

Configuration System for PROFINET IO Networks

Software Manual

Art.no.: 255245 September 2013

A MITSUBISHI ELECTRIC INDUSTRIAL AUTOMATION

About this Manual

The texts, illustrations, diagrams and examples in this manual are only intended as aids to help explain the functioning, operation, use and programming of the open network configuration system MELSOFT GX Configurator-PN. Separate manuals are available for MITSUBISHI ELECTRIC's various series of MELSEC programmable logic controllers.

This manual is only intended for users with experience in handling automation and communication networks. For using and usage of this software only the user his own is responsible. If you have any questions regarding the installation and operation of the software described in this manual, please do not hesitate to contact your sales office or one of your MITSUBISHI ELECTRIC distribution partners. You can also obtain information and answers to frequently asked questions from our MITSUBISHI ELECTRIC website under www.mitsubishi-automation.com.

The GX Configurator-PN software is supplied under a legal license agreement and may only be used and copied subject to the terms of this License Agreement.

No part of this manual may be reproduced, copied, stored in any kind of information retrieval system or distributed without the prior express written consent of MITSUBISHI ELECTRIC.

MITSUBISHI ELECTRIC reserves the right to change the specifications of its products and/or the contents of this manual at any time and without prior notice.

© 2013 MITSUBISHI ELECTRIC CORPORATION

L

Table of Contents

1	How to Use	1
2	PROFINET Controller ME1PN1FW-Q	2
2.1	Shared Memory PLC Interface	5
2.1.1	Management Area	11
2.1.2	Cyclic Communication Area	
2.1.3	Acyclic Communication Area	20
2.1.4	Network Diagnostics	
2.1.5	PLC Program Watchdog	
2.1.6	PLC and PROFINET Controller States (RUN/STOP)	
2.2	LED Display	
2.2.1	User LED	
2.2.2	7-Segment LED Display	
3	Getting to know GX Configurator-PN	58
4	Installation	59
4.1	System Requirements	59
4.2	Software Installation	60
4.3	Installing the DCP Protocol Driver	64
4.3.1	Windows XP	65
4.3.2	Windows Vista	
4.3.3	Windows 7	
4.3.4 4.4	Windows 8 PROFINET Controller Installation	
4.4	PROFINET Controller Installation	
5	Getting Started	80
6	Main Menu	85
6.1	File Menu	85
6.1.1	'Preview or Print Listings' Dialog	87
6.2	Description Menu	88
6.3	Help Menu	88
7	User Interface	89
7.1	Device Library	89
7.1.1	Library Menu	
7.1.2	'GSDML Management' Dialog	
7.1.3	'Device Type Properties' Dialog	
7.2	Network Detection	
7.2.1	'Network' Menu	
7.2.2	Online Action Tool	
7.3	PROFINET Network View	105
7.3.1	'Devices' Menu	
7.3.2	'Display Option' Dialog	
7.3.3 7.3.4	'Channel Properties' Dialog IP Address Manager	
1.3.4		

П	GX Configurator-PN	
7.4	┘ Items View	116
7.4.1	'Items' Menu	117
7.4.2	'Items Properties' Dialog	
7.4.3	'Items Declaration' Dialog	
7.5	Message View	
7.5.1	'Message View' Menu	
7.5.1 7.5.2	Message View Meria	
7.5.Z 7.6	Configuration Manager	
-		
7.6.1	'New Configuration' Dialog	
7.6.2	'Duplicate Configuration' Dialog	
7.6.3	'Rename Configuration' Dialog 'Configuration Properties' Dialog	
7.6.4		
7.7	'ME1PN1FW-Q Properties' Dialog	
7.8	'IO-Device Configuration' Dialog	131
7.8.1	'Device - General Configuration' Tab	132
7.8.2	'Device - Module Configuration' Tab	134
7.8.3	'Device - Parameters' Tab	136
7.8.4	'Device - Connection Information' Tab	
7.8.5	'Device - I/O Data' Tab	
7.8.6	'Device - GSDML File' Tab	142
7.9	'Module Configuration' Dialog	143
7.9.1	'Module Parameters' Tab	143
7.9.2	'Module Information' Tab	145
7.10	'PLC Settings' Dialog	146
7.10.1	'Multiple CPU Settings' Dialog	151
7.10.1	Documentation of Multiple CPU Settings	
	Configuration Samples	
	Hints for configuring multiple CPU settings and high speed memory	
	User Library Export	173
	GX Works2 Support	173
7.10.2	'Update Parameters' Dialog	177
7.10.3	'PROFINET Controller Status' Dialog	184
7.11	Aboutbox	186
8	PLC Code for PROFINET Controller	187
-		
8.1	Function Blocks	
8.1.1	Function Block 'Net_Detect'	
8.1.2	Function Block 'Read_Rec_Im'	
8.1.3	Function Block 'Write_Rec_Ex'	
8.1.4	Function Block 'Read_Rec_Ex'	
8.1.5	Function Block 'Alarm_Request'	
8.1.6	Function Block 'Alarm_Ack'	
8.1.7	Function Block 'Alarm_Log'	
8.1.8 8.2	Function Block 'IO_Device_Info'	
8.2	Global Variables	205
9	Appendix	212

9.1	Troubleshooting	212
9.1.1	Factory Default Settings	212
9.2	Introduction to PROFINET IO	213

Index

_

1 How to Use

This manual...

...is a compact guide to using GX Configurator-PN software suitable both for beginners and experienced users upgrading from other systems. The manual includes explanations of the terms and structural concepts about the software and the configuration of an open network system. The manual provides a precise step-by-step description of how to use GX Configurator-PN including sample projects. The PLC series MELSEC Q Series is referenced as MELSEC system Q in this manual.

If you are not yet familiar with MS Windows...

... please at least read the Windows Fundamentals section in the Windows User's Guide, or work through the Windows Tutorial accessible through the Help menu of the Windows Program Manager. This will teach you what you need to know about using the basic elements of Microsoft ® Windows, and the operating procedures that are identical in all Windows application programs.

If you have problems with parameter settings, ...

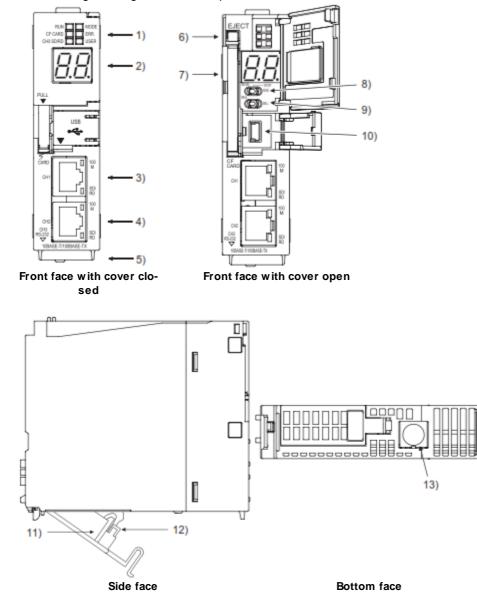
... please refer to the user's manuals of the concerning open network modules.

If you get stuck...

... do not despair, help is never far away! If you run up against seemingly insoluble problems, or if you have questions about GX Configurator-PN or the connected programmable logic controller (PLC) configuration, please first refer to the manuals and documentation. Many answers and solutions can also be found directly in the GX Configurator-PN context-sensitive online help system, which can always be accessed by pressing the <F1> key. If you cannot find answers to your questions in any of these places, contact your local MITSUBISHI ELECTRIC representative or call our European head-quarters in Ratingen directly. The addresses and phone numbers are provided on the back covers of our manuals.

2 PROFINET Controller ME1PN1FW-Q

The ME1PN1FW-Q is a PROFINET RealTime (RT) communication master based on the hardware of the Q12DCCPU-V. The restrictions of the Q12DCCPU-V with regard to environmental, mechanical and electrical conditions apply.



The following drawings indicate the parts of the ME1PN1FW-Q.

Parts	list

No.	Name	Description
1	Indicator LEDs	for the USER LED see ' <u>User LED</u> ', for the other LEDs consult the Q12DCCPU-V manual
2	7-segment LEDs	see ' <u>7-Segment LED Display</u> ' for details
3	10BASE-T/100BASE-TX interface connector (RJ45)	Ethernet interface used for configuration and PROFINET I/O communication

No.	Name	Description
	Channel 1	
4	10BASE-T/100BASE-TX interface connector (RJ45) Channel 2	Not used for the PROFINET Controller
5	Serial number plate	Hardware serial number
6	EJECT button	Press to eject CF card from slot
7	CompactFlash (CF) card installation slot	Slot for installing CF card
8	RUN/STOP/MODE switch	Sets the operation mode
9	RESET/SELECT switch	Used to reset the module
10	USB interface connector	For USB connections Not supported by the PROFINET Controller. The module can only be accessed via the first Ethernet port.
11	Battery	Buffers data in RAM
12	Battery connector pin	Pin to connect battery Note : when delivered the battery is not connected to en- sure its capacity.
13	RS-232 interface connec- tor	For RS-232 connections Not supported by the PROFINET Controller.

Technical Data

Maximum number of total cyclic input data (1)	9228 bytes
Maximum number of total cyclic output data (1)	9900 bytes
Maximum number of cyclic input data	1437 bytes per device (= IOCR data length)
Maximum number of cyclic out- put data	1437 bytes per device (= IOCR data length)
Maximum number of configured devices	128
Minimum cycle time	1 ms

Maximum number of total cyclic input data (1)	9228 bytes	
Maximum cycle time	512 ms Different IO-Devices can be configured with different	
	cycle times	
RT communication	RT Class 1	
Alarm processing	Read/Write Records	
	Limited to 5448 bytes per request	
DCP (Discovery & Configure Protocol)	Supported	
RPC (Remote Procedure Call)	Supported (up to 4 fragments 5448 bytes)	
Baud rate	100 MBit/s Full-Duplex mode	
Data transport layer	Ethernet II, IEEE 802.3	
LLDP sender	supported	

(1) these sizes includes potential padding that could be inserted for variable alignment.

The following limitations apply:

- The usable (minimum) cycle time depends on the number of IO-devices and the total size of input and output data. For example it is not possible due to performance reasons to have 128 IO-devices communicating with a cycle-time of 1 ms.
- RT over UDP, RT Class 2 and RT Class 3 (IRT) are not supported
- · Multicast communication is not supported
- DHCP is not supported (neither for the PROFINET Controller nor for the IO-devices)
- Only one input IOCR and one output IOCR per IO-device
- Only one API (API = 0) is supported. Any profile requesting a different API is currently not supported.
- The IO-device feature "FastStartUp" cannot be used
- WriteMultiple-Record service is not supported

System Configuration

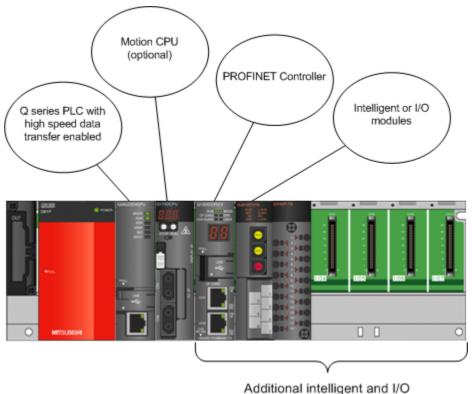
The ME1PN1FW-Q uses high speed data transfer for the data exchange with the controlling CPU. It can only be used in combination with QnU-CPUs, which support high speed data transfer. The following QnU-CPUs do not support high speed transfer and therefore cannot be used

- Q00UJ
- Q00U
- Q01U
- Q02U

Mounting the PROFINET Controller in a PLC Rack

The PROFINET Controller must be placed in a slot to the right of the controlling QnU-CPU, but not necessarily next to it. Additional QnU-, Motion- or NC-CPUs can be placed between the controlling QnU-CPU and the PROFINET Controller. Intelligent and I/O modules are supported in the slots follo-

wing the PROFINET Controller.

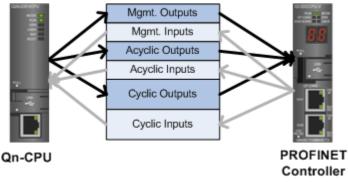


modules

Note: if any of the intelligent modules requires specific settings in the 'I/O Assignment' configuration, these settings must first be set in the controlling Qn-CPU using the PLC programming software (GX Developer, GX IEC Developer, GX Works 2). After this the I/O assignment settings must be copied to the PROFINET Controller by updating the PROFINET Controller using the <u>'Update Parameters' dia-</u>log. Otherwise the Qn-CPU will signal an error, because the I/O assignment settings on Qn-CPU and PROFINET Controller differ. When using GX Works 2 to set up the controlling QnU-CPU the parameters must not be necessarily be downloaded to the CPU module. If the PLC project path is set in the <u>'Update Parameters' dialog</u> the I/O assignment information is taken from there instead of uploading them from the module.

2.1 Shared Memory PLC Interface

The communication between the PLC program and the PROFINET Controller is based on a shared memory area (inside the High Speed Area), which is accessed via buffer devices in the CPU (PLC).



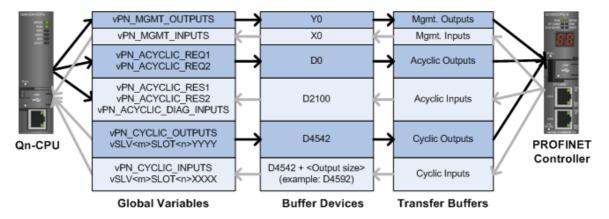
The memory area consists of the following sections

Block	Description		
Management Outputs	Control and request flags from the Q-CPU to the PROFINET Controller		
Management Inputs	Status and response flags from the PROFINET Controller to the Q-CPU		
Acyclic Outputs	Request buffer for acyclic communication		
Acyclic Inputs	Response buffer for acyclic communication		
Cyclic Outputs	Outputs for I/O devices sent during cyclic data exchange		
Cyclic Inputs	Inputs from I/O devices received during cyclic data exchange		

Access to Shared Memory From PLC Program

GX Configurator-PN generates PLC code for the interaction of the application program with the PROFINET Controller. The PLC code contains global variables mapped to buffer devices, which are automatically exchanged between Qn-CPU and PROFINET Controller.

The following diagram shows the principal structure. For details see the section 'Global Variables'.



Addresses in High Speed Area

The settings for the high speed transfer in both the controlling Qn-CPU as well as the ME1PN1FW-Q are updated by the GX Configurator-PN software. The address range occupied in the high speed area depends on the size of the cyclic data exchanged between the controller and the I/O devices.

The two following tables list the used high speed memory area addresses for outputs and inputs. Because the size of the memory areas used for management and for acyclic communication are fixed, the total size of required high speed buffers depends only on the size of the cyclic data.

For outputs:

Profinet		Max Cy-	High Speed Area		
manage- ment	Buffer Si- ze	clic Out- put Size (words)	Calculated Minimal Size	Address Start	Address End

PROFINET Controller ME1PN1FW-Q

(words)	(words)		(kWords)		
N/A	N/A	N/A	0	N/A	N/A
N/A	N/A	N/A	1	N/A	N/A
N/A	N/A	N/A	2	N/A	N/A
118	2100	854	3	10 000	13071
118	2100	1878	4	10 000	14095
118	2100	2902	5	10 000	15119
118	2100	3926	6	10 000	16143
118	2100	4950	7	10 000	17167

For inputs:

Profinet			Max In- High Speed Ar	ea	
ment z	ze (words)	put Size (words)	Calculated Minimal Size (kWords)	Address Start	Address End
N/A	N/A	N/A	0	N/A	N/A
N/A	N/A	N/A	1	N/A	N/A
N/A	N/A	N/A	2	N/A	N/A
112	2442	518	3	10 000	13071
112	2442	1542	4	10 000	14095
112	2442	2566	5	10 000	15119
112	2442	3590	6	10 000	16143
112	2442	4614	7	10 000	17167

The refresh buffers in the high speed memory area are always aligned to the end address of the high speed area, not its start address. The end addresses is calculated by adding the total size of the high speed area to the start address of the memory area (here 0x10000). If the total size of the refresh buffers is not a multiple of kWords, the gap to the next kWord boundary is filled with the 'user area'. Because the user area always starts at address 0x10000, the start addresses of the refresh blocks are variable.

The following tables contain the formulas for calculating the start and the end address of each refresh block.

Block	Start Address	End Address
Cyclic Outputs	End Addr Output size + 1	End Addr.
Acyclic	End Addr Output size -	End Addr Output
Outputs	2100 + 1	size
Mgmt.	End Addr Output size -	End Addr Output
Outputs	2100 - 118 + 1	size - 2100

Output Areas Offsets Calculation

Input Areas Offset Calculation

Block	Start Address	End Address
Cyclic In- puts	End Addr Input size + 1	End Addr.
Acyclic In-	End Addr Input size -	End Addr Input si-
puts	2442 + 1	ze
Mgmt. In-	End Addr Input size -	End Addr Input si-
puts	2442 - 112 + 1	ze - 2442

Two examples show the application of these formulas for calculating the start and end addresses for a specific combination output and input size, resulting from the corresponding PROFINET configuration.

Example 1	Example 1: Output size is 900 and Input size is 500.						
				Addresses in high speed area			
	Size in word	Nb points (K)	start	end	I/O	Acyclic Buffer	PROFINET Management
Outputs	900	4	10000	14095	13196- 14095	11096- 13195	10978-11095
Inputs	500	3	10000	13071	12572- 13071	10272- 12371	10160-10271

a is 000 and Input size is 500

Example 2: Output size is 1900 and Input size is 1900.

			Addresses in high speed area				
	Size in word	Nb points (K)	start	end	I/O	Acyclic Buffer	PROFINET Management
Outputs	1900	5	10000	15119	13196- 14095	11096- 13195	10978-11095
Inputs	1900	5	10000	15119	12372- 13071	10272- 12371	10160-10271

Shared Memory Structure

Data from Qn-CPU to PROFINET Controller

Size in Word	Block num- ber (for PLC)	Global Variable Identifiers in Exported PLC Code	Description		
High Speed Transmission Area (0x2710 – 0x5F0F)					
1		vPN_MGMT_OUTPUTS. <u>IOC_STAR</u> T_STOP	Allows to start or stop the PROFINET IO-Con- troller.		
8		vPN_MGMT_OUTPUTS. <u>IOD_MGT_</u> MODE	Allow to set IO-Device management in auto- matic or manual mode.		
8		vPN_MGMT_OUTPUTS. <u>IOD_STAR</u> T_STOP_DEV	Allow to connect or re- lease connection with an IO-Device.		
8		vPN_MGMT_OUTPUTS. <u>IOD_CMD_</u> HSK_Y	PLC to PROFINET Controller handshake flag to perform com- mand indicated in IOD START STOP D EV		
8	BLOCK 1 Size: 118	vPN_MGMT_OUTPUTS. <u>IOD_MGT_</u> <u>ALARM</u>	Allow to enable or disa- ble alarm management by PLC		
8		vPN_MGMT_OUTPUTS. <u>IOD_CON</u> <u>SIST</u>	Allow to enable or disa- ble the handshake me- chanism for I/O data (so having consistency enabled)		
8		vPN_MGMT_OUTPUTS. <u>IOD_INPU</u> T_HSK_Y	PLC to PROFINET Controller handshake flags for Inputs		
8		vPN_MGMT_OUTPUTS. <u>IOD_OUTP</u> <u>UT_HSK_Y</u>	PLC to PROFINET Controller handshake flags for Outputs		
1		vPN_MGMT_OUTPUTS. <u>ACYC_HS</u> K_Y_REQ1_EXECUTE and ACYC_HSK_Y_REQ2_EXECUTE	PLC to PROFINET Controller handshake bits for acyclic re- quests (2 bits used)		
60		Reserved	Reserved for future use		
750	BLOCK 2	VPN_ACYCLIC_REQ1	Buffers for acyclic re-		

750	Size: 2100	VPN_ACYCLIC_REQ2	quest data (2 buffers - max 1500 bytes each incl. header)
600		Reserved	Reserved
1		vPN_CYCLIC_OUTPUTS. <u>LIVE_WOR</u> D_Y	PLC to PROFINET Controller live register
Varia- ble, Up to 4949	BLOCK 3 Size: 4950 max	variable names for cyclic I/O data are user-defined	output data sent to IO- Devices. The data size is variable up to 9898 bytes.

Data from PROFINET Controller to Qn-CPU

Size in Word	Block number (for PLC)	Global Variable Identifier	Description
High Spee	d Transmission	Area (0x2710 – 0x5F0F)	
2		vPN_MGMT_INPUTS. <u>IOC_STS_</u> 	IO Controller Status
8	BLOCK 1 Size: 112	vPN_MGMT_INPUTS. <u>IOD_CMD</u> HSK_X	PROFINET Controller to PLC handshake flag to acknowledge command in IOD_START_STOP_DEV
8		vPN_MGMT_INPUTS. <u>IOD_INPU</u> <u>T_HSK_X</u>	PROFINET Controller to PLC handshake flags for Inputs
8		vPN_MGMT_INPUTS. <u>IOD_OUTP</u> <u>UT_HSK_X</u>	PROFINET Controller to PLC handshake flags for Outputs
1		vPN_MGMT_INPUTS. <u>ACYC_HS</u> K_X_*	PROFINET Controller to PLC handshake bits for acyclic requests (2 bits used)
8		vPN_MGMT_INPUTS. <u>IOD_ALAR</u> M_IND	Alarm indication
8		vPN_MGMT_INPUTS. <u>IOD_CON</u> <u>N_STS</u>	Connection status flag 0: IO-device Not connec- ted 1 Device connected
8		vPN_MGMT_INPUTS. <u>IOD_ERR_</u> <u>STS</u>	Device ERROR flag 0: device no error

request - max
- max
- max
incl.
tic infor- es with
ed
C value.
status
ed
rror U state)
oller to
d from ize up to

2.1.1 Management Area

IOC_START_STOP Register

This register is set or cleared by the control CPU to start or stop the PROFINET Controller.

From CPU to PROFINET IO-Controller				
Global Var. Identifier	Values			
Giobal val. identilier	0	1		
vPN_MGMT_OUTPUTS.IOC_ START_STOP	IO-controller has to be stopped If the IO-controller is not star- ted, nothing is done by	IO-controller has to be started If the IO-controller is started, nothing is done by PROFINET		

PROFINET firmware. If the IO-controller is starting or started, each connection will be automatically released by the firmware, even if the connection is in manual mana- gement.	firmware. If the IO-controller is stopping (stop sequence), the firmware will continue the stop se- quence up to the end and then will initiate again a start se- quence.
	If the IO-controller is stopped, the IO-controller will be started. The controller will try to start each connection with an IO-de- vice, which is configured with automatic management mode (1). Each connection with a de- vice in manual management mode will not be up until the PLC explicitly sends a com- mand to the device.

(1) See <u>IOD_MGT_MODE</u> registers. By default the IO-device management is in automatic mode (bits are 0). If the PLC does nothing, every connection will automatically be started, when the IO-controller is started.

IOD_MGT_MODE Registers

With these 128 bits the PLC can indicate, how each connection to an IO-device should be managed by the firmware.

- for an IO-device in automatic mode the IO-controller will initiate the connection, until the connection is established.
- for an IO-device in manual mode the IO-controller will wait for commands from the PLC to manage the connection (see <u>IOD_START_STOP</u> and <u>IOD_CMD_HSK_Y</u> registers).

From CPU to PROFINET IO-Controller					
Clobal Variable Identifier	IO-Device	Values			
Global Variable Identifier	Number	0	1		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[0]	0	Automatic	Manual		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[15]	15	Automatic	Manual		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[16]	16	Automatic	Manual		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[31]	31	Automatic	Manual		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[116]	116	Automatic	Manual		
vPN_MGMT_OUTPUTS.IOD_MGT_MODE[127]	127	Automatic	Manual		

IOD_START_STOP_DEV Registers

With these 128 bits the PLC specifies, which command will be executed when the corresponding command handshake flag (see <u>IOD_CMD_HSK_Y</u>) is set. These registers are relevant only for devices, which are in manual management mode (see <u>IOD_MGT_MODE</u>).

From CPU to PROFINET IO-Controller				
Global Variable Identifier	IO-De- vice	Values		
	Num- ber	0	1	
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[0]	0			
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[15]	15			
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[16]	16			
		Release	Establish	
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[31]	31	connection	connection	
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[116]	116			
vPN_MGMT_OUTPUTS.IOD_START_STOP_DEV[127]	127			

IOD_CMD_HSK_X and IOD_CMD_HSK_Y Registers

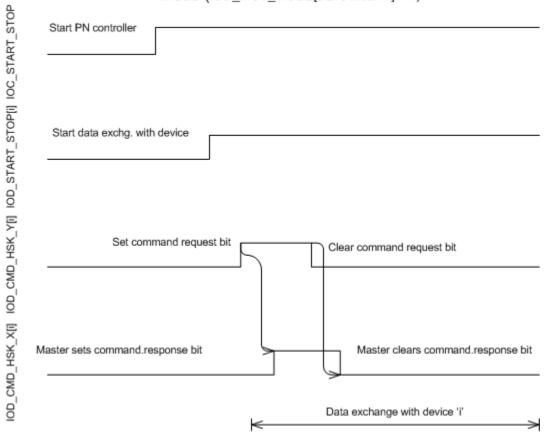
With the 128 bits the PLC can ask the PROFINET Controller to execute command(s) previously defined in the corresponding <u>IOD_START_STOP</u> register(s).

When the command(s) are completed, the PROFINET Controller sets the corresponding bit(s) in the IOD_CMD_HSK_Y registers. The PLC can then verify the connection status via the IOD_CONN_STS registers.

From CPU to IO-Controller		From IO-Controller to CPU	
Global Var. Identifier	Function	Global Var. Identifier	Function
vPN_MGMT_OUTPUTS.I OD_CMD_HSK_Y[0]	Trig command for device 0	vPN_MGMT_INPUTS.IOD _CMD_HSK_X[0]	command for device 0 executed
	Trig command for device n		command for device n executed
vPN_MGMT_OUTPUTS.I OD_CMD_HSK_Y[127]	Trig command for device 127	vpn_mgmt_inputs.iod _CMD_HSK_X[127]	command for device 127 executed

Example for Starting PROFINET Communication

If the data exchange mode for an IO device is set to 'automatic' (corresponding bit in IOD_MGT_MODE is 0), the cyclic data exchange with the device is automatically initiated, when the PROFINET Controller is started by setting IOC_START_STOP. If the device is however set to 'manual' mode, the data exchange between the PROFINET Controller and the device must be started separately by setting the bit in IOD_START_STOP_DEV, which corresponds to the device. The PROFINET Controller only evaluates a bit in IOD_START_STOP_DEV, if the equivalent bit in IOD_CMD_HSK_Y is set.



Start communication for an IO device, which is in ,manual' mode (IOD_MGT_MODE[slave index 'i'] = 1)

2.1.2 Cyclic Communication Area

Process Data (Cyclic Data Exchange)

From the PROFINET perspective the cyclic communication is a continuous transfer of input and output data between the IO-controller and each IO-device without further interaction by the application. In PROFINET the cyclic communication is based on the producer/consumer model. For each IO-device, the IO-controller establishes connection with a specific refresh period (duration of the cycle). The cyclic data exchange can be individually started or stopped for each PROFINET IO-device.

Inputs and outputs are exchanged between the PLC and the PROFINET Controller via the INPUT_DATA and OUTPUT DATA buffers.

- I/O variables configured in GX Configurator-PN are located inside these two buffers by respecting some alignment rules.
- As these buffers can be accessed simultaneously from the PROFINET Controller and the PLC, a

handshake mechanism exists to ensure consistency on all variables. This mechanism is optional and can be activated and deactivated per device.

Input and Output Data Alignment

The IO-device input and output areas in the buffer memory of the PROFINET Controller are word-aligned. PROFINET variables are located in the shared memory by respecting the following rules

- The data of each PROFINET IO-device is placed at an address on a word boundary, independent of its type.
- Single or array variables must be aligned on an address modulo of the minimum of both the PLC alignment (2) and the native type size (1, 2 or 4). So specifically
 - o Each slot should always be located at the next available word boundary address
 - BYTEs or BYTE ARRAYS of the same slot are packed in memory to follow directly the previous defined variable
 - o WORDs should always be located at the next available word boundary address
 - o DWORDs, FLOATs should be also located at a word boundary address

Additionally all WORD, DWORD and FLOAT variables are stored in little-endian format in shared memory, to ease interpretation of the variables by the PLC program.

Example:

		 b15 b8	b7 b0
\square	Input data Slot1	0 0H	First byte
	1 byte 1 word	 W lo	W hi
9		 W lo	W hi
Devic	Input data Slot2 1 word Input data Slot2 Array 3 bytes	 2nd byte	First byte
5		 0 0H	3d byte
		 W lo	W hi
Н	Input data Slot2	W lo	W hi
è e	·•	 2nd byte	First byte
Device	Input data Slot2	0 0H	3d byte
	Array 3 bytes		

IO-Device Consistency Management (IOD_CONSIST Registers)

The Q-series OS can ensure data consistency within a word in the data exchange via Autorefresh. The Autorefresh settings of the respective module contain a module specific X-device, which the communication module resets during access to the buffer memory. The CPU must check this device before accessing the buffer memory. If consistency handling has been disabled in the module, the device remains permanently set. The single X-device can only control access to the I/O data of all slaves together. An individual handshake for each station is not possible with this approach.

Using the following 128 bits the PLC can enable and disable at any time the consistency management per device.

From CPU to PROFINET IO-Controller				
Global Variable Identifiers	IO-Device Number	Values		
Giobal variable identifiers		0 (default)	1	
vPN_MGMT_OUTPUTS.IOD_CONSIST[0]	0	Disable Con- sistency	Enable Con- sistency	
vPN_MGMT_OUTPUTS.IOD_CONSIST[15]	15			

16

From CPU to PROFINET IO-Controller			
Clabel Verieble Identifiere	IO-Device Number	Values	
Global Variable Identifiers		0 (default)	1
vPN_MGMT_OUTPUTS.IOD_CONSIST[16]	16		
vPN_MGMT_OUTPUTS.IOD_CONSIST[31]	31		
vPN_MGMT_OUTPUTS.IOD_CONSIST[116]	116		
vPN_MGMT_OUTPUTS.IOD_CONSIST[127]	127		

Therefore station-specific handshake flags are added to the shared memory, which block simultaneous access to the same input or output area by both the master and the PLC program. This solution is slower, but has the following advantages:

- 1. IO-controller checks the configuration to detect stations, which require consistency
- 2. it marks those stations, which require consistency for inputs and outputs.
- 3. handshake controls access to each station separately, not blocking simultaneous access to all stations

The disadvantage of this solution is the delay between two updates data from PLC.

Note: PLC CPU and PROFINET Controller cannot write to the same area in shared memory. Therefore the handshake mechanism requires to define two bits for device inputs and two bits for device outputs.

Output Handshake Registers (IOD_OUTPUT_HSK_Y and IOD_OUTPUT_HSK_X)

From CPU to IO-Controller		
Global Variable Identifier	Function	
vPN_MGMT_OUTPUTS.IOD_OUTPUT_HSK_Y[0]	Take into account new outputs for device 0	
	Take into account new outputs for device n	
vPN_MGMT_OUTPUTS.IOD_OUTPUT_HSK_Y[127]	Take into account new outputs for device 127	

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

From IO-Controller to CPU		
Global Variable Identifier	Function	
vPN_MGMT_INPUTS.IOD_OUTPUT_HSK_X[0]	New Outputs read (will be sent to the IO-device 0 during next exchange)	
	New Outputs read (will be sent to the IO-device n during next exchange)	
vPN_MGMT_INPUTS.IOD_OUTPUT_HSK_X[127]	New Outputs read (will be sent to the IO-device 127 during next exchange)	

Input Handshake Registers (IOD_INPUT_HSK_Y and IOD_INPUT_HSK_X)

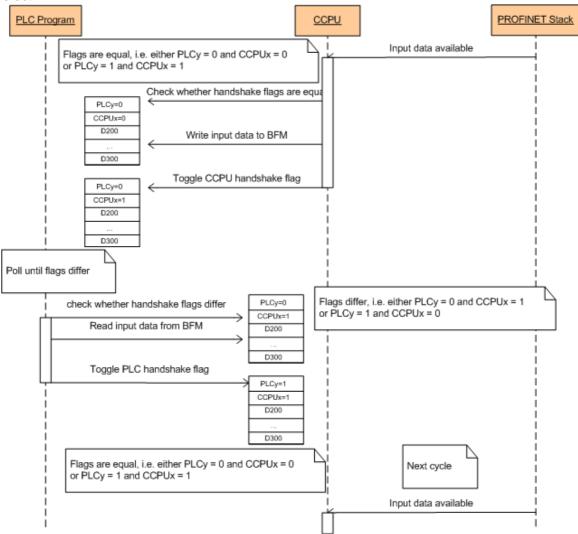
From CPU to IO-Controller		
Global Variable Identifier	Function	
vPN_MGMT_OUTPUTS.IOD_INPUT_HSK_Y[0]	New Inputs of the IO-device 0 has be- en read.	
	New Inputs of the IO-device n has be- en read.	
vPN_MGMT_OUTPUTS.IOD_INPUT_HSK_Y[127]	New Inputs of the IO-device 127 has been read.	

From IO-Controller to CPU		
Global Variable Identifier	Function	
vPN_MGMT_INPUTS.IOD_INPUT_HSK_X[0]	Take in account new inputs from devi- ce 0	
	Takes in account new input from devi- ce n	
vPN_MGMT_INPUTS.IOD_INPUT_HSK_X[127]	Takes in account new input from devi- ce 127	

Note: the 'Input/output PLC-side flags' are set and cleared by the PLC program, the 'Input/output master-side flags' are set and cleared by the master. In general write access is permitted to the input or output area of a station, if both flags are equal (0,0 or 1,1). Read access is permitted if both flags differ (0,1 or 1, 0).

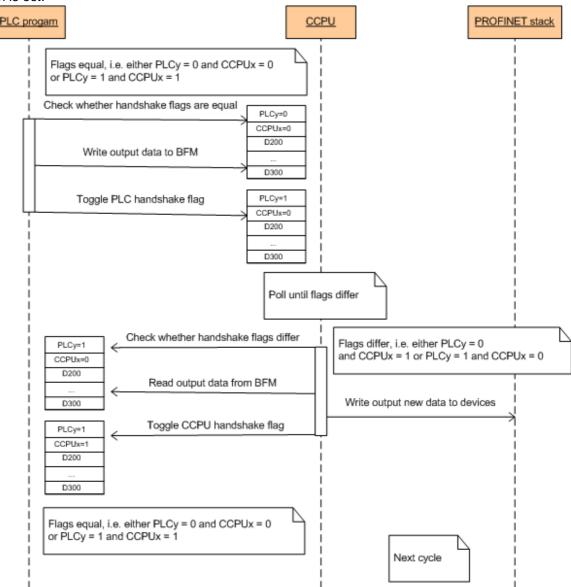
Access to Input Data

The following procedure must be followed, if the 'Input consistency flag' corresponding to the station is set.



Access to Output Data

The following procedure must be followed, if the 'Output consistency flag' corresponding to the station is set.



Cycle 1:

- 1. The PLC CPU detects that the output buffer is free because values of the handshake flags are equal (0:0 for cycle 1)
- 2. The PLC CPU writes the output data to the OUTPUT_DATA buffer
- 3. The PLC CPU toggles its handshake flag (0 -> 1 for cycle 1)
- 4. The PROFINET Controller detects that the values of the handshake flags are different
- 5. The PROFINET Controller reads the output data from the OUTPUT_DATA buffer
- The PROFINET Controller signals that the output buffer is free by toggling its bit to equal the one of the PLC CPU (0 -> 1 for cycle 1)
- 7. The cycle 1 is completed

Cycle 2:

- 1. The PLC CPU detects that the output buffer is free (1:1 in handshake flags)
- 2. The PLC CPU writes the output data to buffer memory
- 3. The PLC CPU toggles its handshake flag (1 -> 0 for cycle 2)
- 4. The PROFINET Controller detects that the values of the handshake flags are different

20

- 5. The PROFINET Controller reads the output data from buffer memory
- 6. The PROFINET Controller signals that the output buffer is free by toggling its bit to equal that of the PLC CPU (1 -> 0 for cycle 2)
- 7. The cycle 2 is completed

2.1.3 Acyclic Communication Area

The acyclic communication is an exchange of request and response messages between the PROFINET Controller and each IO-device station. The message exchange must be initiated by the controller.

Acyclic Request/Response Buffers

The shared memory area contains two pairs of buffers (vPN_ACYCLIC_REQ1/2 and vPN_ACYCLIC_RES1/2) allowing two acyclic requests to be performed simultaneously.: - vPN_ACYCLIC_REQ1 and vPN_ACYCLIC_REQ2 allow PLC to deposit a request. - vPN_ACYCLIC_RES1 and vPN_ACYCLIC_RES2 allows to get the respective answers To manage synchronization, some handshake bits are used. A request buffer can be used to send a request to any of the configured stations; there is no relation between a request buffer and a particular station.

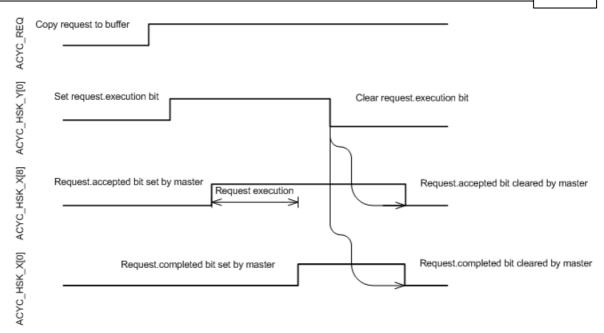
Acyclic Handshake Bits

Each request/response buffer pair is associated with a set of handshake bits.

Global Variable Identifier	Description
vPN_MGMT_OUTPUTS.ACYC_HSK_Y_RE Q1_EXECUTE	execution req. flag for buffer 1
vPN_MGMT_OUTPUTS.ACYC_HSK_Y_RE Q2_EXECUTE	execution req. flag for buffer 2
vPN_MGMT_INPUTS.ACYC_HSK_X_RES1 _COMPLETED	request in buffer 1 completed, respon- se is in corresponding buffer
vPN_MGMT_INPUTS.ACYC_HSK_X_RES2 _COMPLETED	request in buffer 2 completed, respon- se is in corresponding buffer
vPN_MGMT_INPUTS.ACYC_HSK_X_RES1 _ACCEPTED	request in buffer 1 accepted
vPN_MGMT_INPUTS.ACYC_HSK_X_RES2 _ACCEPTED	request in buffer 2 accepted

Once the response has been read by the PLC from the response buffer, the PLC must clear the ACYC_HSK_Y_REQ<n>_EXECUTE bit corresponding to the request. The PROFINET Controller will then clear the two corresponding bits ACYC_HSK_X_RES<n>_ACCEPTED and ACYC_HSK_X_RES<n>_COMPLETED.

