build the project again.

Test the drive from an operator screen [Optional] (Hardware is required for this section)

- i. Build and transfer the project to the PLC and the drive then Run it.
- ii. Open the operator screen and enable write variable modification.



- iii. Note: If the text Ext.controlled is displayed it probably means that did not disabled the control form the DTM window (redo the steps at the end of 5 "Control and diagnostic" the drive from the DTM window).
 - En.DFB ATV6xx Hos < 192.168.10.1 > BMEP58_ECPU < Modbus: 192.168.11.3 > Pump12 En.Device DFB NOTReady RUN DIR 0.0 speed rpm RESET_F 0.0 0.0 0.0 torque Ctrl_CMD Ctrl_SP -💷 PLC bus 🔄 test : [MAST] 👹 Data Editor 📓 Pump12_HMI 🗱 Pump12 · fd... 🕵 pump_12 : [...] ocess succeeded : 0 Error(s) , 1 Warning(s) λ Useremons λ FDT log event λ Search/Replace / Rebuild All Project / Import/eq de EQUAL RUN UPLOAD I
- v.

iv.

- The device should start running and the speed should be actuated in the operator screen.
- vi. NOTE: The values aren't actuated in the DTM window.
- vii. **Stop** the drive when finished.
- viii. The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.

Summary

Summary	In this chapter the following topics have been covered:
	 Installing a DTM in Windows How to add a DTM in Unity Pro Configuring an Altivar drive through Unity Pro Testing an Altivar Drive through Unity Pro
Questions	The following questions will help to check understanding of the topics covered in this chapter:
	What kind of device can be included in a DIO drop?
	\searrow What is the main advantage of device integration? (Now can take the Altiver

What is the main advantage of device integration? (You can take the Altivar drive as an example)

Introduction	The first chapter explained the use of the different ports of the M580: Connecting to RIO or DIO drops or to a third party client such as a SCADA or Unity Pro.
	A NOC's role is quite similar: Connected to DIO drops or a SCADA. Doing so, will extend the number of drops connected to the M580 rack, as well as freeing bandwidth and CPU usage for the M580.
	This chapter will explain how to configure a NOC; Once the NOC is configured a DIO drop will be connected to it, as per the DIO chapter, or connect it to the SCADA system.
Topic Objectives	By the end of this section the student will be able to:
	Configure an NOC both for SCADA applications or to connect to DIO drops

Exercise - Distributed Devices via a NOC

Learning Outcomes	By the completion of this exercise the student will be able to:					
	Implement an isolated distributed device network using the BME NOC 0311 module					
	Integrate a distributed device using Modbus/TCP					
	Monitor and control the health of a device via the available DDTs.					
Equipment & Software Required	This exercise requires the Advantys software. To complete this exercise on a PLC the following equipment is required:					
-	➢ One NOC 0311					
	➢ One M580					
	One compatible rack					

- > One compatible power supply
- > STB Modules

Add the BME NOC 0311 to the Local Rack.

i. Open the **PLC Bus** and insert the **BME NOC 0311.2** module into the correct slot as per the hardware configuration.

Topological Address:		0.3	OK Cancel
Part Number	Description		Help
Modicon M580 local drop			
Analog			
Communication			
- BME NOC 0301	Ethernet Communication Module		
BME NOC 0301.2	Ethernet Communication Module		
BME NOC 0311	Factory Cast Ethernet Module		
BME NOC 0311.2	Factory Cast Ethernet Module		
BMX EIA 0100	AS-interface Module V3		
- BMX NOC 0402	Ethernet 4 Port 10/100 RJ45		
- BMX NOM 0200.2	Bus Module 2 RS485/232 port (SV >= V1.2)		
- BMX NOR 0200	Ethernet 1 port 10/100 RJ45 - RTU		
BMX NRP 0200	Fiber Converter MM/LC 2CH 100Mb		
BMX NRP 0201	Fiber Converter SM/LC 2CH 100Mb		
Counting			
Discrete			
Motion			
Third party products			

ii. Use the default name and click the **OK** button.

Configure the IP address of the BME NOC 0311.

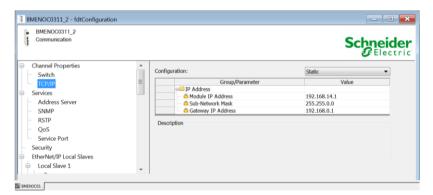
i. View the DTM Browser by selecting Tools » DTM Browser.



ii. In the DTM manager, right-click the **BMENOC0311** and select **Open** from the menu.

DTM Browser	×	
Host PC		
└─ 🕻 < 192.168.14.1 > BMENOC0311_2	Open	
	Add	
	Delete	Del

iii. In the browser tree, select **TCP/IP**.



- iv. From there, you can see the IP address assigned to the device. In the picture: 192.168.14.1. This IP is assigned by the PLC, and can't be changed.
- v. Close the window.
- vi. The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.

Summary

Summary	In this chapter the following topics have been covered:
	 How to add a NOC in Unity Pro Configuring a NOC
Questions	The following questions will help to check understanding of the topics covered in this chapter:
	> What are the possible roles of a NOC?

M580 Isolated Device Networks

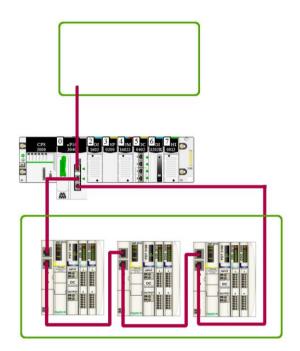
Introduction	Distributed I/O can be combined with RIO on a single network to reduce wiring and installation costs. However, with a large amount of DIO, this can impact performance of both the RIO and DIO networks.
	A solution is to isolate the Distributed I/O onto a separate network. This chapter details the techniques for this and how to use the BME NOC to achieve network isolation.
Topic Objectives	By the completion of this topic you will be able to:
	Understand the difference between combined and isolated Device Networks
	Investigate possible network architectures
	Configure an Isolated Device Network using the BME NOC 0311
	Use the BME NOC 0311 Web Services
	Configure a FactoryCast Web page

Device Networks	2-22
BME NOC 03*1	2-24
BME NOC Web Services	2-38
FactoryCast	2-42

Device Networks

Distributed Devices A **distributed device cloud** is one or more **distributed devices** that are daisy chained or linked to a standard switch or service port in the M580 architecture.

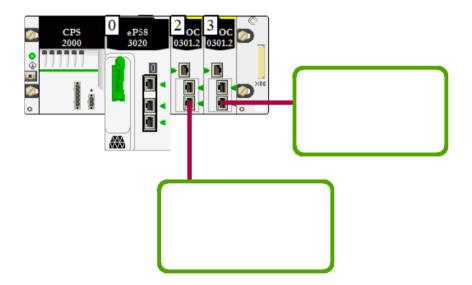
A cloud can be connected to the main ring via a dual-ring switch (DRS), or it can be isolated via a direct connection to an M580 CPU with the DIO Scanner Service or an Ethernet module (**BME NOC 03x1**) in the Local Rack.



A single connection allows a single device or multiple devices to be "daisy chained" shown above the CPU in the picture above. The configuration shown below the CPU is a Daisy Chain Loop

Isolated Device Networks

Isolated Distributed Device Network The **second** way to integrate **distributed devices** is to separate them from the M580 Ethernet Remote I/O network. This allows for optimum utilisation of resources. Daisy chain loops are supported. We will not learn how to do this in this training.



BME NOC 03*1

BME NOC

The **BME NOC 03*1** is a replacement for the BMX NOC 0402. Physically it is almost the same but only has three Ethernet ports on the front of the module. The fourth port has been moved to the back of the module to connect with the Ethernet bus on the rack.



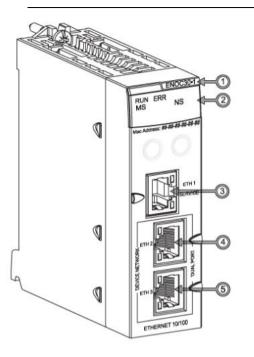
It is functionally similar to the BMX NOC 0402 although it has Cyber Security built in. It also does not require the Interlink cable that is used by the BMX NOC 0401 to communicate with the processor.

Note:

Although the BME NOC 03*1 has multiple RJ45 ports it only has a single IP address.

BME NOC 03*1 (cont.)

Module Description



Item	Description	Function
1	Module Name	BME NOC 0301 or BME NOC 0311
2	LED Array	Module status and diagnosis
3	Service Port	Used for programming, diagnostics, SCADA, HMI etc.
4	Device Network Port (ETH2)	Ethernet comms to distributed devices
5	Device Network Port (ETH3)	Ethernet comms to distributed devices



The two device Network ports can provide redundant connections to distributed devices.

BME NOC 03*1 (cont.)

Features

The BME NOC module provides the following features:

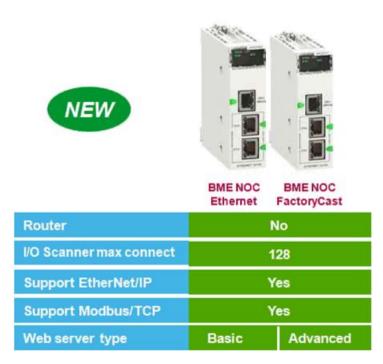
- ➢ I/O Scanner
- Modbus TCP Server
- ➢ HTTP Server
- Address server for connected Ethernet Devices
- SNTP client
- FactoryCast Server (0311 only)

The I/O scanner provides EtherNet/IP and TCP/IP scanner services for communication to distributed equipment on a DIO network.

The HTTP server provides access to the modules web pages using a standard web browser.

The FactoryCast server also includes a FTP server and allows the creation of basic HMI pages for web animation

Feature Comparison Both modules support all features except FactoryCast Enhanced Web Server which is only available on the BME NOC 0311.



Exercise - Distributed Devices via a NOC

Learning Outcomes By the completion of this exercise the student will be able to:

- Implement an isolated distributed device network using the BME NOC 0311 module
- > Integrate a distributed device using **Modbus/TCP**
- Monitor and control the heath of a device via the available DDTs.
- > Isolate the Distributed I/O from the rest of the Ethernet architecture.

Add the BME NOC 0311 to the Local Rack.

1 Open the **PLC Bus** and insert the **BME NOC 0311.2** module into the correct slot as per the simulator being used.

Part Number ■ Modeon MS80 local drop ■ Analog ■ Communication ■ BME NOC 0301 ■ BME NOC 03012 ■ BME NOC 0311 ■ BME NOC 03112 ■ BME NOC 03112	Description Ethernel Communication Module Ethernel Communication Module Factory Cast Ethernel Module Factory Cast Ethernel Module Factory Cast Ethernel Module	Help
Communication BME NOC 0301 BME NOC 0301.2 BME NOC 0311 BME NOC 0311 BME NOC 0311.2 BMX EIA 0100	Ethernet Communication Module Factory Cast Ethernet Module	
BME NOC 0301 BME NOC 03012 BME NOC 0311 BME NOC 03112 BMX EIA 0100	Ethernet Communication Module Factory Cast Ethernet Module	
BME NOC 0301.2 BME NOC 0311 BME NOC 0311.2 BMX EIA 0100	Ethernet Communication Module Factory Cast Ethernet Module	
BME NOC 0311 BME NOC 0311.2 BMX EIA 0100	Factory Cast Ethernet Module	
BME NOC 0311.2 BMX EIA 0100		
BMX EIA 0100	Easters Oast Ethernet Medule	
	AS-interface Module V3	
- BMX NOC 0402	Ethernet 4 Port 10/100 RJ45	
BMX NOM 0200.2	Bus Module 2 RS485/232 port (SV >= V1.2)	
- BMX NOR 0200	Ethernet 1 port 10/100 RJ45 - RTU	
BMX NRP 0200	Fiber Converter MM/LC 2CH 100Mb	
BMX NRP 0201	Fiber Converter SM/LC 2CH 100Mb	
Counting		
B Discrete		
Motion		
Third party products		
Products Third party products		

2 Use the default name and click the **OK** button.

Configure the IP address of the BME NOC 0311.

1 View the **DTM Browser** by selecting **Tools** » **DTM Browser**.

✓ Project <u>B</u> rowser	Alt+1
Hardware Catalog	Alt+2
Iypes Library Browser	Alt+3
Operator Screen Librar	y Alt+4
Search / Replace	Alt+5
Diagnostic Viewer	Alt+6
PLC Screen	Alt+7
<u>V</u> ariable Window	Alt+8
Data Editor	Alt+9
DTM Browser	Alt+Shift+1
Bookmarks	Alt+Shift+2
Trending tool	
Convert Partially	
Convert Partially	ager
Convert Partially Network Inspector	-
Convert Partially Network Inspector Ethernet Network Man	-
Convert Partially Network Inspector Ethernet Network Man Types Library Manager	-

2 In the DTM manager, right-click the **BMENOC0311** and select **Open** from the menu.



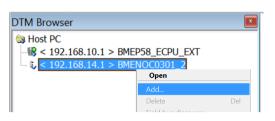
3 In the browser tree, select TCP/IP.

BMENOC0301_2 Communication		Schneid
Services	Configuration:	Static
Address Server	Group/Parameter	Value
- SNMP	□□ IP Address	
	- 👛 Module IP Address	192.168.14.1
- RSTP	- 👛 Sub-Network Mask	255.255.0.0
- QoS	- 🖾 Gateway IP Address	192.168.0.1
Service Port	Description	
Help		OK Cancel App

- **4** Note that the IP address is automatically set. In the above picture it is set to 192.168.14.1.
- 5 Click the **Cancel** button.

Add the Advantys STB DTM.

1 Right-click the **BMENOC0311** and select **Add...** from the menu.



2 Locate and Select the **STB NIP2x1x** item from the list of available DTMs. Click the **Add DTM** button.

		Type	Vendor	Version	Date	
Schneider TCSESM	08XXXXXX R	Device	Schneider Electric	1.1		
Schneider TCSESM	08XXXXXX R	Device	Schneider Electric	1.2		
Schneider TCSESM	10XXXXXX R	Device	Schneider Electric	1.1		
Schneider TCSESM	10XXXXXX R	Device	Schneider Electric	1.2		1
Schneider TCSESM	16XXXXXX R	Device	Schneider Electric	1.1		
Schneider TCSESM	16XXXXXX R	Device	Schneider Electric	1.2		
Schneider TCSESM	16XXXXXX R	Device	Schneider Electric	1.3		
Schneider TCSESM	24XXXXXX R	Device	Schneider Electric	1.1		
Schneider TCSESM	24XXXXXXX R	Device	Schneider Electric	1.2		
STB NIC:	2212	Device	Schneider Electric	2.x, 3.x		
STB NIP:	2x1x	Device	Schneider Electric	1.x, 2.x,		
STBNIC2212 (from EDS)	Device	Schneider Electric	2.10		
TSXETC100 (f	rom EDS)	Device	Schneider Electric	1.1		
TSXETC101 (f	rom EDS)	Device	Schneider Electric	1.1		
TSXETC101 Revisio	on 2.1 (from E	Device	Schneider Electric	2.1		
AMCI-NR25-ENI	P (from EDS)	Device	Advanced Micro Co	1.2		
	(from EDS)	Device	Advanced Micro Co	1.3		
AMCI-NX1F2E		Device	Advanced Micro Co	1.3		
AMCI-NX1F2E AMCI-NX1F4E	(from EDS)					
		Device	Advanced Micro Co	1.3		
AMCI-NX1F4E	(from EDS)	Device	Advanced Micro Co Advanced Micro Co	1.3 1.3		
AMCI-NX1F4E AMCI-NX2A4E	(from EDS) (from EDS)					=

This DTM is installed by the Advantys Configuration Software.



If there the STB NIP2x1x does not appear in the list; check your installation of Avantys.

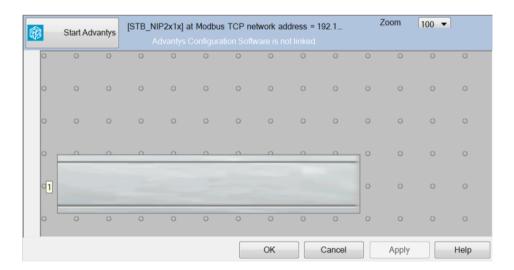
3 Use STBNIP2311_NOC for the DTM Alias name.

Properties of device	
General Device info	rmation DTM information Protocol information
DTM name manag	ement
Name :	STBNIP2311_NOC
Default I/O vision r	nanagement
Variable name :	STBNIP2311_NOC
Type name :	T_STBNIP2311_NOC
	OK Cancel Help

Be aware of the $Variable\ Names$ that are being created based upon the Alias Name.

Use the DTM to configure the new module.

1 Double-click the new **STB** item within the **DTM Browser**. The DTM will open and will show a view of an empty island configuration.

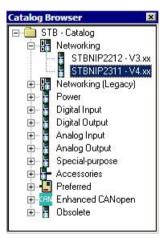


2 Click the Start Advantys button.

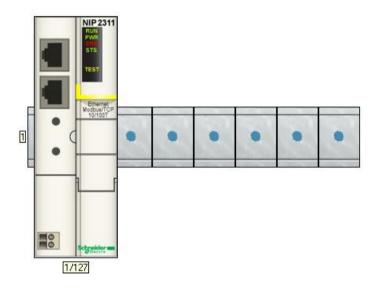
The **Advantys Configuration Software** will open, and a **Blank** configuration is shown.

Advantys - [STB_NIP2311_RIO]	
Rile Edit View Island Online Options Window Help	OO _B×
	Catalog Browser
Catalog of STB modules for Advantys Configuration Software - standard version.	Offline

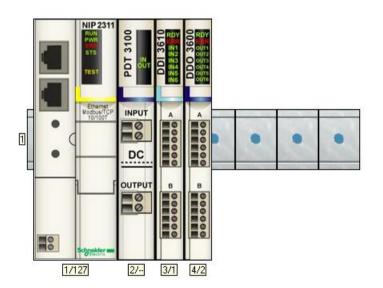
3 From the **Catalog Browser**, expand the **Networking** family and select the **STBNIP2311 - V4.xx** NIM (Network Interface module).



4 To add the **NIM** to the configuration either double-click the **STBNIP2311 - V4.xx** or drag & drop it to the empty island.



5 Configure the remaining components of the island using the same method as above.

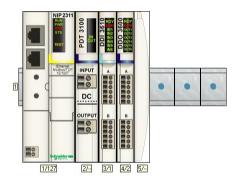


The remaining components can be located in the **Catalog Browser** in the **Power**, **Digital Input** & **Digital Output** families respectively.

6 The last item to add is the terminator that resides at the end of the Island. Locate the **STBXMP1100 - V1.xx** from the **Accessories** family and add it to the Island.



The Island configuration should now look similar to this.



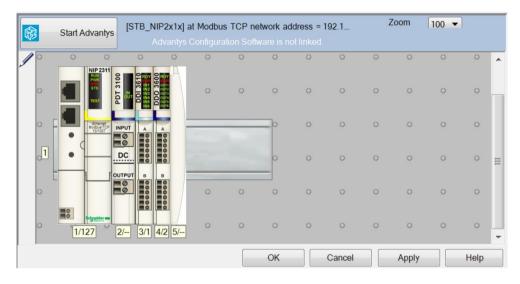
7 The final step is to save the configuration. Using the Advantys Configuration Software toolbar, click File » Save, this will build the Island and then Export the data back to Unity Pro.

STB_NIP2311_RIO

2013-08-05 15:10:04 - Generation of "DDXML Communication" sections. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - data type definition. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - module type definition. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - module instance definition. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - module description. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - module description. 2013-08-05 15:10:04 - Generation of "DDXML Application Process" sections - module description. 2013-08-05 15:10:04 - Creating output file C:\temp\FDTDTM\3BD4BFEC-1AB5-49b9-B333-DE2147D33645\DTMBulkdata\64154e6c-73b3-403e-b343-84fdef231653 \DdxmLxml. 2013-08-05 15:10:04 - Export completed successfully. 8 Close Advantys Configuration Software.

The DTM in **Unity Pro** is updated accordingly.

9 Click the **OK** button.

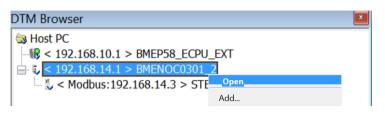


10 Close the DTM.

Exercise - Distributed Devices via a NOC (cont.)

Configure the IP settings of the STB via the BME NOC DTM.

1 From the **DTM Browser**, right click the BME NOC DTM **BMENOC0311** and select **Open...** from the popup menu.



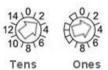
The BME NOC DTM will open.

BMENOC0301_2 Communication			Schneic GElec	ler tric
Switch TCP/IP Services Address Server		Global policy	Enforce Security	
SNMP RSTP QoS Service Port		Services FTP : TFTP :	Disabled	
Security Implementation of the security of th	+	<	OK Cancel A	pply

2 Locate the **Device List**, select the **STBNIP2311_NOC** item, and then select the **Address Setting** tab. Configure the **Address Server** settings as follows, ensure the **Identifier** uses the correct format as shown below.

BMENOC0301_2 Communication				Sc	hn G	eic	le	r
Local Slave 14	Properties	Address Setting	Request Setting					
Items								
Local Slave 15	Configuratio	n						
Items	IP Address:		192	. 168 .	14 .	23		Ξ
Local Slave 16								
Items	Subnet Mask	c	255	. 255 .	0.	0		
Device List								
[000] STB_NIP2x1x <mdb: 1<="" td=""><td>Gateway:</td><td></td><td>192</td><td>. 168 .</td><td>14</td><td>1</td><td></td><td></td></mdb:>	Gateway:		192	. 168 .	14	1		
Logging	· · ·		172	. 100 .		-		Ŧ
۰ III ۲	•		III					
Help			ОК	Ca	ncel	Ap	oply	

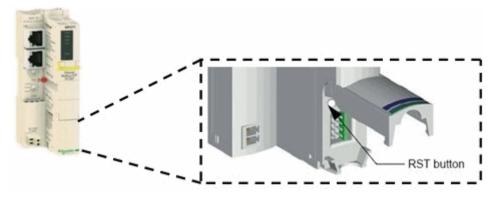
By doing this, the PLC will assign the IP Address 192.168.11.23 to the STB with role name of $\mathtt{STBNIP2311}_{OXX}$. To match this name, on the simulator, set the rotary switches on the front of the STB to 3 for ones, and 2 for Tens.



- 3 Click the **OK** button to accept the changes.
- **4 Build** the application.
- **5 Save** the application.

Auto-configure the Advantys STB Island

- **1** Power cycle the Advantys STB island, so it will take into account the new rotary switches configuration.
- 2 Open the front door of the Network Interface Module (NIM).
- **3** Using a screw driver, **press and hold** the **RST** button for 3 seconds to reset the Island to its factory settings. (This action has nothing to do with the IP Address: It is just to reset the modules configuration).