The following diagram shows the request/response handshake between PLC program and the PROFINET Controller for acyclic communication.



Acyclic Request Header

The request buffer consists of an header and a data buffer area. The same header is used whatever is the requested service. Consult each service detailed description to verify which fields are relevant.

Word Offset	ID	Description
0	RequestID	ID of the request
1	Requestio	ID of the request
2	ServiceID	service identifier (see above)
3	Status	Status of the request. shall always be equal to 0x55.
4	DeviceID	IO-Device number defined in the GX Configurator PN, or in the
5	DeviceiD	case of implicit request, the IP address of the IO-device.
6	API	API number used to perform the Read
7	AFI	Value: 0 to 0xFFFFFFF
8	SlotNumber Target slot number.	
		Value: 0 to 0x7FFF
9	SubslotNumber	Target subslot numbe
		Value: 1 to 0x8FFF
10	Index	Index in the slot or sub-slot
		Value: 1 to 0xFFFF
11	Data length (byte)	Number of bytes stored in the request data buffer

		Value: 0 to 1440.
12	PnDeviceID	PROFINET Device ID
13	PnVendorID	PROFINET Vendor ID
14-21	ARUUID	Never used, must be set to 0.
22-29	Reserved	Reserved

Note: Each value is in little-endian- (i.e. Intel-) format.

Acyclic Response Header

The response buffer consists of a header and a data buffer area. The same header is used independently of the requested service. Consult each service detailed description to verify, which fields are relevant.

Word Offset	ID	Description
0	DeguestID	ID of the request
1	<u>RequestID</u>	ID of the request
2	<u>ServiceID</u>	service identifier (see above)
3	Status	Status of the Request
4	<u>DeviceID</u>	IO-device number defined in GX Configurator-PN or in the case of
5		explicit request, the IP address of the IO-device.
6	Data length	Number of bytes stored in the response data buffer
7	ErrorDecode	PROFINET value. Used when a negative response is returned
8	ErrorCode1	PROFINET value. Used when a negative response is returned
9	ErrorCode2	PROFINET value. Used when a negative response is returned
10-19	reserved	Reserved

Note: Each value is in little-endian- (i.e. Intel-) format.

RequestID

The RequestID field in the request buffer header can be used by PLC to identify the answer. It is the responsibility of the PLC program to manage the field RequestID. The best practice is to increment this field before each new request. The PROFINET firmware will answer to the request with the same RequestID.

ServiceID

The field 'ServiceID' marks the type of request. Acyclic communication can be used for the following services:

Service	Identifier	Description
Network detection	0x01	determines the number of connected IO devices
		(see ' <u>Network Detection Service</u> ')
IO-Device Detected	0x02	
Read Implicit	0x03	see 'Record Block Implicit Read'
Write Explicit	0x04	see 'Record Block Explicit Write'
Read Explicit	0x05	see 'Record Block Explicit Read'
Alarm Request	0x06	see ' <u>Alarm Request</u> '
Alarm Ack	0x07	see ' <u>Alarm Ack</u> '
IO-Device Information	0x08	get information for a specific IO device
Read alarm log	0x09	see ' <u>Alarm Log</u> '

DeviceID

This ID is defined during PROFINET configuration with the GX Configurator PN tool.

General Configurat	ion	Module (Configuration
Device Designa	ation		
Name:	BK	9103	
Number:	00	1 💌	🗹 Link Pa
Comment:	BK	.9103 PR	OFINET 1/O D

Acyclic Service Request/Response Formats

Network Detection Service

Based on DCP identify request, this service allows to detect up to 255 IO-devices present on the network (LAN). This function returns only the number of IO-Devices detected. After the call of this service, it is needed to call the service IO-Device detected (serviceID = 2) to get more information on each detected IO-Device.

Request Format

Word Offset	ID	Value
0	DeguestiD	
1	RequestID	PLC value

Word Offset	ID	Value
2	ServiceID	0x01
3	Status	0x55
4	DeviceID	0x0000
5		
6	API	0x0000
7	AFI	
8	SlotNumber	0x00
9	Subs- lotNumber	0x00
10	Index	0x00
11	Data length (byte)	0x0000
12	PnDeviceID	0x00
13	PnVendorID	0x00
14-21	ARUUID	0x00
22-29	Reserved	Reserved (0x00)

Response Positive Format (Status = 0)

	Word Offset	ID	Value
	0	RequestID	Same as the request
	1	Requestio	Same as the request
	2	ServiceID	0x01
	3	Status	0x00
Header	4	DeviceID	0x0000
	5		
	6	Data length (byte)	0x0004
	7	ErrorDecode	0x00
	8	ErrorCode1	0x00

	Word Offset	ID	Value
	9	ErrorCode2	0x00
	10-19	reserved	0x00
Data	20	Nr IO-Devices	Number of IO-devices detec-
Data	21		ted

Response Negative Format

	Word Offset	ID	Value
	0	PoqueatID	Some as the request
	1	RequestID	Same as the request
	2	ServiceID	0x01
	3	Status	!= 0x00
	4	DeviceID	0x00
Header	5		
	6	Data length	0x0000
	7	ErrorDecode	!= 0x00
	8	ErrorCode1	!= 0x00
	9	ErrorCode2	!= 0x00
	10-19	reserved	0x00

Possible values for Status

Value	Comment
0	Status OK
1	Profinet stack not started
2	No ethernet link
3	No IO-Device detected

Note: if more than 255 devices are detected, the function returns status OK and Nr IO Devices ==255

IO-Device Detection

This function allows to get for each IO-Device detected by a previous call to the service Network Detection, some information like IP configuration, MAC Address, Vendor ID, Device ID, Name of the IO-Device and IO-Device type.

Request format			
Word Offset	ID	Value	
0		PLO coluz	
1	RequestID	PLC value	
2	ServiceID	0x02	
3	Status	0x55	
4	DeviceID	0x0000	
5			
6	API	0x0000	
7	AFI		
8	slot_number	0x00	
9	Subslot_number	0x00	
10	Index	0x00	
11	Data length (byte)	0x00	
12	PnDeviceID	0x00	
13	PnVendorID	0x00	
14-21	ARUUID	0x00	
22-29	Reserved	Reserved (0x00)	

Response Positive Format (Status = 0)

	Word Off- set	ID	Value
	0		
Header	1	RequestID	Same as the request
	2	ServiceID	0x02

	Word Off- set	ID	Value
	3	Status	0x00
	4	DeviceID	0x0000
	5		
	6	Data length (byte)	Size of the Data.
	7	ErrorDecode	0x00
	8	ErrorCode1	0x00
	9	ErrorCode2	0x00
	10-19	reserved	0x00
	20	VendorID	VendorID of the device
	21	DeviceID	DeviceID of the device
	22	IP address	IP address of the Device
	23		
	24	Subnetmask	Subnet mask of the Device
	25		
	26	Gateway	Gateway IP Address of the De-
Data	27		vice
	28 – 30	Mac address	Mac Address of the Device
	31	SizeName	Size name of the device (240 bytes max)
	32 - SizeNa- me	DeviceName	Name of the device
	XX	SizeType	Size of "Type" field (max size : 25 byte)
	Xx+1 – Si- zeType	Туре	Type of Device

28

Response Negative Format

	Word Offset	ID	Value
	0	RequestID	Same as the request
	1	Requestib	Same as the request
	2	ServiceID	0x02
	3	Status	!= 0x00
	4	DeviceID	0x0000
Header	5		
	6	Data length (byte)	0x00
	7	ErrorDecode	!= 0x00
	8	ErrorCode1	!= 0x00
	9	ErrorCode2	!= 0x00
	10-19	Reserved	0x00

Possible Values for Status

Value	Comment	
0	Status OK	
1	Profinet stack not started	
4	Reception buffer too small (stack internal error)	
5	No more IO-Device	
6	"Network detection" service never called.	

Network Detection Scenario

First, the Network detection service has to be called. This function will return the number of IO-devices (NbIOD) detected on the LAN. After, IO-Device Detection service should be called Nb IO Device times or until the returned status equal to 0. A status 5 is returned when all detected IO-devices have already been requested by the service IO-Device Detection

Note: IO-devices are returned in the same order in which they answered to the DCP identify request. Two consecutive calls to network detection can result in two different lists.

Record Block Implicit Read (non connected)

Word Offset	ID	Value	
0			
1	RequestID	PLC value	
2	ServiceID	3	
3	Status	0x55	
4	DeviceID	Shall contain the IP address	
5	DeviceiD		
6	API	ADI number used to perform the read	
7		API number used to perform the read	
8	SlotNumber	Slot number targeted	
9	SubslotNumber	Sub-slot number targeted	
10	Index	Index of the record block	
11	Data length (byte)	0	
12	PnDeviceID	DeviceID of the IO-Device	
13	PnVendorID	VendorID of the IO-Device	
14-21	ARUUID	0	
22-29	Reserved	Reserved (0)	

Response Positive Format (Status = 0)

	Word Offset	ID	Value
	0	RequestID	Same as the request
	1	Requestio	
Header	2	ServiceID	0x03
	3	Status	0x00
	4	DeviceID	Requested device
	5		

Request format

30

	Word Offset	ID	Value
	6	Data length (byte)	Buffer data size
	7	ErrorDecode	0x00
	8	ErrorCode1	0x00
	9	ErrorCode2	0x00
	10-19	reserved	0x00
Data	20		
		·	Data

Response Negative Format

	Word Offset	ID	Value
	0	Paguaat ID	Same as the request
	1	Request ID	
	2	ServiceID	3
	3	Status	!= 0
Header	4	Device ID	0
	5		
	6 Da	Data length (byte)	0
	7	ErrorDecode	!= 0
	8	ErrorCode1	!= 0
	9	ErrorCode2	!= 0
	10-19	reserved	0

Value	Comment		
0	Status OK, function		
1	Profinet stack not started		
2	No ethernet link		
3	No IO-Device detected		
4	Reception buffer too small (internal stack error)		
6	Device not connected		
7	Device not configured		
8	Profinet error		

Possible Values for Status

Record Block Explicit Write (connected)

Request format

Word Offset	ID	Value	
0	PaguaatID	PL Cuelue	
1	RequestID	PLC value	
2	ServiceID	4	
3	Status	0x55	
4	DeviceID	Democrated device	
5	DeviceiD	Requested device	
6	API	A DI number used to perform the units	
7	AFI	API number used to perform the write	
8	SlotNumber	Slot number targeted	
9	SubslotNumber	Subslot number targeted	
10	Index	Index of the record block	
11	Data length (byte)	data size	
12	PnDeviceID	0	
13	PnVendorID	0	

Word Offset	ID	Value
14-21	ARUUID	0
22-29	Reserved	Reserved (0)
30	data	data

Response positive format (Status = 0)

	Word Offset	ID	Value
	0	PaguaatiD	Same as the request
	1	RequestID	
	2	ServiceID	0x03
	3	Status	0x00
	4	DeviceID	Requested Device
Header	5		
	6	Data length (byte)	0
	7	ErrorDecode	0x00
	8	ErrorCode1	0x00
	9	ErrorCode2	0x00
	10-19	reserved	0x00

Response Negative Format

	Word Off- set	ID	Value
	0	RequestID	Same as the request
Header	1		
	2	ServiceID	0x04
	3	Status	!= 0x00
	4	DeviceID	0x00

Word Off- set	ID	Value
5		
6	Data length (byte)	0x00
7	ErrorDecode	!= 0x00
8	ErrorCode1	!= 0x00
9	ErrorCode2	!= 0x00
10-19	reserved	0x00

Possible Values for Status

Value	Comment
0	Status OK, function
1	Profinet stack not started
2	No ethernet link
3	No IO-Device detected
6	Device not connected
7	Device not configured
8	Profinet error see others status

Record Block Explicit Read (connected)

Request format

Word Offset	ID	Value	
0	RequestID	PLC value	
1	Requestio	PLC value	
2	ServiceID	0x05	
3	Status	0x55	
4	DaviasID	Degraphed device	
5	DeviceID	Requested device	
6	API	API number used to perform the read	

34

Word Offset	ID	Value
7		
8	SlotNumber	Slot number targeted
9	SubslotNumber	Subslot number targeted
10	Index	Index of the record block
11	Data length (byte)	0
12	PnDevicelD	0x00
13	PnVendorID	0x00
14-21	ARUUID	0x00
22-29	Reserved	Reserved (0x00)

Response positive format (Status = 0)

	Word Offset	ID	Value
	0		Same as the request
	1	Request ID	
	2	ServiceID	0x05
	3	Status	0x00
	4	Device ID	IP address
Header	5	Device ID	
	6	Data length (byte)	Buffer data size
	7	ErrorDecode	0x00
	8	ErrorCode1	0x00
	9	ErrorCode2	0x00
	10-19	Reserved	0x00
	20		
Data			Data

Word Offset	ID	Value

Response Negative Format

	Word Offset	ID	Value
	0	PaguaatID	Some as the request
	1	RequestID	Same as the request
	2	ServiceID	0x05
	3	Status	!= 0x00
	4	DeviceID	0x00
Header	5		
	6	Data length (byte)	0x00
	7	ErrorDecode	!= 0x00
	8	ErrorCode1	!= 0x00
	9	ErrorCode2	!= 0x00
	10-19	reserved	0x00

Possible values for Status

Value	Comment	
0	Status OK, function	
1	Profinet stack not started	
2	No ethernet link	
3	No IO-Device detected	
4	Reception buffer too small (internal stack error)	
8	Profinet error see others status	

Alarm Request

This service allows PLC to ask to PROFINET stack the alarm received from a specific IO-Device. This service has to be used in relation with the IOD_MGT_ALARM and IOD_ALARM_IND Alarm registers see 3.1.6.

Request Format

Word Offset	ID	Value	
0	PoquestID	PLC value	
1	RequestID		
2	ServiceID	0x06	
3	Status	0x55	
4	DeviceID	Requested Devi-	
5	Deviceid	се	
6	API	0x00	
7		0,00	
8	SlotNumber	0x00	
9	SubslotNumber	0x00	
10	Index	0x00	
11	Data length (byte)	0x00	
12	PnDeviceID	0x00	
13	PnVendorID	0x00	
14-21	ARUUID	0x00	
22-29	Reserved	Reserved (0x00)	

Response Positive Format (Status = 0)

	Word Off- set	ID	Value
	0	RequestID	Same as the request
	1	Requestio	
	2	ServiceID Status	0x06
	3		0x00
Header	4	DeviceID	Requested Device
	5		
	6 Data length (byte)	-	Data size
	7	ErrorDecode	0x00

	Word Off- set	ID	Value
	8	ErrorCode1	0x00
	9	ErrorCode2	0x00
	10-19	reserved	0x00
	20	API	API number used to perform
	21		the alarm
	22	Priority	Alarm priority
	23	Туре	Alarm type
	24	Slot number SubSlot number	Slot number of the alarm
	25		Subslot number of the alarm
Data	26	Specifier	Alarm specifier
	27	Module ident	Module ID of the Alarm
	28	number	
	29 SubMo	SubModule ident	submodule ID of the Alarm
	30	number	
	31	Data length	Data Size in byte
	Data	Data	0 to 1432 bytes

Alarm priority:

- High priority : 0x06Low priority: 0x05

Alarm Type:

Value (hexadecimal)	Meaning
0x0000	Reserved
0x0001	Diagnosis
0x0002	Process
0x0003	Pull
0x0004	Plug
0x0005	Status

Value (hexadecimal)	Meaning
0x0006	Update
0x0007	Media Redundancy
0x0008	Controlled by supervisor. Logical "Pull" of a sub- module to withdraw ownership
0x0009	Released. Logical "Plug" of a submodule to re- turn ownership or trigger a reparameterization
0x000A	Plug Wrong Submodule
0x000B	Return of Submodule
0x000C	Diagnosis disappears
0x000D	Multicast communication mismatch notification
0x000E	Port data change notification
0x000F	Sync data changed notification
0x0010	Isochronous mode problem notification
0x0011	Network component problem notification
0x0012	Time data changed notification
0x0013	Dynamic Frame Packing problem notification
0x0014	MRPD problem notification
0x0015	System Redundancy
0x0016 – 0x001D	Reserved
0x001E	Upload and retrieval notification
0x001F	Pull module
0x0020 - 0x007F	Manufacturer specific
0x0080 – 0x00FF	Reserved for profiles
0x0100 – 0xFFFF	Reserved

Alarm specifier: coding of bit fields is shown below:

bits	Description	Value
0-10	Sequence number	0 to 2,047, incremented upon each indication
11	Diagnostis channel	0x00: No diagnosis available 0x01: Diagnosis available
12	Specific dia-	0x00: No diagnosis available

bits	Description	Value
	gnosis	0x01: Diagnosis available
13	Diagnostis sub-module	0x00: No diagnosis available 0x01: Diagnosis available
14	Reserved	0x00
15	AR diagnostis	0x00: No diagnosis available 0x01: Diagnosis available

Response Negative Format

	Word Offset	ID	Value
	0	Request ID	Same as the request
	1	Request ID	Same as the request
	2	ServiceID	0x06
	3	Status	!= 0x00
	4	Device ID	0x00
Header	5		
	6	Data length (byte)	0x00
	7	ErrorDecode	!= 0x00
	8	ErrorCode1	!= 0x00
	9	ErrorCode2	!= 0x00
	10-19	reserved	0x00

Possible values for Status

Value	Comment
0	Status OK
1	Profinet stack not started
7	Device not configured
8	Profinet error see others status

Value	Comment
9	No Alarm for this device

Alarm Ack

This service sends to the IO-Device the Ack alarm frame. This service has to be used in relation with the IOD_MGT_ALARM and IOD_ALARM_IND Alarm registers.

Request format

Word	ID	Value	
0			
1	RequestID	PLC value	
2	ServiceID	0x07	
3	Status	0x55	
4	DeviceID	Requested device	
5			
6	API	API number used to perform the ACK	
7	AFI	the ACK	
8	SlotNumber	Slot number targeted	
9	SubslotNumber	Subslot number targeted	
10	Index	has to be contain the alarm priority.	
11	Data length (byte)	0x00	
12	PnDeviceID	0x00	
13	PnVendorID	0x00	
14-21	ARUUID	0x00	
22-29	Reserved	Reserved (0x00)	

Response positive format (Status = 0)

	Word Off- set	ID	Value
Header	0	Request ID	Same as the request

Word Off- set	ID	Value
1		
2	ServiceID	0x07
3	Status	0x00
4	Device ID	Deguasted device
5	Device ID	Requested device
6	Data length (byte)	0x00
7	ErrorDecode	0x00
8	ErrorCode1	0x00
9	ErrorCode2	0x00
10-19	reserved	0x00

Response negative format

	Word Off- set	ID	Value
	0	RequestID	Some as the request
	1	Requestio	Same as the request
	2	ServiceID	0x07
	3	Status	!= 0x00
	4	 DeviceID Data length (byte) ErrorDecode ErrorCode1 ErrorCode2 	0x00
Header	5		
	6		0x00
	7		!= 0x00
	8		!= 0x00
	9		!= 0x00
	10-19	reserved	0x00

Possible values for Status

Value	Comment
0	Status OK
1	Profinet stack not started
7	Device not configured
8	Profinet error see others status
9	No alarm for this device

IO-Device Information

Request format

Word Offset	ID	Value	
0	PoquestID	PLC value	
1	RequestID		
2	ServiceID	0x08	
3	Status	0x55	
4	DeviceID	Poguested device	
5	DeviceiD	Requested device	
6	API	0x00	
7	AFI	0x00	
8	SlotNumber	0x00	
9	Subslot Number	0x00	
10	Index	0x00	
11	Data length (byte)	0x00	
12	PnDeviceID	0x00	
13	PnVendorID	0x00	
14-21	ARUUID	0x00	
22-29	Reserved	Reserved (0x00)	

	Word Off- set	ID Value			
	0	Deguest ID	Same on the request		
	1	Request ID	Same as the request		
	2	ServiceID	0x08		
	3	Status	0x00		
	4	Device ID	Requested Device		
Header	5	Device ID	Requested Device		
	6	Data length (byte)	0x24		
	7	ErrorDecode	0x00		
	8	ErrorCode1	0x00		
	9	ErrorCode2	0x00		
	10-19	reserved	0x00		
	20				
	21		Mac address		
	22				
	23		- IP address		
	24		IF addless		
	25		Input @ area in High Speed		
	26		Area		
Data	27		output @ area in High Speed		
	28		Area		
	29		Input length		
	30		Output Length		
	31		Refresh period		
	32		Number of successul connections		
	33		Number of disconnections		

	Word Off- set	ID	Value
	34		State (Connected/Not Connec- ted)
	35		Management (Manual Automa- tic)
	36		Current Profinet Status
	37		Current Pronnet Status

Response negative format

_	Word Off- set	ID Value	
	301		
	0	Request ID	Same as the request
	1		
	2	ServiceID	8
	3	Status	!= 0
	4	Device ID	0
Header	5		
	6	Data length (byte)	0
	7	ErrorDecode	!= 0
	8	ErrorCode1	!= 0
	9	ErrorCode2	!= 0
	10-19	reserved	0

Possible values for Status

Value	Comment	
0	Status OK, function	
1	Profinet stack not started	
10	Bad Device ID (Device not configured)	

Alarm Log

This request allow to get an alarm description from the internal alarm log

- Function has to be called several times to get several alarm description
- The older alarm is returned first

Word Offset	ID	Value	
0			
1	RequestID	PLC value	
2	ServiceID	0x09	
3	Status	0x55	
4	DeviceID	Poguested device	
5	Deviceid	Requested device	
6	API	0	
7			
8	SlotNumber	0	
9	SubslotNumber	0	
10	Index	0	
11	Data length (byte)	0	
12	PnDeviceID	0	
13	PnVendorID	0	
14-21	ARUUID	0	
22-29	Reserved	Reserved (0)	

Request format

Response positive format (Status = 0)

	Word Off- set	ID	Value	
	0	RequestID	Some on the request	
Header	1	Requestio	Same as the request	
	2	ServiceID	0x09	
	3	Status	0x00	
	4	DeviceID	Requested Device	

	Word Off- set	ID	Value	
	5			
	6	Data length (byte)	0	
	7	ErrorDecode	0x00	
	8	ErrorCode1	0x00	
	9	ErrorCode2	0x00	
	10-19	reserved	0x00	
	20	Date	Date of the PROFINET Control- ler when the frame has been re-	
	21	Date	ceived	
	22	Time	Time of the PROFINET Control- ler when the frame has been re- ceived	
	23	mine		
	24	Alarm Type		
	25	API	API number used to perform	
	26		the alarm	
Data	27	Alarm Priority		
	28	ModuleID	ID of the module. Manufacturer	
	29		dependant.	
	30	SubModuleID	ID of the module. Manufacturer	
	31		dependant.	
	32	Slot	Slot number of the alarm	
	33	SubSlot	Subslot number of the alarm	
	34	Alarm specifier		

Response negative format

	Word Off- set	ID	Value	
Header	0	PoqueetID	Same as the request	
	1	RequestID	Same as the request	

Word Off- set	ID	Value	
2	ServiceID	0x09	
3	Status	!= 0x00	
4	DeviaelD	000	
5	DeviceID	0x00	
6	Data length (byte)	0x00	
7	ErrorDecode	!= 0x00	
8	ErrorCode1	!= 0x00	
9	ErrorCode2	!= 0x00	
10-19	reserved	0x00	

Possible values for Status

Value	Comment
0	Status OK, function
1	PROFINET stack not started
2	No ethernet link
7	Device not configured
8	PROFINET error see others status
9	No alarm in log

Alarm Management

A IO-device is able to send alarms to the IO-controller. When a alarm is received, the IO-controller is expected to get the alarm description, then to acknowledge the alarm.

An IO-device can send up to 2 alarms simultaneously:

- one alarm of High Priority
- one alarm of low priority.

The IO-device won't be able to initiate a new alarm of the respective priority as long as the IO-controller has not "acknowledge" the previous one

By default, the PROFINET stack can handle alarm automatically without reporting any indication to the PLC program. However, PLC can decide to manage or not by itself alarms for each device. This can be done using the IOD_MGT_ALARM registers. With these eight 16bit registers the PLC can indicate, how the firmware should for each IO-device manage alarms.

48

From CPU to PROFINET IO-Controller						
Global Variable Identifier	IO-Device	Values				
Giobal variable identifier	Number	0	1			
vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[0]	0	Automatic	Manual			
 vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[15]	 15	 Automatic	 Manual			
vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[16]	16	Automatic	Manual			
 vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[31]	 31	 Automatic	 Manual			
vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[116]	116	Automatic	Manual			
 vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[127]	 127	 Automatic	 Manual			

For an IO-device in automatic mode the IO-controller automatically acknowledges each alarm received from an IO-device (IOD_ALARM_IND bits are not used). For an IO-device in manual mode an alarm indication is signalled to the PLC program via the IOD_ALARM_IND registers.

From IO-Controller to CPU					
Register	Function				
vPN_MGMT_INPUTS.IOD_ALARM_IND[0]	Alarm has been received from the device 0				
	Alarm has been received from the device n				
vPN_MGMT_INPUTS.IOD_ALARM_IND[127]	Alarm has been received from the device 127				

Note: the stack can store internally both high and low priority alarms. When the CPU requests alarms, the high priority alarm will be returned first. The IOD_ALARM_IND bit for the corresponding device will be reset only after the management of both alarms.

The following diagram demonstrates an alarm cycle (when alarm management is activated by the PLC program).

PROFINET Controller ME1PN1FW-Q 49 PLC Program PROFINET Stack <u>CCPU</u> Alarm from device--Signal alarm-Log alarm-IOD_ALARM_IND..bitn (X0n) = 1 Pool signal Ask Alarm Data (Acyclic request)--Receive the request--Set the Answer-Ack Alarm (Acyclic request)--Receive the request Ack--Send alarm Ack-----Remove alarm signal-IOD_ALARM_IND..bitn (X0n) = 0 -Set the Answer-

Note: a ring buffer exists for each device. This ring buffer stores up to seven alarms for each IO-device. Each incoming alarm is logged in this ring log buffer, from which the PLC can read using acyclic requests.

2.1.4 Network Diagnostics

PROFINET IO Controller Status

The bits in these two words provide information on the IO-controller stack state.

From PROFINET IO-Controller to CPU							
Global Variable Identifier	Values						
	0	1					
vPN_MGMT_INPUTS.IOC_STS_CON FIG_OK	No configuration.	Configuration OK.					
vPN_MGMT_INPUTS.IOC_STS_CON FIG_DOWNLOADING		A new configuration is dow- nloading					
vPN_MGMT_INPUTS.IOC_STS_KEY FILE_ERROR		Missing or wrong keyfile					
vPN_MGMT_INPUTS.IOC_STS_STA RTED	Not Started	Started					
vPN_MGMT_INPUTS.IOC_STS_ERR OR_DIAG_SET	No error	Error occured (see Diagno- stic area)					
vPN_MGMT_INPUTS.IOC_STS_PLC _WD_ERR	Watchdog ok or watchdog mechanism disabled	Watchdog mechanism de- tects that PLC is not run-					

From PROFINET IO-Controller to CPU

Global Variable Identifier	Values				
	0	1			
		ning.			

Possible combinations of the flags IOC_STS_CONFIG_OK, IOC_STS_CONFIG_DOWNLOADING, IOC_STS_KEYFILE_ERROR and IOC_STS_STARTED with their respective meaning are

Flags Set	Comment
no flag set	There is no configuration inside the PROFINET Controller. To use PROFINET download a configuration
IOC_STS_KEYFILE_ERROR	BAD pnengine.dat.
IOC_STS_CONFIG_DOWNLOADIN G	A new configuration download is pending.
IOC_STS_CONFIG_OK	Configuration is valid. Waiting start from PLC
IOC_STS_CONFIG_OK and IOC_STS_STARTED	Configuration is valid. PROFINET is started.

• * During a configuration download sequence .IOC_STS_CONFIG_OK is off (= "No Configuration").

• At the end of the configuration download sequence, the new configuration will be immediately started, if the <u>IOC_START_STOP</u>.bit0 equals 1.

If IOC_STS[1].bit2 is set, the MAC address protection mechanism detected an issue and PROFINET cannot be started.

IOD_CONN_STS Registers

The following 128 bits contain the connection state of each IO-device.

PROFINET IO-Controller to CPU					
Clabel Verieble Identifier	IO-Device	Values			
Global Variable Identifier	Number	0	1		
vPN_MGMT_INPUTS.IOD_CONN_STS[0]	0				
 vPN_MGMT_INPUTS.IOD_CONN_STS[15]	 15				
vPN_MGMT_INPUTS.IOD_CONN_STS[16]	16	Not Connec- ted	Connected		
 vPN_MGMT_INPUTS.IOD_CONN_STS[31]	 31				

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

PROFINET IO-Controller to CPU					
Olahal Variahla Idaréfian	IO-Device	Values			
Global Variable Identifier	Number	0	1		
vPN_MGMT_INPUTS.IOD_CONN_STS[116]	116				
vPN_MGMT_INPUTS.IOD_CONN_STS[127]	127				

IOD_ERR_STS Registers

The following 128 bits indicate for each IO-device, whether an error has occurred.

PROFINET IO-Controller to CPU						
Global Variable Identifier	IO-Device	Values				
Giobal variable identifier	number	0	1			
vPN_MGMT_INPUTS.IOD_ERR_STS[0]	0					
vPN_MGMT_INPUTS.IOD_ERR_STS[15]	15					
vPN_MGMT_INPUTS.IOD_ERR_STS[16]	16					
vPN_MGMT_INPUTS.IOD_ERR_STS[31]	31	No Error	Error			
vPN_MGMT_INPUTS.IOD_ERR_STS[116]	116					
vPN_MGMT_INPUTS.IOD_ERR_STS[127]	127					

For each IO-device the following combinations are possible:

IOD_CONN_STS	IOD_ERR_STS	Meaning
0	0	IO-device not connected because no connection re- quested.
1	0	IO-device connected, connection without error.
0	1	IO-device not connected. In automatic mode connection not possible. In manual, last connection request failed.
1	1	IO-device connected but connection in error

Device Advanced Status (IOD_ADV_STS Registers)

For each IO-device a byte in the variable 'vPN_ACYCLIC_DIAG_INPUTS.IOD_ADV_STS' contains the detailed status error code, when the corresponding bit in IOD_ERR_STS is set. Each element in the word array 'IOD_ADV_STS' contains the status codes of two devices, the status of the device with an odd index is placed in the low byte, the status of the device with an even index is placed in the high byte.

IOD_CONN_STS, IOD_ERR_STS	Byte Value in IOD_ADV_STS	Comment
N/A	0	IO-device Status is not set. (no error)
1,1	1	The IO-device produces in stop mode
1,1	2	One of IOPS in input frame is in bad.
1,1	3	One of IOCS in input frame is in bad.
1,1	4	IO-device Configuration does not match.
1,1	599	Reserved
0,1	100	No answer from the IO-device at the DCP identify request. The configured name is not present on the network.
0,1	101	Duplicate name for the IO-device. The DCP identify request received several answers from different IO-devices.
0,1	102	Duplicate IP address detected during DCP identify request.
0,1	103	Out of AR resource. The device is already connec- ted and do not accept more connection.
0,1	103-252	Reserved, to be completed during development.
0,1	253	Connection failed.
0,0	254	Never connected. This IO-device ID is present in the configuration, but the PROFINET stack never sent a connect request.
0,0	255	Not used. This IO-device ID is not present in the configuration.

Diagnostic Area (ADV_DIAG_* Registers)

In the ADV_DIAG_* registers the PROFINET stack can report some advanced information on the PROFINET Controller state (used for technical support only).

From IO-Controller to CPU						
Global Variable Identifier	Contents					
		0: Stack running well				
vPN_ACYCLIC_DIAG_INPUTS.ADV_DI AG_ERR_CODE		1: MAC address check fails				
	PROFINET stack error code	2: MAC file encrypted not found				
		3: Assert				
		4: Error system				
vPN_ACYCLIC_DIAG_INPUTS.ADV_DI AG_ERR_CODE2	PROFINET stack error code (high word)	0 (currently not used)				
vPN_ACYCLIC_DIAG_INPUTS.ADV_DI AG_ADD_INFO	Additional information depending on the main error co- de. See below					

Error code value	Ado	Additional information (word 2 to 19)											
0	All C)											
	0	1	2	3	4	5	6	7				17	18
1	PRC	AC address MAC ad- PROFINET dress stack controller											
2	All C	All O											
	0	1	2	3	4	5	6	7				17	18
3		Line in File name where the assert appears.											
4	0		1	1 2 3 18									
	ErrC	Cde	E	ErrDec Errcod1 Errcod2									

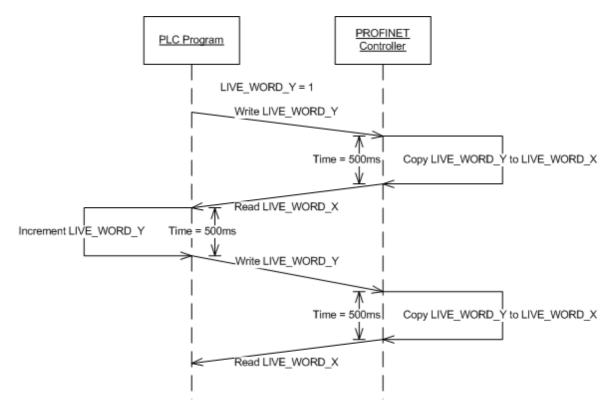
2.1.5 PLC Program Watchdog

LIVE_WORD_X and LIVE_WORD_Y Registers

The live word register variables 'vPN_CYCLIC_INPUTS.LIVE_WORD_X' and 'vPN_CYCLIC_OUTPUTS.LIVE_WORD_Y' allows the PLC to activate a watchdog mechanism bet-

ween the PLC program and the PROFINET Controller. By default this mechanism is not activated (LIVE_WORD_X=0)

The following scenario applies:



By default the LIVE_WORD_Y register is set to 0, meaning that no check is activated. To activate the mechanism, PLC sets LIVE_WORD_Y to 1 or to any value different from 0

The IO-controller reads the LIVE_WORD_Y value in an interval of 500 ms. If the value is identical three consecutive times (1.5s) and differs from 0, the IO-controller will consider the PLC as no longer running. In this case IO-controller sets the IOC_STS.bit17 for indication.

If activated this watchdog mechanism is the only way for the IO-controller to detect that a PLC program is currently running. In this case any attempt to download a new configuration will display a warning message to alert the end user.

Once the mechanism is activated the PLC has to write a new value each 500 ms. The mechanism can be stopped at any time by writing 0 again to the LIVE_WORD_Y register.

Each 500ms the IO-controller also copies the LIVE_WORD_Y read value in the LIVE_WORD_X register If the PLC does not read the same value after a maximum of 1 second, the PLC can consider that the IO-controller is no longer running and start any appropriate action.

2.1.6 PLC and PROFINET Controller States (RUN/STOP)

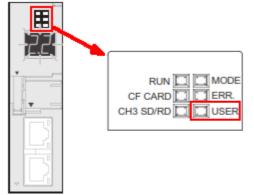
PLC STATE	PROFINET Controller STATE	Comment		
RUN	RUN	PROFINET stack is in RUN. IOPS and IOCS have status GOOD Input data are updated in the High Speed Area		

RUN	STOP	PROFINET stack is in STOP. Output data = old values and IOPS and IOCS set to BAD Input data are updated in the high speed area
STOP	RUN	PROFINET stack is in RUN. Output data = old values an IOPS and IOCS set to GOOD Input data are updated in the high speed area
STOP	STOP	PROFINET stack is in STOP. Output data = old values an IOPS and IOCS set to BAD Input data are updated in the high speed area

2.2 LED Display

2.2.1 User LED

The 'USER' LED is the bottom-right one in the six LEDs group on the front of the ME1PN1FW-Q.



This LED signals PROFINET Controller specific states in combination with the <u>7-segment LED display</u>. For the meaning of the other LEDs please consult the user manual of the Q12DCCPU-V.

State	Meaning
RED	Error, see 7 segments LED
RED slow blink	Some IO-devices are not connected.
RED rapid Blink	Network storm
Green	All OK. All IO-devices connected whatever their mode (manual or auto- matic)
Green slow blink	All OK. All IO-devices in automatic mode are connected. All IO devices in manual mode are not connected.
Green rapid Blink	All OK. All IO-devices in automatic mode are connected. Some IO devices in manual mode are connected, some are not connected
Orange	All IO-devices connected whatever their mode (manual or automatic). However, some configuration mismatches exist.

State	Meaning
Orange slow blink	All IO-devices in automatic mode are connected. All IO devices in ma- nual mode are not connected. However, some configuration mismat- ches exist.
Orange rapid Blink	All IO-devices in automatic mode are connected. Some IO devices in manual mode are connected, some are not connected. However, some configuration mismatches exist.

2.2.2 7-Segment LED Display

The 7-segment display is located on the front of the ME1PN1FW-Q.



It indicates PROFINET Controller specific states in combination with the status of the User LED.