4 When the reset is done, both **PWR** and **RUN** LEDs should be steady on.

Test the Distributed Device.

Connect, Transfer and RUN the application.

- **5** Use a Red patch cable to connect the **Device** port of the NOC to one of the available Ethernet ports on the **STBNIP2311**.
- 6 Open the **Data Editor**, select the **STBNIP2311_NOC** variable and add it to an **Animation Table**.

Exercise - Distributed Devices via a NOC (cont.)

7 Expand the structure and click the **Modification** button to be able to modify the values of this variable.

Modification Force	5	N 5 8 🖩 🗲 H	
lame 🔻	Value	Type 🔻	Comment
- STB_NIP2311_RIO		T_STB_NIP2311_RIO	
- Sreshness	1	BOOL	Global Freshness
	1	BOOL	Freshness of Object
🗐 🗇 Inputs		T_STB_NIP2311_RIO_IN	Input Variables
🔶 ID3_Input_Data	3	BYTE	
🔶 Free0	0	BYTE	Unused Variable
🔷 ID3_Input_Status	0	BYTE	
🔶 Free 1	0	BYTE	Unused Variable
🐤 ID4_Echo_of_Output	1	BYTE	
🔶 Free2	0	BYTE	Unused Variable
🐤 ID4_Output_Status	0	BYTE	
👆 🔶 Free3	0	BYTE	Unused Variable
🖻 🗂 Outputs		T_STB_NIP2311_RIO_OUT	Output Variables
🔶 ID4_Output_Data	1	BYTE	
🗄 📲 📕 Free4		ARRAY[02] OF BYTE	Unused Variable
🔶 Free4[0]	0	BYTE	
🔶 Free4[1]	0	BYTE	
Free4[2]	0	BYTE	

- 8 Set a value to **ID4_Output_Data** and observe the outputs of the STB on the simulator.
- **9** Add the **BMENOC0311.MODBUS_SCANNER** variable to the **Animation Table**, confirm the Distributed Device Service (Modbus Scanner) is now in operation.

MODBUS_SCANNER	1	BOOL

- **10** Save the application.
- 11 View the Device List, and observe the Request/Connection Summary information, making note of the addresses being used. In order to view the Request/Connection Summary section the DTM may have to be maximised, or locate the scroll bar and scroll down.

Re	quest / Connection Summary					
	Device Name	Туре	Address	Rate (msec)	Input Packets per second	Output 🔺
	STBNIP2311_NOC	Modbus	192.168.20.23	60	16	

12 The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.

5

BME NOC Web Services

What are Web Services Web Services are provided by a Web Server embedded in the BME NOC modules. They provide diagnostic and other information to show the operation of the module. They also give diagnostic information to help with troubleshooting.

http://192.168.10.20/	ted Sites 🔹 🙋 Web	1 1		0 • N •	📑 📾 🕶 Bage 🕶 Safe	ty = Tools =
	actoryCa	st™ Web				English
BMENOC0311	actoryca	St VVCL				
ome	Monitoring	Diag	nostics Se	tup		
Menu	< _	RUN		ERR		
n Module	·	MOD STATUS		E NE	TWORK STATUS	
Status Summary Performance	S	ervice Status		Version Info		
Port Statistics	•	DHCP Server	Enabled	Exec. Version	1.01	
Connected Devices	° °	FDR Server Access Control Scanner Status	Enabled Disabled Working Properly	Web Server Version Web Site Version CIP Version	1.0 v1.01 IR12 1.0	
cc Services	× 0	NTP Status	Disabled			
QoS NTP	Mo		BME P58 3040 RUN	Network Info.	192.168.10.20	
Redundancy	× Sci	an Time	1 ms		255.255.0.0 0.0.0.0	
Alarm Viewer		U Exec. Version	1.13		00 00 54 22 27 4C BMENOC0311	

C See Also:

Web services were examined briefly in the *Exercise - View the CPU Web Pages* (page **Error! Bookmark not defined.**) as the CPU offers similar functionality.

How to access BME NOC Web Services Web services can be accessed using any Web Browser from a computer on the BME NOC network. Simply enter the address of the BME NOC into the browser's address bar to open the Web Services main web page.

If security is enabled, a username and password will be required to access the Web Server. The default username is 'admin' and the default password is 'factorycast'.

BME NOC Web Services (cont.)

Diagnostics
ViewerThe Diagnostic Viewer offers several pages of diagnostic information for the BME
NOC. These includes the following:Module Status
Performance
Port Status
I/O Scanner
Redundancy Status
Alarm Viewer
Rack ViewerRok Viewer
These pages can assist with fault-finding the module or device network. The other
pages that are available can assist with more detailed network troubleshooting.

Exercise - BME NOC Web Services

Learning Outcomes By the completion of this exercise you will:

Access Web Services in the BME NOC

Enable the HTTP connection.

1 In the DTM manager in Unity Pro, right-click the **BMENOC0311** and select **Open** from the menu.

DTM Browser	×
S Host PC	
- 🛃 < Modbus:192.168.10.3 > Pump12	
[™] 🛃 < 192.168.14.1 > BMENOC0311_2	
Modbus:192.168.14.23 > STBNIP2311 NOC	
Open	
Add	

- **2** In the browser tree, select Security.
- 3 Drop down the HTTP Selection box and choose Enabled from the list.
- **4** Build the application and download it to the M580.

Connect to the BME NOC Web Server.

- 1 Connect an Ethernet cable from the **PC** to the **service port** of the BME NOC 0311.
- 2 Open the Web Browser and enter the address http://192.168.20.1 (where X is the Group number being used).
- **3** If the login screen is displayed, enter the following:

Username: admin

Password: schneider

View the Status Summary

1 Click the Diagnostics tab.

Favorites 👍 😰 Sugge	ested Sites 🔹 💋 We	Slice Gallery •				
http://192.168.10.20/				👌 • 🕤 -	🗆 🛞 • Bage • Safe	ety + Tgols + 👔
M580 F BMENOC0311	actoryCa	ast™ Web)			English Help
ome	Monitoring	Diag	nostics Se	tup		
Menu	•	RUN		ERR		
n Module	· ·	MOD STATUS			ETWORK STATUS	
Status Summary						-
Performance		Service Status		Version Info		
Port Statistics	¢	DHCP Server	Enabled	Exec. Version	1.01	
A Connected Device	es 🖌 🔮	FDR Server	Enabled	Web Server Version	1.0	
I/O Scanner	0	Access Control	Disabled	Web Site Version	v1.01 IR12	
Messaging	0		Working Properly	CIP Version	1.0	
CD Services	v Ø	NTP Status	Disabled			
QoS		CPU Summary		Network Info.		
NTP	Mo	del	BME P58 3040	IP Address	192,168,10,20	
Redundancy	Sta	ate	RUN	Subnet Address	192.168.10.20	
System	v Sc	an Time	1 ms	Gateway Address	0.0.0.0	
Alarm Viewer		gged In	No	MAC Address	00 00 54 22 27 4C	
Rack Viewer		U Exec. Version	1.13 Projet	Host Name	BMENOC0311	

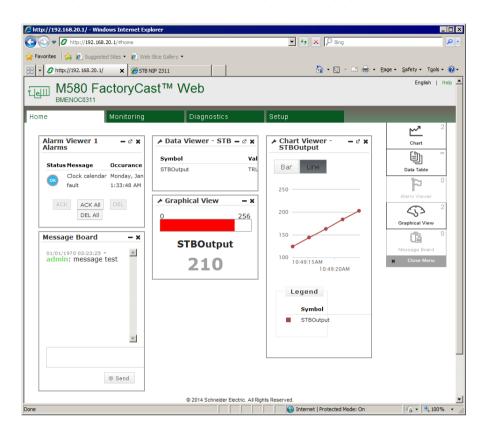
2 View the information displayed on the Status Summary page.

FactoryCast

What is FactoryCast?	FactoryCast is a Web server included with the BME NOC 0311. It provides the following features:
	Custom Web Pages to create a user defined interface to the module
	Rack Viewer providing a graphical representation of the configured ePAC system including all modules and I/O status
	ePAC Program Viewer giving a view of the ePAC program code with animated variable states
	Trend Viewer for graphical visualisation of variables
	Customisable Dashboard with widgets to provide an efficient view of process data
	Configuration is via a built-in designer which is part of the Web Interface. Logos and colours can be configured to provide easy brand labelling.

FactoryCast (cont.)

Graphic Viewer The Graphic viewer allows data to be displayed on a page in a Web browser.



Several widgets are available to simplify configuration of the graphic display. These can be added to the page and the data point selected.

Tables and graphs must be configured in the monitoring section before they can be displayed in a widget.

Exercise - FactoryCast Graphic Display

Learning Outcomes By the completion of this exercise you will:

Access FactoryCast in the BME NOC

Explore the FactoryCast Data Display features

Prepare the application to use FactoryCast.

In Unity Pro, select **Tools** » **Project Settings** to open the project settings.

1 Select PLC embedded data from the left menu.

Project Settings		? ×
Project Settings	Property label	Property value
🖻 General	Data dictionary	
- Management of build messages	Preload on build changes	Г
- Build settings	Effective Build changes time-out (sec)	40
 Project autosaving on download PLC embedded data 	Only HMI variables	
- PLC diagnostics		
- PLC behaviour	Upload information	N
Path	Comments	
- Time	Animation tables	
Configuration	Upload information management	Automatic
Variables	Optimize data on-line change	Г
Program		
E Languages		
Common		
FBD FF LD		
Mixed display		
EL-SEC		
SEC multitoken		
- ST		
⊟- LL984		
View 1		
View 2	-	
- View 3		
View 4		
Operator Screens		
- 📲 Import - 📑 Export - 🗶 Beset All	<u>D</u> K .	Apply <u>C</u> ancel <u>H</u> elp

- 2 Select the **Data Dictionary** tickbox and click the **OK** button to save the changes.
- **3** Build the application and download it to the M580.

Connect to the FactoryCast Server.

- Open the Web Browser and enter the address http://192.168.14.
 1.
- **2** If the login screen is displayed, enter the following:

Username: admin

Password: schneider

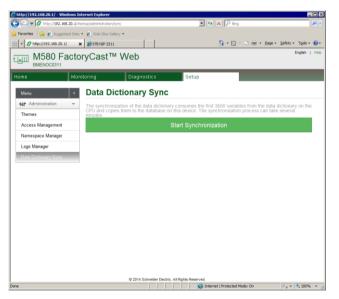
Exercise - FactoryCast Graphic Display (cont.)

3 If anything is displayed on the Main screen, delete all the objects as these may be referencing variables that are not used in the application.

😋 🕘 🔻 🖉 ht	tp://192.168.20.1/#home		💌 🔶 🗙 🔎 Bing	٩
🚖 Favorites 🛛 🚖	🙋 Suggested Sites 🔹 🙋 Web Slice (Sallery •		
🖉 http://192.168.20	D. 1/		👌 • 🖸 × 🖬 🖷	🔹 Page 🔹 Safety 🔹 Tools 🔹 🚯
Lell M58	80 FactoryCast	™ Web		English H
Home	Monitoring	Diagnostics	Setup	
				🛖 Add Widget
		© 2014 Schneider Electric	All Rights Reserved.	 • • • 100%

Configure data for the widget

1 Select the **Setup** tab and in the left menu select **Data Dictionary** Sync.



2 Click the **Start Synchronization** button.

When the process has completed, a message will show Synchronisation Completed.