User LED	7 segment value	Meaning		Meaning	
	1	No Ethernet link			
	2	No configuration			
	3	No IO-device connected			
Red fix	4	The engine.dat file is corrupted.			
	5	Stack failed to start			
	6	Declare Device failed (config corrupt)			
	7	Error system see 3.1.7.4.			
Green fix	Off	All IO-devices connected			
N/A	BL	A DCP blink command is receiving.			
OFF	8	Wait Start from register.			
Ded fix	9	The stack can't start. The initialization sequence failed			
Red fix	10	Memory allocation error during initialization sequence			

User LED	7 segment value	Meaning
	11	CNFMAST.001 is missing in folder \RAM\Profinet\Default
	12	CNFDEVIC.001 is missing in folder \RAM\Profinet\Default
	13	CNFNAME.001 is missing in folder \RAM\Profinet\Default
	14	copycross10.bin is missing in folder \RAM\Profinet\Default
	15	CNFMAST.001 is missing in folder \RAM\Profinet
	16	CNFDEVIC.001 is missing in folder \RAM\Profinet
	17	CNFNAME.001 is missing in folder \RAM\Profinet
	18	copycross10.bin is missing in folder \RAM\Profinet
	19	Configuration files Access error. File is open but not readable
	20	Configuration files check error. Values read in the file are not ac- ceptable. Configuration of high speed area is wrong
	21	Init controller failed. Cannot start the PROFINET firmware
	22	GX Configurator Remote access initialization failed

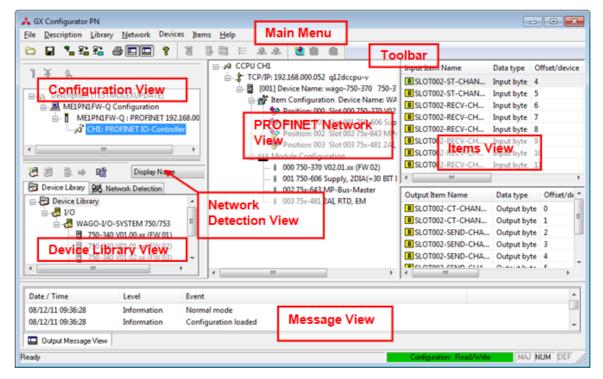
3 Getting to know GX Configurator-PN

GX Configurator-PN Concept

GX Configurator-PN (GXPN) is the configuration tool for PROFINET I/O interfaces in MITSUBISHI PLCs. It provides functions for defining a PROFINET I/O network, validating the configuration and downloading it to the respective PLC module via a MITSUBISHI automation network. GX Configurator-PN is capable of downloading configuration data to the PROFINET I/O module via a variety of different communication types. The module can be located in a PLC rack directly connected to the PC or in a PLC rack, which is connected to other PLCs in a separate network. GX Configurator-PN takes information on PROFINET I/O slaves from GSD files, which are specific to the respective slave and usually provided by the slave hardware vendor. It generates multi-CPU parameters for use in GX Developer (GD) and GX IEC Developer (GID).

User Interface

The graphical user interface of GX Configurator-PN assists the user by making the most important functions easily accessible.



The main items of the user interface are

- <u>Main Menu</u>
- Toolbar
- Configuration View
- PROFINET Network View
- Device Library View
- Network Detection View
- Items View
- Message View

4 Installation

Before You Begin

Copyright

Important Notice:



This software is protected by copyright. By opening the distribution disks package you automatically accept terms and conditions of the license agreement. You are only permitted to make one single copy of the original distribution disks for your own backup and archiving purposes.

Software Purpose

This software is a configuration utility software package which will be used to configure the following PROFINET I/O network interface modules of MELSEC System Qn series PLCs:

• PROFINET I/O master module ME1PN1FW-Q

4.1 System Requirements

To install the GX Configurator-PN software package your computer has to meet the following requirements

Minimum Hardware Requirements

- Pentium II 350 Mhz processor (for Vista: 1 GHz processor)
- 256 MB RAM for Microsoft ® Windows XP
- 1 GB RAM for Microsoft ® Windows Vista
- VGA compatible graphics adapter
- 17"/43 cm diag. VGA monitor
- At least 200 MB free hard disk space
- CD-ROM drive
- interface for communication with the PLC system

Software Requirements

GX Configurator-PN is a 32-bit software that runs on the following operating systems

- Microsoft ® Windows XP Home or Professional Edition
- Microsoft ® Windows Vista Home (or higher)
- Microsoft ® Windows 7 Home (or higher), both 32- and 64-bit versions
- Microsoft ® Windows 8, both 32- and 64-bit versions

Related MELSOFT Software

GX Configurator-PN is typically used together with one of the PLC programming packages for MITSUBISHI PLCs

- 'GX Developer' (GD)
- 'GX IEC Developer' (GID)
- 'GX Works 2' (GXW2) (version 1.501X or higher)

Certain functions of GX Configurator-PN are restricted or not available for specific PLC programming packages.

4.2 Software Installation

60

GX Configurator-PN Setup

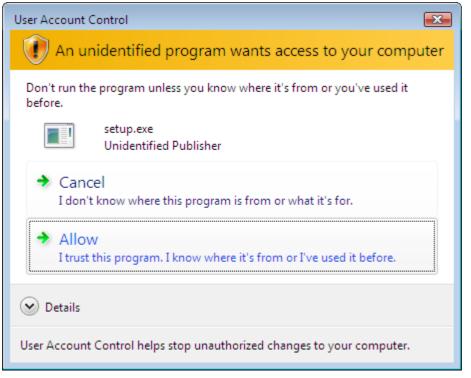
To install the GX Configurator-PN software you need to have Microsoft ® Windows properly installed. You may require administrator privileges when installing the software.

If an older version of GX Configurator-PN is already installed, uninstall it first. After the de-installation please start the installation of the new version. If you want to keep the older version of GX Configurator-PN, please select a different directory for the new version. A de-installation of the older version, after the newer version has been installed, will also damage the newer version. Therefore please reinstall the new version after uninstalling both the older and the newer GX Configurator-PN versions, if you encounter problems. Please stop all other running software before the installation and do not run other installation programs during the installation of GX Configurator-PN.

Installing GX Configurator-PN

To start the installation, proceed as follows:

- 1. Insert the installation CD-ROM into your CD-ROM drive.
- 2. If you have 'Autorun' enabled for the drive, the setup should start automatically.
- 3. If the setup is not started automatically, please locate the 'setup.exe' file and execute it.
- 4. If you see the following message on a Windows ® Vista operating system, please select 'Allow'



5. Follow the given instructions that guide you through the installation procedure. Continue with **Next**.



6. The licensing agreement is displayed. Please read these terms carefully. If you accept the license agreement, you can proceed with the installation by clicking **Next**. Otherwise the installation is aborted.

😸 GX Configurator-PN 1.03 - InstallShield Wizard 🧮	
License Agreement Please read the following license agreement carefully.	
ENDUSER LICENSING AGREEMENT for the MELSOFT software package The software package contains software under copyright. Use of the software without prior conclusion of this licensing agreement is illegal and subject to prosecution by MITSUBISHI ELECTRIC EUROPE B.V. This licensing agreement is concluded upon the user signing the enclosed ENDUSER SOFTWARE SERVICE CARD. This agreement is concluded between MITSUBISHI ELECTRIC EUROPE B.V. and the enduser, hereinafter referred to as "Licensee".	
1 By means of this agreement MITSURISHI ELECTRIC ELIROPE B.V. I accept the terms in the license agreement Print I do not accept the terms in the license agreement Print]
InstallShield < Back Next > Cancel]

7. Enter your name, organization and the product serial number. Click on **Next** to proceed.

😸 GX Configurator-PN 1.03 - InstallShield Wizard
Customer Information Please enter your information.
User Name:
Name
Organization:
Organization
Serial Number:
InstallShield
< Back Next > Cancel

 Enter the destination folder where you want the GX Configurator-DP software to be installed (default C:\Program Files\MELSOFT\GX Configurator-PN 1.03). If you want to install to a different directory, click on Change and select the installation directory. If you agree with the default setting, just click on Next.

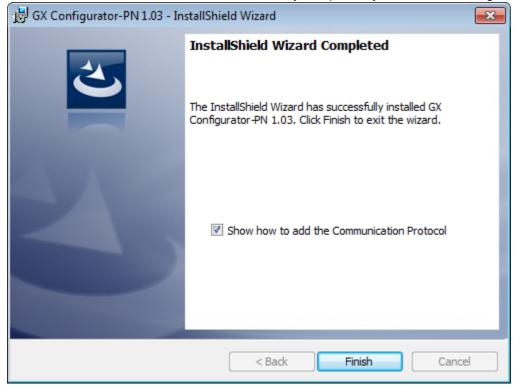
📸 GX Conf	igurator-PN 1.03 - InstallShield Wizard
	ion Folder kt to install to this folder, or click Change to install to a different folder.
ð	Install GX Configurator-PN 1.03 to: C:\Program Files (x86)\MELSOFT\GX Configurator-PN 1.03\ Change
InstallShield -	
TUSTAIISUIEIO -	< Back Next > Cancel

9. The installation is started by pressing the **Install** button.

😸 GX Configurator-PN 1.03 - InstallShield Wizard	×
Ready to Install the Program	1
The wizard is ready to begin installation.	
Click Install to begin the installation.	
If you want to review or change any of your installation settings, dick Back. Click exit the wizard.	Cancel to
InstallShield < Back Install	Cancel

10. After pressing the 'Install' button the installation is started. Progress bars will inform you about the setup status.

🙀 GX Confi	gurator-PN 1.03 - InstallShield Wizard				
	GX Configurator-PN 1.03 ram features you selected are being installed.				
1	Please wait while the InstallShield Wizard installs GX Configurator-PN 1.03. This may take several minutes.				
	Status:				
	Copying new files				
InstallShield –					
	< Back Next > Cancel				



11. After the installation has been successfully completed, you see the following message

For the communication with the PROFINET Controller the 'Discovery and Configuration Protocol' (DCP) communication driver must be attached to the local Ethernet interface, which is connected to the controller. The exact steps depend on the operating system used. Please see section '<u>In-</u> stalling the DCP Protocol Driver' for details.

Button Functions

With the **Next** button you will leave the current menu and enter the next menu. With the **Back** button you go to the previous window. **Cancel** button ends the installation procedure.

4.3 Installing the DCP Protocol Driver

The DCP protocol must be manually added to the Ethernet interface, which is used for communication with the PROFINET Controller. The procedure is specific for each of the following supported operating systems

- Windows XP
- Windows Vista
- Windows 7
- Windows 8

Note: you may need administrator rights for the following steps!

4.3.1 Windows XP

1. Open the Control Panel and double click "Network Connections" to open the Network Connection Settings.

🛃 Control Panel		
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools	Help	
🔇 Back 🔹 🕥 🔹 🏂 🔎 S	earch 😥 Folders 🛄 🗸	
ddress 📴 Control Panel	and see a	Image: A state of the state
	Name 🔺	Comments
Control Panel Image: Control Panel Switch to Category View See Also Image: Control Panel Windows Update Image: Control Panel Help and Support Image: Control Panel	Name A Accessibility Options Add Aradware Administrative Tools Add or Remove Programs Administrative Tools Automatic Updates Date and Time Display Tooler Options Fonts Game Controllers Fonts Game Controllers Thermet Options Keyboard Mouse Network Connections Network Connections Steppend Network Connections Steppend Stepp	Comments Adjust your computer settings for vision, hearing, and mobility. Installs and troubleshoots hardware Installs and troubleshoots hardware Install or remove programs and Windows components. Configure administrative settings for your computer. Set up Windows to automatically deliver important updates Set the date, time, and time zone for your computer. Change the appearance of your desktop, such as the background, screen saver, colors, Customize the display of files and folders, change file associations, and make network fil. Add, change, and manage fonts on your computer. Add, remove, and configure game controller hardware such as joysticks and gamepads. Configure your Internet display and connection settings. Customize your weyboard settings, such as the cursor blink rate and the character repea Customize your mouse settings, such as the button configuration, double-click speed, m. Configure over telephone dialing rules and modem settings. Configure over telephone dialing rules and modem settings. Configure energy-saving settings for your computer. Shows installed printers and fax printers and helps you add new ones. Customize settings for the display of languages, numbers, times, and dates. Add, remove, and configure scanners and cameras. Schedule computer tasks to run au

66

2. Right click "Local Area Connection" and select "Properties" to open the "Local Area Connection Properties".

S Network Connections				
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools	Adva <u>n</u> ced <u>H</u> elp			
🚱 Back 🔹 🕥 🕤 🏂 🔎 Se	earch 😥 Folders 🛄 🗸			
Address 🔇 Network Connections				💌 🔁 Go
Network Tasks	Name	Туре	Status	
	LAN or High-Speed Internet			
Create a new connection	Local Area Connection	LAN or High-Speed Internet	Connected, Firewalled	
 Set up a home or small office network Change Windows Firewall 				
settings				
See Also				
 Network Troubleshooter 				
Other Places				
Control Panel				
My Network Places				
My Computer				
Details 🛞				
Network Connections				
System Folder				
	<	III		>

3. Click "Install" to open the "Select Network Component Type" dialog.

🕹 Local Area Connection Properties 🛛 🔹 🛛 🛛				
General Advanced				
Connect using:				
VMware Accelerated AMD PCNet Ad Configure				
This connection uses the following items:				
 Client for Microsoft Networks File and Printer Sharing for Microsoft Networks QoS Packet Scheduler Internet Protocol (TCP/IP) 				
Install Uninstall Properties				
Allows your computer to access resources on a Microsoft network.				
Sho <u>w</u> icon in notification area when connected Notify <u>m</u> e when this connection has limited or no connectivity				
OK Cancel				

4. Select "Protocol" from the List and click "Add..." to open the "Select Network Protocol" dialog.

Select Network Component Type 🛛 🛛 🔀
Click the type of network component you want to install:
Service
Description A protocol is a language your computer uses to communicate with other computers.
Add Cancel

5. Select "MITSUBISHI ELECTRIC" from the "Manufacturer" List and after that "MITSUBISHI DCP driver" from the "Network Protocol" List. Then click "OK" to confirm the selection.

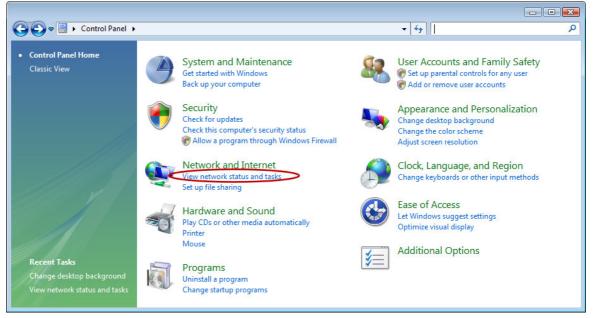
Select Network Protocol	? 🛛			
	ocol that you want to install, then click OK. If you have his component, click Have Disk.			
Manufacturer	Network Protocol:			
This driver is not digitally signed! <u>Tell me why driver signing is important</u> Have Disk				
	OK Cancel			

The "MITSUBISHI DCP driver" is now added to the Protocol List in the dialog "Local Area Connection Properties".

Note: After adding the driver the operating system must be restarted to enable online operation for GX Configurator-PN.

4.3.2 Windows Vista

1. Open the Control Panel and click "View network status and tasks" to open the "Network and Sharing Center".



~~~			
🚱 🔵 🗢 👯 🕨 Control Panel 🕨	Network and Internet   Network	and Sharing Center 🔹 🍫 Search	Q
Tasks View computers and devices	Network and Sharing Co	enter	View full map
Connect to a network Set up a connection or network Manage network connections Diagnose and repair	WIN-SEYGTOC7 (This compute		Internet
	<b>Network 2</b> (Public netwo Access	rk) Local only	Customize
	Connection	Local Area Connection	View status
	3 Sharing and Discovery		
	Network discovery	• Off	$\overline{\mathbf{v}}$
	File sharing	• On	$\overline{\mathbf{v}}$
III V	Public folder sharing	• Off	$\odot$
	Printer sharing	• Off	$\overline{\mathbf{v}}$
	Password protected sharing	• On	$\odot$
	Media sharing	© Off	$\overline{\mathbf{e}}$
See also Internet Options Windows Firewall	Show me all the files and folders I am sharing Show me all the shared network folders on this computer		

2. Click "View Status" of the "Local Area Connection" to open the "Local Area Connection Status".

Connection —		
IPv4 Connect	ivity:	Internet
IPv6 Connect	ivity:	Limited
Media State:		Enabled
Duration:		01:09:44
Speed:		1.0 Gbps
Activity —	Sent —	
		2
Bytes:	16,083	21,254

3. Click "Properties" to open the "Local Area Connection Properties".

4. Answer the "User Account Control" with "Continue" to step further to the "Local Area Connection Properties".

User Account (	Control 🧧	×
💎 Wind	lows needs your permission to continue	
If you started	d this action, continue.	
1	Network Connections Microsoft Windows	
🕑 Details	Continue Cancel	
User Account	Control helps stop unauthorized changes to your computer.	

Intel(R) P	RO/1000 MT Network Conne	ection
		Configure
	o uses the following items: for Microsoft Networks	
	acket Scheduler	
	d Printer Sharing for Microsoft	Networks
	t Protocol Version 6 (TCP/IP)	
	t Protocol Version 4 (TCP/IP) aver Topology Discovery Map	
🗹 🔺 Link-La	ayer Topology Discovery Resp	ponder
⊻ 🔺 Link-La	ayer Topology Discovery Res	portder
✓ ⊥ink-La Install	ayer Topology Discovery Resp	Properties
Install Description		Properties
Install		

5. Click "Install..." to open the "Select Network Feature Type" dialog.

6. Select "Protocol" from the List and click "Add..." to open the "Select Network Protocol" dialog.

Client	eature you want to install:
Description	
A protocol is a language communicate with other	
	$\frown$

7. Select "MITSUBISHI ELECTRIC" from the "Manufacturer" List and after that "MITSUBISHI DCP driver" from the "Network Protocol" List. Then click "OK" to confirm the selection.

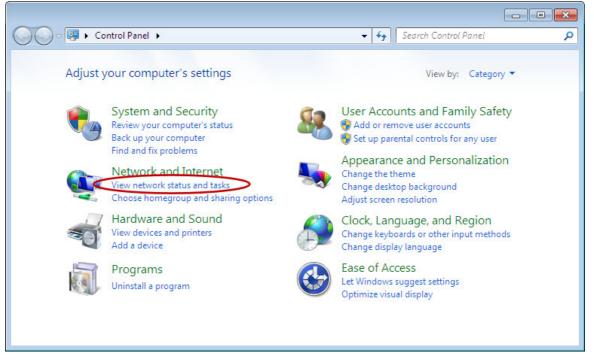
Select Network Protocol	? 💌
	tocol that you want to install, then click OK. If you have this feature, click Have Disk.
Manufacturer Microsoft	Network Protocol:
This driver is not digita	
Tell me why driver signing is	Have Lisk

The "MITSUBISHI DCP driver" is now added to the Protocol List in the dialog "Local Area Connection Properties".

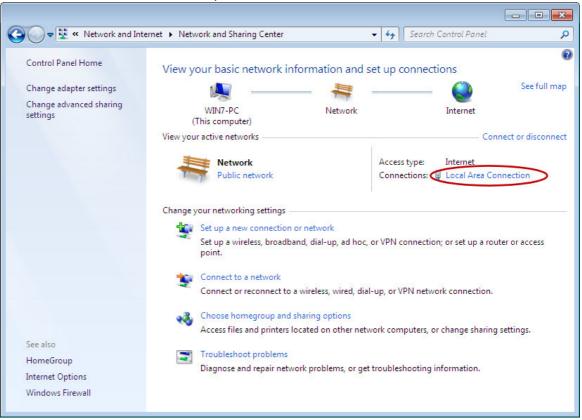
Note: After adding the driver the operating system must be restarted to enable online operation for GX Configurator-PN.

### 4.3.3 Windows 7

1. Open the Control Panel and click "View network status and tasks" to open the "Network and Sharing Center".



72



2. Click "Local Area Connection" to open the "Local Area Connection Status".

3. Click "Properties" to open the "Local Area Connection Properties".

	tion Status	le l
General		
Connection		
IPv4 Connectivity	1	Internet
IPv6 Connectivity		No network access
Media State:		Enabled
Duration:		00:18:27
Speed:		1.0 Gbps
Details		
Activity		
Activity	Sent —	— Received
Activity Bytes:	Sent — 8,454	
	2	difference of the second secon

4. Click "Install..." to open the "Select Network Feature Type" dialog.

vorking	
nnect using:	
Intel(R) PRO/1000 MT Network Connecti	ion
	Configure
s connection uses the following items:	
Client for Microsoft Networks	
🛛 🚚 QoS Packet Scheduler	
E I File and Printer Sharing for Microsoft Ne	
Internet Protocol Version 6 (TCP/IPv6)	
Internet Protocol Version 4 (TCP/IPv4)	
🖞 🔺 Link-Layer Topology Discovery Mapper 🖞 🔺 Link-Layer Topology Discovery Respor	
I Enk-Layer Topology Discovery Respon	
Install 🔰 Uninstall	Properties
escription	
Allows your computer to access resources on	a Microsoft
network.	
ОК	Cancel

5. Select "Protocol" from the List and click "Add..." to open the "Select Network Protocol" dialog.

Select Network Feature Type	×
Click the type of network feature you want to inst	all:
Client	
Protocol	
Description	
A protocol is a language your computer uses to communicate with other computers.	0
communicate with other computers.	
Add	ancel

ſ

6. Select "MITSUBISHI ELECTRIC" from the "Manufacturer" List and after that "MITSUBISHI DCP driver" from the "Network Protocol" List. Then click "OK" to confirm the selection.

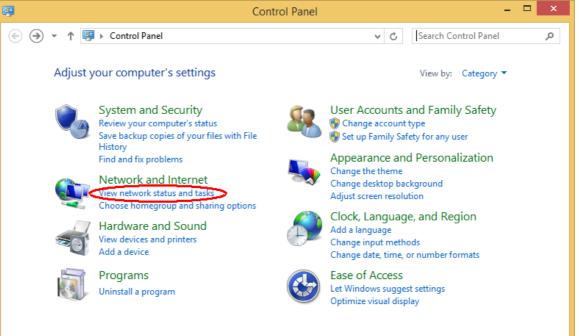
Select Network Protocol		? 🔀
	rk Protocol that you want to insta sk for this feature, click Have Dis	
Manufacturer Microsoft MITSUBISHI ELECTRIC	Network Protocol:	iver
This driver is not     Tell me why driver sig		Have Disk
	$\subset$	OK Cancel

The "MITSUBISHI DCP driver" is now added to the protocol list in the dialog "Local Area Connection Properties".

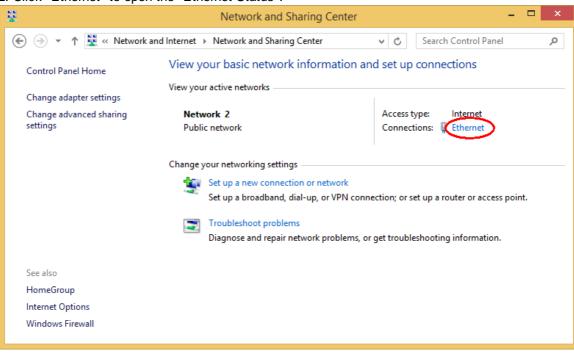
Note: After adding the driver the operating system must be restarted to enable online operation for GX Configurator-PN.

### 4.3.4 Windows 8

1. Open the Control Panel and click "View network status and tasks" to open the "Network and Sharing Center".



2. Click "Ethernet" to open the "Ethernet Status".



#### 3. Click "Properties" to open the "Ethernet Properties".

<b>Q</b>	Ethernet Status	X
General		
Connection		-
IPv4 Connectivity:	Internet	
IPv6 Connectivity:	No Internet access	
Media State:	Enabled	
Duration:	00:28:10	
Speed:	1.0 Gbps	
Details		
Activity		-
	Sent — Received	
Bytes:	1.712.892 70.880.549	
Properties	Pisable Diagnose	
	Close	:

76

Chernet Propertie	es ×
Networking	
Connect using:	
Intel(R) PRO/1000 MT Desktop Adapt	er
	Configure
This connection uses the following items:	
Client for Microsoft Networks	^
File and Printer Sharing for Microsoft	Networks
QoS Packet Scheduler	or Protocol
Microsoft LLDP Protocol Driver	
🗹 📥 Link-Layer Topology Discovery Map	
<ul> <li>Link-Layer Topology Discovery Resp</li> </ul>	ponder V
Install Uninstall	Properties
Description	
Allows your computer to access resources network.	on a Microsoft
IGWOIN.	
0	OK Cancel

4. Click "Install..." to open the "Select Network Feature Type" dialog.

5. Select "Protocol" from the List and click "Add..." to open the "Select Network Protocol" dialog.

Select Network Feature Type	X
Click the type of network feature you want to install:	
Protocol	
Description	
A protocol is a language your computer uses to communicate with other computers.	
Add Cancel	

6. Select "MITSUBISHI ELECTRIC" from the "Manufacturer" List and after that "MITSUBISHI DCP driver" from the "Network Protocol" List. Then click "OK" to confirm the selection.

Select Network Protocol ? ×					
Click the Network Protocol that you want to install, then click OK. If you have an installation disk for this feature, click Have Disk.					
Manufacturer Microsoft MITSUBISHI ELECTRIC					
This driver has an Authenticode(tm) signature. <u>Tell me why driver signing is important</u> Have Disk					
OK Cancel					

The "MITSUBISHI DCP driver" is now added to the protocol list in the dialog "Local Area Connection Properties".

Note: After adding the driver the operating system must be restarted to enable online operation for GX Configurator-PN.

# 4.4 **PROFINET Controller Installation**

The PROFINET Controller must be in its factory default settings, before the PROFINET I/O firmware can be installed and started. If the module has been used before or any problems are encountered during the PROFINET I/O firmware installation, the module must first be set to its factory defaults. For the detailed procedure see the section 'Troubleshooting - Factory Default Settings'.

To install the PROFINET I/O firmware the CF card received from MITSUBISHI must be inserted in the CF card slot on the module.

1. reset the module to initiate copying the contents of the CF card to the ME1PN1FW-Q memory

2. wait, until the 7-segment LED shows 'AA', indicating that the script on the CF card has been completed without an error

3. now remove the CF card and reset the controller

4. start GX Configurator-PN, create a configuration with the correct MAC address of the PROFINET Controller and enter the IP address you want for the PROFINET Controller.

ile <u>D</u> e	onfigurator PN escription <u>L</u> ibra	y <u>N</u> etwork Devices <u>I</u> tems <u>H</u> elp	
	k 🗒 🗄 🙎	* C	
ĩΧ			ר ר
-			PN HF V6.1
	P/IP: 192.168.000		IP67 PROFINET IO-Devi
0	General IP Addres	s Manager	be20 BN-PNIO DI8
	Name	Value Unit	B70 V02.01.xx (FW 02) Exte
	D IP Address:		
2	IP Address	192.168.000.052	
	Sub-Netweet Gateway IP	Address	×
	Controllor		
		value	
		Parameter	
		Name : IP Address Description : Zone of 4 bytes entered in pointed decimal notation representing	
		the Internet address or IP address of the controller.	
Da			
09			
)9		Setting	to the configuration.
	- Description -	Default : 000.000.000 192 . 168 . 000 . 052	
ad	Zone of 4 byt of the control		MAJ NUM DEF
	or the control		

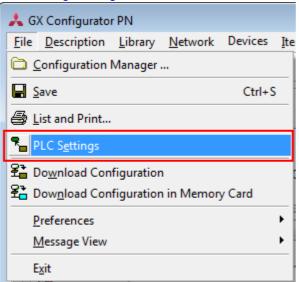
5. download the configuration (this includes setting the IP address from the default setting of the PROFINET Controller to the address assigned in the GX Configurator-PN project)

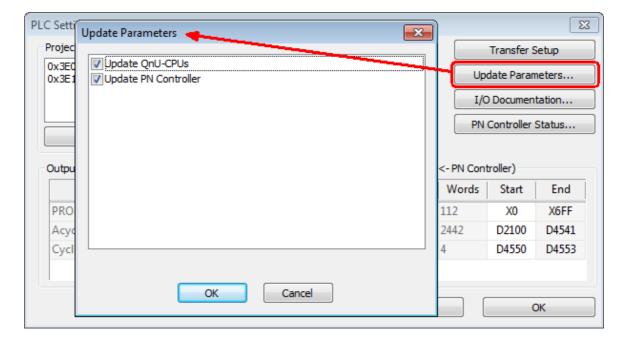
🙏 G	X Configurato	r PN			
<u>F</u> ile	<u>D</u> escription	<u>L</u> ibrary	<u>N</u> etwork	Devices	<u>I</u> te
	onfiguration l	Manager			
	ave			Ctrl+S	5
🖨 L	ist and Print				
<b>%_</b> P	PLC S <u>e</u> ttings				
£≟ ¤	)o <u>w</u> nload Con	figuratior			
율.	)ow <u>n</u> load Con	figuratior	in Memor	y Card	
P	references				۲
<u>N</u>	<u>M</u> essage View				۲
E	xit				

**GX** Configurator-PN

78

6. update the refresh settings on both the controlling Qn-CPU and the PROFINET Controller in the <u>'PLC Settings' dialog</u>.





# 5 Getting Started

80

Below are the main steps, which are required to configure a PROFINET I/O master module.

### Start GX Configurator-PN

 Start GX Configurator-PN via the shortcut in the Programs menu. The default location of the shortcut is Programs \ MELSOFT Application \ GX Configurator-PN 1.03 \ GX Configurator-PN 1.03.

🙏 GX Configurator PN 📃	
<u>F</u> ile <u>D</u> escription <u>H</u> elp	
<u>** *</u>	
🔂 Device Library 🙀 Network Detection	
Date / Time Level Event	•
08/03/11 12:14:07 Information Configuration loaded	
09/02/11 12:14:16 Information METDNII EN/ CCDU deleted	*
🛄 Output Message View	
Ready Configuration: Read/Write MAJ NU	IM DEF

## **Start a New Project**

1. In the main menu File select Configuration Manager.

<u>F</u> ile	e <u>D</u> escription <u>H</u> elp	
0	Configuration Manager	
	<u>S</u> ave	Ctrl+S
6	List and Print	
Ł	Download Configuration	
£	Download Configuration in Memory Ca	ard
	<u>P</u> references	•
	<u>M</u> essage View	•
	E <u>x</u> it	

Configuration Mana	iger			
Active Configuration :	config01			
Configuration Path :	C:\ProgramData\M	/itsubishi\CCP	J Profinet Configuration Tool\Config\confi	g01
Available Configuration	s Created	Modified	Description	]
🙏 config01	26.05.2011	03.08.2011	Description Configuration config01	New
				Duplicate
				Rename
				Delete
				Properties
Storage				
Restore B	ackup		Help OK	Close

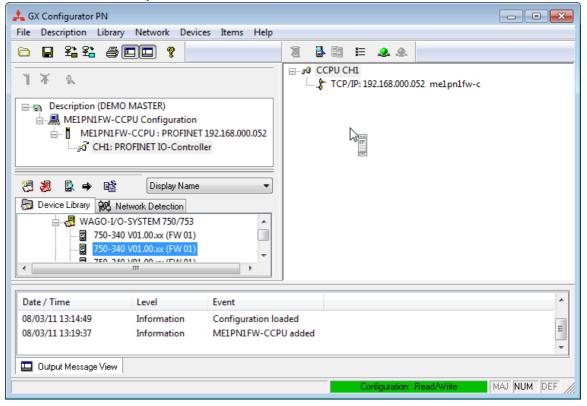
2. in the Configuration Manager press New to create a new configuration project

After closing the 'Configuration Manager' dialog the 'Add New ME1PN1FW-Q' dialog is displayed. The user must select the local network interface, the ME1PN1FW-Q is connected to. The user can then choose to obtain the network address of the module either automatically or manually. For details see the description of the 'Add New ME1PN1FW-Q' dialog.

Add New ME1PN1FW-Q	1		<b>×</b>	
ME1PN1FW-Q 1:				
Local Network Adapt	ers			
Board Name: [8] Realtek PCIe GBE Family Controller				
MAC Address:	BC:AE:C5:8D:47:ED	IP address: 19	2.168.0.20	
Status:	Connected		-	
Automatic Manual		Configured ME	E1PN1FW-Q	
Detected ME1PN1 ME1PN1FW-Q List Name IP Sut			192 . 168 . 0 . 52 me1pn1fw-q	
		ОК	Cancel Help	

82

3. the inserted module is now displayed in the network view and slaves can be added by drag&drop from the 'Device Library'.



or by scanning the network for slave devices using the 'Network Detection View' .

🙏 GX Configurator PN	
File Description Library Network Devices Items Help	
їж «.	⊡ 90 CCPU CH1 
E-S Description (DEMO MASTER) B ME1PN1FW-CCPU Configuration ME1PN1FW-CCPU : PROFINET 192.168.000.052 ME1PN1FW-CCPU : PROFINET 10-Controller	
ivit       image: second	Ctrl+R
$\mathbf{B}^{\mathbf{Q}}_{\mathbf{Q}}$ Online Action	
Date / Time 08/03/11 13:19 Properties	Space
	-wago-series750_753-20100525.xml: the maximum number of slots s 👻
<	•
🛄 Output Message View	
Ready	Configuration: Read/Write MAJ NUM DEF

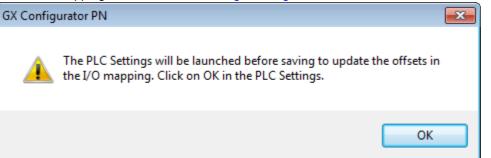
			· · · · · · · · · · · · · · · · · · ·					
🙏 GX Configurator PN								
<u>File Description Lib</u>	orary <u>N</u> etwork [	Devices <u>I</u> tems	<u>H</u> elp					
📓 🖺 🗒 🖽 .	🧟 🧶 🗀 🖪	] X X (	3 🗖 🗖 🤋 📄					
750-340 V01.00.xx (FW					×	]		
	-		o	Luc p .		.pn1fw-c		_
General Configuration	Module Configuration	on Parameters	Connection Information	ns I/O Data	GSDML File	>-750-340 75 Device Na	0-340 V01.00.xx (FW 0)	
Device Designation						001 750- 🙀	<u>D</u> elete	CTRL+D
Name: 🚻	/AGO-750-340					002 /5x		
Number: 00	01 👻 📝 Link	Parameters	Active Configuration	n: 🔽		003 75x-	D <u>e</u> lete all Disable all	
Comment: PF	ROFINET IO Fieldbus	s Coupler for Series	s 750 and 753	*		0.xx (FW	Enable all	
	minalblocks					ly, DIA	Duplicate <u>X</u> times	
				*		30 BIT I) + 30 BIT (		Space
Network Properties							Properties	space
N	Name	Value	Unit					
•	Addressing Mode	DCP						
		192.168.000.001						
	Device Name	wago-/50-340						
Description:	efines which methods	s for IP addess ass	ignment is used. Local	*				
	eans that the DAP su Idress assignment.	pports a device sp	pecific method for IP					
	j			-				*
				Ţ		naximum nur	mber of slots supporte	ed by this
								-
								+
				Creat				
F			ОК	Cancel	Help	guration: Read	MAJ N	UM DEF

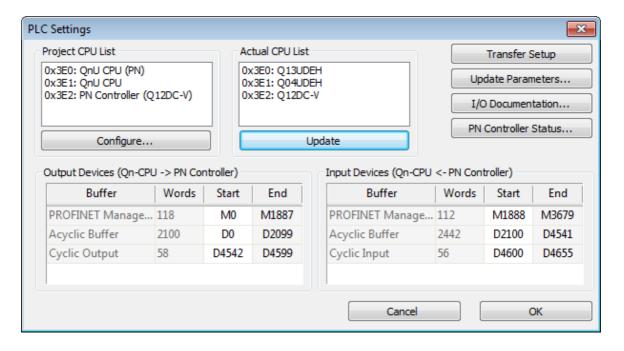
4. the configuration of a slave can be edited by selecting 'Properties' from the slave context menu.

5. after completing the network settings the configuration can be downloaded to the ME1PN1FW-Q with the item 'Download Configuration' from the 'File' menu.

🙏 G	X Configurato	r PN			
<u>F</u> ile	<u>D</u> escription	<u>L</u> ibrary	<u>N</u> etwork	De <u>v</u> ices	<u>I</u> te
	onfiguration	Manager .			
	ave			Ctrl+S	
<b>a</b> 1	ist and Print				
F	PLC <u>S</u> ettings				
율 (	Do <u>w</u> nload Con	figuration	1		
£7 (	Oow <u>n</u> load Con	figuration	in Memory	y Card	
E	references				×
Δ	<u>M</u> essage View				۲
E	<u>x</u> it				

 whenever the I/O configuration has been changed the user is prompted to update the offsets in the I/O mapping within the <u>'PLC Settings' Dialog</u>.





# 6 Main Menu

# Starting GX Configurator-PN

Select GX Configurator-PN from the Windows Start menu. The default shortcut is

Start -> Programs -> MELSOFT Applications -> GX Configurator-PN 1.03 -> GX Configurator-PN 1.03

## Main menu

The main menu offers the following pull-down menus.

Main Menu Items	Description
<u>File</u>	opening, saving and downloading configurations
Description	add/remove a PROFINET Controller
<u>Library</u>	managing the library with the device types
<u>Network</u>	functions related to scanning an existing network
<u>Devices</u>	adding/removing devices from/to the network
<u>ltems</u>	configuring data items in device modules
<u>Help</u>	help and application information

The items in the open pull-down menus can be reached via mouse or keyboard. The underlined character will start the function. In addition there are some menu items which may be started using predefined shortcuts.

# 6.1 File Menu

After having started the GX Configurator-PN software, this is the first menu to work with. With the help of this menu you can create a new or load an existing project.

0	<u>C</u> onfiguration Manager	
	Save	Ctrl+S
6	List and Print	
۹.	PLC S <u>e</u> ttings	
_	Do <u>w</u> nload Configuration Dow <u>n</u> load Configuration in Memory Ca	ard
	<u>P</u> references	•
	<u>M</u> essage View	•
	E <u>x</u> it	

The menu offers the following commands:

Command	Description	
Configuration Manager	Opens the project manager for selecting and managing configurati-	

Command	Description	
	on projects	
<u>Save</u>	Save the current configuration	
List and Print	Opens the 'Preview and Print Listings' dialog	
PLC Settings	Opens the 'PLC Settings' dialog	
Download Configurati- on	Download the configuration to the PROFINET controller	
Download Configurati- on in Memory Card	Download the configuration to the memory card in the PROFINET controller	
Preferences	Selects the user interface layout, active 'Advanced Mode'	
Message View	Functions related to the 'Message View'	
Exit	End application	

### **Command 'Save'**

This item saves the modifications of the current configuration.

### 'List and Print'

Opens the 'Preview or Print Listings' Dialog.

#### **Command 'PLC Settings'**

The 'PLC Settings' dialog provides the user interface for configuring the data exchange between the PROFINET Controller and the controlling Qn-CPU. This includes

- · assigning buffer devices
- updating refresh settings in Qn-CPU, PROFINET Controller and/or the PLC programming project
- checking existing refresh settings

For details see 'PLC Settings' dialog.

### **Command 'Download Configuration'**

The current configuration is downloaded to the RAM of the PROFINET Controller.

**Note**: please make sure that the refresh settings for the interaction with the PLC program are consistent with the configuration of the PROFINET Controller by <u>updating the refresh settings</u> in the <u>'PLC Settings' dialog</u> after a download of the PROFINET Controller configuration.

### **Command 'Download Configuration in Memory Card'**

The current configuration is downloaded to the CF-card inserted in the PROFINET Controller.

## **Command 'Preferences'**

<u>W</u>orkspace
 <u>O</u>utput Window
 Advanced Mode

86

Command	Description
Workspace	Toggles the display of the 'Configuration View', the 'Device Library View' and the 'Network Detection View'
Output Window	Toggles the display of the 'Message View' window
Advanced Mode	Toggles 'Advanced Mode'

### **Command 'Message View'**

This item opens the 'Message View' menu.

### **Command 'Exit'**

You can use this menu command to quit the software. If the configuration has been modified and has not yet been saved the following message appears

GX Configurator PN
Save modifications ?
Yes No Cancel

If you want to save the last changes before leaving and ending GX Configurator-PN choose **Yes**. If you choose **No**, all modifications to the respective project are lost.

# 6.1.1 'Preview or Print Listings' Dialog

View and print the settings of the current configuration.

Preview or Print Listings	<b>X</b>
Listing Selection	Preview
Devices Configuration	Print
Items Configuration	Print All Listing
	Help
Cancel	

Name	Description	Choices / Range	Default
Devices Configuration	If selected, the I/O devices and their confi- guration are included in the printout	-	-
Items Configuration	If selected, the data items are included in the printout	-	-

Preview	Shows the contents of the selected confi- guration in the default text editor	-	-
Print	Prints the selected part of the configurati- on on the default printer	-	-
Print All Listing	Prints devices and items on the default printer	-	-
Help	Open online help	-	-
Cancel	Close the dialog	-	-

# 6.2 Description Menu

Add ME1PN1FW-Q	Ins
★ Delete ME1PN1FW-Q	Del
Notes Properties	Space

 Command
 Description

 Add ME1PN1FW-Q
 Add PROFINET Controller to configuration

 Delete ME1PN1FW-Q
 Remove PROFINET Controller from configuration

 Properties
 Open 'Properties' dialog for PROFINET Controller

## Command 'Add ME1PN1FW-Q'

Add a ME1PN1FW-Q to the configuration

## Command 'Delete ME1PN1FW-Q'

Remove the ME1PN1FW-Q from the configuration

# 6.3 Help Menu

<u>C</u>onsole Help

The menu contains the following commands:

Command	Description	
Console Help	Opens the online help	
About	Displays version information	

88

# 7 User Interface

# 7.1 Device Library

The device library is the local collection of descriptions for types of PROFINET I/O devices.

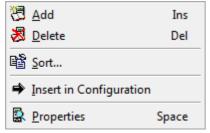
🤁 😹 🔹 🖨	) B	Display Name 🔹
👼 Device Library	Net	work Detection
🖃 👼 Device Lil	brary	
🛓 🖓 I/O		
📥 🛃 W.	AGO-I/O-9	SYSTEM 750/753
	750-340	/01.00.xx (FW 01)
	750-340	/01.01.xx (FW 02)
	750-340	/01.02.xx (FW 03)
	750-370	/01.00.xx (FW 01)
	750-370	/02.01.xx (FW 02)
	750-370	/02.01.xx (FW 02) Extended DAP
_		

The parameters used for configuring an IO-Device are contained in a GSDML file (Generic Station Description Markup Language), commonly called a GSD. A GSD may contain one or more IO-Device descriptions.

The device library is used to store GSD files and to provide a graphic view. Using this graphic view, it is possible to manually insert IO-Devices into the current configuration. The device library is also accessed during automatic detection of IO-devices present on the network.

## **Context Menu**

For the nodes in the device library tree context menus exists. The entries depend on the type of the selected node.



This menu is also accessible via the main menu. For a detailed description see 'Libray Menu'.

## **Library Display Options**

The selector above the device library tree allows you to choose the display mode.



The available options are Display Name Display Order Number

Display the product name Display the order number

# Adding IO-Device Types to the Library

The 'GSDML Management' wizard lets you add one or more IO-Devices to the library. This wizard

may be accessed via the button or via the menu item 'Add...' from the context menu of the device library or the 'Library' submenu in the main menu. For details see '<u>Add GSDML Files</u>'.

## 7.1.1 Library Menu

圐	<u>A</u> dd	Ins
8	<u>D</u> elete	Del
ŧ	<u>S</u> ort	
⇒	Insert in Configuration	
	<u>P</u> roperties	Space

The menu contains the following commands:

Command	Description	
Add	Add device type with GSDML file to library	
Delete	Remove device type from library	
	Device types must not be deleted while being used in the configuration.	
	<b>Note</b> : deleting a GSD from the library does not physically delete the GSD file on the hard disk. It is instead moved to the subdirectory 'removed_gsdml'	
<u>Sort</u>	Sort the entries in the library	
Insert in Configuration	Add selected device type to library	
Properties	Show properties of the selected device type	

## Sort Device Library

Select the criteria for sorting the entries in the device library

S	ort Device Library 🧮	×
	Choose the type of sort	
	By Category	9
	By Manufacturer	
	By File name	
	4 III >>	
	OK Cancel	

Name	Description	Choices / Range	Default
Choose the type of sort	Select the criteria for sorting the ent-	Category /	Category

Name	Description	Choices / Range	Default
	ries in the device library	Manufacturer /	
	Available sort keys are:	File name /	
	<b>By Category</b> : Displays IO-Devices according to their main type then their secondary type. This sort is based on the "Main Family" and "Product Family" fields in the GSD for the IO-Device.	IO-Device na- me	
	<b>By Manufacturer</b> : Displays the IO- Device by manufacturer. This sort is based on the "VendorName" field in the GSD for the IO-Device.		
	<b>By File name</b> : Displays the IO-De- vices according to the GSD filena- me.		
	<b>By IO-Device name</b> : Displays the IO-Devices by name. This sort is based on the "Name" field in the GSD for the IO-Device.		
ОК	Close dialog and save changes		
Cancel	Close dialog and discard changes		

92

# 7.1.2 'GSDML Management' Dialog

This wizard-style dialog is opened to add device types defined in GSDML files to the device library.

GSDML Management	
This Wizard allows you to add GSDML files.	GSDML Profinet
< Back	Next > Cancel Help

GSDML Management
PROFT [®] TNETT
Select the Location of the GSDML File(s):
Add File(s)
Add all the GSDML from the Directory Look in Subfolders
Directory or File Name: Browse
The GSDML files usable in the Console are registered in the GSDML base. Select the location of the file(s) and click on Next button to insert the GSDML files in the base.
< Back Next > Cancel Help

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

Name	Description	Choices / Ran- ge	Default
Add File(s)	Add one or more GSDML files Use the [Browse] button to select the files. If the file already exists, the <u>'File</u> <u>Already Exists' warning</u> is dis- played.	Selected / not se- lected	Selected
Add all the GSDML from the Directory	Add the GSDML files in a specified directory and (optionally) its subdi- rectories Use the [Browse] button to select the files.	Selected / not se- lected	Not selec- ted
	If a file already exists, the <u>'File Al-</u> ready Exists' warning is displayed.		
Look in Subfolders	If selected, also the subfolders of the selected directory are searched for GSDML files.	Selected / not se- lected	Not selec- ted
Directory or File Name	Path of the selected file(s) or direc- tory	-	-
Browse	Open a file dialog for selecting the GSDML file(s) or the directory to search	-	-
Back	Go back to the start page	-	-
Next	Proceed and add the selected file or scan the selected directory	-	Default button
Cancel	Close wizard and discard changes	-	-
Help	Open online help	-	-

# 'File Already Exists' Warning

If a file is to be added, which already exists in the library, a warning is displayed. The existing type is not overwritten. If it should be replaced, the existing entry must be deleted first.

94	GX Configurator-PN
• •	



# 'Add GSD File Completed' Page

After adding one or several GSD files to the library, the next page shows for each selected GSD file, whether it has been added to the library or not.

SDML Management			
PRQED® Net			
Status			
This GSDML already exists in the devic			
ОК			
4			
,			
View Selected File			
t > Cancel Help			

Name	Description	Choices / Ran- ge	Default
Column 'File Name'	Name of GSDML file	-	-
Column 'Status'	Status (added or failure)	-	-

User	Interface
0301	michace

95	

Name	Description	Choices / Ran- ge	Default
Columns 'Family Na- me', 'Schema Version', 'Manufacturer', 'File Da- te' and 'File Time'	Additional information taken from the GSDML file	-	-
View Selected File	Open the selected GSDML file in the default text editor	-	-
Back	Go back to the previous page	-	-
Next	Proceed to the next page to end the wizard	-	Default button
	GSDML Management		
Cancel	Close wizard and discard changes	-	-
Help	Open online help	-	-

# 7.1.3 'Device Type Properties' Dialog

A double-click on a device type entry in the 'Device Library' tree opens a dialog with information from the respective GSDML file.

750-340 V01.02.xx (FW 03)
GSDML File
⊡
GSDML-V2.0-wago-series750_753-20100525.xml
Compared States / 50_/35-20100325.011
VendorID : 0x011D
···  - DeviceID : 0x02EE
Information : Finely-graduated modular distributed I/O device, protection type IP20
- MainFamily: I/O
ProductFamily : WAGO-I/O-SYSTEM 750/753
Module Informations
- Name : 750-340 V01.02.xx (FW 03)
Information : PROFINET IO Fieldbus Coupler for Series 750 and 753 terminalblocks
VendorName : WAGO Kontakttechnik GmbH u. Co. KG
Proder Number : 750-340
···· ⊫- Hardware Release : 05
····· ⊨- Software Release : V01.02.xx (03)
En Partice Access Point
···· Implementation Type : NetArm
···· ⊨- PhysicalSlots : 0128
···· ⊨- Minimum Interval for Sending Cyclic IO Data : 4 ms
···· ⊨- DNS_CompatibleName : WAGO-750-340
···· ⊨- MultipleWriteSupported : false
···· IOXS_Required : true
···· ⊫· ObjectUUID_LocalIndex : 1
ID : DIM 3
Check GSDML View or Print GSDML File
<< Previous

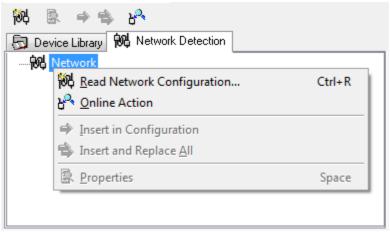
Name	Description	Choices / Range	Default
Tree	Structured display of the GSDML file contents	-	-
Check GSDML	Checks, whether GSDML file con- tents comply to the specification (i.e. schema definition)	-	-
View or Print GSDML File	Displays the GSDML file contents in the default text editor, from they can be saved or printed	-	-
Previous	Show properties of previous device	Disabled, if the device is the first in the list	-

96

Name	Description	Choices / Range	Default
Next	Show properties of next device	Disabled, if the device is the last in the list	-
ОК	Close dialog and save changes	-	-
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

# 7.2 Network Detection

Instead of manually adding device types to the network configuration the user can scan the network of the PROFINET Controller for connected devices and one or several of these devices to the current network configuration.



The context menu of the 'Network' node corresponds to the 'Network Menu' in the main menu.

### **Network Tree**

₩ 🗟 🔿 🛸 😚
E 🔂 Network
■É bl.ctl01
■få ctrl.mu.ng
📄 🖳 et200m
Module Configuration
👔 000 IM153-4 PN V2.0
001 SM 323 DI8/D08xDC24V/0.5A
in the second s
🚍 📲 ethio-pnio-dev1
🖻 📲 Module Configuration
👔 000 PCU-ETHIO / PCIE-ETHIO
📔 001 Input 36 Bytes
🛄 📔 002 Output 36 Bytes
epb-link
iepb-link 
🖬 📲 lab.harsh.0033
E lab.harsh.0039
Device Library 🙀 Network Detection

Network components with icons like this: 📲 are IO-Controllers They cannot be used in the current configuration.

Network detection will carry out an implicit read request to the IO-Device to find out the configuration of the IO-Device's slots and sub-slots. Certain IO-Devices do not support this request and must therefore be configured manually.

The message window contains all the IO-Devices, whose name or current IP address are not compatible with network detection from GX Configurator-PN.

IO-Devices with an IP address, which is not of the same class as that of the IO-Controller, are represented like this: They cannot be inserted into the current configuration.

For PROFINET network detection to be as effective as possible, the following rules must be obeyed:

- Each IO-Device must have a unique name PROFINET uses DCP protocol to address the IO-Devices. This protocol allows a name to be given to each IO-Device. As for the IP address, the name must be unique over the network. To name an IO-Device, it is recommended to use the 'Online Action Tool'.
- Each IO-Device must have one IP address in the same network range as the IO-Controller. When an IO-Device is detected, an implicit read request is carried out to find out the slot/subslot configuration of the IO-Device. This request uses RPC protocol based on TCP/IP. If the IO-Device is not in the same network range as the IO-Controller, then this request will fail. To configure an IP address for an IO-Device, it is recommended to use the '<u>Online Action Tool</u>'.
- Each IO-Device must have its GSD present in the device library. The configuration of an IO-Device is based on its GSD. Without a GSD file an IO-Device cannot be configured.

### 7.2.1 'Network' Menu

秘 <u>R</u> ead Network Configuration 삼 ^속 <u>O</u> nline Action	Ctrl+R
Insert in Configuration	
🛸 Insert and Replace <u>A</u> ll	
Properties	Space

The menu contains the following commands:

Command	Description
Read Network Configuration	Scans the network for connected devices
Online Action	Starts the 'Online Action' tool for finding and identifying devices and for setting device name and/or IP address
Insert in Configuration	Adds the selected device to the current network configuration
Insert and Replace All	Removes the devices currently configured and adds all devices found
<u>Properties</u>	Opens the view with the properties of the selected device

### **Command 'Read Network Configuration'**

This command scans the network for connected devices.

Network detection 🖪 🔀
ø
6 Stations Detected
11%
<u>Cancel</u>

Alternatively the button can be pressed. The devices found are listed in the [Network Detection] area.

## **Command 'Online Action'**

Starts the <u>'Online Action'</u> tool for finding and identifying devices and for setting device name and/or IP address.

## **Command 'Insert in Configuration'**

Adds the selected device to the current network configuration.

### **Command 'Insert and Replace All'**

Removes the devices currently configured and adds all devices found.

## **Command 'Properties'**

Opens the view with the properties of the selected device.

### 7.2.2 Online Action Tool

The 'Online Action' tool is started via either the menu item 'Online Action' or by pressing the button. When the tool is started, it issues requests to detect PROFINET stations on the network.

Devices on the Net	twork				🖃 🖂
Number of Nodes on th	he Network: 89				
Name	IP Address	Туре	MAC Address	Addressing Mode	<b>^</b>
lab.harsh.0039	128.127.060.120	IP67	00:A0:91:2F:00:39	DCP	
lab.harsh.0042	128.127.060.129	IP67	00:A0:91:2F:00:42	DCP	
lab.harsh.0045	128.127.060.126	IP67	00:A0:91:2F:00:45	DCP	
lab.harsh.004e	128.127.060.123	IP67	00:A0:91:2F:00:4E	DCP	
lab.harsh.0051	128.127.060.125	IP67	00:A0:91:2F:00:51	DCP	
lab.harsh.0060	128.127.060.133	IP67	00:A0:91:2F:00:60	DCP	
lab.harsh.0063 lab.harsh.0066	128.127.060.130 128.127.060.128	IP67 IP67	00:A0:91:2F:00:63 00:A0:91:2F:00:66	DCP DCP	
lab.harsh.0069	128.127.060.128	IP67	00:A0:91:2F:00:66	DCP	
lab.harsh.00072	128.127.060.124	IP67	00:A0:91:2F:00:72	DCP	
lab.harsh.0075	128.127.060.121	IP67	00:A0:91:2F:00:75	DCP	
lab.harsh.007b	128.127.060.127	IP67	00:A0:91:2F:00:7B	DCP	<b>~</b>
Scanning:					
		Addressing		Blinking Te	est
MAC Address:		Addressing Mode:			
		DHCP Based on:	MAC Address		<u>^</u>
Device Type:		Client Identifier:	MAL Address		
		1			<b>v</b>
	Factory Reset	IP Address:	0.0.0.	0	
Name		Sub-Network Mask:	0.0.0.	0 Device	Blinking
		Gateway IP Address:	0.0.0.	0	
Permanent Name	Apply Name	Permanent	Apply		<u>C</u> lose
GSDML Presence		Request Status			
		Status			

Name	Description	Choi- ces / Range	Default
Number of Nodes on the Network	Number of network nodes found	-	-
Network Nodes Ta- ble	Shows the PROFINET stations present as well as their name, IP address, type, MAC address and addressing mode	-	-

		User Interfac	e 101
Name	Description	Choi- ces / Range	Default
Scanning	If checked, the network nodes list is refreshed every 3 seconds. Otherwise the list is not re- freshed again.	-	-
MAC Address	Ethernet address of the selected device	-	-
Device Туре	Type of the selected device	-	-
Factory Reset	Sends a DCP request to the IO-Device telling it to restart with its factory default settings. The result of this command will be displayed in the Request status field	-	-
	MAC Address: 00:A0:91:2F:00:66 Device Type: IP67 Factory Reset		
Name	Name of the selected device	-	-
Permanent Name	Checked: the IO-Device is to store its new na- me in non-volatile memory. After the next power cycle the device must use its new na- me. Unchecked: the IO-Device is to store its new name in volatile memory. After the next power cycle the device goes back to its old name.	-	-
Apply Name	Sends a DCP request to the IO-Device telling it to use its new name. The result of this command will be displayed in the Request status field. For further information see ' <u>Naming an IO-Devi-</u> <u>ce</u> '.	-	-
Addressing Mode	There are three available addressing modes: <b>DCP</b> : the IO-Controller may change the TCP/IP configuration of the device. The IO-Controller will change the TCP/IP configuration of the IO- Device if it differs from the TCP/IP configuration of the IO-Device contained in the IO-Controller configuration. <b>DHCP</b> : In this mode, the IO-Device obtains its TCP/IP configuration from a DHCP server. The criterion for obtaining the TCP/IP configuration from the DHCP server is configurable in the 'DHCP Based on' list.	-	-

Name	Description	Choi- ces / Range	Default
	<b>Note</b> : if an IO-Device is configured in DHCP mode and a connection is established, the IO- Controller compares the TCP/IP configuration of the IO-Device with that contained in the con- figuration of the IO-Controller. If they differ, the connection cannot be established.		
DHCP Based on	<b>MAC address</b> : the identifier used for obtaining the IP configuration from the DHCP server will be the MAC address of the IO-Device.	-	-
	<b>Station name</b> : the identifier used for obtaining the IP configuration from the DHCP server will be the name of the IO-Device.		
	<b>Client identifier</b> : the identifier used for obtai- ning the IP address from the DHCP server will be the character string entered by the user in the [Client Identifier] field.		
	<b>Local</b> : This parameter cannot be selected. It is there for information only if the IO-Device is already set to local mode.		
Client Identifier	The identifier used for obtaining the IP address from the DHCP server	-	-
IP Address	IP address to be set in the device	-	-
Sub-Network Mask	Sub-network mask to be set in the device	-	-
Gateway IP Address	Gateway IP address to be set in the device	-	-
Permanent	Checked: the IO-Device is to store its new IP configuration in non-volatile memory. When it is next turned on, it must use its new IP configuration.	-	-
	Unchecked: the IO-Device is to store its new IP configuration in volatile memory. When it is next turned on, it must use its new IP configuration.		
Apply	Sends a DCP request to the IO-Device for it to use its new TCP/IP configuration.	-	-
	The result of this command will be displayed in the Request status field.		
	For further information see ' <u>Configure the IP Ad-</u> dress of an IO-Device'		
Blinking Test	If the GSDML file of the selected device exists in the device library and contains the	-	-

		User Interfac	<u>2e</u> 103
Name	Description	Choi- ces / Range	Default
	'DCP_FlashOnceSignalUnit' tag, the text from the GSDML file indicates the device behaviour when it receives a DCP flash command.		
Device Blinking	The 'Blinking Device' dialog is displayed and DCP blink commands are sent to the device.	_	-
Help	Open online help	-	-
Close	Close dialog	-	Default button
Request Status	Lists the results of the commands issued in this dialog	-	-

llear Interface

103

## Naming an IO-Device

When an IO-Device is selected from the list, the name of the selected IO-Device is shown in the Name field and the Write to device button is enabled.