Create a new data table.

Select the **Monitoring** tab.

- **1** Create a new data Table with the name MyData.
- 2 Click the **Data Dictionary** button to show a list of all variables in the application.

🗢 🗢 💋 http://192.168.20	.1/#datasetup/create			-	🕂 🗙 🖓 Bing		2
Favorites 🙀 🙋 Suggested S	Sites 🔹 🙋 Web Slice Gallery	•					
http://192.168.20.1/					💁 • 🖻 · 🗆 👼	 Page • Saf 	
M580 Fac	toryCast™ \	Web					English F
BMENOC0311	Monitoring	Diagnostics	Setup				
iome	Monitoring	Diagnostics	Setup				
Menu	< Create Da	ata Table					
🕲 Data Tables	New Table	Name*: MyDa	ital		7		
Create New Table		L					
Graphic ∀iewer Grap	• Des	scription:					
Chart Viewer	 0 variables selected; 	F	ilter Variables:		Direct Address		œ
Create Chart	believed.						Ŭ
C Program Viewer	Namespace	Symbol	Address		-,	ddress	
Open Program Viewer	Data Dictionary	Enable	UNLOCATED	*	No data available in table		
Custom Pages	~	TOut	UNLOCATED	э			
		TimerValue	UNLOCATED				
		OK					
ė		© 2014 Sct	neider Electric. All Rights Reser		Internet Protected Mode: On		à • 💐 100%

3 Click the small arrow to the right of each variable to add the variable to the table.

Enable UNLOCATED »



If there are no variables in the list, go back to Unity Pro and add some internal variables to the application and download it to the M580.

Exercise - FactoryCast Graphic Display (cont.)

4 When the variables have been added, click the **OK** button to create the table.

O http://192.158.20.1/#datasetup/MyData/view Favorites A						× P Bing		۶.
http://192.168.20.1/						💁 • 🖸 • 🗆 👼	• Bage • Safety •	Tgols +
<u>ы</u> М580 Fa	actor	ryCast™	' Web				E	inglish)
BMENOC0311	Moni	toring	Diagnostics		Setup			
Menu	٠	MyData	\$\$					
政 Data Tables	~					Filter Variable	B.	
Create New Table		Symbol	Direct Address	Туре	Value	Format	Status	
MyData	×	Enable	UNLOCATED	BOOL	TRUE	BOOLEAN	• ОК	
Chart Viewer	~	TOut	UNLOCATED	BOOL	TRUE	BOOLEAN	• ок	
Create Chart		TOUT	UNLOCATED	BOOL	TRUE	BOOLEAN	_	
Da Program Viewer	~	TimerValue	UNLOCATED	TIME	20s	TIME	• ок	
Open Program Viewer								
Custom Pages	*							

Add a widget to the main screen

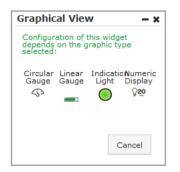
Select the **Home** tab.

1 Click the **Add Widget** button to open the Widget menu. Select the **Graphical View** widget and drag it onto the main page. Three grey rectangular blocks will appear.

- 0 http://2	- Windows Internet Explorer		💌 🔂 🗙 🔎 Bing	0
	Suggested Sites 🔹 💋 Web Sice G	alanı •		
http://192.168.20.1/	inggested ones - 💽 med onee o		👌 • 🔊 - 🗆 🖨 •	Page - Safety - Tools - 😥 -
M580	FactoryCast	[™] Web		English Help
Home	Monitoring	Diagnostics	Setup	
	Graphical View			Court
		@ 2014 Schneider Electri	c. All Rights Reserved.	

2 Drop the widget onto one of the blocks.

Configure the widget



1 Click Circular Gauge to select it.

Graphic	al View		- ×
Configura on the gr	ation of th aphic type	is widget e selected	depends I:
Circular Gauge	Linear Gauge		r Numeric Display ှု 2္၀
Timer	Valua		-
L	value		
MIN	value	MAX	
L		MAX	
MIN	reshold	2000 High	0
MIN	*	2000 High Thresh	0
MIN 0 Low Th	*	2000 High	0

- **2** Drop down the list box to choose an analog variable.
- 3 Set the Maximum Value to match the maximum value of the variable.
- 4 Click the **Save** button to save the widget and display the data.

Graphical View	/ – ×
0	20000
TimerV	alue
556	50

5 The configuration of the widget can be changed by clicking the spanner icon in the top left hand corner.

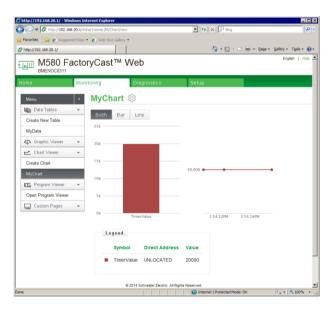
Create a chart.

Go to the monitoring tab and select Create Chart from the left menu.

1 Give the chart the name MyChart and add an **analog value** to the configuration (click the arrow as with the data table).

http://192.168.20.1/ - Window								İC
🕥 🗣 🖉 http://192.168.20.	1/#chartviewer/create			• •	🗙 🔎 Bing			م
Favorites 🛛 🚖 🙋 Suggested S	ites 🔹 🙋 Web Slice Gallery	•						
http://192.168.20.1/					- 🚹 • 🗟 - 🛋	(m) • Bage • Safet		
	toryCast™ \	Neb					English He	24
BMENOC0311								
ome N	Ionitoring	Diagno	stics Setup					
Menu	Create C	nart						
🕼 Data Tables 🗸								
Create New Table	Char	Name*:	MyChart					
MyData	Plot Free	uency*:	3000		A			
Graphic Viewer	Plot frequer	ev unit:						
Chart Viewer		cy unit .	Milliseconds					
Create Chart	Plot	Points*:	5		* *			
📭 Program Viewer 🗸	. Auto	-Scale*:	4					
Open Program Viewer	Add Variab							
🖵 Custom Pages 🔷		105 101	ayonart					
	1 variable selected		Filter Variables:		Direct Addr	ess	Œ	
	benetica.						Ŭ	
	Namespace	Symbol	Address		Symbol	Address		
	Data Dictionary	TOut	UNLOCATED	» «	TimerValue	UNLOCATED		
		Enable	UNLOCATED	3				
			Create Chart Cancel					
		@ 201	4 Schneider Electric. All Rights Reserve					
•					met Protected Mode:	On 🕼	· 100%	1

2 Click the **Create Chart** button to save the chart and display the data.



Add the chart to the home page.

- 1 Go to the **Home** tab and drag a **Chart** widget onto the page. Select **MyChart** and click the **Save** button to display the data.
- 2 Modify the analog value in Unity Pro and observe the changes on the Web page.

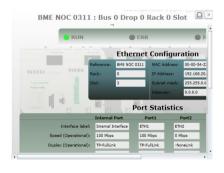
FactoryCast (cont.)

Rack Viewer

The rack viewer gives a graphical representation of the M580 architecture, showing racks, modules and some diagnostic information for the modules. The view can be zoomed and scrolled to explore the architecture.

http://192.168.20.1/ - Windows	Internet Explorer			
C C + I + 192.168.20.1	/#diagnostics/system/rac	kviewer	💌 🔄 🗙 🔎 Bing	ρ.
🔆 Favorites 🛛 🚖 🙋 Suggested Sit	tes 🔹 🕖 Web Slice Gali	ery 🔻		
Ø http://192.168.20.1/			🦄 • 🖾 - 🖻 🖶 • Bage •	Safety • Tools • 🕢 •
M580 Fact	toryCast™	Web		English Help 📥
Home M	onitoring	Diagnostics	Setup	
Menu <	Rack Vi	ewer		
🔊 Module 🗸 🗸				
Status Summary			Drops Layout Vertical	•
Performance			Navigation Type Zooming	•
Port Statistics				
🖧 Connected Devices 👻		An or the second s	NUMBER REAL REAL NUMBER	
I/O Scanner	<ê>>			
Messaging	0			
cco Services ∽				
QoS				
NTP				
Redundancy	9			
⊴d1 System ∽			and a second a second and a second	
Alarm Viewer				
Rack ∀iewer	2			
		© 2014 Schneider Electr	ic. All Rights Reserved.	_
Done			Internet Protected Mode: On	🐴 • 🔍 100% • 🎢

Clicking a module will give detailed information for that module. For example, clicking a NOC module will show Ethernet configuration and port statistics.





The Rack Viewer requires Microsoft Silverlight installed on the computer.

Exercise - The Rack Viewer

Learning By the completion of this exercise you will: Outcomes Use the rack viewer to examine the PAC architecture

- 2 Ensure that Microsoft Silverlight is installed on the machine.
 - Click the Windows Start button and enter Silverlight into the Search all Programs and Files dialog box.

Select **Microsoft Silverlight** from the list.

I Micr	osoft Silv	erlight Co	onfiguration				×
About	Updates	Playback	Webcam / Mic	Permissions	Application Storag	e	
Šīl	verlight	Versio	soft Silverlight (6 nr: 5.1.30214.0 14 Microsoft Cor	-	ights reserved.		
			the Silverlight Lie	-			
		View 1	the Silverlight Pr	ivacy Stateme	nt		
Una	uthorized rep	roduction or	distribution of this p	program, or any	d international treaties portion of it, may resul extent possible under	t in severe	
						ОК	Cancel

If Microsoft Silverlight does not appear, or the version is older than V5 then go to http://www.microsoft.com/silverlight/ and follow the instructions to download and install the latest version.

Open the FactoryCast Web Page in a browser.

Open the Web Browser and enter the address http://192.168.14.1.

If the login screen is displayed, enter the following:

Username: admin Password: schneider

Examine the Rack Viewer

1. Click the **Diagnostics** Tab. Select **Rack Viewer** from the left Menu.



2. Use the zoom buttons, or slider to zoom out to see the complete architecture.



Note:

The mouse wheel can also be used to zoom in and out but only when the Java window has focus.

Hover the mouse button over the various modules to identify them.

FactoryCast (cont.)

Program Viewer The Program Viewer allows sections of the program to be displayed complete with run-time animation similar to Unity Pro.

Program Viewer	
8	
Eg Logical View	SlowMeDown := SlowMeDown + 1;
C Dynamic Plc	if SlowMeDown = 150 then
🖻 🗁 Tasks	STBOutput := STBOutput + 1;
🖻 🗁 MAST	if STBOutput = 256 then
🖻 🗁 Sections	STBOutput :=);
🖕 इन 🔚 STB	end_if;
E Sections SR	SlowMeDown := 0;
E Cents	<pre>STE_HIP2x1x.Outputs.ID4_Output_Data := int_to_byte(STBOutput);</pre>
Timer Events	end_if;
T/O Evente	

The explorer on the left hand side allows the program section to be selected. The animated section of code is then shown in the right hand section. As with Unity Pro, hovering over a variable will show the value of that variable.

The main difference is that the Program Viewer is not able to show the state/value of I/O variables.



The Program Viewer requires Java Runtime installed on the computer.

Summary

Summary	In this chapter the following topics have been covered:
	Device Networks Isolated Device Networks BME NOC 03*1 BME NOC Web Services
	FactoryCast
Questions	The following questions will help to check understanding of the topics covered in this chapter:
	What are the possible roles of a NOC?
	How many BME NOC modules make up the offer?

Which BME NOC modules support Factorycast?