Name		
lab.harsh.0066		
Permanent Name	Apply Name	

This command sends a DCP request to the IO-Device telling it to use its new name. The Permanent name checkbox is used as follows:

- Checked: the IO-Device is to store its new name in non-volatile memory. When it is next turned on, it must use its new name.
- Unchecked: the IO-Device is to store its new name in volatile memory. When it is next turned on, it goes back to its old name.

The result of this command will be displayed in the Request status field.

### Naming rules for an IO-Device

The name of an IO-Device is made up of 1 to 240 characters and must comply with the following rules:

• 1 or more labels separated by [.]

104

- the size of a label varies from 1 to 63 characters
- total size (sum of all label and [.] character) varies from 1 to 240 characters
- the allowed characters are [a-z0-9], upper-case letters are prohibited
- labels may not start with [-]
- labels may not terminate with [-]
- labels may not start with [port-xyz] or [port-xyz-abcde] where a,b,c,d,e,x,y,z = 0..9

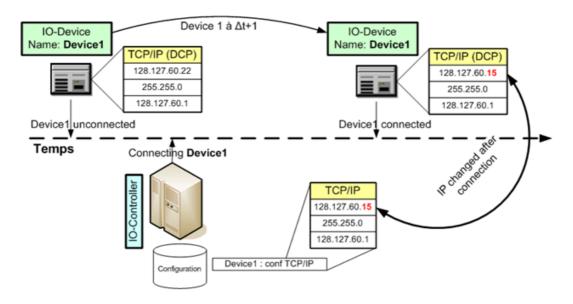
### Configure the IP Address of an IO-Device

When an IO-Device is selected from the list, the TCP/IP configuration of the selected IO-Device is shown in the addressing field and the [Apply] button is enabled.

Addressing		
Addressing Mode:	DCP 😽	
DHCP Based on:	MAC Address	
Client Identifier:		
IP Address:	128 . 127 . 60 . 128	
Sub-Network Mask:	255 . 255 . 255 . 0	
Gateway IP Address:	0.0.0.0	
Permanent 📃	Apply	

There are three available addressing modes:

• DCP: In this mode, although the IO-Device has a TCP/IP configuration, when an IO-Controller connects to this IO-Device, the IO-Controller may change the TCP/IP configuration of this IO-Device. The IO-Controller will change the TCP/IP configuration of the IO-Device if it differs from the TCP/IP configuration of the IO-Device contained in the IO-Controller configuration.



• **DHCP**: In this mode, the IO-Device obtains its TCP/IP configuration from a DHCP server. The criterion for obtaining the TCP/IP configuration from the DHCP server is configurable. The DHCP based on gives the following options:

MAC address: the identifier used for obtaining the IP configuration from the DHCP server will be

the MAC address of the IO-Device.

*Station name*: the identifier used for obtaining the IP configuration from the DHCP server will be the name of the IO-Device.

*Client identifier*. the identifier used for obtaining the IP address from the DHCP server will be the string entered in the client identifier field.

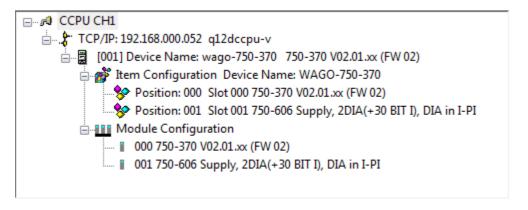
If an IO-Device is configured in DHCP mode: when a connection is established, the IO-Controller compares the TCP/IP configuration of the IO-Device with that contained in the configuration of the IO-Controller. If they differ, the connection cannot be established.

• Local: This parameter cannot be selected. It is there for information only if the IO-Device is already set to local mode.

# 7.3 **PROFINET Network View**

The PROFINET network view is the central view of the application. It lists

- PROFINET controller
- assigned I/O devices
- modules of the I/O devices



Operations for the network view are contained in the 'Devices' Menu.

### **Diagnostic Mode**

The diagnostic mode is activated with the menu item 'Start Console Diagnostic' or by pressing the

🚨 button.	
□         CCPU CH1           □         ↓         TCP/IP: 128.127.060.067 myccpu01           □         ↓         TCP/IP: 128.127.060.067 myccpu01           □         ↓         TCP/IP: 128.127.060.067 myccpu01           □         ↓         [000] Device Name: lab.harsh.0076           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □         ↓         ↓           □	<ul> <li>TCDEP-8YYX-D1U: IP67 Universal block (FW4.1)</li> <li>TCDEP-8YYX-D1U: IP67 Universal block (FW4.1)</li> <li>TCDEP-8D0N-D1U: IP67 16 In NPN block (FW4.1)</li> <li>TCDEP-8YYX-D1U: IP67 Universal block (FW4.1)</li> </ul>

After configuring the IO-Controller, adding and configuring the devices of your network and downloading your configuration to the board, the statuses of all devices can be tested with the internal dia-

gnostic tool. This tool gives a first level diagnosis of the status of the current configuration. When the diagnostic mode is enabled, the configuration cannot be changed. It is in read-only mode. Once enabled, the diagnostic view shows the current status of the connection for each IO-Device.

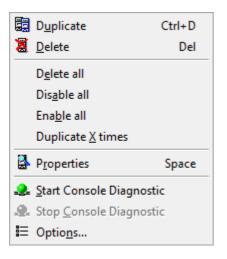
- Indicates that the IO-Device is connected
- Indicates that the IO-Device is disconnected but that a connection phase is under way
- Indicates that the IO-Device is not connected. Connection is controlled by the user

### **'Device Name Properties' Dialog**

The device name can be changed from its default, which is the type name taken from the GSD file.

Properties			<b>—</b> ×
Device Name:	WAG0-750-370		
	ОК	Cancel	

### 7.3.1 'Devices' Menu



### The menu contains the following commands:

Command	Description
Duplicate	Add a copy of the selected device
Delete	Remove the selected device
Delete all	Remove all devices
Disable all	Disable all devices
Enable all	Enable all devices
Duplicate X times	Add multiple copies of the selected device
Properties	If the PROFINET Controller is selected:
	opens the 'PROFINET Controller Properties' dialog
	If an IO device is selected:

Command	Description
	opens the <u>'PROFINET I/O Device Properties' dialog</u>
Start Console Diagnostic	Start diagnostic mode
Stop Console Diagnostic	Stop diagnostic mode
Options	Opens the <u>'Display Option' dialog</u>

## **Properties**

The effect of this menu item depends on the node, which is selected in the network tree.

Node Type	Properties Dialog
Channel	'Channel Properties' Dialog
PROFINET Controller	'ME1PN1FW-Q Properties' Dialog
IO-Device	<u>'IO-Device Configuration' Dialog</u>
Item Configuration - Device	PROFINET Network View - 'Device Name Properties' Dialog
Item Configuration - Slot	'Items Declaration' Dialog
Module Configuration	'IO-Device Configuration' Dialog - Tab 'Module Configuration'
Module Name	<u>'Module Configuration' Dialog</u>

## 7.3.2 'Display Option' Dialog

The display of the PROFINET network tree can be modified with the options in this dialog.

Display Option			×
Value			
Name	Value	Unit	
Display device IP address in tree	INACTIVE		
<ul> <li>Display device number in tree</li> <li>Add GSDML in library: Message for Redundant GSDMI</li> </ul>	ACTIVE ACTIVE		
Parameter Description : Display IP address device in tree			*
ОК	Cancel	He	lp

Name	Description	Choices / Range	Default
Display device IP ad- dress in the tree	If enabled, displays the IP address of the device in the current configuration tree.	Active / Inacti- ve	Inactive
Display device num- ber in the tree	If enabled, displays the number of the device in the current configuration tree.	Active / Inacti- ve	Active
Add GSDML in libra- ry: Message for red- undant GSDML	If enabled, displays a message if a GSDML file for the same device with the same file version is already in the GSDML database. This GSDML file will not be inserted into the device library.	Active / Inacti- ve	Active
Parameter Descripti- on	Shows a descriptive text to the selected para- meter	Read-only	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

## 7.3.3 'Channel Properties' Dialog

This dialog provides access to timing parameters for the PROFINET I/O communication. The displayed values depend on whether '<u>Advanced Mode</u>' has been selected or not.

In 'Standard Mode':

User Interface
----------------

109

nnel Properties					
ROFINET IO					
Name	Value	Unit			
► DCP					
Request Time-out Request Retry		S			
► RTA					
► Request Time-out ► Request Retry		x100 ms			
Description					
Discovery and basic C	Configura	ion Protocol			*
			ОК	Cancel	Help

DCP section		
Request time-out	Sets the maximum time from the IO-Controller sending a DCP request from the reply. It also sets the listening time of the IO-Controller to the DCP identification request	
Number of request retries	Sets the maximum number of times a DCP request is repeated following a timeout.	
RTA (Real Time with Acknowledgment) section		
Request time-out	Sets the maximum period separating the time from the IO-Con- troller sending a RTA request and the reply.	
Number of request retries	Sets the maximum number of times an RTA request is repeated following a timeout.	

In 'Advanced Mode':

Name	Value	Unit	
Send Clock Factor	32		
► DCP			
Request Time-out	3	S	
⊨ Request Retry	2		
F RTA			
⊨ Request Time-out	3	x100 ms	
⊨ Request Retry	3		
🥭 RPC			
🥭 Client			
G Maximum Number of Ping	3		
G Maximum Number of Resend	3		
Time-out on CANCEL Request	1000	ms	
Time-out on Fragment Acknowledge	2000	ms	
🥭 Time-out Before Sending First Ping	2000	ms	
🥭 Time-out Before Resending Ping	2000	ms	
🥭 Server			
🥭 Maximum Number of Resending	3		
/> Time-out Before Resending	2000	ms	
Description			5
send clock factor* 31.25 * reduction ratio	. Cautio	fresh period for each device. Refresh period = n: if you modify his value, the refresh period of all essages will be displayed. Default value: 32. T	

<b>RPC section - Client</b>	
Maximum number of pings	Sets the maximum number of pings while awaiting a response.
Maximum number of re-sends	Sets the maximum number of times an RPC frame is repeated (question or response).
Timeout on CANCEL request	Sets the maximum time from the IO-Controller sending an RPC cancel request to the reply.
Timeout on Fragment Acknowled- ge	Sets the maximum time separating the IO-Controller sending an RPC ACK request from the reply.
Timeout on sending first ping	Sets the maximum time separating the IO-Controller sending the first RPC PING request from the reply.
Timeout on resending first ping	Sets the maximum time separating the IO-Controller sending an RPC PING request from the response to the first PING.
<b>RPC section - Server</b>	
Maximum number of re-sends	Maximum times a telegram is retransmitted before signalling an error.
Timeout before resending	Interval to wait before retransmitting a telegram.

## 7.3.4 IP Address Manager

This dialog provides access to the network address settings of the PROFINET Controller and to the 'IP Address Manager'.

## **PROFINET Controller Network Address Settings**

TCP/IP: 192.168.000.052 q12dccpu-v						×
0	General IP Address Manag	ger				
	Name	Value	Unit			
	<ul> <li>□- IP Address:</li> <li>□. IP Address</li> <li>□. Sub-Network Mask</li> <li>□. Gateway IP Address</li> <li>□- Controller Name</li> </ul>					
	Description					
						*
				ОК	Cancel	Help

Name	Description	Choices / Range	Default
Table	<b>IP Address:</b> area of 4 bytes entered in decimal nota- tion with decimal point representing the Internet ad- dress or IP address of the PROFINET Controller channel 1 (CH1)	-	-
	<b>Sub-Network Mask:</b> defines the addresses to be routed by the gateway and the network of valid IP addresses.		
	<b>Gateway IP Address:</b> IP address of a machine which can perform routing to another network.		

Name	Description	Choices / Range	Default
	PROFINET is not an IP-based protocol. It will not be possible to route I/O exchanges through a gateway.		
	<b>Controller Name:</b> PROFINET name of the IO-Con- troller.		
Description	Provides help on the selected field.	read-only	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

**Note:** after changing the controller IP address the configuration must be downloaded. Otherwise the controller will regain the old IP address after the next reset.

# **IP Address Manager**

The 'IP Address Manager' service manages the IP address allocation for IO-Devices present in the configuration.

CP/IP: 192.168.000.052 q12dc	cpu-v		×			
General IP Address Manager						
Address Ranges			Enable this Service			
Beginning IP Address	End IP Address		Sub-Network Mask :			
192.168.000.001	192.168.000.255		255.255.255.0			
			Gateway IP Address :			
		$\mathbf{X}$	0.0.0.0			
Address Assignments						
Assignments from Network :	Scan					
Device Name MAC A	ddress IP Address					
Configured Assignments :			I 💭 🖾			
Device Name IP Add	ress					
q12dccpu-v 192.1	68.000.052					
		ОК	Cancel Help			

Name	Description	Choices / Range	Default
Address Ran-	define one or more IP address ranges	-	-
ges	IP addresses from these ranges will be distribu- ted by the console when an IO-Device is added.		
	The address ranges are managed using the fol- lowing buttons:		
	Creates an address range		
	Edits the selected address range		
	Deletes the selected address range		

Address Assi- gnments	To reserve IP addresses for predefined IO-Devi- ce names This is useful for IO-Devices with addresses which must remain fixed. When the respective IO-Device is inserted into the current configurati- on, the corresponding IP address will automati- cally be assigned to it.	-	-
Scan	Get a list of I/O devices on the network The button is used to copy device name and IP address to the 'Configured Assignments' list. Alternatively the button allows to make an assignment by specifying the IP address and the name of the IO-Device.	-	-
Enable this Service	Enable the 'IP Address Manager' service	selected / not selected	not se- lected
Sub-Network Mask	Sub-netwok mask from the configuration of the PROFINET Controller The subnetwork mask along with the gateway address cannot be configured using this ser- vice.	read-only	
Gateway IP Address	Gateway address from the configuration of the PROFINET Controller	read-only	
Configured As- signments	List of configured pairs of device name and IP address, which are assigned by the address manager, when the device is connected. : Edits the selected entry : Deletes the selected entry	-	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

When a connection is established, the PROFINET Controller can send the TCP/IP configuration to an IO-Device. This helps to avoid problems with IP address conflicts. The IP addresses distributed by the console will only be effective, when the PROFINET Controller establishes the connection with the IO-Device.

**Note**: if no address ranges have been specified, the IP addresses of the network devices start with the first IP address within the specified subnet mask, independent of the controller IP address.

## **Changing the Controller IP Address**

If a different IP address has been entered and the dialog has been closed by pressing 'OK', the user

Change	Change IP Address							
the actual IP address (192, 168.0.52) is different from the IP address configured (192, 168.0.59). Do you want to set the target IP address to 192, 168.0.59?								
	Actual IP Address:	192.168.0.52						
	Configured IP Address:	192.168.0.59						
	Name:	mitsubishi-q12dccpu-v						
	Mac Address:	00:26:92:19:74:86						
	Yes	No						

is asked, whether the IP address should also be changed online on the PN controller.

The IP address can only be changed on the controller, if the PROFINET cyclic data exchange is stopped. If the data exchange has been started, the attempt to change the IP address online causes an error entry in the log.

Level	Event					
Information	Configuration saved.					
Error	Cannot modify IP address of the ME1PN1FW-Q. Error 99.					
		-				
•		•				

The data exchange can be stopped via the 'PROFINET Controller Status' dialog.

ROFINET Contro	oller Status			×
PROFINET Contro	ller Status	PROFINE	T running	Stop PROFINET
Additional Status	Information			
Buffer Name	Start Device	End Device		
Mgmt. Outputs	YO	Y75F		
Mgmt. Inputs	XO	X6FF		
Acyclic Outputs	D0	D2099		
Acyclic Inputs	D2100	D4541		
Cyclic Outputs	D4542	D4545		
Cyclic Inputs	D4546	D4553		
			Close	

### 7.4 **Items View**

116

Lists the I/O points of the module selected in the network configuration view. The user can select an item and change its name in the 'Items Properties' Dialog

Input Item Name	Data type	Offset/device	Offset/module	Bit in the byte	Word Offset in Inputs
8 SLOT004_STATUS_CHANNEL_0	Input byte	4	0		6
16 SLOT004_CNT_VAL_CHANNEL_0	Input word	5	1		7
8 SLOT004_STATUS_CHANNEL_1	Input byte	7	3		8
16 SLOT004_CNT_VAL_CHANNEL_1	Input word	8	4		9
Output Item Name	Data type	Offset/device	e Offset/module	Bit in the byte	Word Offset in Outputs
8 SLOT004_CONTROL_CHANNEL_0	Output byte	3	0		5
16 SLOT004_CNT_SET_CHANNEL_0	Output word	4	1		6
8 SLOT004_CONTROL_CHANNEL_1	Output byte	6	3		7
	Output word		4		8

The context menu in the view corresponds to the 'Items Menu' in the main menu.

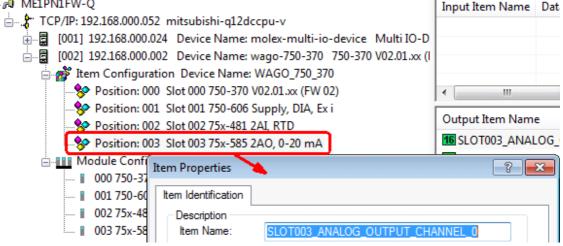
### 'Item Properties' Dialog

This dialog is opened by double-clicking an item in the 'Items View' table. Only the 'Item Name' can be edited, the other fields are read-only.

Item Properties		? <b>X</b>
Item Identification Description Item Name: Data Type:	SLOT003_ANALOG_OUTPUT_CHANNEL_0	
Position Block Offset in De Item Offset in the I	5 Dytes	
< Previous N	ext >> Help OK	Cancel

### 'Items Declaration' Dialog

This dialog is opened by double-clicking a position in the 'PROFINET Network' view.



The user can change the I/O structure of the module. This affects the global variable, which represents the module in the generated PLC code.

### 7.4.1 'Items' Menu

<u> A</u> dd Item(s)	Ins
<u>X</u> Delete Item(s)	Del
<u>R</u> ename Item	F2
<b><u>Q</u></b> Properties	Space

The menu contains the following commands:

Command	Description	
Add Item(s)	Add item(s)	
Delete Item(s)	Delete selected item(s)	
Rename Item	Rename the selected item	
Properties	Properties of the selected item	

### Command 'Add Item(s)'

Opens the <u>'Items Declaration' dialog</u> to define new items or edit existing ones.

### Command 'Delete Item(s)'

The selected item(s) are deleted, when the following query is confirmed.

GX Configurator PN	23
Delete all selected item(s) ?	
Yes No	

### **Command 'Rename Item'**

Opens an edit field in the cell with the name of the selected item

Input Item Name	Data type	Offset/device	Offset/module	Bit in the byte
8 SLOT001-STATUS-CHANNEL-0	Input byte	0	0	
16 SLOT001-ANALOG-INPUT-CHANNEL-0	Input word	1	1	
8 SLOT001-STATUS-CHANNEL-1	Input byte	3	3	
16 SLOT001-ANALOG-INPUT-CHANNEL-1	Input word	4	4	

### **Command 'Properties'**

This command opens the 'Item Properties' dialog.

# 7.4.2 'Items Properties' Dialog

Item Properties		? <b>×</b>
Item Identification		
Description		
Item Name:	SLOT001-STATUS-CHANNEL-1	
Data Type:	Input byte	
Position		
Block Offset in De	vice: 3 bytes	
Item Offset in the	Block: 3 bytes	
< Previous N	ext >> Help OK	Cancel

Name	Description	Choices / Range	Default
Item Name	Item name	1 - 50 characters	-
Data Type	Item data type	read-only	-
Block Offset in Device	Offset of the item within the input or output area of the device in by- tes	read-only	-
Item Offset in the Block	Offset of the item within its block in bytes	read-only	-
Previous	Show settings of previous item in table	Enabled, the se- lected item is not the first one	-
Next	Show settings of next item in table	Enabled, the se- lected item is not the last one	-
Help	Open online help	-	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard changes	-	-

# 7.4.3 'Items Declaration' Dialog

Opens the 'Items Declaration' dialog for defining items.

Items Declaration				
Numeric Input Items	Numeric Outp	ut Items		
Offset/device	Offset/module	Item Name	Default Items Name Root:	
<b>8</b> 4 <b>8</b> 5	0	SLOT002-RECV-CHANNEL-0-C SLOT002-RECV-CHANNEL-0-1	SLOT002	
6	2		Input DUT Name:	
87	3	SLOT002-RECV-CHANNEL-0-3	SLOT002DataStructIn	
			Define Item(s)	
			Delete Item(s)	
			Define Bit(s)	
			Select a zone and click on the "Define Item(s)" bouton to create:	
			- One or several Item(s) Byte, word, double word, float - an array	
•		4		
OK Cancel Help				

Name	Description	Choices / Range	Default
Numeric Input Items	Table with items in input area	read-only	-
Numeric Output Items	Table with items in output area	read-only	-
Default Items Name Root	Prefix for item names		SLOT <nnn> with <nnn> being the slot in the slave</nnn></nnn>
Input DUT Name	Name of the struct, which con- tains the items		-
Define Item(s)	opens the ' <u>Define Item(s)</u> ' dialog	Enabled, if an unal- located area is se- lected; disabled, if an existing item is selected	-
Delete Item(s)	delete selected item(s)	Enabled, if an exis-	-

Name	Description	Choices / Range	Default
		ting item is selected	
Define Bit(s)	opens the ' <u>Define Bit(s)</u> ' dialog	Enabled, if an exis- ting item is selected	-
ОК	Close dialog and save changes	-	Default
Cancel	Close dialog and discard chan- ges	-	-
Help	Open online help	-	-

**Warning**: when changing the data type of an item the memory position may change. Elements of WORD, DWORD and REAL types are always placed on a word boundary. This may require insertion of padding bytes and thus change the sizes of the transfer buffers for the cyclic data. Therefore the refresh settings must always be updated in both the PLC CPU and the PROFINET Controller.

### Define Item(s)

Define one or more items.

Item Name Definition				
New Item(s) Data Type Byte (8 bits) Dword (32 bits) Word (16 bits) IEEE float				
Define Selected Area As One or Several Single Item(s) One Item of Array Type				
Item Name (50 char max) :				
SLOT002-IB2				
OK Cancel Help				

Name	Description	Choices / Range	Default
Data Type	Data type of the item	Byte, Word, Dword, IEEE float	Byte
Define Selected Area	Select, whether either several sin- gle items or an item of array type is created	Single Items / Ar- ray	Single Items
Item Name	Name of the new item	1 - 50 characters	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard changes	-	-

		User Inte	rface 121
Name	Description	Choices / Range	Default
Help	Open online help	-	-

**Define Bit(s)** Define items for individual bits in the selected item of type 'Byte' or larger.

Ite	Items Declaration					
[	Discrete Input Iter	ns				
	Offset/device	Offset/module	Bit in the byte	Item Name	Default Items Name Root:	
	05	1	0		SLOT002	
	05	1	1			
	05	1	2			
	05	1	3			
	05	1	4			
	○5 ○5	1	5		Define Item(s)	
	05	1	7			
		1	/		Delete Item(s)	
					Select a zone and click on the	
					"Define Item(s)" bouton to create:	
					- One or several Item(s)	
					- an array	
	•	111		4		
				ОК	Cancel Help	

Name	Description	Choices / Range	Default
Discrete Input Items or Discrete Output Items	Table with items in input area	read-only	-
Default Items Name Root	Prefix for item names	-	SLOT <nnn> with <nnn> being the slot within the slave</nnn></nnn>
Define Item(s)	opens the 'Item Name Definition'	Enabled, if a very	-

122

Name	Description	Choices / Range	Default
	dialog (see <u>'Bit Item Definition'</u> )	unallocated area is selected; di- sabled, if an exis- ting item is se- lected	
Delete Item(s)	delete selected item(s)	Enabled, if an existing item is selected	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

### Bit Item Definition

Specify the name(s) for one or multiple bit items

Item Name Definition
Define Selected Area As
One Item of Array Type
Item Name (50 char max) :
SLOT002-IX2
OK Cancel Help

Name	Description	Choices / Range	Default
Define Selected Area	Select, whether either several sin- gle items or an item of array type is created	Single Items / Ar- ray	Single Items
Item Name	Name of the new item	1 - 50 characters	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

# 7.5 Message View

The message view shows the entries of the events log.

Date / Time	Level	Event		
07/28/11 10:46:57 07/28/11 10:47:03 07/28/11 10:47:11	Information Error Error	Normal mode File: GSDML-V2.1-wago-series7 File: GSDML-V2.0-wago-series7	Copy Clear Configuration	um number o um number o
•				-,
🛄 Output Message View	N			

The message view contains a <u>context menu</u>.

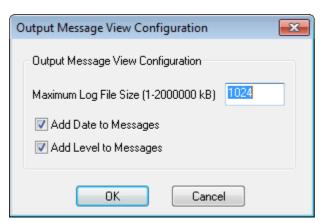
### 7.5.1 'Message View' Menu

Co<u>p</u>y Clea<u>r</u> <u>C</u>onfiguration...

Command	Description
Сору	Copies the contents of the message view to the clipboard
Clear	Deletes the contents of the message view
Configuration	Opens the <u>'Output Message View Configuration</u> ' dialog

## 7.5.2 'Message View Configuration' Dialog

This dialog is used to configure the message view.



Name	Description	Choices / Ran- ge	Default
Maximum Log File Size	Maximum size of log file	1 - 2000000 kB	1024 kB
Add Date to Messa- ges	Add date field to entries	selected / not se- lected	selected

Name	Description	Choices / Ran- ge	Default
Add Level to Messa- ges	Add level field to entries	selected / not se- lected	selected
ОК	Close the dialog and save changes	-	Default
Cancel	Close the dialog and discard chan- ges	-	-

# 7.6 Configuration Manager

Each project with the settings for a PROFINET Controller is a 'configuration' and stored in a fixed directory. The 'Configuraton Manager' provides the UI for managing several PROFINET I/O projects.

Configuration Mana	ger			<b>-X</b> -
Active Configuration : Configuration Path :	config01 C:\ProgramData\}	Mitsubishi\CCP	U Profinet Configuration Tool\Config\config	01
Available Configuration:	s Created 26.05.2011	Modified 03.08.2011	Description Description Configuration config01	New Duplicate Rename Delete Properties
Storage Restore Ba	ackup		Help OK	Close

Name	Description	Choices / Range	Default
Active Configuration	Name of currently open con- troller project	read-only	-
Configuration Path	Directory of active configura- tion	read-only	-
Available Configurati- ons	Names of existing configura- tions	read-only (to change press 'Rena- me')	-

Name	Description	Choices / Range	Default
Created	Date, when configuration has been created	read-only	-
Modified	Date, when configuration has been modified for the last ti- me	read-only	-
Description	Descriptive text of configura- tion	read-only (to change press 'Proper- ties')	-
New	Create a new configuration Opens the <u>'New Configura-</u> <u>tion</u> ' dialog	-	-
Duplicate	Create a copy of the selec- ted configuration Opens the <u>'Duplicate Confi-</u> <u>guration'</u> dialog	Enabled, if a configurati- on is selected; otherwise disabled	-
Rename	Opens the <u>'Rename Configu-</u> <u>ration'</u> dialog for the selected configuration	Enabled, if a configurati- on is selected; otherwise disabled	-
Delete	Delete the selected configu- ration	Enabled, if a configurati- on is selected and it is not the only one; otherwi- se disabled	-
Properties	Opens the <u>'Configuration</u> <u>Properties'</u> dialog for the se- lected configuration	Enabled, if a configurati- on is selected; otherwise disabled	-
Restore	Opens a file dialog for selec- ting a *.mit file created as backup before, which is ad- ded to the list of configurati- ons	-	-
Backup	Opens a file dialog for selec- ting a *.mit file, the selected configuration is exported to	-	-
ОК	Close dialog and save chan- ges	-	-
Close	Close dialog and discard changes	-	-
Help	Open online help	-	-

## 7.6.1 'New Configuration' Dialog

The user enters the name and a descriptive text for the new configuration.

New Configuration		×
Configuration :		
Description :		
Created :	05.08.2011	
Modified :	05.08.2011	
Configuration Path :	C:\ProgramData\Mitsubishi\CCPU Profinet Configuration Tool\Config\	
	OK Cancel	

Name	Description	Choices / Range	Default
Configuration	Name of the selected configuration	1-124 cha- racters	-
Description	Descriptive text of configuration	-	-
Created	Date, when configuration has been crea- ted	read-only	-
Modified	Date, when configuration has been modi- fied for the last time	read-only	-
Configuration Path	Directory of configuration	read-only	-
ОК	Close dialog and save changes	-	Default
Cancel	Close dialog and discard changes	-	-

## 7.6.2 'Duplicate Configuration' Dialog

Enter the name of the new 'copied' configuration.

Duplicate Configuration			<b>-X</b> -
Source Configuration Name :	config01		
New Configuration Name :			
		ОК	Cancel

User Interface

127

Name	Description	Choices / Range	Default
Source Configuration Name	Name of the selected original configuration	read-only	-
New Configuration Na- me	New name for the copy of the selected configuration	1-124 cha- racters	-
ОК	Close dialog and save changes	-	Default
Cancel	Close dialog and discard changes	-	-

# 7.6.3 'Rename Configuration' Dialog

Enter a new name for the selected configuration.

Rename Configuration		<b>—</b> ———————————————————————————————————
Old Configuration Name :	config01	
New Configuration Name :		
		OK Cancel

Name	Description	Choi- ces / Range	Default
Old Configuration Na- me	Current name of the selected configuration	read-only	-
New Configuration Na- me	New name for the selected configuration	1-124 cha- racters	-
ОК	Close dialog and save changes	-	-
Cancel	Close dialog and discard changes	-	Default

128

# 7.6.4 'Configuration Properties' Dialog

Edit the configuration description.

Configuration Properties	5	<b>x</b>
Configuration :	config01	
Description :	Description Configuration config01	
Created :	26.05.2011	
Modified :	03.08.2011	
Configuration Path :	C:\ProgramData\Mitsubishi\CCPU Profinet Configuration Tool\Config\config01	Open Folder
	OK Cancel	

Name	Description	Choices / Range	Default
Configuration	Name of the selected configuration	read-only	-
Description	Descriptive text of configuration		-
Created	Date, when configuration has been crea- ted	read-only	-
Modified	Date, when configuration has been modi- fied for the last time	read-only	-
Configuration Path	Directory of configuration	read-only	-
Open Folder	Opens the Windows file explorer and se- lects the configuration directory	-	-
ОК	Close dialog and save changes	-	Default
Cancel	Close dialog and discard changes	-	-

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

# 7.7 'ME1PN1FW-Q Properties' Dialog

Address settings of a ME1PN1FW-Q can be manually entered or copied from station found during a network scan.

ME1PN1FW-Q Proper	ties		×
ME1PN1FW-Q 1:			
-Local Network Ada	apters		
Board Name:	[8] Realtek PCIe GBE Family Controller		▼
MAC Address:	BC:AE:C5:8D:47:ED	IP address:	192.168.0.20
Status:	Connected		~
Automatic Manua			ME1PN1FW-Q 1PN1FW-Q is correctly
ME1PN1FW-Q	List:		gured, but no connection test was
Name IP S	Sub-Network Mask Mac Address	ME1PN1FW	-Q ME1PN1FW-Q
		IP Address:	192 . 168 . 0 . 52
		Name:	q12dccpu-v
Detect	Blink >>	Mac Address	s: 00:26:92:19:74:86
		Blink	k Connection Test
L		ОК	Cancel Help

Name	Description	Choices / Range	Default
Board Name	List of local Ethernet interfaces to select the one, the PROFINET Controller is connected to	local Ethernet interfa- ces	-
MAC Address	MAC address of selected Ethernet interface	6 pairs of hex digits se- parated by colons	-
Status	Connection status of selected Ethernet interface	read-only	-
IP address	IP address(es) assigned to se- lected Ethernet interface	read-only	-
Detect	Scan the network of the selec- ted network adapter for suita- ble network stations. The con- trollers found are added to the list.	-	-
Blink	Flashes the LED display on the PROFINET Controller	Enabled, if a module entry in the table is selected	-

130

Name	Description	Choices / Range	Default
>>	Copies the address of the se- lected PROFINET Controller to the 'Configured' section	Enabled, if a module entry in the table is selected	-
ME1PN1FW-Q	Controller model name	read-only	ME1PN1FW -Q
IP Address	Controller IP address	4 integers in the range of 0-254	0.0.0.0
Name	Controller name		
MAC Address	MAC address of selected con- troller	6 pairs of hex digits se- parated by colons	-
Blink	Flashes the LED display on the PROFINET Controller	-	-
Connection Test	Tries to connect to the PROFINET Controller	-	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard chan- ges	-	-
Help	Open online help	-	-

### **Changing the Controller IP Address**

If a different IP address has been entered and the dialog has been closed by pressing 'OK', the user is asked, whether the IP address should also be changed online on the PN controller.

Change	IP Address		<b>×</b>
?	the actual IP address (192.168.0.52) configured (192.168.0.59). Do you w to 192.168.0.59?		
	Actual IP Address:	192.168.0.52	
	Configured IP Address:	192.168.0.59	
	Name:	mitsubishi-q12dccpu-v	
	Mac Address:	00:26:92:19:74:86	
	Yes	No	

The IP address can only be changed on the controller, if the PROFINET cyclic data exchange is stopped. If the data exchange has been started, the attempt to change the IP address online causes an error entry in the log.

Event		1
Configuration saved.		
Cannot modify IP address of the ME1PN1FW-Q. Error 99.		
		-
III	•	
	Configuration saved. Cannot modify IP address of the ME1PN1FW-Q. Error 99.	Configuration saved. Cannot modify IP address of the ME1PN1FW-Q. Error 99.

The data exchange can be stopped via the 'PROFINET Controller Status' dialog.

PROFINET Controller Status					
PROFINET Controller Status PROFINET Additional Status Information		T running	Stop PROFINET		
Buffer Name	Start Device	End Device			
Mgmt. Outputs Mgmt. Inputs Acyclic Outputs Acyclic Inputs Cyclic Outputs Cyclic Inputs	X0 D0 D2100	Y75F X6FF D2099 D4541 D4545 D4553			
			Close		

# 7.8 'IO-Device Configuration' Dialog

This dialog is displayed, when a new device is added to the network view, and when the item 'Properties' is selected from the context menu of the device in the network view. The settings of a PROFINET I/O slave device are accessed via the following tab pages in this dialog

- 'Device General Configuration' Tab
- <u>'Device Module Configuration' Tab</u>
- 'Device Parameters' Tab
- 'Device Connection Information' Tab
- 'Device I/O Data' Tab
- 'Device GSDML File' Tab

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

# 7.8.1 'Device - General Configuration' Tab

Lists general parameters like name and IP address of the corresponding I/O device.

750-370 V02.01.xx (	(FW 02)				<b>—</b> ×
General Configurat	tion Module Configuration	Parameters	Connection Information	I/O Data	GSDML File
Device Designation	ation				
Name:	WAGO-750-370				
Number:	001 👻 📝 Link F	arameters	Active Configuration		
Comment:	2-Port PROFINET IO Fie	Idbus Coupler f			
	terminalblocks			_	
				·	
- Network Proper	ties		1		
	Name	/alue	Unit		
	Addressing Mode [				
		92.168.000.00	1		
	► Device Name v	vago-750-370			
Description:					
Doconption.	Defines which methods f means that the DAP sup	or IP addess as	ssignment is used. Local	*	
	address assignment.				
				-	
Concel Help					
	110/1 //			Cancer	Ticip

Name	Description	Choices / Range	Default
Name	Name of the IO-device		Model name
Number	Device ID to be chosen from the list of devices not configured.	0 - 127	
Link Parameters	Checkbox to activate the link of the device num- ber with the device IP address: the device num- ber will then correspond to the station number of the IP address.		
Active Configu- ration	Checkbox to activate the configuration of the device in the IO-Controller: used to delete a device from IO-Controller, whilst keeping its configuration in the console.		

1	33	

Name	Description	Choices / Range	Default
Comments	Free text related to a device. The total number of characters must not exceed 80.	0 - 80 cha- racters	
Addressing Mo- de	Defines the way of obtaining the IP configuration which may be DCP, Local or DHCP. The modes vary according to the contents of the GSD for the IO-Device.		
	<b>DCP</b> : during the connection, the IO-Controller sets the IP address of the IO-Device.		
	<b>DHCP</b> : during the connection, the IO-Controller compares the IP address of the IO-Device with that configured. If they are identical, the connection can go ahead. If not, the connection fails. <b>Local</b> : during the connection, the IO-Controller uses the configured IP address.		
IP Address	This IP address will be the IP address of the IO- Device after connection if the selected addres- sing is DCP. This IP address shall be the same as the IP ad- dress configured inside the IO-Device if the se- lected addressing mode is different than DCP.		
Device Name	This field shall be the same as name configured inside the IO-Device. (See Name an IO-Device)		
Description	Provides help on the selected field.	read-only	-
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

**Note**: when creating a configuration from the 'Network Detection View' (aka 'automatic configuration mode'), IP address and name of the device are already set. When manually adding the device, these items must be entered by the user.

# 7.8.2 'Device - Module Configuration' Tab

This tab is used to select the modules in the IO-Device.

750-370 V02.01.xx (FW 02)	<b>X</b>
General Configuration Module Configuration Parameters	Connection Information I/O Data GSDML File
Available Modules: Display Order Number	Configured Modules: 🔎 🏠 🖳 🔀
	Slot Module
Digital Input Modules      Digital Output Modules      Digital In-/Output Modules      Analog Input Modules      Analog Output Modules      Analog Output Modules	□ 000         750-370         V02.01.xx         (FW 02)           □ 001         750-606         Supply, 2DIA(+30 BIT I), I         I           □ 002         75x-643         MP-Bus-Master           □ 003         75x-481         2AI, RTD, EM           004         [empty]
	005         [empty]           006         [empty]           007         [empty]           008         [empty]
	008         [empty]           009         [empty]           010         [empty]           011         [empty]
	012 [empty] 013 [empty] 014 [empty]
	015 [empty]
*	*
-	~
<< Previous Next >>	OK Cancel Help

Name	Description	Choices / Range	Default
Available Modu- les	Contains the list of modules compatible with the IO-Device configured. This list was established from the device library. From this list, it is possible to add the mo- dules present on the IO-Device to the list of configured modules.	-	-
	When a module can be configured, dou- ble-clicking the slot opens an editor for the module settings. The settings displayed are taken from the GSD file. Therefore the settings differ from between modules.		
Display Order	If selected, only the order number from the	selected / not	not selected

1	35	

Name	Description	Choices / Range	Default
Number	GSDML file is displayed, otherwise the module type name	selected	
Configured Mo- dules	Modules in the I/O device per slot with their type names	-	-
	Copens the <u>'Module Configuration'</u> dialog.		
	: Moves the selected module up in the list		
	E Moves the selected module down in the list		
	: Deletes the selected module; same as pressing the [Del] key.		
•	Adds a module from the list of modules available to the list of those configured.	-	-
	Other ways of carrying out this com- mand:		
	Double click the module to be added		
	Drag and drop the module to be added		
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default but- ton
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

**Note**: when creating a configuration from the 'Network Detection View' (aka 'automatic configuration mode'), the module list is already filled. When manually adding the device, the modules must be added by the user.

### 136

### 7.8.3 'Device - Parameters' Tab

Device specific parameters can be edited.

750	-370 V02.01.xx (FW 02)					<b>—</b>
G	eneral Configuration M	odule Configu	ration Parameters	Connection Informat	ion I/O Data	GSDML File
	Name	Value	Unit			
	► Refresh Period	16	ms			
	🖛 Device Data Order	Big Endian				
	► Watchdog Factor					
	🛱 Watchdog	48	ms			
	Description					
	This time specifies the i	interval for se	nding cyclic IO data.			
						-
	•					
<	< Previous Next >	>		ОК	Cancel	Help

Name	Description	Choices / Range	Default
Refresh Period	Time interval in milliseconds between the trans- mission of each production frame and the re- ception of each consumption frame.	-	16 ms
Device Data Or- der	Data order for the device Used to specify the data format in memory of the 16 and 32-bit words: "Little Endian (Intel)" format: In increasing ad- dress order: low order byte – high order byte. "Big Endian (Motorola)" format: In increasing address order: high order byte - low order byte	'Little Endi- an' / 'Big Endian'	'Big En- dian'

137	
-----	--

Name	Description	Choices / Range	Default
Watchdog Fac- tor	This value is used to calculate the production and consumption time out period.	-	3
	Time out period = Refresh period * Watchdog factor		
	The result is displayed in the Watchdog field.		
Watchdog	Production and consumption timeout period	read-only	-
Description	Provides help on the selected field.	read-only	-
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

### 7.8.4 'Device - Connection Information' Tab

Show online status information for the respective IO-device.

-370 V02.01.xx (FW 02)		arameters	Connection Information	I/O Data	GSDML File
eneral Configuration Module Config	juration   r	arameters	Connection information	1/O Data	
Connection State	List of In	valid Module	es in Configuration		
	Name	Value			<b>A</b>
PROFINET Status					
Status Description					
					_
					_
					_
Production Time					_
Configured					
Current					
Max					_
					-
Min		[	Search Modules in GSD	ML ]	
< Previous Next >>			ОК	Cancel	Help

Name	Description	Choices / Range	Default
Connection State	Indicates, whether the IO-Controller is <b>connec-</b> ted to or <b>disconnected from</b> the IO-Device.	-	-
PROFINET Sta- tus	The values of the stati displayed are those defined by the PROFINET standard.	-	-
List of Invalid Mo- dules in Configu- ration	The IO-Controller may connect to an IO-Device with an imprecise module configuration. In this case, the IO-Device may accept the connection while indicating the differences between the con- figured modules and the modules making up the IO-Device.	-	-
	<b>Configured identification Number</b> : corre- sponds to the module configured in the enginee- ring tool		

User Interface	User	Interfa	ce
----------------	------	---------	----

139
-----

Name	Description	Choices / Range	Default
	Actual identification Number: the value for the module present in the IO-Device Module status: current status of the module in the IO-Device		
Production Time	Shows the configured and the current cycle time for the device as well as the maximum and mini- mum cycle time since starting the cyclic data exchange	-	-
Search Modules in GSDML	Lookup module information in the GSDML files	-	-
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

# 7.8.5 'Device - I/O Data' Tab

Access the cyclic input and output data of the IO-device.

750-370 V02.01.xx (FW 02)	<b>—</b>
General Configuration Module Configuration Parame	ters Connection Information I/O Data GSDML File
Status	
Output Length (Bytes)	Input Length (Bytes)
Data Description	Data Description
Data Output Status	Data Input Status
✓ Run Stop	Run Stop
Data Valid     Data Invalid     Normal Operation     Problem	Data Valid Data Invalid Normal Operation Problem
<< Previous Next >>	OK Cancel Help

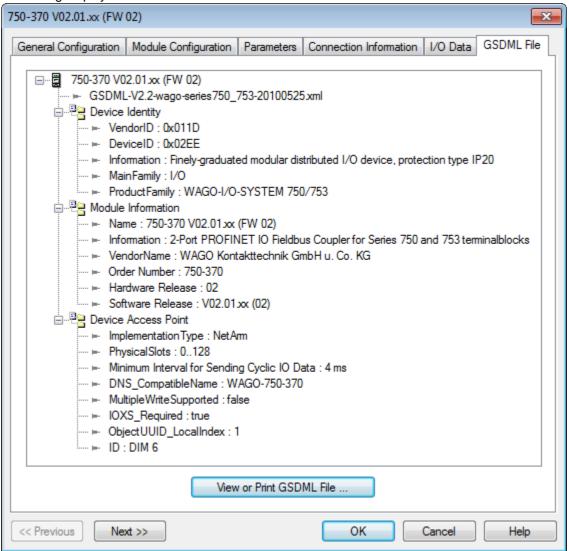
Name	Description	Choices / Range	Default
Status	Indicates whether the connection has been established (OK) or not. A detailed status is gi- ven in the information on the connection tab.		
Output	Displays the output values for the IO-Device. The output values may be changed by clicking them.		
Input	Displays the input values for the IO-Device. The input and output views include either: Data : the background of the cell is yellow IOPS (IO provider status) and IOCS (IO consu-	read-only	

### 141

Name	Description	Choices / Range	Default
	mer status): the background of the cell is green if the value is GOOD, if not the background of the cell is red		
Set Values	Writes the modified output values to the device		
Dismiss modifi- cations	Returns to the initial values		
Data Descripti- on	The field gives the slot number, sub-slot num- ber and the type of data item selected simply by clicking a value. A data item may be:		
	IOCS: Represents a consumption status		
	IOPS: Represents a production status		
	Data: Represents data.		
Data Output Status	Shows the status of the outputs production fra- me called the production APDU Status		
Data Input Sta- tus	Shows the status of the inputs production fra- me called the production APDU Status.		
Run / Stop	Where the IO-Controller is in stop mode, the IO-Devices must not consume the data received and vice-versa.	For inputs read-only	-
Data Valid / Da- ta Invalid	If the IO-Controller is in Invalid data mode, the IO-Device must close the connection.		-
Normal Operati- on / Problem	If the IO-Controller is in Problem mode, the IO- Device must close the connection.		-
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

### 7.8.6 'Device - GSDML File' Tab

This dialog displays information from the GSD file of the device.



Name	Description	Choices / Range	Default
Tree	Lists the entries of the GSDML file	-	-
View or Print GSDML File	Displays the file in a Windows text editor. This text editor can be used to print the file. What is displayed is a copy of the GSD with the .txt extension.	-	-
Previous	Get settings of previous I/O device (slave)	disabled for first device	-
Next	Get settings of next I/O device (slave)	disabled for last device	-
ОК	Close dialog and save changes	-	Default

142

ace	143

Name	Description	Choices / Range	Default
			button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

# 7.9 'Module Configuration' Dialog

The 'Module Configuration' dialog provides access to module-specific parameters. It contains the <u>'Module Parameters' tab</u> and the <u>'Module Information' tab</u>.

### 7.9.1 'Module Parameters' Tab

Lists the parameters of the selected module as defined in the GSD file of the device type. The settings in this tab will be sent to the IO-Device during the connection phase.

dule Configuration		<b>X</b>
arameters Information		
Name	Value	
Pageneral device parameters		
<ul> <li>Restart on K-Bus Failure</li> <li>Module Extension</li> <li>Diagnosis of external module/channel errors</li> <li>Process data representation</li> <li>Response to PROFINET IO failure</li> <li>Response to K-Bus failure</li> </ul>	POWER ON RESET EEPROM setting is used enabled MOTOROLA (MSB-LSB) Substitude values are switched PROFINET IO communication stops	
Description		
		*
< Previous Next >>	OK Cancel	Help

Name	Description	Choices / Range	Default
Name	Parameter name	read-only	-
Value	Parameter value	device spe- cific	device specific
Description	Descriptive text for parameter	read-only	-
Previous	Go to the previous module of the device	disabled for the first module	-
Next	Go to the next module of the device	disabled for the last module	-
ОК	Close dialog and save changes	-	Default button
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

144

### 7.9.2 'Module Information' Tab

Show information on the selected module taken from the GSD file of the IO-device.

Module Configuration	×
Parameters Information	
<ul> <li>Information</li> <li>Module Name: 750-340 V01.00 xx (FW 01)</li> <li>Order Number : 750-340</li> <li>Description : PROFINET IO Fieldbus Coupler for Series 750 and 753 terminalblocks</li> <li>Slot Number : 0</li> <li>Vendor Name : WAGO Kontakttechnik GmbH u. Co. KG</li> <li>Module ID : DIM 1</li> <li>Data Input Size: 0 byte(s)</li> <li>Data Output Size: 0 byte(s)</li> </ul>	
Comment:	
<< Previous Next >> OK Cancel Hel	p

Name	Description	Choices / Range	Default
Information	Lists properties of the module	read-only	-
Comment	User comment for the module		-
Previous	Go to the previous module of the device	disabled for the first module	-
Next	Go to the next module of the device	disabled for the last module	-
ОК	Close dialog and save changes	-	Default button

Name	Description	Choices / Range	Default
Cancel	Close dialog and discard changes	-	-
Help	Open online help	-	-

**Note:** the values contained in this tab come from analyzing the GSD for the IO-Device. Depending on the version of the GSD and IO-Device, the values will differ. They are displayed for information only.

# 7.10 'PLC Settings' Dialog

The 'PLC Settings' dialog provides the user interface for configuring the data exchange between the PROFINET Controller and the controlling Qn-CPU.

roject CPU List			tual CPU List	·		Transfer S	Setup
0x3E0: QnU CPU (PN) 0x3E1: QnU CPU		0x	0x3E0: Q13UDEH 0x3E1: Q04UDEH		Up	date Paran	neters
)x3E2: PN Controller (Q	12DC-V)	0>	(3E2: Q12DC	C-V	I/0	) Documen	tation
Configure			l	Update	PN	Controller	Status
Output Devices (Qn-CPL	J -> PN Co	ntroller)		Input Devices (Qn-CPU	<- PN Con	troller)	
Dutput Devices (Qn-CPL Buffer	J -> PN Co Words	ntroller) Start	End	Input Devices (Qn-CPU Buffer	<- PN Con Words	troller) Start	End
	Words	-	End M1887		Words	-	
Buffer	Words	Start		Buffer	Words	Start	M3679
Buffer PROFINET Manage	Words 118	Start M0	M1887	Buffer PROFINET Manage	Words 112	Start M1888	End M3679 D4541 D4655
Buffer PROFINET Manage Acyclic Buffer	Words 118 2100	Start M0 D0	M1887 D2099	Buffer PROFINET Manage Acyclic Buffer	Words 112 2442	Start M1888 D2100	M3679 D4541

Name	Description	Choices / Range	Default
Project CPU List	lists the CPU types from the current confi- guration	-	-
Configure	opens the <u>'Multiple CPU Settings' dialog</u> to configure in a multiple CPU configuration other high speed transmission enabled CPUs like motion or CNC controller	-	-
Actual CPU List	lists the CPUs found in the connected PLC	-	-
Update	refreshes the list of actual CPU types after reading it online from the CPU	-	-
Output Devices	lists the output buffers (QCPU ->	for input in	-

User	Inte	rfa	ce
0361	mue	110	66

1	47	

Name	Description	Choices / Range	Default
	PROFINET Controller); only the device ad- dresses in the 'Start' column are editable, other columns are readonly	the 'Start' co- lumn see	
Input Devices	lists the input buffers (QCPU <- PROFINET Controller); only the device ad- dresses in the 'Start' column are editable, other columns are readonly	' <u>Supported</u> <u>PLC Device</u> <u>Types</u> ' below	-
Transfer Setup	opens the <u>transfer setup editor</u> for the con- figuration of the connection to the Q-series PLC	-	-
Update Parameters	opens the <u>'Update Parameters' dialog</u> and executes the listed updates	-	-
IO Documentation	generates an HTML document with global variables and buffer devices	-	-
PN Controller Status	opens the <u>'PROFINET Controller Status'</u> dialog, which shows the status of the PN controller and permits to start/stop the PROFINET communication	-	-
ОК	close dialog and save changes	-	Default but- ton
Cancel	close dialog and discard changes	-	-

## Supported PLC Device Types

The following table lists the supported device types and their respective address ranges.

Device Type	Address Range
х	0x0 – 0x1FFF
Υ	0x0 – 0x1FFF
L	0 – 32767
Μ	0 – 61439
D	0 – 4891647
R	0 – 32767
В	0x0 – 0xEFFF
W	0x0 – 0x4A1FFF
ZR	0 – 4849663

The CPU devices L, R and ZR are not available for Q-series motion CPUs.

#### **Default Device Addresses**

For a new project GX Configurator-PN assigns default device addresses to the refresh buffers according to the following schema

Buffer	Default Device Address
PROFINET Management (Outputs)	Y100
PROFINET Management (Inputs)	X100
Acyclic Buffer (Outputs)	D0
Acyclic Buffer (Inputs)	D2100
Cyclic Output	D4542
Cyclic Input	D4542 + <cyclic output="" size=""></cyclic>

The default device address of the cyclic input area is the first D-device behind the area occupied by the cyclic outputs. It depends therefore on the cyclic output size of the network configuration. Note: the default device address is only assigned in a new project and is not adjusted, when the cy-lic output size changes due to changes in the network configuration.

### Validation of IO Identifiers

Both functions 'IO Documentation' and 'Export PLC Code' validate the identifiers used in the IO configuration. These identifiers include the names of DUT elements listed in the 'Items' tables as well as the global variable names of the instances of these DUTs. The identifiers must conform to specification IEC 61131. Some of the restrictions checked are:

- global variable names must be unique within the PLC project
- identifiers must not exceed 32 characters in length
- identifiers must not contain 'hyphen' characters
- identifiers must not contain multiple consecutive underscores and must not end with one

If any of these restrictions are violated, GX Configurator-PN attempts to modify the identifiers in question and displays warnings on the problems encountered in a separate dialog.

Validating I/O Configuration	<b>-X</b>
'SLOT013_RESERVED_CHANNEL_0') Warning: Invalid identifier replaced (changed 'SLOT013-CNT-VAL-CHANNEL-0' to 'SLOT013_CNT_VAL_CHANNEL_0') Warning: Invalid identifier replaced (changed 'SLOT013-CONTROL-CHANNEL-0' to	•
'SLOT013_CONTROL_CHANNEL_0') Warning: Invalid identifier replaced (changed 'SLOT013-RESERVED-CHANNEL-0A' to 'SLOT013_RESERVED_CHANNEL_0A')	•
Do not show warnings again	
OK Cancel	Save

User Interface
----------------

#### 149

Name	Description	Choices / Range	Default
List	Messages on violations to IEC 61131 restric- tions	-	-
Do not show war- nings again	If checked, this dialog is no longer displayed, when warnings are encountered, but the re- spective function (documentation or POU ex- port) is directly executed.	selected / not selec- ted	not selected
	<b>Note</b> : this option is de-selected, when the program is restarted.		
ОК	Close dialog and proceed	-	Default button
Cancel	Close dialog and do not display IO documen- tation or export PLC code	-	-
Save	Store the displayed messages in a text file	-	-

# 'Transfer Setup' Dialog

MX Transfer	Setup				×
Select transf	er setup	TransferSetup1	•	Configure	Comm. Test
PC VF Protocol Time-out	Ethernet Ethernet TCP 1000 ms	CPU type Module type Host(IP Address)	Q04UDEH CPU module 192.168.0.53		
		Multiple CPU	None		
				ОК	Cancel

The transfer setup dialog is used to specify the settings of the connection to the control CPU in the target PLC. Except for the PROFINET controller, which can only be updated via its own Ethernet interface, all CPUs can be updated via the one connection defined in the transfer setup. Internally the starting I/O number is used to access the different CPUs via the one connection defined.

150

#### **IO Documentation**

An HTML document with the global variables and corresponding buffer devices is generated and displayed in the default web browser. The document can be saved or printed for documentation purposes.

-	OHECK3 - Mozilla Firefox     Image: Checks - Mozilla Firefox       File     Edit     View       Higtory     Bookmarks     Tools       Help     Image: Checks     Image: Checks							
	Project: CHECK3							
Slave No.	Name	Model		Мос	lules			
			Slot	Model	Global Var. In / Global Var. Out			
1	im151-3pn	IM151-3 PN HF V6.1	1	IM151-3 PN HF V6.1 PM-E DC2448V/ AC24230V	- / - - / -			
			2	2DO DC24V/0.5A ST	- / vSLV1SLOT002DataStructOut			
			3	2DI DC24V HF	vSLV1SLOT003DataStructIn / -			
			Slot	Model	Global Var. In / Global Var. Out			
8	molex- harsh600-ip67	IP67 PROFINET IO-Device universal block	0	IP67 PROFINET IO-Device universal block	- / -	Ŧ		

## 7.10.1 'Multiple CPU Settings' Dialog

This dialog enables the user to configure the high speed memory on up to three CPUs including the PN controller, the controlling QnU-CPU as well as any additional QnU-, motion- and NC-CPUs.

ultiple CPU Settings							<b>—</b> ×
fultiple CPU Scenario	Qn-CPU w	ith Mot	ion CPU and PROFINET Co				Check PLC
** 	J			and and			9 19 19 19 19 19 19 19 19 19 19 19 19 19
CPU Info			PU Info			PU Info	
Start I/O no.	0x3E0	St	art I/O no.	0x3E1	St	art I/O no.	0x3E2
CPU type	QnU-CPU	C	PU type	Motion CPU (Q17nl	C	PU type	PROFINET Control
PLC Project	D:\Projects\Mitsubi	🖂 Hi	igh Speed Transmission		C	ontrol CPU	0x3E0
High Speed Transmission			dditional user area size (v	2048	ΘH	igh Speed Transmission	
Additional user area size (v		N	umber refresh blocks	1		dditional user area size (\	
Number refresh blocks	4		Refresh Block 1			umber refresh blocks	3
Refresh Block 1			Name		E	Refresh Block 1	
Name	PROFINET Mgmt. O		Size of block	12		Name	PROFINET Mgmt. I
Size of block	118		Send device (start-end)			Size of block	112
Send device (start-end)	110		Start Address	W0		Send device (start-end)	
Start Address	Y100		End Address	WB		Receive devices	
End Address	Y85F		Receive devices			PLC no. 1 (start-end)	
Receive devices	1051		PLC no. 1 (start-end)			Start Address	Y860
PLC no. 2 (start-end)			Start Address	D2138		End Address	YF5F
Start Address	W100		End Address	D2149		PLC no. 2 (start-end)	
End Address	W100		End Address	02149	_	Refresh Block 2	
	W1/5						A . F. T
Refresh Block 2	10 F 0 F 1					Name	Acyclic Input
Name	ACyclic Output				3	Size of block	2442
Size of block	2100					Send device (start-end)	
Send device (start-end)						Receive devices	
Start Address	D0					PLC no. 1 (start-end)	
End Address	D2099					Start Address	D2168
Receive devices						End Address	D4609
Refresh Block 3					Ξ	Refresh Block 3	
Name	Cyclic Output					Name	Cyclic Input
Size of block	6					Size of block	6
Send device (start-end)						Send device (start-end)	
Start Address	D2100				-	Receive devices	
End Address	D2105					PLC no. 1 (start-end)	
Receive devices						Start Address	D4610
PLC no. 2 (start-end)						End Address	D4615
Refresh Block 4						PLC no. 2 (start-end)	
Name	Motion Output						
Size of block	32						
Send device (start-end)							
Start Address	D2106						
End Address	D2137						
Receive devices							
<ul> <li>PLC no. 2 (start-end)</li> </ul>	WC - W2B						
CPU Info		CPU	Info		CPU	Info	
CI O INO		cro	ino		Cru		
					1 V	liew OK	Cancel

Name	Description	Choices / Range	Default
Multiple CPU Scenario	list of supported combinations of multiple CPUs, which are sup- ported in combination	see ' <u>Multiple CPU Scena-</u> rios' for possible entries	-
Check PLC	connects to the PLC and reads the list of CPUs within the rack. For details see 'Check PLC' Function.	-	
lcons	displays icons for Q-CPU, PN Controller, Motion CPU only D/ DS models and CNC CPU Q17nNC	Q-CPU, PN Controller, Mo- tion CPU (only D/DS mo- dels), CNC CPU Q173NC and empty slot	-
CPU Info	combines general settings for the respective slot	for details see <u>'CPU specific</u> Grids'	Property
High Speed Transmission	defines structure of the high speed memory	<b>Note</b> : the refresh blocks for cannot be modified. The nur	-
Refresh Block <n></n>	each refresh block defines a me- mory area, which can be map- ped to a device area	depends on the PROFINET the buffer devices are entere <u>Settings' dialog</u>	configuration,
<info field=""></info>	shows a descriptive text for the selected parameter	see <u>'Info Texts for Parame-</u> ters'	-
View	opens the documentation of the current configuration in an HTML browser window; see ' <u>Documen-</u> tation of Multiple CPU Settings' for details	-	-
ок	close dialog and save changes after checking for overlapping de- vice addresses and restrictions for high speed memory transfer	-	Default but- ton
Cancel	close dialog and discard chan- ges	-	-

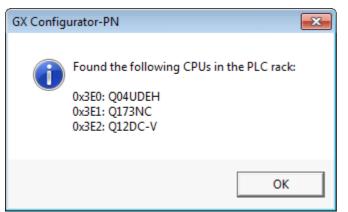
Some combinations of CPU models have restricted access to some properties. In general it is not possible to alter the size and the number of the refresh buffers for the PN Controller. The first three refresh blocks of the controlling CPU are read- only as well. The user may add more refresh blocks, but cannot change the refresh block size of the first three blocks, which are defined by the PROFINET configuration.

#### 'Check PLC' Function

This function assists the user by comparing the current assignment of CPU types in the dialog with the actual situation in the connected PLC rack.

If the CPU types in the current configuration match those in the PLC, a confirmation message is displayed.

152



If the CPU types in the PLC differ from those selected in the configuration, a warning is displayed. If the user presses OK, the selected scenario is adjusted to match the situation in the PLC.

GX Config	urator-PN
<u> </u>	Found the following CPUs in the PLC rack: 0x3E0: Q13UDEH 0x3E1: Q173DS 0x3E2: Q12DC-V
	The actual CPU combination does not match the selected scenario. Do you want to select the corresponding scenario?
	<u>Y</u> es <u>N</u> o

#### **Multiple CPU Scenarios**

A 'scenario' specifies a predefined combination of multiple CPUs within a PLC rack. The user can choose the appropriate scenario for his requirements and does not have to take care of the order, in which the CPUs must be placed. The following scenarios are available:

Scenario	CPU List
Qn-CPU with PROFINET Controller	Slot 1: QnU-CPU
	Slot 2: PN Controller
	Slot 3: empty
Qn-CPU with empty slot and PROFINET Controller	Slot 1: QnU-CPU
	Slot 2: empty
	Slot 3: PN Controller
Qn-CPU with Motion CPU and PROFINET Controller	Slot 1: QnU-CPU
	Slot 2: Motion CPU (Q17nD/DS)
	Slot 3: PN Controller
Qn-CPU with NC CPU and PROFINET Controller	Slot 1: QnU-CPU

Scenario	CPU List
	Slot 2: NC CPU (Q17nNC)
	Slot 3: PN Controller
Two Qn-CPUs and PROFINET Controller	Slot 1: QnU-CPU
	Slot 2: QnU-CPU
	Slot 3: PN Controller

The configuration of the refresh buffers for both the PN Controller and its controlling host CPU is always copied to the new position of either CPU on the rack.

#### **CPU Specific Property Grids**

The contents of the property grids below the CPU icons in <u>'Multiple CPU Settings' Dialog</u> depends on the type of the selected CPU.

Fc	or a	a PROFINET Contro	oller:	
Ξ	CI	PU Info		
	St	art I/O no.	0x3E2	
	C	PU type	PROFINET Controller	
	C	ontrol CPU	0x3E0	
⊡	Hi	igh Speed Transmission		
	A	dditional user area size	0	
	N	umber refresh blocks	3	
	Ξ	Refresh Block 1		
		Name	PROFINET Mgmt. Input	
		Size of block	112	
		Send device (start-end)		
	Ξ	Receive devices		
		PLC no. 1 (start-end)		
		Start Address	X0	
		End Address	X6FF	
	Ξ	Refresh Block 2		
		Name	ACyclic Input	
		Size of block	2442	
		Send device (start-end)		
		Receive devices		
			D2100 - D4541	
	Ξ	Refresh Block 3		
		Name	Cyclic Input	
		Size of block	4	
		Send device (start-end)		
	Ξ	Receive devices		
			D4550 - D4553	

For the controlling QnU-CPU:

Ξ	CF	PU Info	
	Start I/O no.		0x3E0
	CPU type		QnU-CPU
	PL	.C Project	P:\Mitsubishi\Doc\PROFINE
⊡	Hi	igh Speed Transmission	
	Additional user area size		0
	N	umber refresh blocks	3
	Ξ	Refresh Block 1	
		Name	PROFINET Mgmt. Output
		Size of block	118
	Ξ	Send device (start-end)	
		Start Address	Y0
		End Address	Y75F
	Ξ	Receive devices	
		PLC no. 2 (start-end)	
		Start Address	W100
		End Address	W175
	Ξ	Refresh Block 2	
		Name	ACyclic Output
		Size of block	2100
	Ŧ	Send device (start-end)	D0 - D2099
	⊡	Receive devices	
		PLC no. 2 (start-end)	
	Ξ	Refresh Block 3	
		Name	Cyclic Output
		Size of block	8
	Ŧ	Send device (start-end)	D4542 - D4549
	⊡	Receive devices	
		PLC no. 2 (start-end)	

#### For NC-CPUs:

Ξ	CPU Info		
	Start I/O no.	0x3E1	
	CPU type	NC CPU (Q17nNC)	
	Control CPU	0x3E0	
	CNC File Path	d:\tmp\NC project\nc.prm	
_	Illeb Consel Terroralisation		

High Speed Transmission Additional user area size 3072

Number refresh blocks 0

Name	Description	Choices / Range	Default
Start I/O No.	fixed value shows the starting I/O number according to the slot position	read-only 0x3E0, 0x3E1, 0x3E2 and 0x3E3	-

Name	Description	Choices / Range	Default
CPU Type	type of CPU in the slot	Empty Slot QnU-CPU PROFINET Controller Motion CPU (Q17nD/DS) NC CPU (Q17nNC) available types depend on the scenario; the item is read-only for the con- trolling QnU-CPU and the PN controller	empty slot
Control CPU	the starting I/O number of the corresponding control CPU, i.e. the CPU, with which data is exchanged Only the starting I/O numbers of mounted QnU-CPUs are al- lowed	starting I/O numbers of QnU CPUs only	0x3E0
Additional user area size	minimum size of the user area required by the application in words; the actual size is usually greater and depends on the additional refresh blocks	0 - 14384 words	3072 for NC- CPUs, 1024 for motion- CPUs, 0 for PN control- lers
Number refresh blocks	number of refresh blocks If the CPU is the control CPU of a PN controller, the first three refresh blocks are reser- ved for data exchange with the PN controller. For a PN con- troller this value is fixed to 3.	0 - 32	3 for PN controller and corre- sponding control CPU, 0 for other CPUs
Name	user label for the refresh block Note: this is not part of the CPU configuration, but for do- cumentation purposes	printable characters	Default na- mes for PROFINET, otherwise empty
Size of block	size of the respective refresh block in words0 - 14384 wordsNote: only even word sizes are allowed0		specific si- zes for PROFINET, otherwise 0
Send device	devicethe device on the CPU, which contains the data that is auto- matically copied to the shared memory blockonly for QnU- and QMoti- on-CPUs for device types and ran- ges see <u>'Supported Devi- ce Ranges'</u>		none

156

		Description	Obaiaaa (Dawaa	Defection
N	ame Description Cho		Choices / Range	Default
		and end address. For details see <u>'Device Ad-</u> <u>dress Property'</u> .		
	Start Address	start address of CPU device area	for device types and ran- ges see <u>'Supported Devi-</u> <u>ce Ranges</u> '.	blank
	End Address	calculated end address of the device area	read-only	blank
Re	eceive devices	group item of CPU devices which contain the data read from the refresh block on the specified CPU	only for QnU- and QMoti- on-CPUs as receiving CPUs read-only	blank
		For details see <u>'Device Ad-</u> dress Property'.	for device types and ran- ges see <u>"Supported De-</u> <u>vice Ranges</u> ".	
	PLC No.	the CPU number this CPU de- vice belongs to.	read-only	blank
	Start Address	start address of CPU device area CPU device addresses are checked for valid CPU device type and range	for device types and ran- ges see <u>"Supported De-</u> <u>vice Ranges</u> ".	blank
	End Address	calculated end address of the device area	read-only	blank
Pl	C Project	for QnU-CPUs: path of GD/ GID/GXW2 project file, which contains the programming pro- ject for the respective CPU	any valid Windows path with max. 256 charac- ters must end either with *.gpj (GD), *.pro (GID), *.gxw(GXW2) or *.gd2 (GXW2)	none
CNC File Path		the ASCII parameter file, which can be handled by the 'Remote Monitor Tool'	any valid Windows path with max. 256 charac- ters must end with *.prm (Re- mote Monitor)	none

### Info Texts for Parameters

Property	Info Text
Start I/O No.	Starting I/O number of this CPU

Property	Info Text
СРИ Туре	Type of this CPU
Control CPU	Starting I/O number of the controlling CPU
Additional user area size	Minimum size of the user area in words (0-14336 words)
Number refresh blocks	Number of memory blocks for automatic refresh (0-32)
Name	Name of the refresh block
Size of block	Size of the refresh block in words (must be even!)
Send device	Device, which contains the data to be copied to the refresh block
Receive device	Device, where the respective CPU receives data from the refresh block
PLC No.	Device on CPU <n>, where the data from this refresh block is copied to</n>
PLC Project	Path of project with PLC program and parameters
CNC File Path	Path of the CNC parameter file

#### **Device Address Property**

The properties 'Send device' and 'Receive devices' are expandable. In the 'collapsed' state start and end address are shown in the value field. In the 'expanded' state the original value field is empty and start and end address are displayed as two separate properties.

Refresh Block 1				
Name	PROFINET Mgmt. Input			
Size of block	112			
Send device (start-end)				
Receive devices	expanded			
□ PLC no. 1 (start-end)				
Start Address	Y860			
End Address	YF5F			
PLC no. 2 (start-end)				
Refresh Block 2	-m			
Name	Acyclic Input			
Size of block	2442			
Send device (start-end)				
Receive devices	collapsed			
	D2168 - D4609			
PLC no. 2 (start-end)				

#### Select PLC Project for QnU-CPUs

Select a GD (gppw.gppj), GID (softctrl.pro) or GXW2 (*.gxw or Project.gd2) project file, which contains settings of the respective CPU.

	000000000000000000000000000000000000000		I ] [		
Organize 🔻 New folder					
<ul> <li>GNavi</li> <li>Gppw</li> <li>GPPW2</li> <li>20130625</li> <li>Ani</li> <li>CHANGEPCTYPE</li> <li>Doc</li> <li>EXTDEV</li> <li>GUIDANCE</li> <li>GX CONFIGURATOR2</li> <li>GX Simulator2</li> <li>Int</li> <li>Original Files</li> <li>projects</li> <li>SampleData</li> </ul>	A H	Name test_gxpn_1cpu_leer.gxw test_gxpn_1cpu_empty.gxw test_gxpn_3cpus_empty.gxw test_gxpn_3cpus.gxw test_gxpn_1cpu.gxw test_gxpn_1cpu_leer Backup test_gxpn_1cpu_empty test_gxpn_1cpu_empty test_gxpn_1cpu test_gxpn_1cpu	Date modified 11.07.2013 09:47 10.07.2013 19:59 10.07.2013 17:53 10.07.2013 14:17 10.07.2013 10:33 11.07.2013 11:27 11.07.2013 09:48 10.07.2013 19:57 10.07.2013 14:17 09.07.2013 18:48	Type GXW File GXW File GXW File GXW File File folder File folder File folder File folder	Size
SystemConfiguration	+ 4		m		+
File name: test_gxp	in_3cpus.gx	w	GXW GID/0	2 Project Files (*.gxv 2 Project Files (*.gxv 3D Project Files (*.pr .C Project Files(*.gx	/;*.gd2) ro;*.gpj)

**Note:** GXW2 supports two different project file formats. The older 'Workspace Format Project' and the newer 'Single File Format Project'. The file 'Project.gd2' is supported only in the 'Workspace Format Project' and is a dummy file to identify this type of project format.

#### Select NC Parameter File

Select the parameter file, which will later be downloaded to the NC-CPU.

Select CNC Parameter File					<b>×</b>
🚱 🗢 📕 « tmp 🕨 NC project 🕨	NC with	PN	✓ 4 Search NC	with PN	٩
Organize 🔻 New folder				•	
NC project	-	Name	*		Date mod
			No items match yo	ur search.	
	_				
	Ŧ	•	III		Þ
File name:				ter Files (*.pı ter Files (*.pr	
			All Files(*.*)		

### Data checks on OK button action

The following context-based verifications are performed, when the dialog is closed by pressing OK.

Data	Check				
Total high speed trans- mission area.	Checks the size against the upper limit of the high speed transmissi- on area. This area consists of the user, the refresh and the system area. The total amount must not exceed 16k words. By default for each CPU 1k words are reserved as system area.				
Overlapping CPU device addresses	Each CPU configured is checked ce addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send and review of the send addresses for both send addresses for both send addresses for the send addreseses for the send addresses for the send addresses for	against overlapping of CPU devi- aceive devices. If overlapping de-			
addresses	End Address     D117     Star Address     D2222       C Receive devices     End Address     D2223       D PLC no. 2 (start-end)     D200 - D317       Barfreisk Block 2     ACyclic Output       Star Address     D2203       D Send Address     D200 - D317       Brefreisk Block 2     D200 - D317	and the receive and send CPU device ranges marked in			

Data	Check
CPU position	The CPU position is checked for QnU-CPUs and PN controller. QnU- CPUs must be on the left of every other CPU type including PN con- troller, QMotion and Q17nNC CPUs. The PN controller must always be the last CPU on the rack. Only one PN controller is supported.
	The size of each refresh block must be an even number of words. The following message is displayed and allows to return and correct the size or to continue closing the dialog:
	GX Configurator-PN
Even word size of refresh block	CPU no. 2: refresh block no. 3 has no even word size of at least two words. Press 'OK' to continue or 'Cancel' to correct it.
	OK Cancel

#### Sequence when configuring Multiple PLC Settings

The <u>'Multiple CPU Settings' dialog</u> allows the configuration of high speed transmission settings on the CPUs in the PLC rack. However the PLC I/O assignment, which includes the number and slots of CPUs, must be set in the first QnU-CPU using GX Works2 (GXW2), GX Developer (GD) or GX IEC Developer (GID). The following screenshots demonstrate, how the I/O assignment is set with GXW2.

In the 'Q Parameter Setting' dialog the number of slots reserved for CPUs is entered in the tab 'Multiple CPU Setting'.

PLC Name PLC System PLC File PLC RAS Boot Fil	e Program SFC Device I/O Assignment Multiple CPU Setting Built-in Ethernet Port Setting
No. of PLC (*1)	Online Module Change(*1) Enable Online Module Change with Another PLC. When the online module change is enabled with another PLC, I/O status outside the group cannot be taken.
Host Station	I/O Sharing When Using Multiple CPUs (*1) All CPUs Can Read All Inputs All CPUs Can Read All Outputs

After this the tab 'I/O Assignment' can be used to set empty slots and assign the controlling CPU for additional intelligent modules.

		File PLC RAS Boot File	Program SFC Device I/O A	ssignment Multiple CPU Set	and loans means.	inter or containing [
I/O A	ssignment(*1)					
No.	Slot	Туре	Model Name	Points	Start XY	Switch Setting
0	PLC	PLC No.1				
1	PLC	PLC(Empty)				Detailed Setting
2	PLC	PLC No.3				
3	PLC	PLC No.4				Select PLC type
4	3(0-3)	Intelligent 🗸	QJ71PB92V	32Points	•	New Module
5	4(0-4)	Empty -		0 Point	•	
6	5(0-5)	Empty -		0 Point	•	
	6(0-6)				_	*

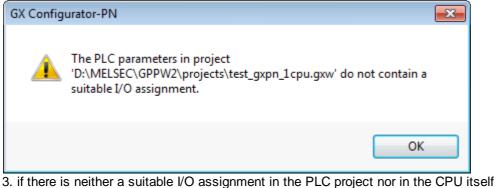
The I/O assignment must be consistent between the CPUs in the same PLC rack. GX Configurator-PN attempts to set a consistent I/O assignment with the following steps:

1. if the first QnU-CPU has a PLC project path assigned and the PLC project contains an I/O assignment with at least the same number of CPUs as in the GXPN configuration

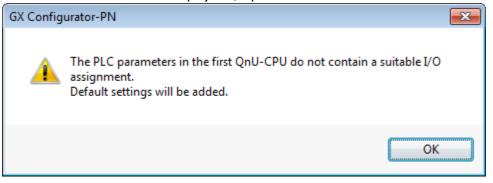
-> I/O assignment from the GD/GID/GXW2 project is copied to all CPUs including the first QnU-CPU itself

2. if the first QnU-CPU has no PLC project path assigned or the PLC project contains no suitable I/O assignment, but a suitable I/O assignment can be read online from the first CPU

-> the following message is displayed and the I/O assignment is copied from the first QnU-CPU to all CPUs and also to the PLC projects, if present



-> the following message is displayed and a default I/O assignment is inserted in all CPUs as well as in the GD/GID/GXW2 projects, if present



Note: After changing the position of CPUs in the PLC rack it may be necessary to once set the I/O assignment on the motion CPU with MT Developer2.

### 7.10.1.1 Documentation of Multiple CPU Settings

The multi-CPU settings are output to an HTML document, which is displayed by automatically starting the default browser.

	· ··· g··	ed area	Total hig	h speed use	r area	Total	high speed	d refresh a
ah Spe	ed Refree	6144 Words	CPU1 to o		868 Words	5		2276 W
J F -					CPU sp	ecific d	levice area	as
No.	Size	Direct acces	ss address		CPL	J 2	CPU 3 receive	CPU 4 receive
1	118	U3E0\G1	13868	M16	U3E0\G	13868	U3E0\G13868	-
2	2100	U3E0\G1	13986	D0	U3E0\G	13986	U3E0\G13986	-
3	58	U3E0\G1	16086	D4542	U3E0\G	16086	U3E0\G16086	-
	l high spe multiple (	eed area 3072 Words CPU paramet	_		r <b>area</b> 1072 Words		high speed	d refresh a
Tota .7*NC		3072 Words	_	;				
Tota .7*NC	Multiple ( NC Remote Moni Help	3072 Words	_	;				0 W
Tota 7*NC	Multiple ( NC Remote Monin Help II 🌇 🖉 I	3072 Words CPU paramet	ter setting	s #2 # CPU#2 #			U#4	0 W
Tota 7*NC	multiple ( NC Remote Moni Help II 🏹 🌋	3072 Words CPU paramet tor CPU specific send 26 range (K) 26	ter setting: CPU#1 # 5701 6 2	s #2 # CPU#2 # 26711 3 26	072 Words	# <b>CP</b> 26731	U#4 0	0 W
Tota 7*NC	Multiple ( NC Remote Monin Help II 🌇 🌋	3072 Words CPU paramet tor CPU specific send 26 range (K) auto refresh area size Rogietred	ter setting CPU#1 # 5701 6 2 5702 2276 2	<b>s #2</b> # <b>CPU#2 #</b> 26711 3 26 26712 0 26	072 Words CPU#3 721 3	# <b>CP</b> 26731	U#4	0 W
Tota 7*NC	multiple ( NC Remote Moni Help II 🏧 🌋	3072 Words CPU paramet tor  CPU specific send 26 auto refresh area size Registered system area (K) 26	<b>CPU#1 #</b> 5701 6 2 5702 2276 2	<b>s #2</b> <b># CPU#2 #</b> 26711 3 26 26712 0 26 26713 1 26	CPU#3 721 3 722 2610	<b># CP</b> 26731 26732	U#4 1 0	0 W

Name	Description
Total high speed area	Total high speed transmission size in words with k words ali- gnment
Total high speed user area	Total high speed transmission user area size in words
Total high speed refresh area	Total high speed transmission refresh area size in words
No.	Refresh block number starting at 1
Size	Size of refresh block in words

164

Name	Description
Direct access address	Shared memory address for direct access
CPU specific device areas	Shared memory or CPU device address for each CPU and each refresh block
CPU1	Shared memory or CPU device address for CPU no. 1 and each refresh block
CPU2	Shared memory or CPU device address for CPU no. 2 and each refresh block
CPU3	Shared memory or CPU device address for CPU no. 3 and each refresh block
CPU4	Shared memory or CPU device address for CPU no. 4 and each refresh block
Q17*NC multiple CPU parame- ter settings	multi-CPU settings as they would be displayed in the 'CNC Remote Monitor Tool'

For better distinction between the address and size information of different CPUs colours are used for background and font.

#### 7.10.1.2 Configuration Samples

The following samples show possible combinations of a QnU-CPU and a PN controller with an additional CPU.

#### Sample 1: additional motion CPU

- 1. Slot: QnU-CPU
- 2. Slot: Motion CPU
- 3. Slot: PN controller

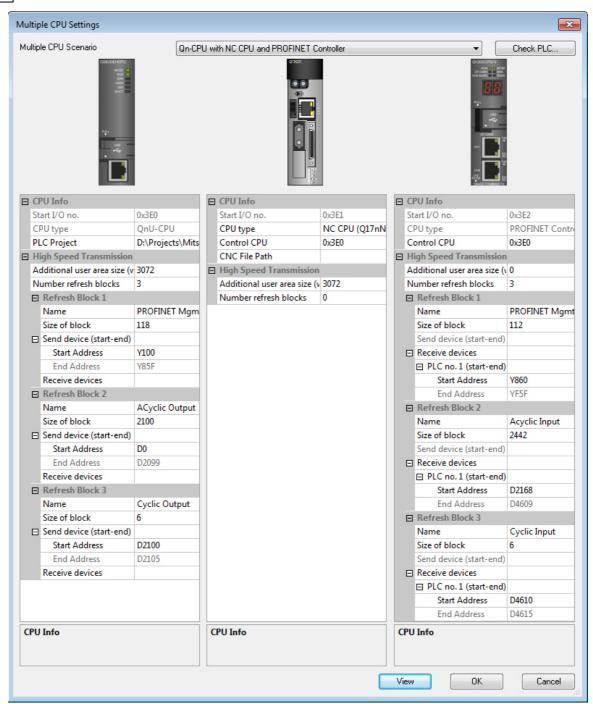