Remote I/O (RIO)

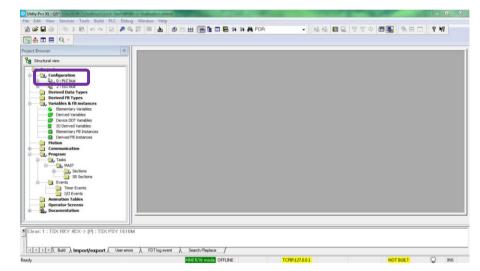
Introduction	The first chapter explained how to configure local I/O.
	This chapter will show that configuring an RIO drop is quite similar to a local.
	This makes the configuration of RIO much easier than DIO drops.
	Other advantages of RIO over DIO are:
	> The rapidity of communication between the devices 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

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

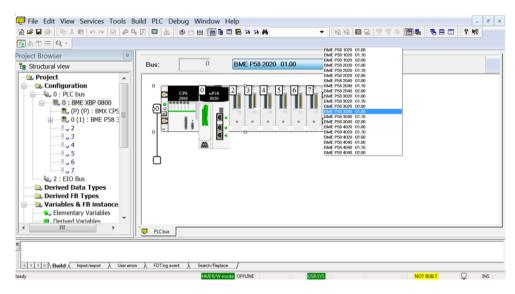
Make sure you have a **40 part number M580.

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.

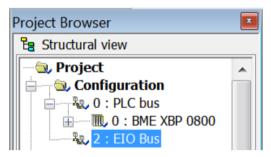
iv. If it is not the case click the drop down list and select a **40 CPU.



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

Create the Remote drop.

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



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

2	Comr

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

Topological Address: [131]		 Cancel
Part Number	Description	 Help
an Number an Modicon M580 remote drop	Description	Thosp
Back		
BME XBP 0400	4 SLOTS BACKPLANE	
BME XBP 0800	8 SLOTS BACKPLANE	
	12 SLOTS BACKPLANE	
BMX XBP 0400	4 SLOTS BACKPLANE	
BMX XBP 0600	6 SLOTS BACKPLANE	
BMX XBP 0800	8 SLOTS BACKPLANE	
BMX XBP 1200	12 SLOTS BACKPLANE	
Drop end communicator BME CRA 312 10.2 BMX CRA 312 00.2		
BMX CRA 312 10.2		

EIO Bus

Bus:

2

CommHeadRIODIO16L2 01.00 Connections configured:

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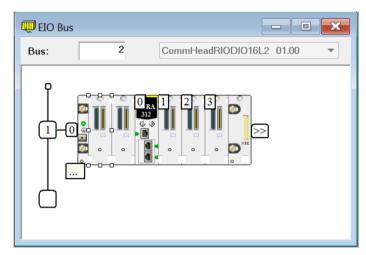
1

2
</

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

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.

		10.110	ОК
Topological Address:		\2.1\0	Cancel
Part Number	Description		Help
■ Modicon M580 remote drop			
é Supply			
	STANDARD AC POWER SUPPLY		
BMX CPS 2010	STANDARD ISOL DC POWER SUPPLY		
	HIGH POWER ISOL 24 TO 48 VDC POWER SUPPLY		
	HIGH POWER AC POWER SUPPLY		
BMX CPS 3540	HIGH POWER DC POWER SUPPLY		

iii. The Power Supply is added to the Rack:

💭 EIO B	us	
Bus:	2	CommHeadRIODI016L2 01.00 -

Configure the IP Address for the drop.

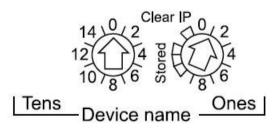
- i. Open the **Ethernet Port** properties of the M580 CPU from the **PLC Bus** by clicking the port of the M580 on the main rack.
- Click the IP Config tab, and click Udate CRAIP address configuration link.

CommHeadRIODI	Security O IPConfig O RST	TP 0 SNMP 0 NTP 0	ServicePort
Channel 0	Main IP addross	192 . 168 . 10 . 1	
	IP address A	192 . 168 . 11 . 1	
	IP address B	0.0.0.0	(Urød for Hot Standby)
	Subnotworkmark	255.255.0.0	
	Gatoway addross	192 . 168 . 10 . 1	
	CRA IP address configuratio	_	
	Undate CRAIP addres		

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	Туре	Subtype	CRA -	Profiles	Topo address	DHCP Enable	IP Address	Subnet Mask
BMECRA_001	Module	CRA		Remote	2.1/0.0	Yes	I92.168.11.2	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.

Add the DD01602.

i. Add a **DD01602** 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:

Note:

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

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:

	_
X [Channel (0.0.0] RIODIOBM] : CRA doesn't work when TFTP setting is disabled. Enable TFTP service in the Security screen of the CPU Ethernet Embedded	 ~
Process failed : 1 Error(s) , 0 Warning(s)	
	 *
I C + P N Rebuild All Project / Impot/expot / User errors / FDT log event / Search/Replace /	
Ready HMLR/W mode OFFLINE TCPIP-127.0.0.1 NOT BUILT	

- 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**:

Global po	licy	Enforce Security		Unlock Security
Services				
	FTP :	Disabled	DHCP / BOOTP :	Enabled
	TFTP :	Enabled	SNMP :	Disabled
	HTTP :	Disabled	EIP :	Enabled

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

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

Modification Eorce	•		
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
	0	BOOL	Link up/down for Ethernet port 2
- PORT3 LINK	0	BOOL	Link up/down for Ethernet port
- 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 I
- 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.
	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.
HODBUS 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.
	0	BOOL	0: service not operating normal.
	0	BOOL	0: service not operating normal.
- 🗣 FTP	0	BOOL	0: service not operating normal.
	0	BOOL	0: service not operating normal.
- Selp_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[131]	DROP health bits (Drop 1 to 31
B RIO_HEALTH		ARRAY[257	RIO health bits (1 bit per RIO
LS_HEALTH		ARRAY[13]	Local Slave health bits (Local
DIO_HEALTH		ARRAY[513	DIO health bits (1 bit per DIO
DROP_CTRL		ARRAY[131]	DROP control bits (Drop 1 to 3.
B RIO_CTRL		ARRAY[257	RIO control bits (1 bit per RIO
DIO_CTRL		ARRAY[513	DIO control bits (1 bit per DIO
	1		

ii. As well as the DD01602.

Name		Value	Type •	Comment	
B- 💋 Obi2			T_U_DIS_STD		
MOD H	EALTH	0	BOOL	Module health	
MOD_F	LT	0	BYTE	Module faults	
E DIS_CH	LOUT		ARRAY[0_15] O_		
🖨 💕 DIS	CH_OUT[0]		T_U_DIS_STD		
•	CH_HEALTH	0	BOOL	Channel health	
•	VALUE	1	EBOOL	Discrete output value	
	CH_OUT[1]		T_U_DIS_STD		
	CH_HEALTH	0	BOOL	Channel health	
	VALUE	0	EBOOL	Discrete output value	
	CH_OUT[2]		T_U_DIS_STD		
	CH_HEALTH	0	BOOL	Channel health	
	VALUE	1	EBOOL	Discrete output value	
	CH_OUT[3]		T_U_DIS_STD		
	CH_HEALTH	0	BOOL	Channel health	
	VALUE	0	EBOOL	Discrete output value	
	CH_OUT[4]		T_U_DIS_STD		
	CH_HEALTH	0	BOOL	Channel health	
	VALUE	1	EBOOL	Discrete output value	
	CH_OUT[5]		T_U_DIS_STD		
	CH_HEALTH	0	BOOL	Channel health	
	VALUE	0	EBOOL	Discrete output value	
	CH_OUT[6]		T_U_DIS_STD		
•	CH_HEALTH	0	BOOL	Channel heath	
	VALUE	1	EBOOI	Discosts or doub under	_



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

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

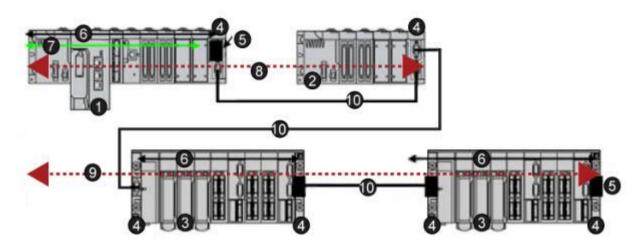
Summary

Summary	In this chapter the following topics have been covered:
	 Configuring a CRA for a RIO drop Configuring a device in a RIO drop using a Device DDT
Questions	The following questions will help to check understanding of the topics covered in this chapter:
	> What is the main advantage of an RIO drop over a DIO drop?
	Which service needs to be enabled in the M580 security features to allow the use of a RIO drop?

Premium I/O

Legacy Migration (Premium I/O) In addition to the new modules and features, a key feature of the M580 is the ability to manage install base via the possibility to connect to Premium PLC racks and use the Premium I/O.

An existing Premium installation can be easily migrated by replacing the Premium local rack with a **BME XBP **00** and M580 CPU, whilst the Premium Remote racks can be upgraded to Premium Extended racks (**TSX RKY **EX**) and connected to the M580 rack via a **BMX XBE 1000** expansion module and supported cables.



1	Modicon M580 main local rack
2	Modicon X80 extended local rack
3	Premium extended local rack
4	extension rack module
5	bus terminator module
6	X Bus connection on the rack
7	Ethernet connection on the rack
8	maximum X Bus cable length between the M580 main local rack (1) and the Modicon X80 extended local rack (2) is 30 m (98 ft)
9	maximum X Bus cable length between the M580 main local rack (1) and the Premium extended local rack (4) is 100 m (328 ft)
10	X Bus extension cable



Premium motion, communication, and safety and modules are not supported in an M580 system.

Topic Objectives

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

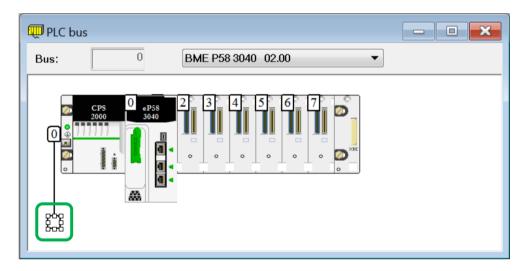
Connect a Premium I/O drop to a M580 main rack

Exercise - Premium I/O

Learning Outcomes	By the completion of this exercise the student will:
	 Integrate Premium I/O as an Extension Rack with an M580 architecture Prove Legacy Migration of Install Base systems
Equipment Required	To complete this exercise on a PLC the following equipment is required:
-	TSX RKY 4EX
	> DEY 08D2
	> DSY 08T2

Configure the Premium Extension Rack within the Application.

- i. From the **Project Browser** open the **Main rack.**
- ii. Double-click the place holder for the Extension Rack.



The New Device window appears.

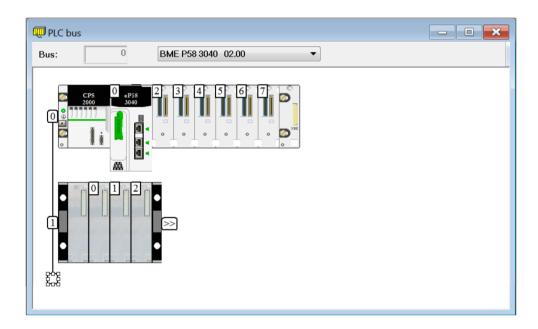
Topological Address: [17]		1 Cancel
Part Number	Description	Help
Modicon M580 local drop Rack		
BME XBP 0400	4 SLOTS BACKPLANE	
	8 SLOTS BACKPLANE	
	12 SLOTS BACKPLANE	
BMX XBP 0400	4 SLOTS BACKPLANE	
BMX XBP 0600	6 SLOTS BACKPLANE	
BMX XBP 0800	8 SLOTS BACKPLANE	
BMX XBP 1200	12 SLOTS BACKPLANE	
TSX RKY 12EX	EXTENDABLE 12 POSITION RACK	
TSX RKY 4EX	EXTENDABLE 4 POSITION RACK	
TSX RKY 6EX	EXTENDABLE 6 POSITION RACK	
TSX RKY 8EX	EXTENDABLE 8 POSITION RACK	
ISA KKI ÓĽÁ	EATEINDADLE O PUSITIUN RACK	

Exercise - Premium I/O (cont.)

iii. Select the **TSX RKY 4EX** rack and click the **OK** button.

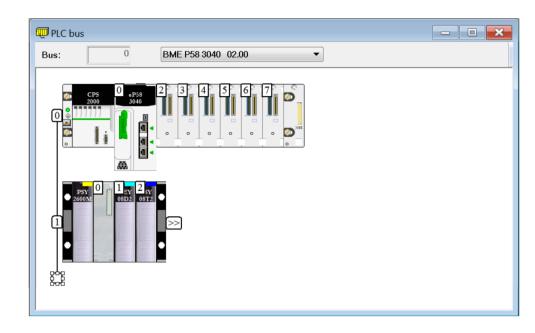
Part Number	Description
■ Modicon M580 local drop	
Back	
BME XBP 0400	4 SLOTS BACKPLANE
BME XBP 0800	8 SLOTS BACKPLANE
BME XBP 1200	12 SLOTS BACKPLANE
BMX XBP 0400	4 SLOTS BACKPLANE
BMX XBP 0600	6 SLOTS BACKPLANE
BMX XBP 0800	8 SLOTS BACKPLANE
BMX XBP 1200	12 SLOTS BACKPLANE
TSX RKY 12EX	EXTENDABLE 12 POSITION RACK
TSX RKY 4EX	EXTENDABLE 4 POSITION RACK
TSX RKY 6EX	EXTENDABLE 6 POSITION RACK
TSX RKY 8EX	EXTENDABLE 8 POSITION BACK

iv. The new rack will appear.



Exercise - Premium I/O (cont.)

v. Populate the rack with the appropriate Power Supply and I/O modules.

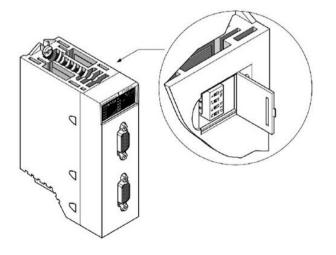


vi. Build and Save the application.

Do NOT Transfer the application yet.

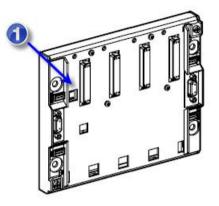
Manually configure the hardware components required.

i. Take the **BMX XBE 1000** adaptor, open the door on the side and confirm the **Address** is set **0** via the Dip Switches.



Exercise - Premium I/O (cont.)

Remove the Power Supply of the Premium Rack to reveal the dip switches
 (1) used to set the Address. Ensure the Address is set to 1, to match with the Rack number within Unity Pro.



- iii. Take the Bus-X terminators (TSX TLY EX). Place the Terminator marked A into the Top Port of the BMX XBE 1000 adaptor. Place the Terminator marked B into the Port on the Right Side of the Premium Rack.
- iv. Using the Bus-X cable, connect the **bottom port** of the **BMX XBE 1000** adaptor and the **Port** on the **Left Side** of the **Premium Rack**.
- v. Turn **OFF** the power to the Simulator.
- vi. Connect the BMX XBE 1000 adaptor to the XBE slot of the Local Rack.
- vii. Power **ON** the Simulator and the Premium Rack.
- viii. The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.

Summary

Summary	In this chapter the following topics have been covered:		
	Integrating Premium I/O modules in a M580		
Questions	The following questions will help to check understanding of the topics covered in this chapter:		
	> Which type of I/O is a PIO drop: local I/O RIO or DIO?		
	What type of cables do you need to connect the main rack to the PIO drop?		

M580 Hot Standby (HSBY)

Introduction	Just as Premium PLCs, M580s come with a Hot Standby offer to ensure high reliability of systems.
	This chapter covers the basic configuration of M580 architectures. For more information, follow the M580 HSBY configuration course.
Topic Objectives	By the end of this section the student will be able to:
	 Configure a basic Hot Standby M580 architecture
	 Test this architecture

Exercise - Create a New HSBY Project

Learning Outcomes	By the completion of this exercise the student will:
	be able to create a new M580 HSBY ePAC project using Unity Pro
	configure the embedded Ethernet ports of the CPU
	setup parameters for Hot Standby operation
	➢ test a M580 HSBY architecture
Equipment Required	To complete this exercise in simulation mode the following software is required:
1	Unity v11 or later
	To complete this exercise on a PLC the following equipment is required:
	➤ 2 M580 HSBY
	2 compatible power supply
	> 2 Racks
	> 1 Ethernet cable

Create a new project

i. Create a **New Project** by clicking **File** » **New** from the Unity Pro menu, or clicking the **New Project** button on the toolbar:

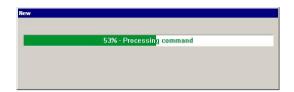
😳 Unity Pro XL					
File	View	Tools	PLC Help		
Mew Ctrl+N					
B	Open		Ctrl+O		

ii. Select the appropriate **M580 HSBY Processor** and **Rack** according to the simulator being used:

PLC	Min.OS Version	Description	Cancel
Modicon M340			
Modicon M580			Help
BME H58 2040	02.00	CPU 580-2 ETH HSBY remote and distributed IO	
BME H58 4040	02.00	CPU 580-4 ETH HSBY remote and distributed IO	
BME H58 6040	02.00	CPU 580-6 ETH HSBY remote and distributed IO	
BME P58 1020	02.00	CPU 580-1 ETH distributed IO	
BME P58 2020	02.00	CPU 580-2 ETH distributed IO	
BME P58 2040	02.00	CPU 580-2 ETH remote and distributed IO	
BME P58 3020	02.00	CPU 580-3 ETH distributed IO	
		CPU 580-3 ETH remote and distributed IO	
BME P58 4020 02.00		CPU 580-4 ETH distributed IO	
BME P58 4040	02.00	CPU 580-4 ETH remote and distributed IO	
BME P58 5040 02.00		CPU 580-5 ETH remote and distributed IO	
BME P58 6040	02.00	CPU 580-6 ETH remote and distributed IO	
Momentum Unity			
E Premium			
e Quantum			
Rack	Description		<u>^</u>
Modicon M580 local drop			
🖻 🔤 Rack			
BME XBP 0400 4 SLOTS ETHERNE			
BME XBP 0602		ANT ETHERNET BACKPLANE	
BME XBP 0800	8 SLOTS ETHERNE		
BME XBP 1002	10 SLOTS REDUND	DANT ETHERNET BACKPLANE	×

Exercise - Create a New HSBY Project (cont.)

iii. Unity Pro will create the new project and populate it with default items:



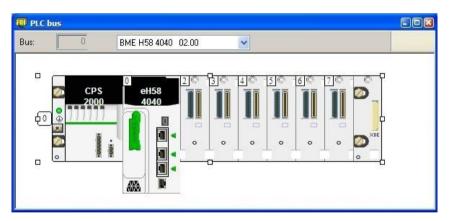
iv. The **Project Browser** will display to show the project contents:



v. Double click the 0: PLC Bus item from the Project Browser:

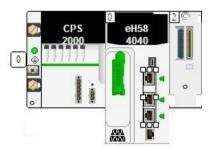


vi. The Local Rack will be displayed, pre-populated with the CPU and the Power Supply:



Configure the IP address.

i. Double click the embedded Ethernet modules of the CPU:



ii. Go to the **IP Config** Tab, enter the following **Main IP Address**: 192.168.10.21.

Security	IPConfig	RSTP	SNMP	10 NTP
IP address con	Figuration			
Main IP	address 192.	168 . 10 . 21		
Main IP ad	Idress •1 192 .	168 . 10 . 2	(Used for H	iot Standby)
IP ad	dress A 192 .	168 . 11 . 21]	
IP ad	idress B 192	168.11.22	(Used for H	iot Standby)
Subnetwo	rk mask 255	255.0.0	3	
Gatewag	address 192	168 . 11 . 21	31	

- iii. Set **IP Address A** to: **192.168.11.21**, this is the **Primary** IP address of the Remote I/O (RIO) Scanner for I/O exchanges with modules or devices in the device network drops.
- iv. Set **IP Address B** to: **192.168.11.22**, this is the **Standby** IP address of the Remote I/O (RIO) Scanner in a Hot Standby architecture.
- v. Set the Subnet Mask to: 255.255.0.0 and change the Default Gateway to 192.168.11.21.
- vi. Go to the **Security** Tab, click **Unlock Security** button. This will disable all Cyber Security features during the development state.

Remember to click **Enforce Security** button when the actual project is ready to deploy for operation.

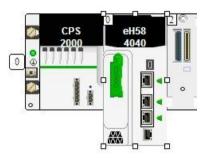
Security	IPCon	fig 0 RSTP	SNMP	NTP	ServicePort		
Global policy							
		Enforce Sec	curity			Unlock Sec	urity
Services							
	FTP :	Enabled	•	DH	CP / BOOTP :	Enabled	
	FTP :	Enabled	-		SNMP :	Enabled	_
Т	FIP :	Enableu			SINTE .	LINDIEU	

vii. Validate 🔛 the changes.

Exercise - Create a New HSBY Project (cont.)

Setup parameters for the Hot Standby operation

i. Double click on the CPU module:



ii. Configure the parameters for **Hot Standby** Tab as shown:

Overview	Device	Fault	Configura	Animation	📥 Hot Sta
Run Mode					
Controller A	Online : Tru	e	•		
Controller B	Online : Tru	e	•		
Standby On	Logic Mismatcl	n .			
	gic Mismatch				
Number of n	nodifications :	20 🜲			
Behaviour of the	e CPU in Run \	Vait Mode			
CPU execute	s: All se	ctions		•	

Checked option for "Allow Logic Mismatch"

- iii. Select CPU executes to "**All sections**" for the behaviour of the CPU in **WAIT** (Run Offline) mode.
- iv. Validate 🗹 the changes.
- v. **Build** the application.
- vi. Rectify any error(s).
- vii. Save the application as M580_HSBY.stu.

ς.

Exercise – Hardware Setting

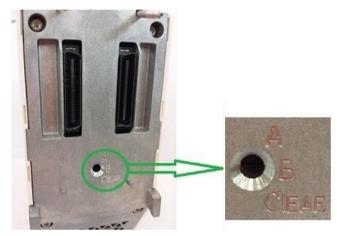
Learning Outcomes By the completion of this exercise you will:

- > Configure the identity of the physical HSBY processor.
- Create a simple daisy chain loop of a M580 HSBY ePAC system.

Determine which CPU to be setup as A or B (You will need the Equipment for this part of the exercise)

i. Before starting any HSBY project, we need to decide which CPU to be setup as CPU A or CPU B.

On the back of the processor module, you will find a small rotary switch.



- ii. Decide one of the HSBY CPU to be designated as **A**. Use a small screwdriver provided and change the rotary switch pointing to position **A**.
- iii. Mount this **CPU A** onto the CPU local rack.
- iv. The other HSBY CPU will be designated as **B**. Similarly, use a small screwdriver and change the rotary switch position to **B**.
- v. Mount this **CPU B** onto the other CPU local rack.