#### 165

ultiple CPU Settings							<b>_</b>
fultiple CPU Scenario	Qn-CPl	J with Mot	tion CPU and PROFINE	Controller		<b>-</b>	Check PLC
Sections 8 4 8 4 8 4 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7							
CPU Info		E CPU	Info			'U Info	
Start I/O no.	0x3E0	Start	I/O no.	0x3E1	St	art I/O no.	0x3E2
CPU type	QnU-CPU	CPU	type	Motion CPU (Q1	CF	U type	PROFINET Cont
PLC Project	D:\Projects\Mits	_	Speed Transmission			ontrol CPU	0x3E0
High Speed Transmission		-	tional user area size (v	2048	🖂 Hi	gh Speed Transmission	
Additional user area size (v			ber refresh blocks	1		ditional user area size (\	
Number refresh blocks	4		efresh Block 1	_		umber refresh blocks	3
Refresh Block 1		N	ame		E	Refresh Block 1	
Name	PROFINET Mgm	Siz	ze of block	12	_	Name	PROFINET Mgr
Size of block	118	E Se	nd device (start-end)			Size of block	112
Send device (start-end)			Start Address	W0		Send device (start-end)	
Start Address	Y100	-	End Address	WB	E	Receive devices	
End Address	Y85F	E Re	ceive devices		_	PLC no. 1 (start-end)	
Receive devices			PLC no. 1 (start-end)	D2138 - D2149		Start Address	Y860
PLC no. 2 (start-end)			,			End Address	YF5F
Start Address	W100					PLC no. 2 (start-end)	
End Address	W175					Refresh Block 2	
Refresh Block 2						Name	Acyclic Input
Name	ACyclic Output					Size of block	2442
Size of block	2100					Send device (start-end)	
					E	Receive devices	
Receive devices	00 02000				_	PLC no. 1 (start-end)	
PLC no. 2 (start-end)						Start Address	D2168
Refresh Block 3						End Address	D4609
Name	Cyclic Output					PLC no. 2 (start-end)	
Size of block	6					Refresh Block 3	
	-					Name	Cyclic Input
Receive devices	21100 02105					Size of block	6
PLC no. 2 (start-end)						Send device (start-end)	~
Refresh Block 4						Receive devices	
Name						PLC no. 1 (start-end)	
Size of block	60					Start Address	D4610
Send device (start-end)						End Address	D4615
Receive devices							
PLC no. 2 (start-end)	WC - W47						
CPU Info		CPU In	fo		CPU	Info	
					View	ОК	Cancel

The send (outputs) and the receive (inputs) CPU devices on the controlling CPU should be configured with the <u>'PLC Settings' Dialog</u>. Additional refresh blocks and the user area for both the QMotionand the QnU-CPU must be entered in the 'Multiple CPU Settings' dialog.

### Sample 2: additional NC CPU

- 1. Slot: QnU-CPU
- 2. Slot: Q17nNC-CPU
- 3. Slot: PN controller



The send (output) and the receive (input) CPU devices on the controlling CPU should be configured with the <u>'PLC Settings' dialog</u>. An additional user area for both the Q17nNC- and the QnU-CPU must be entered in the <u>'Multiple CPU Settings' dialog</u>.

#### Sample 3: additional QnU-CPU

- 1. Slot: QnU-CPU
- 2. Slot: QnU-CPU
- 3. Slot: PN controller

#### 167

ultiple CPU Settings						
fultiple CPU Scenario	Two Qn-C	PUs and PROFINET Controller			•	Check PLC
Concertable water and and and and and and and and and and						
CPU Info		CPU Info	<u></u>		'U Info	
Start I/O no.	0x3E0	Start I/O no.	0x3E1		art I/O no.	0x3E2
CPU type	QnU-CPU	CPU type	QnU-CPU		U type	PROFINET Controller
PLC Project	D:\Projects\Mitsubi	PLC Project	D:\Projects\Mitsubisł		ontrol CPU	0x3E0
High Speed Transmission	-	High Speed Transmission	-	_	gh Speed Transmis	
Additional user area size (		Additional user area size		_	ditional user area s	
Number refresh blocks	4	Number refresh blocks	1.52		umber refresh block	
Refresh Block 1	4	Refresh Block 1	1		Refresh Block 1	-
Name	PROFINET Mgmt. C	Name	Output		Name	PROFINET Mgmt. Input
Size of block	118	Size of block	20		Size of block	112
FI Send device (start-end		Size of block	20		Send device (start-	112
Receive devices	1100 - 105F	Start Address	W20		Receive devices	
PLC no. 2 (start-end		End Address	W20 W33	_	PLC no. 1 (start-	
Refresh Block 2		Receive devices	CCVV		Start Address	
Name	ACyclic Output	□ PLC no. 1 (start-en			End Address	
Size of block	2100	Start Address	D2106		PLC no. 2 (start-	
<ul> <li>Size of block</li> <li>Send device (start-end)</li> </ul>		End Address	D2125		Refresh Block 2	
Receive devices	00 - 02033	End Address	DZIZJ		Name	Acyclic Input
					Size of block	2442
Refresh Block 3					Send device (start-	2442
Name	Cyclic Output				Receive devices	[
Size of block	6			_	PLC no. 1 (start-	
Send device (start-end)	-				Start Address	D2169
	02100 - 02105				End Address	
Receive devices						04009
PLC no. 2 (start-end     Refresh Block 4	/				PLC no. 2 (start- Refresh Block 3	
Name	Input				Name	Cyclic Input
Size of block	30				Size of block	Cyclic Input 6
Size of block					Send device (start-	U
Start Address	D2126			-	Receive device (start-	
End Address	D2126 D2155			_	PLC no. 1 (start-	
	02100					D4610
Receive devices     Receive devices					Start Address End Address	
PLC no. 2 (start-end Start Address	W0				PLC no. 2 (start-	04010
End Address	W1D				E FLC IIO, 2 (Staff-	
CPU Info		CPU Info		CPU	Info	
				Vie		Cancel

The send (output) and the receive (input) CPU devices on the controlling CPU should be configured with the <u>'PLC Settings' dialog</u>. Additional refresh blocks and user areas for both the controlling and the second QnU-CPU must be entered in the <u>'Multiple CPU Settings' dialog</u>.

### 7.10.1.3 Hints for configuring multiple CPU settings and high speed memory

In general parameters for both the PN controller and the controlling QnU-CPU cannot be altered in the <u>'Multiple CPU Settings' dialog</u>. These parameters are calculated from the project settings of GX Configurator-PN. In particular this means that:

1. the size of the user area and the refresh blocks is calculated from the PROFINET network configuration. An additional user area for example to provide data for a Q17nNC CPU can be entered in the property 'Additional user area size'. This additional user area space will be added to the total refresh area size needed for data exchange between PN controller and controlling CPU.

- 2. there is no input corresponding to the 'CPU Specific Send Range' in the 'Multiple CPU Setting' tab of the GXW2 'Q Parameter Setting' dialog. This value is always calculated from the value of the 'Additional user area size' and the auto refresh area size (added sizes of the configured refresh blocks).
- 3. the number of refresh blocks is fixed to 3 for both the PN controller and the controlling QnU CPU. Only on the controlling QnU-CPU additional auto refresh blocks can be configured for example to exchange data with a motion CPU.
- 4. the CPU type property of both the PN controller and the controlling CPU is read only. The position of either CPU in the rack can be changed by manually selecting a different scenario or by scanning the rack online via the <u>'Check PLC'</u> button. If the actual rack position differs from the configuration in the dialog, the user can have the dialog automatically updated.

#### When the <u>'Multiple CPU Settings' dialog</u> must be used

The 'Multiple CPU Settings' dialog is needed,

- if additional CPUs beside the PN controller and the controlling QnU-CPU are mounted or if empty slots between CPUs are required
- if PLC program projects and/or parameter files should be updated in order to assign the file paths

If additional CPUs such as a Q17nNC or a motion CPU are mounted, the following configuration options are supported:

- 1. specifying the additional user area size for Q17nNC and motion CPUs. The CPU specific send range is calculated based on this value and the auto refresh area size.
- 2. configuring refresh blocks for motion CPUs only. For Q17nNC CPU this property cannot be changed and is always 0.

#### Comparison of GXW2 'Multiple CPU Setting' tab and GXPN <u>'Multiple CPU Set-</u> tings' dialog

		CPU Specific Send Range (*1)							igh Speed Transmission	
PLC			Use	r Setting A	vrea	Au	to Refresh		dditional user area size (words)	2048
	Points(K)	I/O No.	Points	Start	End	Points	Setting		umber refresh blocks	1
PLC No.1	6	U3E0	3852	G10000	G13851	2292	Refresh(Send)		Refresh Block 1	-
PLC No.2	3	U3E1	2972	G10000	G12971	100	Refresh(Recv)		Name	Output Buffer
PLC No.3	3	U3E2	488	G10000	G10487	2584	Refresh(Recv)		Size of block	100
PLC No.4			<b>•</b> = 30	72 - 10(					Send device (start-end)	100
									Start Address	W100
									End Address	W163
									Receive devices	

In GXW2 the user starts by entering the 'CPU Specific Send Range', here e.g. 3k. In GX Configurator-PN this value is calculated by adding the 'Additional user area size' of 2048 words and the total size of all refresh blocks, here 100 words and then rounding up this sum to the next multiple of 1k words. The memory section to the next multiple of 1k words, in this example 924 words (= 3k -2148), is technically part of the user area, which explains the difference between the 'Additional user area size' of 2048 words entered by the user and the actual user area size of 2972 words (= 2048 + 924) set in the CPU, which is displayed in GXW2 as 'User Setting Area - Points'.

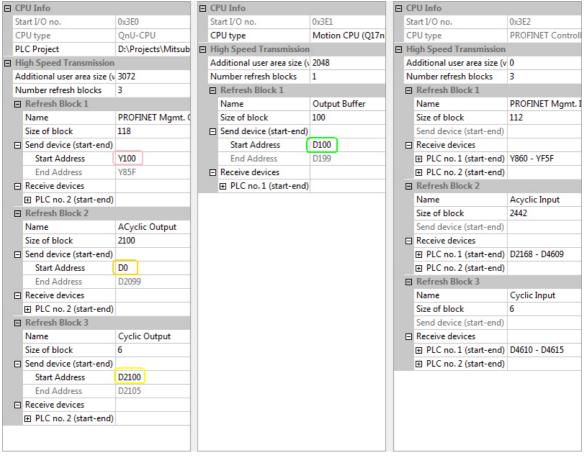
#### **Configuring Send CPU Devices**

The refresh blocks differ from the user area in high speed memory in the fact, that they can be associated to device addresses in the respective CPU. The CPU, on which the refresh block is located, contains the so-called 'Send device', from which data is copied to the refresh block on the same CPU. Any of the other CPUs, which support device addresses, can read the data from the 'sending' CPU by specifying a 'Receive device'. The contents of the refresh block on the 'sending' CPU are then automatically copied to the 'receive device', where they can be processed by the receiving CPU. **Note**: it is important to remember that refresh blocks are not necessarily for a one-to-one, but a oneto-many communication, i.e. the data provided by one CPU can be simultaneously read by any of

PLC no. 1 (start-end)

	User	Interface	169
--	------	-----------	-----

the other CPUs, provided that they support refresh blocks and device addresses. The following screenshots show the corresponding input of send devices in GXW2 and in GXPN marked with the same color. While the <u>Multiple CPU Settings' dialog</u> provides a single user interface for setting send and receive devices on all CPUs, in GXW2 the user must enter the send and receive devices in the GXW2 project of the respective CPU separately.



#### GXW2 PLC project 1

#### PLC No.1(Send) PLC No.2(Receive) PLC No.3(Receive)

Refresh Device(PLC No.1) --> Shared Memory(PLC No.1)

Set send device to the other PLC.

		A	uto Refresh	I		CPU Specific Ser	id Range (U3E0\) 🔺	
No.	Points(*1)		Start	End	1	Start	End	
1	118	Y100		Y85F	>	G13868	G13985	
2	2100	DO		D2099	>	G13986	G16085	
3	58	D2100	)	D2157	>	G16086	G16143	
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15							_	
16							•	
	Г		0074					
т	otal Points		2276	Settable Points		6144		
Available start devices are X,Y,M,L,B,D,W,R,ZR,SM,SD,SB,SW. Word is used for points. Every 2 points are counted as a set.								

#### GXW2 PLC project 2

 PLC No.1(Receive)
 PLC No.2(Send)
 PLC No.3(Receive)

 Refresh Device(PLC No.2)
 -->
 Shared Memory(PLC No.2)

		Auto Ref	resh		CPU Specific S	iend Range (U3E1\)	
No.	Points(*1)	Start	End		Start	End	
1	100	D100	D199	>	G12972	G13071	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12				+			-
13 14							
14							-
15				+			
	otal Points	100	Settable Points		3072		
A١	' ailable start d	levices are X, \ r points. Every	/,M,L,B,D,W,R,ZR,SM, 2 points are counted	,SD,SB,S as a set	w.		

#### **Configuring Receive CPU Devices**

The configuration of receive devices is mostly equivalent to that of send devices. In the <u>'Multiple CPU</u> <u>Settings' dialog</u> the receive devices are entered in the settings of the refresh block, they are associated with. The refresh block is always listed under the sending CPU.

			,		0			
⊡ (	PU Info			PU Info		Ξ	CPU Info	
9	tart I/O no.	0x3E0	S	tart I/O no.	0x3E1		Start I/O no.	0x3E2
(	PU type	QnU-CPU	C	PU type	Motion CPU (Q17n		CPU type	PROFINET Control
F	LC Project	D:\Projects\Mitsub	ΘH	ligh Speed Transmission		Ξ	High Speed Transmission	
	ligh Speed Transmission		A	dditional user area size (v	2048		Additional user area size (v	0
4	dditional user area size (v	3072	N	lumber refresh blocks	1		Number refresh blocks	3
1	lumber refresh blocks	3	E	Refresh Block 1			Refresh Block 1	
E	Refresh Block 1			Name	Output Buffer		Name	PROFINET Mgmt. I
	Name	PROFINET Mgmt. (		Size of block	100		Size of block	112
	Size of block	118	E	Send device (start-end)			Send device (start-end)	
E	Send device (start-end)			Start Address	D100		Receive devices	
	Start Address	Y100		End Address	D199			Y860 - YF5F
	End Address	Y85F	E	Receive devices				
E	Receive devices			PLC no. 1 (start-end)			Refresh Block 2	
	PLC no. 2 (start-end)			Start Address	D2158		Name	Acyclic Input
	Start Address	D200		End Address	D2257		Size of block	2442
	End Address	D317					Send device (start-end)	
E	Refresh Block 2						Receive devices	
	Name	ACyclic Output					PLC no. 1 (start-end)	
	Size of block	2100					Start Address	D2258
E	Send device (start-end)						End Address	D4699
	Start Address	D0						
	End Address	D2099					Refresh Block 3	
E	Receive devices						Name	Cyclic Input
							Size of block	6
E	Refresh Block 3						Send device (start-end)	
	Name	Cyclic Output					Receive devices	
	Size of block	6					PLC no. 1 (start-end)	
E	Send device (start-end)						Start Address	D4700
	Start Address	D2100					End Address	D4705
	End Address	D2105						
E	Receive devices							
	PLC no. 2 (start-end)							

#### Usin

GXW2 PLC project 1	PLC No.1(S	Send) PLC No	0.2(Receive)	PLC No.3(Receive)						
	Refresh I	Device(PLC No	).1) < Share	d Memory(PLC No.2	2)					
	Set receive device from PLC No.2.									
			Auto Refr	esh		CPU Specific S	iend Range (U3E1\) 🔺			
	No.	Points(*1)	Start	End		Start	End			
	1	100	D2158	D2257	<	G12972	G13071			
	2		ļ		_					
	3				_					
	5				_					
	6									
	7									
	8									
	9									
	10									
	11				_					
	12				_					
	13				_					
	15				_					
	16						<b>•</b>			
	Av			Settable Points M,L,B,D,W,R,ZR,SM 2 points are counter	, M,SD,SB,S					

GXW2 PLC project 2

PLC No.1(Receive) PLC No.2(Send) PLC No.3(Receive)

Refresh Device(PLC No.2) <-- Shared Memory(PLC No.1)

Set receive device from PLC No.1.

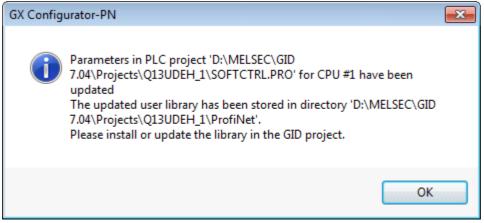
		A	uto Refresh	I		CPU Specific Ser	id Range (U3E0\)	•
No.	Points(*1)		Start	End		Start	End	
1	118	D200		D317	<	G16026	G16143	
2								
3								
4								
5								
6								
7								
8								
9								
10								-
11								
12								
13								
14								
15								
16								<b>•</b>
	_							
Т	otal Points		118	Settable Points		6144		
Available start devices are X,Y,M,L,B,D,W,R,ZR,SM,SD,SB,SW. Word is used for points. Every 2 points are counted as a set.								

If no CPU device is configured for an auto refresh block, the shared memory can be accessed by its memory address in U\G device address format. The U\G device addresses of the refresh blocks are displayed in the documentation view.

#### 7.10.1.4 User Library Export

In case a GXW2 or a GID project path have been assigned to a QnU-Model CPU in the <u>'Multiple CPU</u> <u>Settings' dialog</u>, GX Configurator-PN generates a user library for accessing the PROFINET data in GID and GXW2 projects.

If a GID project path has been assigned, the user library is generated in a sub folder of the GID project directory. This corresponds to the process for GXW2 projects in workspace format as described in '<u>GX Works2 Support</u>. The difference between GID and GXW2 projects is that in case of GID the user library is not automatically installed in the PLC project. The user must do this manually using the respective GID menu items as indicated by a message box.



For GXW2 projects the user library is generated and automatically installed in the project. This is explained in more detail in section '<u>GX Works2 Support</u>'.

#### 7.10.1.5 GX Works2 Support

GX Configurator-PN can update both the parameter data and the PROFINET user library (POU) in a GXW2 project, if at least version 1.501X of GX Works2 is installed on the same computer. The update is performed, when the QnU-CPU download option is selected as described in <u>'Update Parameters' dialog</u>.

Only QnU-Model CPU projects are updated. The user library (.sul) exported by GX Configurator-PN is directly installed in the GXW2 project of theQnU-CPU, which communicates with the PN controller. The multi-CPU settings are updated in the GXW2 projects of all CPUs.

Both formats (single file and workspace) of GXW2 project files are supported. The location and the name of the user library differ for both project formats.

**Single File Format Project**: the user library is stored in a sub folder of the directory, where the GXW2 project is located. The sub folder is named as the corresponding GXW2 project file. The user library is stored in this folder with the fixed file name 'PROFINET_IO_ME1PN1FW_Q.sul'.

Example: light q13u_pn_struct1

💾 q13u_pn_struct1.gxw

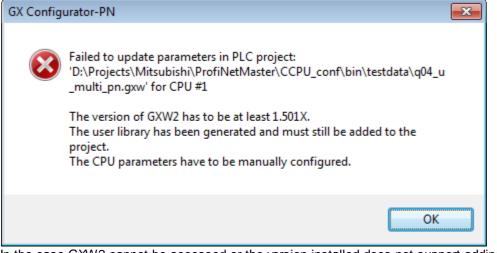
**Workspace Format Project**: the user library is stored in a sub folder of the GXW2 project directory. The sub folder name is always 'ProfiNet'. The name of the user library file is fixed to 'PROFINET_IO_ME1PN1FW_Q.sul' like for single file format projects.

CProfiNet
🖭 checkout.xml
📄 dataprotection.xml
📄 history.xml
📄 label.xml
📄 labellink.xml
Project.gd2
曾 projectdatalist.xml
🔮 securitylevel.xml
🔮 storedhistory.xml
🔮 user.xml

### Error Handling when Updating GX Works2 Projects

#### GXW2 Missing or Version older than 1.87R

GX Configurator-PN identifies the GXW2 installation directory via specific registry entries. It then loads the 'Call DLL' module from that directory to interact with GXW2. If the GXW2 installation is missing, the module cannot be loaded or the installed version of GXW2 is not at least 1.87R, GXPN cannot access the GXW2 project. However the PROFINET user library is generated and an error message is displayed.

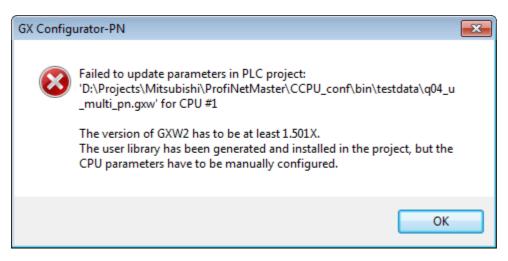


In the case GXW2 cannot be accessed or the version installed does not support adding user libraries, the user library file is created in a sub directory of the GXW2 project For the location of the user library please see section '<u>User library location and name</u>'.

#### GXW2 Version between 1.87R and 1.501X

If the version of GXW2 installed is equal or newer than 1.87R, but not 1.501X or newer, the user library can be inserted to the GXW2 project. However the parameters cannot be updated with these versions and the following error message is displayed:

175



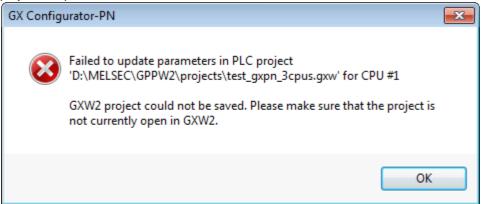
### **GXW2** Project Missing

If the project does not exist, an error message is displayed.

GX Configurator-PN	3
Failed to find PLC project 'D:\MELSEC\GPPW2\projects\test_gxpn_no_cpus.gxw' for CPU #1	
ОК	

#### **GXW2** Project Already Open

If the project is already open in another instance of GXW2, an error message is displayed, when the project is updated.



#### GXW2 Project is 'Simple Type'

If the GXW2 project is not a 'structured', but a 'simple' type project, the parameters in the project can be updated, however the user library cannot be added.

GX Config	urator-PN 💌
8	Failed to add user library to PLC project 'D:\MELSEC\GPPW2\projects\test_gxpn_simple.gxw' for CPU #1 GXW2 project has wrong project type (must be 'structured').
	ОК

Note: the user library file is however generated and not removed, after the above message has been displayed.

#### GXW2 Project is Password Protected

If a password is set for a GXW2 project, the user is prompted for credentials when accessing the GXW2 project.

User Authenticat	ion	x
Login to the test	:_gxpn_3cpus	
Please	e enter the user name and password, and Click [OK].	
User Name:		
Password:		
	OK Cancel	

This dialog is displayed during the update when retrieving the current settings from the GXW2 project of the first QnU-CPU and for each GXW2 project with password protection, when it is updated.

**Note**: this implies that the dialog may be displayed twice for the project of the first QnU-CPU, once when retrieving the current parameters and once when updating them.

#### Parameters in GXW2 Project are Locked

Write access to parameters in a GXW2 project can be disabled via the 'Tool->Options' menu item in GXW2.

Options - test_gxpn_3cpus_prm_disable	
<ul> <li>Project</li> <li>Common Setting</li> <li>Automatic Save</li> <li>Change History</li> <li>Program Editor</li> <li>Label Setting Editor</li> <li>Parameter</li> <li>Monitor</li> <li>PLC Read/Write</li> <li>Online Change</li> <li>Symbolic Information</li> <li>Save Destination of Device Comment</li> <li>Compile</li> <li>Intelligent Function Module</li> <li>Q Works Interaction</li> <li>System Label Setting</li> <li>Sampling Trace</li> </ul>	Extended Setting         Image: Construct of the setting of parameters set in MELSOFT Navigator         Image: Construct of the setting of system configuration if parameters set in MELSOFT Navigator are edited. Use the interaction function with MELSOFT Navigator after the mismatch is resolved by using the reflection function as well as verification function.         • Parameters cannot be edited when the parameter reflection function is executed in MELSOFT Navigator.         • This function is not covered by the "Back to System Default" button and "Back to User Default" button.         • To reflect changes of this setting to windows, please reopen the parameter setting windows.         • When a check is placed to this setting, the CC-Link configuration window of the local station/standby master station of the CC-Link network parameter will not be opened.         Explanation
Back to System Default Back to User Defa	Set as User Default OK Cancel

If the flag marked above has been cleared, GX Configurator-PN cannot update the parameters and displays the following message.

GX Configura	tor-PN	×
'D CF Pa	ailed to update parameters in PLC project h:\MELSEC\GPPW2\projects\test_gxpn_3cpus_prm_disable.gxw' for PU #1 arameters in GXW2 project are locked. Check settings in fool->Options->iQ Works Interaction'.	
	OK	

# 7.10.2 'Update Parameters' Dialog

Whenever the PROFINET or the multi-CPU configuration is changed, settings in the CPUs and the corresponding PLC projects must be updated. This dialog gives the user the choice of selecting, what is to be updated.

If the configuration contains only one or more QnU-projects

Update Parameters
Update QnU-CPUs Update PN Controller
OK Cancel

If the project contains an additional motion CPU

U	po	late	Pa	rar	net	ers	

Update QnU-CPUs Update PN Controller

Update Motion CPUs

If the project contains an additional NC CPU

Update Parameters	×
Update QnU-CPUs Update PN Controller Update NC CPUs	

Name	Description	Choices / Range	Default
Update QnU-CPUs	updates the parameter on QnU-CPUs and, if assigned, in the respective GD/GID/ GXW2 project.	selected / not selected	selec- ted
	If the CPU is the controlling CPU of the PN controller and a GXW2 project has be- en assigned, the user library for PROFINET is added to that project. If a GID project has been assigned, the user library is copied to a sub folder in the GID project directory and must be manually in- stalled by the user.		
Update PN Control-	updates the parameters on the PN control-	selected / not	selec-

x

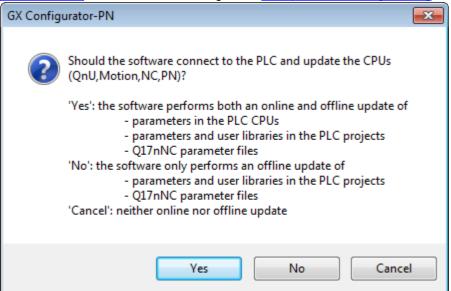
User Interface

1	79	

Name	Description	Choices / Range	Default
		Range	
ler	ler	selected	ted
Update Motion CPUs	updates the parameters on motion CPUs <b>Note</b> : this option is only displayed, if the project contains a motion CPU.	selected / not selected /	selected
Update NC CPUs	updates the parameters on NC CPUs and, if assigned, in the respective NC parame- ter file	selected / not selected /	selected
	<b>Note</b> : this option is only displayed, if the project contains an NC CPU.		
ОК	Close dialog and perform the selected up- dates	-	Default button
Cancel	Close dialog without performing any upda- tes	-	-

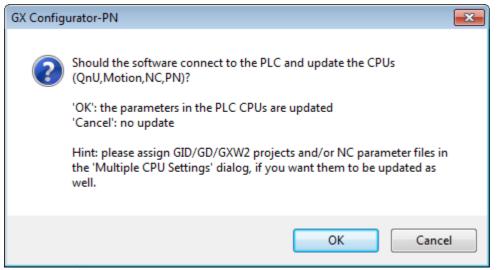
# **Online and Offline Parameters Update**

After selecting, which CPU types will be updated, the user can choose between a combined online and offline or an offline only update. 'Offline' means an update of the <u>GXW2/GID/GD projects</u> and <u>NC parameter files</u>, which have been assigned in <u>'Multiple CPU Settings' dialog</u>.



Choosing 'Yes' executes both an online and an offline update, while selecting 'No' results in an update of the only the projects and parameter files. For details on offline parameter data update refer to Update of PLC Projects and Parameter Files.

If the configuration contains no GXW2/GID/GD project or NC parameter file paths, the user can only choose between an online or no update.

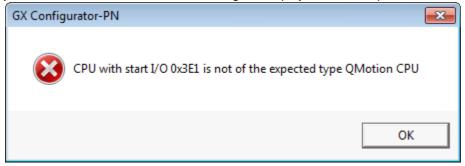


#### Checking CPU Types

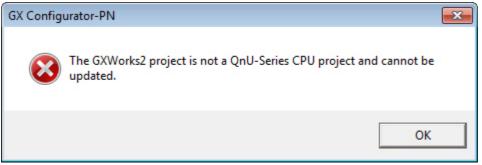
If the user has chosen to also update the CPUs online, GX Configurator-PN first connects to each CPU and determines its type. If the connection fails, an error message is displayed.

GX Configurator-PN	×
Failed to connect to Qn-CPU	
ОК	

If the actual type of a CPU at a certain starting I/O number differs from the CPU type set in the project for that I/O number, an error message is displayed, for example

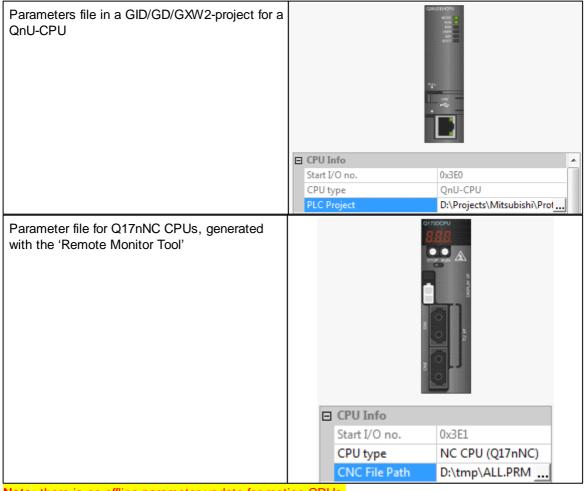


If PLC projects are updated, the CPU type of the PLC project can only be determined for GX Works2 projects. If the GXW2 project is not for a QnU-CPU, the following error is displayed and the update is aborted.



# Update of PLC Projects and Parameter Files

If paths to projects or parameter files have been assigned in the <u>'Multiple CPU Settings' dialog</u>, these projects/files are updated as well. At present for QnU-CPUs GD-, GID- and GXW2-projects and for NC-CPUs the ASCII parameter files handled by the 'Remote Monitor Tool' are supported.



Note: there is no offline parameter update for motion-CPUs.

### Sequence when updating Parameters

A prerequisite for setting the multi-CPU settings is the 'I/O Assignment'. The 'I/O Assignment' is part of the CPU parameters and for example set in the 'Q Parameter Setting' dialog of GX Works2.

	- I <b>,</b> I	CTILE TELC RAS TO	oot File	Program SFC Device I/O Assignm	ent Multiple CPU Setting	Built-in Ethernet P	ort Setting
·	ssignment(*1)						Switch Setting
No.	Slot	Туре		Model Name	Points	Start XY 🔺	awitch setung
0	PLC	PLC No.1	-		<b>•</b>	3E00	
1	PLC	PLC No.2	-		•	3E10	Detailed Setting
2	PLC	PLC No.3	-		-	3E20	
3	2(0-2)		+		•		Select PLC type
4	3(0-3)		-		•		New Module
	4(0-4)		+		-		New Module
6	5(0-5)		+		-		
	6(0-6)		-				

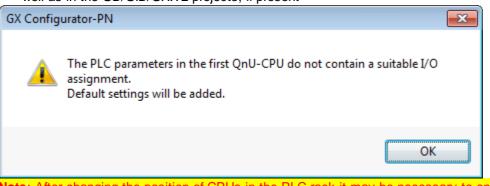
The I/O assignment must be identical on all CPUs. Therefore GX Configurator-PN copies the I/O assignment from the first QnU-CPU to the other CPUs, handling the following situations:

- the first QnU-CPU has a PLC project path assigned and the GD/GID/GXW2 project contains an I/ O assignment with at least the same number of CPUs as in the GXPN configuration -> I/O assignment from the GD/GID/GXW2 project is copied to all CPUs including the first QnU-CPU itself
- 2. the first QnU-CPU has no PLC project path assigned or the GD/GID/GXW2 project contains no suitable I/O assignment, however the CPU itself has a correct I/O assignment
   -> the following message is displayed and the I/O assignment is copied from the first QnU-CPU

to all CPUs and also to the GD/GID/GXW2 projects, if present

GX Config	urator-PN 🗾
<u>^</u>	The PLC parameters in project 'D:\MELSEC\GPPW2\projects\test_gxpn_1cpu.gxw' do not contain a suitable I/O assignment.
	ОК

there is neither a suitable I/O assignment in the PLC project or in the CPU itself
 the following message is displayed and a default I/O assignment is inserted in all CPUs as well as in the GD/GID/GXW2 projects, if present



Note: After changing the position of CPUs in the PLC rack it may be necessary to once set the I/O assignment on the motion CPU with MT Developer2.

### Integration with PLC Programming Packages

The following table lists the supported MELSOFT software packages for PLC programming and the respective functionality.

Software	Version	Available Functions
GX Developer	8.89	update of CPU parameters in project no user library
GX IEC Developer	7.04	update of CPU parameters in project user library generated in sub directory of project, but not installed in project
	< 1.87R	no update of CPU parameters in project user library generated in sub directory of project, but not installed in project
GX Works2	>= 1.87R < 1.501X	no update of CPU parameters in project user library generated in sub directory and installed in pro- ject
	>= 1.501X	update of CPU parameters in project user library generated in sub directory and installed in pro- ject

**Note:** only with GX Works2 of version 1.87R or newer the project CPU type is checked. In case the CPU type does not support high speed transfer an error message is displayed.

#### GX Developer (GD)

GX Configurator-PN cannot generate PLC code for GD, but only update the parameters in a GD project. The user is informed, when the parameters have been updated.

GX Conf	GX Configurator-PN			
٩	Parameters in PLC project: 'C:\MELSEC\Gppw\Projects\q04ude_1\Gppw.gpj' for CPU #1 have been updated			
	ОК			

#### GX IEC Developer (GID)

For GID projects GX Configurator-PN cannot install the user library in the project. This must be done by the user as indicated in the message box.

GX Conf	GX Configurator-PN		
٩	Parameters in PLC project: 'C:\MELSEC\GX IEC Developer 7.04\Projects\q04ude_2\SOFTCTRL.PRO' for CPU #1 have been updated The updated user library has been stored in directory 'C:\MELSEC\GX IEC Developer 7.04\Projects\q04ude_2\ProfiNet'. Please install or update the library in the GID project.		

#### GX Works2 (GXW2)

The best integration of GX Configurator-PN is with GXW2. For details please see section '<u>GX</u> <u>Works2 Support</u>'.

184

# 7.10.3 'PROFINET Controller Status' Dialog

This dialog displays the current status of the PROFINET controller and provides means to start/stop the data exchange in the PROFINET network. It retrieves the multi-CPU settings including the buffer device addresses online from the CPUs independently of the current GX Configurator-PN configuration. Only the IP address of the PN controller and the transfer setup for the QnU-CPU are taken from the current project.

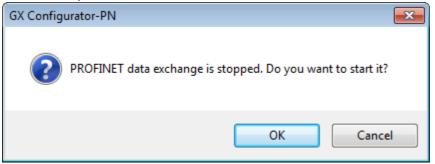
PROFINET Co	ntroller Status			<b>—</b>
	ntroller Status tus Information	PROFINE	[ running	Stop PROFINET
Buffer Name	Start Device	End Device		
Mgmt. Outp	uts Y100	Y85F		
Mgmt. Input	s X100	X7FF		
Acyclic Outp	uts D100	D2199		
Acyclic Inpu	ts D2200	D4641		
Cyclic Outpu	its D4650	D4667		
Cyclic Input:	s D4700	D4721		
			Close	

Name	Description	Choices / Range	Default
PROFINET Con- troller Status	current status of the PN controller (see list below)	-	-
Additional Status Information	additional information for specific status codes	-	-
Start PROFINET or Stop PROFINET	starts respectively stops the cyclic data exchange by the PN controller text depends on the state of the IOC_STS_STARTED flag	button is only enab- led, if the PN ctrl has the flag 'IOC_STS_CONFIG _OK' set, otherwise the button is disab- led	-
Buffer Devices	displays the currently configured devices for the PROFINET refresh buffers	-	-
Close	close dialog and proceed	-	Default button

To obtain the currently active device addresses the dialog first reads the start I/O number of the controlling QnU-CPU from the PN controller. It then reads the multi-CPU settings including buffer devices from that QnU-CPU, independent of the settings in the current GX Configurator-PN project. These active device addresses are displayed in the status dialog.

#### Start/Stop PROFINET

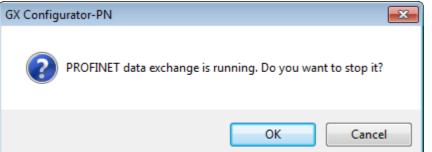
The data exchange on the PN controller can only be started, if the controller is configured and not already running (controller status 'PROFINET stopped'). The start flag is set, after the user has confirmed the request.



In case the PN controlling CPU is not in RUN mode, the user is asked, whether the CPU should be started as well.

GX Configurator-PN	×
The QnU-CPU is not in RUN. Should the QnU-CPU be started as well?	
OK Cancel	

If the data exchange has been started (controller status 'PROFINET started'), pressing the button will stop it, after the user has confirmed the request.



In case the PN controlling CPU is not in STOP mode, the user is asked, whether the CPU should be stopped as well.

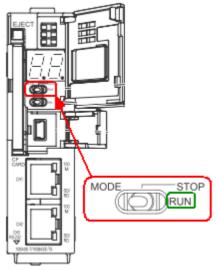
GX Configurator-PN	
The QnU-CPU is not in STOP. Should the	e QnU-CPU be stopped as well?
	OK Cancel

After the start or stop request the user can check the 'PROFINET Controller Status' field to see, whether the request has been successful. The field is automatically updated.

#### Incorrect Status Due to 'MODE' Switch

PROFINET Controller Status		<b>—</b>
PROFINET Controller Status Additional Status Information	PN ctrl. not configured PN Controller is not in 'RUN'.	Start/Stop PROFINET
	Please check the RUN/STOP/MODE switch.	

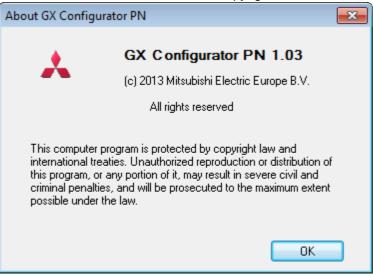
If the status displays 'Not configured', the reason may not be a missing PROFINET configuration.



The 'RUN/STOP/MODE' switch on the ME1PN1FW-Q must be in the 'RUN' position, otherwise any status information from the PROFINET Controller may be incorrect.

# 7.11 Aboutbox

The 'about box' shows the version and copyright notice.



# 8 PLC Code for PROFINET Controller

GX Configurator-PN can export PLC program code for 'GX Works2' (GXW2) and 'GX IEC Developer' (GID), which assists the application programmer in accessing the PROFINET Controller.

# 8.1 Function Blocks

GX Configurator-PN can export PLC code for integrating PROFINET I/O into a 'GX IEC Developer' (GID) or a 'GX Works2' (GXW2) PLC application program. The exported code contains 'Function Blocks' (FBs), 'Data Unit Types' (DUTs) and global variable lists (GVLs).

### **Call of Function Blocks**

All services used in the function blocks access the same data area, defined in the instances of the DUTs. If a function block is in use (output "Busy" is true), no other function block call is allowed. The user must ensure that the function blocks are interlocked against simultaneous use. Two function blocks can only be used simultaneously, if one uses a different request/response buffer pair than the other.

GX Configurator-PN adds global variables to the exported PLC code, which are mapped to the corresponding buffer devices. The PLC program can use the variable identifiers and does not have to access the buffer devices directly. The following table lists the variable names for both acyclic communication buffer pairs.

Buffer	Global Variables for Acyclic Communication Buffers		
	Buffer Pair 1	Buffer Pair 2	
Request handsha- ke bits	vPN_MGMT_OUTPUTS.ACYC_HS K_Y_REQ1_EXECUTE	vPN_MGMT_OUTPUTS.ACYC_HS K_Y_REQ2_EXECUTE	
Response hands- hake bits	vPN_MGMT_INPUTS.ACYC_HSK_ X_RES1_ACCEPTED	vPN_MGMT_INPUTS.ACYC_HSK_ X_RES2_ACCEPTED	
	vPN_MGMT_INPUTS.ACYC_HSK_ X_RES1_COMPLETED	vPN_MGMT_INPUTS.ACYC_HSK_ X_RES2_COMPLETED	
Request buffer	vPN_ACYCLIC_REQ1	vPN_ACYCLIC_REQ2	
Response buffer	vPN_ACYCLIC_RES1	vPN_ACYCLIC_RES2	

### 8.1.1 Function Block 'Net_Detect'

This FB detects IO-devices present on the network. It includes two services: network detection and IO-device detection. The network detection returns only the number of IO-devices found on the network. The following IO-Device detection reads type information from each detected IO-device and stores it in the global variable 'vPN_DEVICE_DETECT_DATA'.

	Instance		
	Net Detect		
_	REQ	VALID	F-
_	Buffer_2	BUSY	Ŀ.
_	EXTENDED	ERROR	Ļ.
		STATUS	ŀ

Variable	Class	Туре	Description
REQ		Bool	Start the network detection
BUFFER_2		Bool	0= Buffer 1 for acyclic request is used
	Input		1= Buffer 2 for acyclic request is used
EXTENDED		Bool	0= Only the <u>standard information</u> (first eight words) is re- turned
			1= The extended device information is returned
VALID		Bool	Data in the global variable 'vPN_DEVICE_DETECT_DATA' is valid
BUSY		Bool	The function block is in use
ERROR		Bool	Error detected
STATUS	Output	Word	Last detected status, possible values:
			0= Status OK
			1= Profinet stack not started
			4= Reception buffer too small (stack internal error)
			5= No more IO-device
			6= "Network detection" service never called

The global variable 'vPN_DEVICE_DETECT_DATA' is defined as an array of DUTs (the DUT type name is 'vPN_DEVICE_DETECT_DATA'). The number of devices in the network equals the number of array elements.

# Standard Device Information (Input 'EXTENDED' is not set)

If 'EXTENDED' has been set to 'FALSE', only standard device data is returned. For each detected device the variable 'vPN_DEVICE_DETECT_DATA' contains the following information:

Variable Pos Offset	ID	Value
1	VendorID	VendorID of the device
2	DeviceID	DeviceID of the device
3	IP_Address	IP address of the Device
4	Subnetmask	Subnet mask of the Device
5	Gateway	Gateway IP Address of the Device
6	Mac_Address_Bytes1_2	Mac Address of the Device, first word
7	Mac_Address_Bytes3_4	Mac Address of the Device, second word

188

Variable Pos Offset	ID	Value
8	Mac_Address_Bytes5_6	Mac Address of the Device, third word

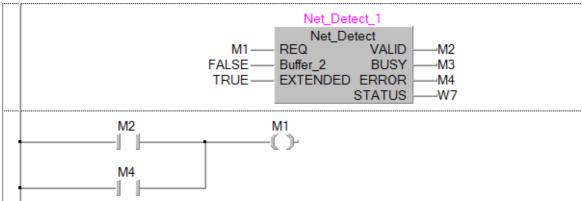
### Extended Device Information (Input 'EXTENDED' is set)

If 'EXTENDED' has been set to 'TRUE', additional device data is returned. The DUT 'tPN_DEVICE_DETECT_DATA' must be expanded by appending an 'ARRAY [0..134] OF WORD' to the standard structure. For each detected device the variable 'vPN_DEVICE_DETECT_DATA' contains the following information:

Variable Pos Offset	ID	Value
1	VendorID	VendorID of the device
2	DeviceID	DeviceID of the device
3	IP_Address	IP address of the Device
4	Subnetmask	Subnet mask of the Device
5	Gateway	Gateway IP Address of the Device
6	Mac_Address_Bytes1_2	Mac Address of the Device, first word
7	Mac_Address_Bytes3_4	Mac Address of the Device, second word
8	Mac_Address_Bytes5_6	Mac Address of the Device, third word
9	Data[0]	Size of the device name (240 bytes max)
10	Data[1]	Device name
9 + n	Data[n]	Size of "Type" field (25 bytes max)
10 + n	Data[n+1]	Type of Device

**Note**: the IO-devices are returned in the order, in which they answered to the DCP identify request. Two consecutive calls to 'Net_Detect' can result in two different lists.

### Call FB 'Net_Detect'



By setting M1 the network detection is started. M2 shows that the network detection data was written to the global variable 'vPN_DEVICE_DETECT_DATA'.