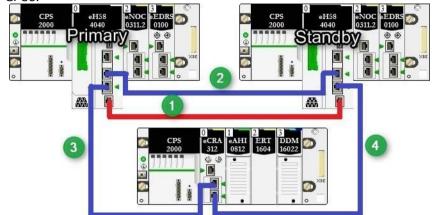
Hints & Tips

This procedure is important to identify the physical processor module in Hot Standby system architecture.

Exercise – Hardware Setting (cont.)

Connect the hardware for a daisy chain loop

i. Use a patch cable to link the two dedicated ports of the two M580 HSBY CPUs.



- ii. Take a long Blue patch cable and connect the ETH2 port from the Primary M580 HSBY CPU to the ETH2 port on the Standby M580 HSBY CPU.
- iii. In the same manner, use another short Blue patch cable and connect the ETH3 port from the Primary M580 HSBY CPU to the ETH2 port on the BME CRA 312 10.
- iv. To make a simple daisy chain loop, loop back by connecting the ETH3 port of the BME CRA 312 10 to the ETH3 port of the Standby M580 HSBY CPU.
- v. Switch both PLCs to ON.
- vi. Observe the LEDs behaviour of both M580 HSBY CPUs and the CRA module.

Test the functioning of the M580 HSBY

i. Locate the Primary CPU Using the LED panel on the CPU:



- ii. Unplug all cables from this CPU.
- iii. Check that the other CPU is now Primary.
- iv. The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.

<u>L</u>_

Summary

Summary	In this chapter the following topics have been covered:
	 Configuring a Basic Hot Standby architecture in Unity Pro How to set a PLC as A or B Wiring a Hot Standby architecture
Questions	The following questions will help to check understanding of the topics covered in this chapter:
	Which version of Unity Pro do you need to configure a Hot Standby architecture?

> How can you check if the PLC is A or B and primary or secondary?

Advanced Cyber Security

Introduction	The first chapter explained the very important Cyber Security feature of the M580; the activation/deactivation of its services.
	In this topic we will discover more Cyber Security features such as:
	Password management
	Integrity Checks
	Memory and Run/Stop Protect
	IP address restrictions
Chapter Objectives	By the end of this chapter the student will be able to:
	Deploy advanced Cyber Security measures in M580 architecture.

Application Security

Password Management	Password management is one of the fundamental tools of device hardening, which is the process of configuring a device against communication-based threats. Schneider Electric recommends the following password management guidelines:
	Enable password authentication on all email and Web servers, CPUs, and Ethernet interface modules.
	Change all default passwords immediately after installation, including those for:
	➢ user and application accounts on Windows, SCADA, HMI, and other systems
	Scripts and source code
	 network control equipment
	devices with user accounts
	FTP servers
Passwords in Unity Pro	When creating an application in Unity Pro, Schneider Electric recommends creating an application password.
	Guidelines for creating a strong password are to choose a password that contains alphanumeric characters, and is case-sensitive. Unity Pro encrypts the password, and stores it in the application:
	Choose a password that contains a minimum of 8 characters.
	Choose a password that is difficult to guess.
	The password should combine upper and lower case letters, digits, and special characters.
	When you open an existing application, the Application Password dialog box opens. Type the password, and click OK.

	Password	×
_	Password:	
	OK Cancel	

Application Security (cont.)

Auto-Lock Within Unity Pro it is possible to Auto-Lock the application based upon a time period.

This means that after the allocated Auto-Lock timeout is exceeded the application will time out and prompts the user to login again.

oplication	Protection active	Data Storage
Change password	Change password	Change password
Clear password	Clear password	Reset password
Auto-lock		

Exercise - Password Management

Learning Outcomes By the completion of this exercise you will:

- ➢ implement an application password within Unity Pro.
- > prove the application password feature.
- implement the Auto-Lock functionality.

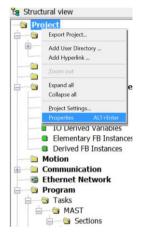


For this exercise the **Simulator Mode within Unity Pro** will be used. Please disconnect from and turn off the physical simulator / PAC now.

If you are unsure how to achieve this please ask the instructor.

Open the Project Properties and create an Application Password.

i. Open the **Project Properties** by right clicking on the **Root** of the **Application** in the **Project Browser**. Select **Properties** from the popup menu:



ii. Select the **Protection** tab:

roperties of Project			
General Protection Identification Com Application	Sections	Firmware	Data Storage
Change password Clear password	Protection active Change password Clear password	Change password Reset password	Change password Reset password
Auto-lock 10 Image: Second		OK	Cancel Apply Help

iii. From the **Application** section. Click the **Change Password...** button. The **Modify Password** dialog appears.

Modify Password	
New password:	
Entry: Confirmation:	Crypted
	OK Cancel

iv. Enter the password automation into both fields. Click **OK**:

Modify Password	
New password:	
Entry: Confirmation:	Crypted
Commination.	
c .	OK Cancel

v. The user is returned to the **Protection** tab:

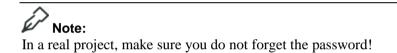
Application	Sections Protection active	Firmware	Data Storage
Change password	Change password	Change password Reset password	Change password Reset password
Auto-lock 10 Minutes before lock			

Exercise - Password Management (cont.)

vi. Enable the **Auto-lock** function, by selecting the tick box, leave the default of 10 minutes. Click **Apply**:

eneral Protection Identification Com			
Application	Sections	Firmware	Data Storage
	Protection active		
Change password	Change password	Change password	Change password
Clear password	Clear password	Reset password	Reset password
Auto-lock			
10 Minutes before lock			

- vii. Build, Connect & Transfer the application to the Simulator.
- viii. Save and Close the application.



Test the Password Management settings:

i. Re-open the previous application within Unity Pro. This time the user will be prompted to enter the application password created in step (iv) of the previous exercise:

	Password		×
2	Password:		
		Cancel	

- ii. Unity Pro will open the application if the correct password is entered. **Close** the application again.
- iii. **Connect** directly to the PLC without opening the application. This time the user will be prompted for the **PLC Application Password**. Enter the correct password. Click **OK**:

Password:			
CON .			
	OK	Cancel	

- iv. Without the password the user is unable to connect to the PLC.
- v. **Transfer** the application from the **PLC** to the **PC**.
- vi. **Save** the application.



Memory & Run/Stop protect

What are	Run/Stop protect is a feature that makes the PLC reject any start/stop command				
Memory & Run/Stop	unless a specific input is ON.				
Protect?	Memory protect is an extension of the Run/Stop protect that will reject any project transfer to the PLC unless a specific input is ON.				
	This way a remote hacker cannot Start/Stop the PLC or download a corrupted project into the PLC.				
How to Activate Run/Stop and Memory Protect? (Unity v11)	In the configuration tab of the M580, tick the feature you want to enable and type in the variable allowing/rejecting commands.				
	0.0 : BME P58 2020				
	CPU 580-2 ETH distributed IO				
	CPU 580-2 ETH distributed IU				
	Overview 10 objects Configuration Animation				
	Operating mode Run/Stop				
	Image: Step input %10.0.0 Image: Step input only %10.0.0				
	Memory protect \$10.0.0				
	🔲 Automatic start in Run				
	Initialize %MWi on cold start				
	Cold Start Only				
	Default values				

Integrity Checking

Integrity Checks The integrity check feature in Unity Pro running on an authorized PC helps prevent Unity Pro files from being changed via a virus / malware through the Internet.

The integrity check feature concerns the following components:

- > DLLs
- Unity Pro hardware catalogue
- libset and object files of EFBs
- > DTMs

Unity Pro automatically performs an integrity check when you first open an application. Beyond the first check, Unity Pro will automatically run the integrity check periodically.

Last check I	has been performed :	Wennesuay, July 1	5, 2015 3:31:34 PM	ОК
Туре	Component		Current	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	=
FFB-Library	.\FFBLibset\v10.0\U	nity984\U984_PCFL\	check ok	
		·		

It is also possible to run the Integrity Check manually.

Exercise - Integrity Checks

Learning Outcomes By the completion of this exercise you will be able to:

> Complete a manual integrity check.

Open the Unity Pro Properties.

i. From the Help menu select About Unity Pro XL:

Help			
₹ <u>I</u> ndex			
<u>F</u> ind			
₩ <mark>₩</mark> hat's This?	Shift+F1		
User Infor <u>m</u> ation			
<u>A</u> bout Unity Pr	o XL		

ii. Click the **Perform self-test** button from the Integrity check area of the dialog:

A	bout Unity Pro	XL		? X	
	Unity Pro XL V10.0 Copyright (c) 2003-	150629B 2015 Schneider Electric Industries S	SAS	(FFF	
	-Registration inform	ations			
	Company:	schneider electric		ОК	
	Username:	arribe		Technical Support	
	Serial Number:	12345678999		reclinical support	
	Registration:	Product is registered (perman	ent).	Technical Info	
	Warning This software is protected by copyright law and by international conventions. Any				
	reproduction or distribution of the software in whole or in part, by any means is strictly prohibited.				
	Any person not respecting these provisions will be guilty of the offense of fraud and will be liable to penalties provided for by the law.				
	In case of cpu crash, power cycle only once and use as soon as possible the 'technical support' button in online mode.				
	Integrity check		Pe	rform self-test	
	Schneider Electric				

iii. The **Perform Self-Test** window will display. The **Integrity Check** will commence and complete automatically:

Туре	Component	Current
FFB-Library	.\FFBLibset\v10.0\Unity984\U984_PCFL\	check ok

- iv. Scroll up the finished list and ensure that all entries have **check ok** for the **Current Status**.
- v. Click **OK** when finished with the **Self-Test** window.
- vi. Then click **OK** to close the **About** window.

Remove all Cyber Security & Passwords settings.

- i. Return to the Embedded Ethernet Port properties and open the **Security** tab and click the **Unlock Security** button.
- ii. Visit the **Application Settings** and **remove** the **Application Password** set in the earlier exercise.
- iii. **Build, Transfer, Run & Test** that the settings have **Cyber Security** and that the **Application Password** has been removed.
- iv. The exercise is now over click the link to go back to the <u>Chapter 2</u> <u>Organisation Chart</u> or to the <u>Table of Contents</u>.



Access Control

Introduction	Access control is a feature that allows the user to set which IP addresses are allow to communicate with the device (PLC or cyber secured NOC), communication from any other IP will be rejected by the device.	
	In Unity Pro v11 this feature will be combined with the restriction of the features allowing IP addresses to communicate with device via specific protocols only.	
How to enable it?	As with most of the M580 cyber security features, this feature is located in the Security tab of the M580. From there type in the list of authorised IP addresses, then enable access control and download the program to the PLC.	
	Note: Be careful if you usually download the projects to the PLC via Ethernet cable to add the IP address of the computer in allowed IP addresses, and remember the PC IP address.	
	If you usually transfer the project via other media, make sure that the service is	

enabled before downloading the project to the PLC!

Summary

Summary	In this chapter the following topics have been covered:		
	 Setting a password to restrict the download of a project to the PLC Performing integrity checks Setting the memory protect and run/stop protect features Restricting the access to the PLC to some IP addresses 		
Questions	The following questions will help to check understanding of the topics covered in this chapter:		
	➢ How does the memory protect and run/stop protect features work?		

When are the integrity check performed?

Chapter 3: Make the Most of the M580!

Overview

Introduction

The previous chapters have explained only the most common features of the M580. This chapter highlights expanded features which increase the possibilities of the M580.

These features include:

- \succ The use of a SD card
- Local extension racks
- Embedded web pages
- ➤ The SCAIME weighing module
- ➢ The HART module
- ➤ Time-stamping



In case you want to implement these features we suggest you to go through the M580 in-class training.

SD Memory Card (BMX RMS 004GPF) The SD memory card **BMX RMS 004GPF** is optional and is used for application backup and data storage.



The memory card is of "Industrial Grade" and formatted for use with Schneider Electric Modicon M580 CPU only. Do not use the memory card with any other CPU or tool, or the card may not be recognised by the Modicon M580 CPU.



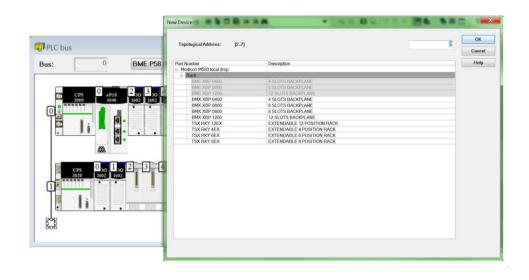
Only the **BMX RMS 004GPF** SD memory card is supported by the Modicon M580. SD cards from the Modicon M340 are **NOT** supported by the Modicon M580.

X80 Extension Racks

Extension Racks

Just like PIO

Extension racks are based on X-Bus-only backplanes and can contain X-Bus I/O modules only:



Extension Rack Rules

- If an Ethernet backplane is used as an Extension Rack, Ethernet Modules will NOT start as they are not on a Rack 0
- Depending on processor performance level, up to 7 Extension Racks are supported the specifics for each CPU can be checked here: CPU Selection Overview (page Error! Bookmark not defined.)
- The M580 ePAC will support up to 8 BMX XBP backplanes (racks) of 4, 6, 8 or 12 slots
- To extend the configuration using additional racks, users must use a bus extender module (BMX XBE 1000) and X-bus cables
- The backplane extender will be plugged on the right side dedicated connector of the backplane. It won't occupy any module slot
- The XBE extender module is NOT hot-swappable in accordance with M340 existing functionality
- Each backplane has to include a power supply module and can support up to 12 modules depending on the rack type

Weighing Module Overview

General Characteristics	The PME SWT 0100 is a versatile and flexible weighing module controller, which can be used wherever weighing scales are to be used in the Schneider Electric Mx80 automation system. The modules main features are:
	➢ Install on either M580 local CPU rack or X80 RIO rack of Ethernet backplane
	Uniform design technology and consistent communication via Ethernet backbone
	Uniform configuration with UNITY V8.0 or latter.
	Configuration, calibration and diagnosis via FDT/DTM.
	Measurement of weight or force with high resolution of 24 bits A/D converter
	➢ High weighing accuracy 0.01 %
	 External Measurement response time of 10ms
	➢ Internal measurement rate up to 400 Hz
	2 x Digital Inputs for monitoring of limit values
	4 x Digital Outputs for dosing control
	Parameter definable inputs and outputs
	 Continuous flow rate calculation
	Theoretical adjustment possible without adjustment weights
	RS485 communication port for dedicated local HMI
	 Factory Pre-calibration
	Replacement of the module possible without a new adjustment of the scale
	 Use in Hazardous area zone 2 and 22 (ATEX approval), class I division 2 (cULus approval)
	 Intrinsically safe load cell powering for the hazardous area Zone 1 (With optional SCAIME Zener barrier kits)
	HE IL

0

Oscaime

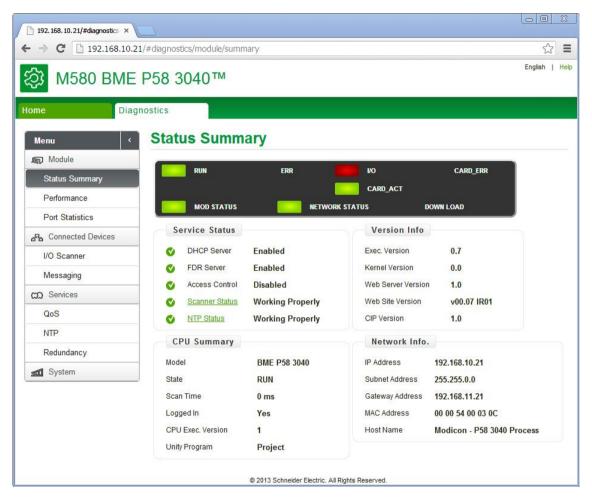
HART with the M580

HART Multiplexer Function	The X80 HART module takes the role of HART multiplexer, facilitating the transmission of HART field instrument data as follows:
	The multiplexer provides one-to-many communications between:
	A HART master device, for example, asset management software resident on a PC, and Multiple HART slave devices (for example, HART field instruments)
	The multiplexer provides HART instrument data to a PLC master.
	The HART I/O data of AHI & AHO modules is accessed and managed by the AMS software. The following AMS software packages are supported:
	Emerson AMS suit
	FieldCare
	> PACTware
I/O Mapping	In addition to the AMS software , the HART I/O data of the BME AHI 0812 & BME AHO 0412 modules can also be accessed by the I/O mapping function found in the device DTMs.
	The X80 HART interface modules support the mapping of HART instrument input and output data items to the HART multiplexer process image. The data items enabled in I/O mapping function can be dynamically controlled by the program logic.

Web Pages

M580 Embedded The M580 CPU comes equipped with a selection of embedded web pages that can Web Pages be used for diagnostics and monitoring information.

> The web pages can be accessed using a web browser and navigating to the IP address of the CPU.



The list of **Diagnostic** web pages available is:

- \geq **Status Summary**
- \triangleright Performance
- \geq Port Statistics
- \triangleright I/O Scanner
- \triangleright
- \geq QoS
 - ➢ Network Time Service
 - Redundancy
- Hints & Tips

The web pages can only be accessed via the Main IP Address of the CPU.

- Messaging
- \triangleright
 - Alarm Viewer \geq

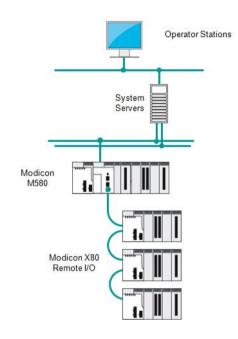
Introduction to Time Stamping

System

System time stamping provides a consistent SOE (sequence of events), time stamped at the source, in order to allow the user to analyse the source of abnormal behaviour in a distributed automation system.

The SOE is displayed in an alarm summary or SOE page of a client (such as a SCADA).

Each source of time stamped event of the SOE is a discrete I/O value change (transition) detected by a time stamping module, this event is then passed through to OFS and straight to the SCADA.



Introduction to Time Stamping (cont.)

Benefits There are many benefits of system time stamping:
removes the need for PLC programming.
Direct communication between the time stamping modules and the client. If the time stamping modules are in a Modicon X80 Remote I/O drop, the PLC communication bandwidth is not used.
Consistency of data (I/O values) between the process (time stamping modules) and the client (SCADA).
Time quality information associated with each time stamped event.
No loss of events in normal operating conditions:
A buffer is available to store the avents in each time stamping module. The

- A buffer is available to store the events in each time stamping module. The event storage is stopped when the buffer is full.
- **Rising and falling** edges transitions are stored for each **discrete I/O**.
- Where available, Hot Standby configurations on the PLC and/or redundant SCADA are managed.

Summary

Summary	In this chapter the following topics have been covered:		
	➢ Using a SD card with M580		
	Local extension racks		
	 Monitor a M580 for its embedded web pages The SCAIME weighing module The HART module 		
	> Time stamping		
Questions	The following questions will help to check understanding of the topics covered in this chapter:		
	➢ What are the two purposes of using an SD card with the M580?		

➤ What is the role of the M580 web pages?

Appendix A: Appendix

Answers to Questions

Introduction

The following pages give suggested answers to the questions asked at various points in the document. These are mainly the end of chapter questions.

This Chapter Covers These Topics:

\triangleright	M580 Basics	A-2
	Device I/O	A-3
	NOC	A-4
	Remote I/O	A-5
\triangleright	Premium I/O	A-6
۶	M580 Hot standby	A-7
\triangleright	Advanced Cyber security	A-8
\triangleright	Make Most of your M580!	A-9

M580 Basics

Answers

> For each part of the following picture, select which kind of I/O is used:



- A: Device I/O B: Local I/O C: Remote I/O
- → What are the three types of I/O? Which ones are faster to configure?

Local I/O Remote I/O Device I/O

Local I/O and Remote I/O are usually faster to configure than Device I/O.

➤ What are the purposes of the SERVICE port?

Most of the time the service port is connected to a SCADA, but it can also be connected to a Device I/O Drop, to Unity Pro, or to a computer for port mirroring and traffic analysing.

> What is the advantage of **Device DDT** over topological addressing?

The main advantage of Device DDT over topological addressing is that there is no need to map the I/O.

➤ What is the purpose of observing the M580 Device DDT?

The M580 Device DDT gives relevant information about the state of the M580 and its communication. It helps to monitor and troubleshoot the PLC.

▶ How to access the security parameters of the M580?

To access the security parameters of the M580, open the main rack, double click the ports of the CPU, click channel 0 and the security tab.

> To ensure higher cyber security; which services should be disabled?

To ensure higher Cyber Security it is best to disable all unused protocols

Device I/O

Answers

> What kind of device can be included in a DIO drop?

It is possible to connect any DTM device to a DIO drop, including non Schneider-Electric devices.

What is the main advantage of device integration? (You can take the Altviar drive as an example)

Device integration makes integration of devices easier by configuring and testing them from single software.

NOC

Answers

➤ What are the possible roles of a NOC?

A NOC has the same use as the service port of M580; it can be used to connect a drop to a SCADA or to connect DIO drops. In both cases, using a NOC instead of connecting directly to the M580 reduces the resources used by the M580.

➢ Which BME NOC modules support FactoryCast?

The 0311 support FactoryCast.

Remote I/O

Answers

> What is the main advantage of an RIO drop over a DIO drop?

Remote I/O drops are usually much faster to configure than Device I/O drops.

Which service needs to be enabled in the M580 security features to allow the use of a RIO drop?

TFTP needs to be enabled in order to being able to build a project with a RIO drop.

Premium I/O

Answers

Which type of I/O is a Premium I/O drop: local I/O RIO or DIO?
 A Premium I/O drop is considered as a local drop.

> What type of cables do you need to connect the main rack to the PIO drop?

To connect a PIO drop to the M580 main rack, you will need X-bus cables.

M580 Hot Standby

Answers

Which version of Unity Pro do you need to configure Hot Standby architecture?

HSBY architectures are configured via Unity Pro v11 or later versions.

▶ How can you check if the PLC is A or B and primary or secondary?

To check if the PLC is A or B and Primary or Secondary you can either look the M580's LED panel, or check the M580 Device DDT.

Advanced Cyber Security

Answers

➤ How does the memory protect and run/stop protect features work?

Run/Stop protect is a feature that makes the PLC reject any start/stop command unless a specific input is ON.

➤ When are the integrity check performed?

Unity Pro automatically performs an integrity check when you first open an application. Beyond the first check, Unity Pro will automatically run the integrity check periodically.

Make the Most of the M580!

Answers

> What are the two purposes of using an SD card with the M580?

The SD memory card is optional and is used for application backup and data storage.

➤ What is the role of the M580 web pages?

Embedded web pages are used for diagnostics and monitoring information.