### 8.1.2 Function Block 'Read_Rec_Im'

This FB reads information from an IO-device, which has not been included in the configuration of the PROFINET Controller.

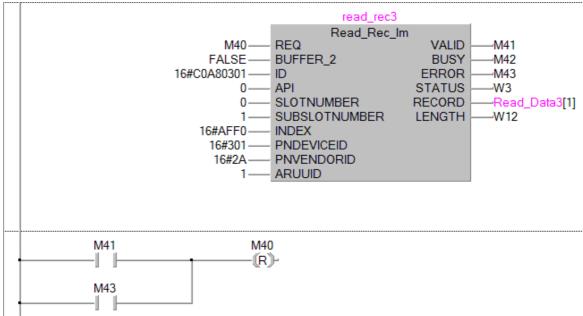
Instance	
Read_Rec_Im	ı
- REQ	VALID
- BUFFER_2	BUSY
– ID	ERROR
– API	STATUS
- SLOTNUMBER	RECORD -
- SUBSLOTNUMBER	LENGTH -
- INDEX	
- PNDEVICEID	
- PNVENDORID	
- ARUUID	

Variable	Class	Туре	Description
REQ		Bool	Start read record
BUFFER_2		Bool	0=Buffer 1 for acyclic request is used 1=Buffer 2 for acyclic request is used
ID		DWord	Device-ID, shall contain the IP-Address
ΑΡΙ	Input	DWord	API number, used to perform the read
SLOTNUMBER		Word	Slot number target
SUBSLOTNUMBER		Word	Sub-slot number target
INDEX		Word	Index of the record block
PNDEVICEID		Word	PN-Device ID (taken from the GSDML-file)

Variable	Class	Туре	Description
PNVENDORID		Word	Vendor ID (taken from the GSDML-file)
ARUUID		Word	Object UUID Local ID (taken from the GSDML-fi- le)
VALID		Bool	Data in the global variable "DEVICE_DATA" is valid
BUSY		Bool	The function block is in use
ERROR		Bool	Error detected
STATUS		Word	Last detected status, possible values:
			0=Status OK
	Output		1=Profinet stack not started
			2= No Ethernet link
			3= No IO-Device detected
			4=Reception buffer too small (stack internal er- ror)
			8= Profinet error
RECORD		Word	Read data
LENGTH		Int	Read data size in byte

The read data is moved to the output 'RECORD' by using a block move operation. The user has to configure an array-Variable for this output with the corresponding number of elements.

# Call FB 'Read_Rec_Im'



The input 'ID' contains the IP-address of the IO-device: 16#C0A80301 = 192.168.3.1. The index for

the read data is 16#AFF0, indicating to read the I&M data (Identification & Maintenance) of the device. Reading of data starts if M40 is set. M41 indicates that the read data has been written to the global variable 'Read_Data3'. The values for the inputs PNDEVICEID, PNVENDORID and ARUUID are taken from the GSDML-file.

FB Input	GSDML Node and Attribute		
PNDEVICEID	DeviceIdentity/@VendorID		
PNVENDORID	DeviceIdentity/@DeviceID		
ARUUID	DeviceAccessPointItem/@ObjectUUID_LocalIndex		

Extract from the sample GSDML-file used for the FB call above:

<profilebody></profilebody>
<pre><deviceidentity deviceid="0x0301" vendorid="0x002A"></deviceidentity></pre>
<applicationprocess></applicationprocess>
<pre><deviceaccesspointlist></deviceaccesspointlist></pre>
<pre><deviceaccesspointitem <="" id="DIM 1" physicalslots="063" pre=""></deviceaccesspointitem></pre>
ModuleIdentNumber="0x00000300" MinDeviceInterval="32"
ImplementationType="NetArm" DNS_CompatibleName="IM151-3PN" Fixe-
dInSlots="0"
ObjectUUID LocalIndex="1">

# 8.1.3 Function Block 'Write_Rec_Ex'

This FB writes data to an IO-Device which is connected to the Profinet.

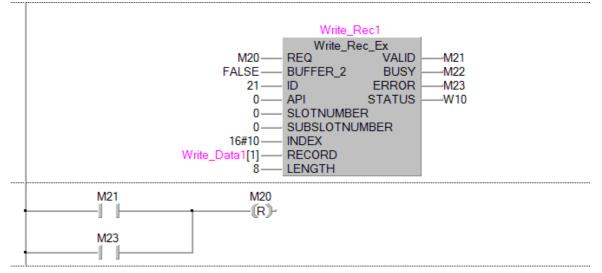
	Instan	00			
Instance					
	Write_Re	ec_Ex			
-	REQ	VALID	-		
-	BUFFER_2	BUSY -	-		
_	ID	ERROR -	-		
_	API	STATUS -	-		
_	SLOTNUMBE	R			
-	SUBSLOTNU	MBER			
_	INDEX				
_	RECORD				
_	LENGTH				

Variable	Class	Туре	Description
REQ		Bool	Start write record
BUFFER_2		Bool	0=Buffer 1 for acyclic request is used 1=Buffer 2 for acyclic request is used
ID	Input	DWord	Device-ID, shall contain the IP-Address
API		DWord	API number, used to perform the read
SLOTNUMBER		Word	Slot number target

Variable	Class	Туре	Description
SUBSLOTNUMBER		Word	Sub-slot number target
INDEX		Word	Index of the record block
RECORD		Word	Write data
LENGTH		Int	Write data size in byte
VALID		Bool	Data in the global variable "DEVICE_DATA" is valid
BUSY		Bool	The function block is in use
ERROR		Bool	Error detected
STATUS	Output	Word	Last detected status, possible values: 0= Status OK 1= Profinet stack not started 2= No Ethernet link 3= No IO-Device detected 6= Device not connected 7= Device not configured 8= Profinet error

The data to write is moved from the input 'RECORD' by using a block move operation to the transfer buffer. The user has to configure an array variable for this input with the corresponding number of elements.

### Call FB 'Write_Rec_Ex'



The input 'ID' contains the IO-device number '21'. The index for the data to write to is 16#10. By setting M40 the writing of the data is started. M41 indicates that the data from the global variable 'Write_Data1' has been successfully transferred to the IO-device.

# 8.1.4 Function Block 'Read_Rec_Ex'

**GX Configurator-PN** 

194

This FB reads information from an IO-Device which is connected to the Profinet.

	Instance		
	Read_Rec_E	c	
_	REQ	VALID	H
_	BUFFER_2	BUSY	F-
_	ID	ERROR	Ļ.
_	API	STATUS	F-
_	SLOTNUMBER	RECORD	Ļ.
_	SUBSLOTNUMBER	LENGTH	Ļ.
_	INDEX		

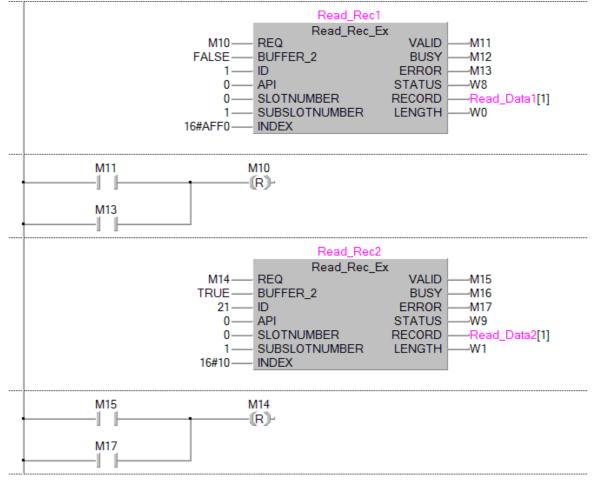
Variable	Clas s	Туре	Description
REQ		Bool	Start read record
BUFFER_2		Bool	0=Buffer 1 for acyclic request is used
			1=Buffer 2 for acyclic request is used
ID		DWord	Device-ID, shall contain the IP-Address
API	Input	DWord	API number, used to perform the read
SLOTNUMBER		Word	Slot number target
SUBSLOTNUMBE R		Word	Sub-slot number target
INDEX		Word	Index of the record block
VALID		Bool	Data in the output "RECORD" is valid
BUSY		Bool	The function block is in use
ERROR		Bool	Error detected
STATUS		Word	Last detected status, possible values:
			0= Status OK
	Out-		1= Profinet stack not started
	put		2= No Ethernet link
			3= No IO-Device detected
			4= Reception buffer too small (stack internal error)
			6= Device not connected
			7= Device not configured
			8= Profinet error
RECORD		Word	Read data

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

Variable	Clas s	Туре	Description
LENGTH		Int	Read data size in byte

The read data is moved to the output 'RECORD' by using a block move operation. The user has to configure an array variable for this output with the corresponding number of elements.

# Call FB 'Read_Rec_Ex'



#### First call:

The index for the read data is 16#AFF0, indicating to read the I&M data (Identification & Maintenance) of the device. The first acyclic buffer is used.

By setting M10 reading the data is started. M11 indicates that the read data has been written to the global variable 'Read_Data1'.

#### Second call:

The index for the read data is 16#10, indicating to read the parameter data from index 10 of the device. The second acyclic buffer is used.

By setting M14 reading the data is started. M15 indicates that the read data has been written to the global variable 'Read_Data2'.

# 8.1.5 Function Block 'Alarm_Request'

**GX** Configurator-PN

With this function block the PLC program requests an alarm received from a specific IO-device.

Instance						
	Alarm_R	equest				
_	REQ	VALID	┝			
_	BUFFER_2	BUSY	┝			
_	ID	ERROR	┝			
		STATUS	┝			
		RECORD	┝			
		LENGTH	$\vdash$			

Variable	Class	Туре	Description	
REQ		Bool	Start alarm request	
BUFFER_2	Input	Bool	0=Buffer 1 for acyclic request is used 1=Buffer 2 for acyclic request is used	
ID		DWord	Device-ID, shall contain the IP-Address	
VALID Bool Data in the output "RECORD" is valid		Data in the output "RECORD" is valid		
BUSY Bool The function block is in use		The function block is in use		
ERROR		Bool	Error detected	
STATUS	Output	Word	Last detected status, possible values: 0= Status OK 1= Profinet stack not started 7= Device not configured 8= Profinet error 9= No Alarm for this device	
RECORD	Word		Read data	
LENGTH	Int		Read data size in byte	

The read alarm data is moved to the output 'RECORD' by using a block move operation. The user has to configure an array variable for this output with the corresponding number of elements.

Word Offset	ID	Value
0	API	API number used to perform the alarm
1		
2	Priority	Alarm priority High priority: 0x06 Low priority: 0x05
3	Туре	Alarm type

196

Word Offset	ID	Value	
4	Slot number	Slot number of the alarm	
5	SubSlot number	Subslot number of the alarm	
6	Specifier	Alarm specifier	
7	Module ident number	Module ID of the Alarm	
8			
9	SubModule ident number	Submodule ID of the Alarm	
10			
11	Data length	Data Size in byte	
12 + Data length / 2 - 1 Data		0 to 1432 bytes	

# Alarm Types

Value (hex)	ID
0x0000	Reserved
0x0001	Diagnosis
0x0002	Process
0x0003	Pull
0x0004	Plug
0x0005	Status
0x0006	Update
0x0007	Media Redundancy
0x0008	Controlled by supervisor. Logical "Pull" of a submodule to withdraw owner- ship
0x0009	Released. Logical "Plug" of a submodule to return ownership or trigger a re- parameterization
0x000A	Plug Wrong Submodule
0x000B	Return of Submodule
0x000C	Diagnosis disappears
0x000D	Multicast communication mismatch notification
0x000E	Port data change notification
0x000F	Sync data changed notification
0x0010	Isochronous mode problem notification

Value (hex)	ID		
0x0011	Network component problem notification		
0x0012	Time data changed notification		
0x0013	Dynamic Frame Packing problem notification		
0x0014	MRPD problem notification		
0x0015	System Redundancy		
0x0016 - 0x001D	Reserved		
0x001E	Upload and retrieval notification		
0x001F	Pull module		
0x0020 - 0x007F	Manufacturer specific		
0x0080 - 0x00FF	Reserved for profiles		
0x0100 - 0xFFFF Reserved			

#### Alarm Specifier

Bits	Description	Value	
0 - 10	Sequence number	0 to 2,047, incremented upon each indication	
11	Diagnosis channel	0x00: No diagnosis available 0x01: Diagnosis available	
12	Specific diagnosis	0x00: No diagnosis available 0x01: Diagnosis available	
13	Diagnosis sub-module	0x00: No diagnosis available 0x01: Diagnosis available	
14	Reserved	0x00	
15	AR diagnosis	0x00: No diagnosis available 0x01: Diagnosis available	

### **Alarm Management**

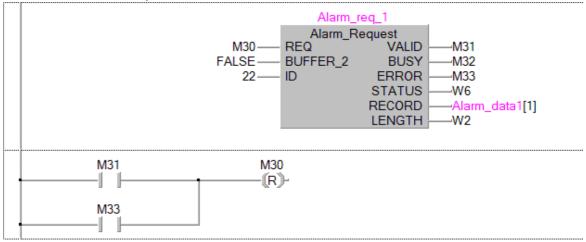
By default the PROFINET stack can handle alarms automatically without reporting any indication to the PLC program. The PLC program can overwrite this default setting per device in order to manage alarms for a device by itself. To select 'manual handling' for alarms of a specific device a bit, which corresponds to the device, must be set in the global variable 'vPN_MGMT_OUTPUTS', which contains the PROFINET management output structure.

198

Alarm Handling	Variable Setting
Automatic handling	vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[device index] = 0
Manual handling	vPN_MGMT_OUTPUTS.IOD_MGT_ALARM[device index] = 1

If automatic handling has been selected for an IO-device, the IO-controller automatically acknowledges each alarm received from the respective IO-device and the alarm indication flags 'vPN_MGMT_INPUTS.IOD_ALARM_IND' are not used. If manual handling has been selected, an alarm indication is passed to the PLC program by setting the bit with the index of the respective IOdevice in 'vPN_MGMT_INPUTS.IOD_ALARM_IND[device index]'.

# Call FB 'Alarm_Request'



The input 'ID' contains the IO-device number '22'. By setting M30 the alarm request is started. M31 indicates that the requested data has been written to the global variable 'Alarm_data1'. This function block accesses the global variables 'vPN_MGMT_INPUTS' and vPN_MGMT_OUTPUTS.

# 8.1.6 Function Block 'Alarm_Ack'

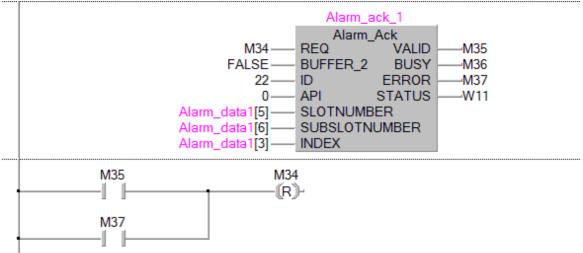
This function block sends the 'acknowledge alarm' frame to the IO-device.

	Instance						
	Alarm Ack						
-	REQ	VALID	⊢				
-	BUFFER_2	BUSY	┝				
_	ID ERROR -						
_	API	STATUS	┝				
_	SLOTNUMBER						
_	SUBSLOTNUMBER						
-	INDEX						

Variable	Class	Туре	Description	
REQ		Bool	Start alarm ack.	
BUFFER_2	Input Bool		0=Buffer 1 for acyclic request is used	
			1=Buffer 2 for acyclic request is used	

Variable	Class	Туре	Description	
ID		DWord	Device-ID, shall contain the IP-Address	
API		DWord	API number, used to perform the ack	
SLOTNUMBER		Word	Slot number target	
SUBSLOTNUMBER		Word	Sub-slot number target	
INDEX V		Word	Must contain the alarm priority	
VALID		Bool	Ack has been send	
BUSY		Bool	The function block is in use	
ERROR		Bool	Error detected	
STATUS	Output	Word	Last detected status, possible values:	
	Guipui		0= Status OK	
			1= Profinet stack not started	
			7= Device not configured	
			8= Profinet error	
			9= No Alarm for this device	

### Call FB 'Alarm_Ack'



The input 'ID' contains the IO-device number '22'. By setting M34 the alarm acknowledge is started. M35 indicates that the acknowledge data has been written to the requested device. This function block accesses the global variables 'vPN_MGMT_INPUTS' and vPN_MGMT_OUTPUTS.

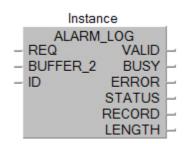
The data for the function block inputs 'SLOTNUMBER', 'SUBSLOTNUMBER' and 'INDEX' must come from the previous call to the function block 'Alarm_Request'. This is achieved by assigning to the inputs of 'Alarm_Ack' the same variable 'Alarm_data1', which has been assigned to the output 'RECORD' of the 'Alarm_Request' function block. The table below shows the structure of the 'Alarmman' m_Request.RECORD' output data and its relation to the 'Alarm_Ack' function block.

200

Word Offset	ID	Value	Variable	FB 'Alarm_Ack' In- put
0	ΑΡΙ	API number used to per- form the alarm	Alarm_data1 [1]	
1			Alarm_data1 [2]	
2	Priority	Alarm priority High priority: 0x06 Low priority: 0x05	Alarm_data1 [3]	INDEX
3	Туре	Alarm type	Alarm_data1 [4]	
4	Slot number	Slot number of the alarm	Alarm_data1 [5]	SLOTNUMBER
5	SubSlot num- ber	Subslot number of the alarm	Alarm_data1 [6]	SUBSLOTNUMBER

# 8.1.7 Function Block 'Alarm_Log'

This function block retrieves an alarm description from the internal alarm log. Each call of the function block retrieves only one alarm description. If several alarms are stored, the function block must be called multiple times. The oldest alarm is returned first.



Variable	Class	Туре	Description	
REQ		Bool	Start read alarm log	
BUFFER_2	Input	Bool	0=Buffer 1 for acyclic request is used 1=Buffer 2 for acyclic request is used	
ID		DWord	Device-ID, shall contain the IP-Address	
VALID		Bool	Data in the output 'RECORD' is valid	
BUSY		Bool The function block is in use		
ERROR	Output	Bool	Error detected	
STATUS		Word	Last detected status, possible values: 0= Status OK	

202

Variable	Class	Туре	Description
			1= Profinet stack not started
			2= No Ethernet link
			7= Device not configured
			8= Profinet error
			9= No Alarm in log for this device
RECORD		Word	Read data
LENGTH		Int	Read data size in byte

The read alarm log data is moved to the output 'RECORD' by using a block move operation. The user has to configure an array variable for this output with the corresponding number of elements.

Word Offset	Value
0	Date of the ME1PN1FW-Q when the frame has been received
1	
2	Time of the ME1PN1FW-Q when the frame has been received
3	
4	Alarm Type
5	API number used to perform the alarm
6	
7	Alarm Priority
8	ID of the module. Manufacturer specific.
9	
10	ID of the submodule. Manufacturer specific.
11	
12	Slot number of the alarm
13	Subslot number of the alarm
14	Alarm specifier

(c) 2013 MITSUBISHI ELECTRIC CORPORATION

#### Call FB 'Alarm_Log' Alarm_Log_1 ALARM_LOG REQ M50 VALID -M51 FALSE BUFFER_2 BUSY -M52 22 -M53 ID ERROR STATUS -W6 RECORD -Log_1[**1**] LENGTH -W5 M51 M50 -(R)--II. - It M53 1

The input 'ID' contains the IO-device number '22'. By setting M50 the alarm request is started. M51 indicates that the requested data has been written to the global variable 'Log_1'.

#### 8.1.8 Function Block 'IO_Device_Info'

This function block reads type information from the specified IO-device.

Instance			
IO_DEVIC	E_INFO		
- REQ	VALID -		
- BUFFER_2	BUSY -		
– ID	ERROR -		
	STATUS -		
	RECORD -		
	LENGTH -		

Variable	Class	Туре	Description
REQ		Bool	Start read IO-device information
BUFFER_2	Input	Bool	0=Buffer 1 for acyclic request is used 1=Buffer 2 for acyclic request is used
ID		DWord	Device-ID, shall contain the IP-Address
VALID		Bool	Data in the output 'RECORD' is valid
BUSY		Bool	The function block is in use
ERROR	Output Word		Error detected
STATUS			Last detected status, possible values: 0= Status OK 1= Profinet stack not started 10= Device not configured

204

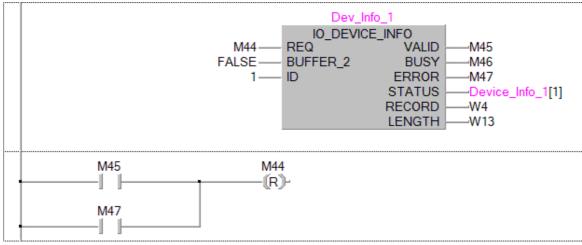
Variable	Class	Туре	Description
RECORD		Word	Read data
LENGTH		Int	Read data size in byte

The read IO-Device information data is moved to the output 'RECORD' by using a block move operation. The user has to configure an array variable for this output with the corresponding number of elements.

Content of the IO-Device information data
-------------------------------------------

Word Offset	Value
0	MAC address
1	
2	
3	IP address
4	
5	Input area in High Speed Area
6	
7	Output area in High Speed Area
8	
9	Input length
10	Output length
11	Refresh period
12	Number of successful connections
13	Number of disconnections
14	State (Connected / Not Connected)
15	Management (Manual / Automatic)
16	Current Profinet Status

#### Call FB 'IO_Device_Info'



The input 'ID' contains the IO-device number '1'. By setting M44 the alarm request is started. M45 indicates that the requested data has been written to the global variable 'Device_Info_1'.

# 8.2 Global Variables

The exported PLC code contains several global variables for addressing the interface of the PROFINET Controller. There are two types of variables:

1. project-independent variables with fixed names and structures related to the PROFINET management and acyclic communication buffers in the PROFINET Controller

2. project-specific variables with editable names and structures related to the cyclic communication data of I/O devices and their modules

The following table lists the global variables and the respective 'Data Unit Types' (DUTs), of which the structure is independent of the IO devices in the network.

Identifier	Туре	Contents
vPN_MGMT_OUTPUTS	tPN_MGMT_OUTPUTS: STRUCT <u>IOC_START_STOP</u> : BOOL; <u>IOD_MGT_MODE</u> : ARRAY [0127] OF BOOL; <u>IOD_START_STOP_DEV</u> : ARRAY [0127] OF BOOL; <u>IOD_CMD_HSK_Y</u> : ARRAY [0127] OF	Outputs to control the PROFINET Con- troller (request bits etc.)
	BOOL; IOD_MGT_ALARM: ARRAY [0127] OF BOOL; IOD_CONSIST: ARRAY [0127] OF BOOL; IOD_INPUT_HSK_Y: ARRAY [0127] OF BOOL;	

GA CONINGUIATOR-FIN		
	IOD OUTPUT HSK Y: ARRAY [0127] OF BOOL; ACYC HSK Y REQ1 EXECUTE: BOOL; ACYC HSK Y REQ2 EXECUTE: BOOL; END_STRUCT;	
vPN_ACYCLIC_REQ1 vPN_ACYCLIC_REQ2	tPN_ACYCLIC_REQ: STRUCT RequestID: DWORD; ServiceID: WORD; Status: WORD; DeviceID: DWORD; API: DWORD; SlotNumber: WORD; SlotNumber: WORD; SubslotNumber: WORD; Index: WORD; DataLength: INT; PNDeviceID: WORD; PNVendorID: WORD; ARUUID: ARRAY [07] OF WORD; Reserve: ARRAY [07] OF WORD; Data: ARRAY [0719] OF WORD; END_STRUCT;	Request buffer for acyclic communica- tion Note: this buffer does not contain I/O data. The I/O data is included in the DUTs/GVs specific to the configured I/O- devices
vPN_CYCLIC_OUTPUTS	tPN_CYCLIC_OUTPUTS: STRUCT <u>LIVE WORD Y</u> : WORD; END_STRUCT;	Watchdog request for cyclic communi- cation
vPN_MGMT_INPUTS	tPN_MGMT_INPUTS: STRUCT IOC STS CONFIG OK: BOOL; IOC STS CONFIG DOWNLOADING: BOOL; IOC STS KEYFILE_ERROR: BOOL; IOC STS_STARTED: BOOL; IOC STS_ERROR_DIAG_SET: BOOL; IOC STS_PLC_WD_ERR: BOOL; IOD_CMD_HSK_X: ARRAY [0127] OF BOOL;	Inputs from the PROFINET Control- ler (handshake, sta- tus etc.)

	IOD INPUT HSK X: ARRAY [0127] OF BOOL; IOD OUTPUT HSK X: ARRAY [0127] OF BOOL; ACYC HSK Y RES1 COMPLETED: BOOL; ACYC HSK Y RES2 COMPLETED: BOOL; ACYC HSK Y RES1 ACCEPTED: BOOL; ACYC HSK Y RES2 ACCEPTED: BOOL; IOD ALARM IND: ARRAY [0127] OF BOOL; IOD CONN STS: ARRAY [0127] OF BOOL; IOD ERR STS: ARRAY [0127] OF BOOL; END_STRUCT;	
VPN_ACYCLIC_RES1	tPN_ACYCLIC_RES: STRUCT RequestID: DWORD; ServiceID: WORD; Status: WORD; DeviceID: DWORD; DataLength: INT; ErrorDecode: WORD; ErrorCode1: WORD; ErrorCode2: WORD; Reserve: ARRAY [09] OF WORD; Data: ARRAY [0729] OF WORD; END_STRUCT;	Response buffer for acyclic communica- tion Note: this buffer does not contain I/O data. The I/O data is included in the DUTs/GVs specific to the configured I/O- devices
vPN_ACYCLIC_DIAG_INP UTS	tPN_ACYCLIC_DIAG_INPUTS: STRUCT ADV_DIAG_ERR_CODE: WORD; ADV_DIAG_ERR_CODE2: WORD; ADV_DIAG_ADD_INFO: ARRAY [017] OF WORD; CNF_CRC: ARRAY [01] OF WORD; IOD_ADV_STS: ARRAY [063] OF	Extended diagnostic information

	WORD; END_STRUCT;	
VPN_CYCLIC_INPUTS	tPN_CYCLIC_INPUTS: STRUCT <u>LIVE WORD X</u> : WORD; END_STRUCT;	Watchdog response for cyclic communi- cation
vPN_DEVICE_DETECT_D ATA This is the default type specified in the exported PLC code. User can change the type to the ex- tended version (see be- low).	tPN_DEVICE_DETECT_DATA: STRUCT VendorID: WORD:=0; DeviceID: WORD:=0; IP_Address: DWORD:=0; Subnetmask: DWORD:=0; Gateway: DWORD:=0; MAC_Address_Bytes1_2: WORD; MAC_Address_Bytes3_4: WORD; MAC_Address_Bytes5_6: WORD; END_STRUCT;	Basic type informati- on of the connected IO devices
vPN_DEVICE_DETECT_D ATA This type must be speci- fied for this global variable by the user, if the user sets the 'EXTENDED' in- put of the <u>function block</u> <u>'Net_Detect'</u> to 1.	tPN_DEVICE_DETECT_DATA: STRUCT VendorID: WORD:=0; DeviceID: WORD:=0; IP_Address: DWORD:=0; Subnetmask: DWORD:=0; Gateway: DWORD:=0; MAC_Address_Bytes1_2: WORD; MAC_Address_Bytes3_4: WORD; MAC_Address_Bytes5_6: WORD; Data: ARRAY [0134] OF WORD; END_STRUCT;	Extended type infor- mation of the connected IO devi- ces This type consists of the structure 'tPN_DEVICE_DETE CT_DATA' with an additional word array element to store ad- ditional device infor- mation.

208

The global variables are assigned to device addresses in the buffers, which the user has entered in the <u>'PLC Settings' dialog</u>.

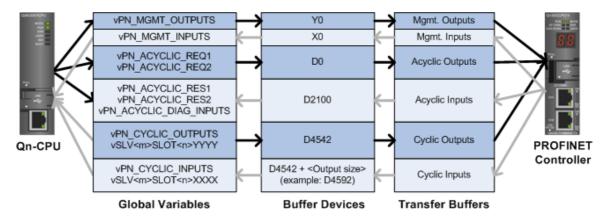
PLC Code for PROFINET Controller



Project CPU List 0x3E0: QnU CPU (PN) 0x3E1: PN Controller (Q12DC-V) 0x3E2: -			DEH Undete Deer			neters	
			Update		Controller	Status	
Output Devices (Qn- Buffer	Words	Start	End	Input Devices (Qn-C Buffer	Words	Start	End
		YO	Y75F	PROFINET Manag	e 112	X0	X6FF
PROFINET Manag	e 118	10	1121	I ROTAGET Manag			
	je 118 2100	D0	D2099	Acyclic Buffer	2442	D2100	D4541
PROFINET Manag						D2100 D4550	D4541 D4553

The automatic refresh executed by the Qn-CPU automatically copies the output contents from the buffer devices to the transfer buffers in shared memory and the input contents in the opposite direction. The global variables reference these buffer devices. Thus a read/write access by the PLC program to a global variable equals a read/write access to the respective buffer device.

The following diagram shows the relation between transfer buffers, devices and global variables.



With the default buffer device addresses as shown in the previous screenshot the export PLC code contains the following global variable definitions:

Identifier	Туре		
vPN_MGMT_OUTPUT S	Name IOC_START_STOP IOD_MGT_MODE IOD_START_STOP_DEV IOD_CMD_HSK_Y IOD_MGT_ALARM IOD_CONSIST IOD_INPUT_HSK_Y IOD_OUTPUT_HSK_Y ACYC_HSK_Y_REQ1_EXE ACYC_HSK_Y_REQ2_EXE	Y90 Y110 Y190 Y210 Y290	IEC-Addr.           %QX0           %QX16           %QX144           %QX272           %QX400           %QX528           %QX528           %QX656           %QX784           %QX12           %QX13

VAN ACYCLIC DEC4								
<pre>vPN_ACYCLIC_REQ1</pre>	Name		Туре		F-Addr.		IEC-Addr.	<b></b>
	RequestID	DWORD		D0		%MW	0.0	
	ServiceID	WORD		D2		%MWI	0.2	
	Status	WORD		D3		%MW		
	DeviceID	DWORD		D4		%MW		
								-
			DWORD D			%MW0.6		-
	SlotNumber	-	WORD D8			%MW		-
	SubslotNumber	WORD		D9		%MW	0.9	
	Index	WORD		D10		%MW	0.10	
	DataLength	INT		D11		%MWI	0.11	
	PNDeviceID	WORD		D12		%MWI		
	PNVendorID	WORD		D13		%MW		
	ARUUID		.7] OF WORD	D13		%MW		
	ANOULD	ANNAT [U	./JOF WOND	014		701MI W	.14	_
	Name		Туре	ыл	F-Addr.		IEC-Addr.	
<pre>vPN_ACYCLIC_REQ2</pre>			туре		Addr.	2/645.7		
	RequestID	DWORD		D750		%MW		
	ServiceID	WORD		D752		%MW		_
	Status	WORD		D753		%MW	0.753	
	DeviceID	DWORD		D754		%MW	0.754	
	API	DWORD		D756		%MW	0.756	
	SlotNumber	WORD		D758		%MW		
	SubslotNumber	WORD		D758		%MW		
								-
	Index	WORD		D760		%MW		_
	DataLength	INT		D761		%MW		_
	PNDeviceID	WORD		D762		%MW		
	PNVendorID	WORD		D763		%MW	0.763	
	ARUUID	ARRAY [0.	7] OF WORD	D764		%MW	0.764	-
VPN_CYCLIC_OUTPU	Name		Туре	N	/IT-Addr.		IEC-Addr.	
	LIVE WORD Y	WORD	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	D4542		2M	W0.4542	
TS		1		1				
vPN_MGMT_INPUTS	Name		Ty	pe	MIT-4	\ddr.	IEC-Addr.	
	IOC_STS_CONFIG_OK				×0	%IX0		
	IOC_STS_CONFIG_DOWN				X1		%IX1	
			BOOL		X2		%IX2	
	IOC_STS_KEYFILE_ERROR		BOOL X3				%IX3	- 1
	IOC_STS_STARTED	- <b>- -</b>						- 1
	IOC_STS_ERROR_DIAG_	SEI	BOOL		X10		%IX16	_
	IOC_STS_PLC_WD_ERR							
			BOOL		X11		%IX17	_
	IOD_CMD_HSK_X		ARRAY [0127	7] OF BOOL	×11 ×20		%IX17 %IX32	
								_
	IOD_CMD_HSK_X IOD_INPUT_HSK_X		ARRAY [0127	] OF BOOL	X20		%IX32	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X		ABBAY [0127 ABBAY [0127 ABBAY [0127	] OF BOOL	X20 XA0 X120		%IX32 %IX160 %IX288	_
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON		ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL	] OF BOOL	X20 XA0 X120 X1A0		%IX32 %IX160 %IX288 %IX416	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON	<b>IPLETED</b>	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL	] OF BOOL	X20 XA0 X120 X1A0 X1A1		%IX32 %IX160 %IX288 %IX416 %IX417	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON	<b>IPLETED</b>	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL	] OF BOOL	X20 XA0 X120 X1A0		%IX32 %IX160 %IX288 %IX416	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON	<b>IPLETED</b>	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL	] OF BOOL	X20 XA0 X120 X1A0 X1A1		%IX32 %IX160 %IX288 %IX416 %IX417	
VPN ACYCLIC RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON	<b>IPLETED</b>	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL	7] OF BOOL 7] OF BOOL	X20 XA0 X120 X1A0 X1A1		%IX32 %IX160 %IX288 %IX416 %IX417	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_COM ACYC_HSK_X_RES2_COM ACYC_HSK_X_RES1_ACC	<b>IPLETED</b>	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL	X20 XA0 X120 X1A0 X1A1 X1A8	%M	%IX32 %IX160 %IX288 %IX416 %IX417 %IX424	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_COM ACYC_HSK_X_RES2_COM ACYC_HSK_X_RES1_ACC Name	APLETED EPTED	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL 8001	X20 XA0 X120 X1A0 X1A1 X1A8		21X32 21X160 21X288 21X416 21X417 21X417 21X424 IEC-Addr.	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_COM ACYC_HSK_X_RES2_COM ACYC_HSK_X_RES1_ACC Name RequestID ServiceID	IPLETED EPTED DWORD WORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7) OF BOOL 7) OF BOOL 0F BOOL NO 0F BOOL NO NO NO NO NO NO NO NO NO NO NO NO NO	X20 XA0 X120 X1A0 X1A1 X1A8	%M	2tX32 2tX160 2tX288 2tX416 2tX417 2tX424 IEC-Addr. IW0.2100 IW0.2102	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status	IPLETED EPTED DWORD WORD WORD WORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7) OF BOOL 7) OF BOOL 0F BOOL	X20 XA0 X120 X1A0 X1A1 X1A8	%M %M	21X32 21X160 21X288 21X416 21X417 21X424 IEC-Addr. W0.2100 W0.2102 W0.2103	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID	APLETED EPTED DWORD WORD WORD WORD DWORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7) OF BOOL 7) OF BOOL 0F BOOL	X20 XA0 X120 X1A0 X1A1 X1A8	%M %M %M	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength	PLETED EPTED DWORD WORD WORD WORD DWORD INT	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL 7] OF BOOL 0 D2100 0 D2102 0 D2102 0 D2104 0 D2106	X20 XA0 X120 X1A0 X1A1 X1A8	%M %M %M %M	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2106	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode	MPLETED EPTED DWORD WORD WORD DWORD DWORD INT WORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL 7] OF BOOL 0 D2100 0 D2102 0 D2103 0 D2103 0 D2104 0 D2106 0 D2107	X20 XA0 X120 X1A0 X1A1 X1A8	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2106           IW0.2107	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1	MPLETED EPTED DWORD WORD WORD DWORD INT WORD WORD WORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL 7] OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2106 0 D2107 0 D2108	X20 XA0 X120 X1A0 X1A1 X1A8	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           WW0.2104           WW0.2106           IW0.2107           IW0.2108	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode	MPLETED EPTED DWORD WORD WORD DWORD INT WORD WORD WORD WORD	ARRAY (0.127 ARRAY (0.127 ARRAY (0.127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2106 0 D2107 0 D2108 0 D2109	X20 XA0 X120 X1A0 X1A1 X1A8	20 20 20 20 20 20 20 20 20 20 20 20 20 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2106           W0.2107           W0.2108           W0.2109	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1	MPLETED EPTED DWORD WORD WORD DWORD INT WORD WORD WORD WORD	ARRAY [0127 ARRAY [0127 ARRAY [0127 BOOL BOOL BOOL	7] OF BOOL 7] OF BOOL 7] OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2106 0 D2107 0 D2108	X20 XA0 X120 X1A0 X1A1 X1A8	20 20 20 20 20 20 20 20 20 20 20 20 20 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           WW0.2104           WW0.2106           IW0.2107           IW0.2108	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode2	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD WORD WORD ARBAY [I	ARRAY (0.127 ARRAY (0.127 ARRAY (0.127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2104 0 D2106 0 D2107 0 D2108 0 D2109 0 D2110	X20 XA0 X120 X1A0 X1A1 X1A8	20 20 20 20 20 20 20 20 20 20 20 20 20 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2106           W0.2107           W0.2108           W0.2109	
vPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD WORD WORD ARBAY [I	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2104 0 D2106 0 D2107 0 D2108 0 D2109 0 D2110	X20 XA0 X120 X1A0 X1A1 X1A8	20 20 20 20 20 20 20 20 20 20 20 20 20 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2105           IW0.2107           IW0.2108           IW0.2109           IW0.2110	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD WORD WORD ARBAY [I	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 0 D2100 0 D2102 0 D2103 0 D2104 0 D2104 0 D2106 0 D2107 0 D2108 0 D2109 0 D2110 10 D2120	X20 XA0 X120 X1A0 X1A1 X1A8	20 20 20 20 20 20 20 20 20 20 20 20 20 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2105           IW0.2107           IW0.2108           IW0.2109           IW0.2110	
VPN_ACYCLIC_RES1	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data	IPLETED EPTED WORD WORD DWORD DWORD INT WORD WORD WORD ARRAY [ ARRAY [	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 0 D2100 0 D2102 0 D2102 0 D2103 0 D2104 0 D2106 0 D2107 0 D2109 0 D2110 0 D2120	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2106           W0.2107           W0.2108           W0.2109           W0.2110           W0.2120	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID Status DeviceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data	MPLETED EPTED DWORD WORD WORD DWORD WORD WORD ARRAY [ ARRAY [	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8 02100 02100 02102 02103 02104 02106 02107 02108 02109 02110 02109 02110 02120 02120	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2106           IW0.2107           IW0.2108           IW0.2109           IW0.2101           IW0.2102           IW0.2108           IW0.2109           IW0.2101           IW0.2120           IEC-Addr.           IEC-Addr.	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode1 ErrorCode2 Reserve Data	MPLETED EPTED DWORD WORD WORD DWORD WORD WORD ARRAY [ ARRAY [ DWORD WORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8 02100 02100 02102 02103 02104 02106 02107 02108 02109 02109 02110 02110 02120 02120 02120	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2105           IW0.2106           IW0.2107           IW0.2108           IW0.2110           IW0.2110           IW0.2120           IW0.2120           IEC-Addr.           IEC-Addr.           IEC-Addr.	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC ACYC_HSK_X_RES1_ACC ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status	MPLETED EPTED DWORD WORD WORD DWORD WORD WORD ARRAY [ ARRAY [ ARRAY [ DWORD WORD WORD WORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 7) OF BOOL 9 02100 02100 02102 02103 02104 02106 02107 02108 02109 02110 02110 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02120 02100 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 0210 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 02102 0210 02102 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0210 0	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX424           IEC-Addr.           IW0.2100           IW0.2102           IW0.2103           IW0.2104           IW0.2106           IW0.2107           IW0.2108           IW0.2109           IW0.2120           IW0.2120           IW0.2120           IW0.2105           IW0.2106           IW0.2107           IW0.2108           IW0.2109           IW0.2120           IW0.2120           IW0.2120	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID Status DeviceID Status DeviceID	IPLETED EPTED DWORD WORD WORD DWORD INT WORD WORD ARRAY [ ARRAY [ ARRAY [ DWORD WORD WORD WORD WORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 7) OF BOOL 7) OF BOOL 8) OF 8) OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	200 200 200 200 200 200 200 200 200 200	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2103           W0.2104           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           IEC-Addr.           W0.2100           W0.2101           W0.2102           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2120           IEC-Addr.           W0.2850           W0.2852           W0.2853           W0.2854	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD ARRAY [I ARRAY [I DWORD WORD WORD WORD WORD WORD WORD WOR	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8] OF 8] OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 % M 2 % M	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           IEC-Addr.           IW0.2120           IEC-Addr.           IW0.2850           IW0.2852           IW0.2853           IW0.2854           IW0.2856	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID Status DeviceID Status DeviceID	IPLETED EPTED DWORD WORD WORD DWORD INT WORD WORD ARRAY [ ARRAY [ ARRAY [ DWORD WORD WORD WORD WORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7) OF BOOL 7) OF BOOL 7) OF BOOL 7) OF BOOL 7) OF BOOL 8) OF 8) OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 % M 2 % M	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2103           W0.2104           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           IEC-Addr.           W0.2100           W0.2101           W0.2102           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2120           IEC-Addr.           W0.2850           W0.2852           W0.2853           W0.2854	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES2_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status DeviceID Status	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD ARRAY [I ARRAY [I DWORD WORD WORD WORD WORD WORD WORD WOR	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8] OF 8] OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 2 M 2 2 M 2 2 M 2 M 2 M 2 M 2 M 2 M 2	%IX32           %IX160           %IX288           %IX416           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           IEC-Addr.           IW0.2120           IEC-Addr.           IW0.2850           IW0.2852           IW0.2853           IW0.2854           IW0.2856	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorDecode ErrorCode1	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD WORD ARRAY [I ARRAY [I DWORD WORD WORD WORD WORD WORD INT WORD WORD DWORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8] OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 2 M 2 2 M 2 2 M 2 M 2 M 2 M 2 M 2 M 2	%IX32           %IX160           %IX288           %IX4160           %IX416           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2109           W0.2120           IEC-Addr.           W0.2850           W0.2852           W0.2853           W0.2854           W0.2856           W0.2857           W0.2858	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data ServiceID Status DeviceID DataLength ErrorDecode ErrorCode1 ErrorCode1 ErrorCode1 ErrorCode1 ErrorCode1 ErrorCode1 ErrorCode2	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD ARRAY [I ARRAY [	ARRAY (0127 ARRAY (0127 ARRAY (0127 BOOL BOOL Type	7] OF BOOL 7] OF	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 2 M 2 2 M 2 2 M 2 M 2 M 2 M 2 M 2 M 2	%IX32           %IX160           %IX288           %IX416           %IX416           %IX417           %IX417           %IX417           %IX417           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2107           W0.2108           W0.2109           W0.2109           W0.2110           W0.2120           IEC-Addr.           IW0.2850           IW0.2852           IW0.2853           IW0.2854           IW0.2855           IW0.2856           IW0.2858           IW0.2858           IW0.2859	
	IOD_CMD_HSK_X IOD_INPUT_HSK_X IOD_OUTPUT_HSK_X ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_CON ACYC_HSK_X_RES1_ACC Name RequestID ServiceID DataLength ErrorDecode ErrorCode1 ErrorCode2 Reserve Data Name RequestID ServiceID Status DeviceID DataLength ErrorDecode ErrorDecode ErrorCode1	MPLETED EPTED DWORD WORD DWORD INT WORD WORD WORD ARRAY [ ARRAY [ DWORD WORD WORD INT WORD WORD WORD INT WORD WORD WORD WORD WORD WORD	ARRAY (0127 ARRAY (0127 BOOL BOOL BOOL Type	7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 7] OF BOOL 8 8 9 9 9 10 10 10 10 10 10 10 10 10 10	X20 XA0 X120 X1A0 X1A1 X1A8 4IT-Addr.	2 2 M 2 2 M 2 M 2 M 2 M 2 M 2 M 2 M 2 M	%IX32           %IX160           %IX288           %IX4160           %IX416           %IX417           %IX417           %IX424           IEC-Addr.           W0.2100           W0.2102           W0.2103           W0.2104           W0.2107           W0.2108           W0.2109           W0.2101           W0.2102           W0.2103           W0.2104           W0.2105           W0.2107           W0.2108           W0.2109           W0.2109           W0.2120           IEC-Addr.           W0.2850           W0.2852           W0.2853           W0.2854           W0.2856           W0.2857           W0.2858	

# PLC Code for PROFINET Controller

211
-----

<pre>vPN_ACYCLIC_DIAG_I NPUTS</pre>	Name	Туре	MIT-Addr.	IEC-Addr.
	ADV_DIAG_ERR_CODE	WORD	D3600	%MW0.3600
INFUI3	ADV_DIAG_ERR_CODE2	WORD	D3601	%MW0.3601
	ADV_DIAG_ADD_INFO	ARRAY [017] OF WORD	D3602	%MW0.3602
	CNF_CRC	ARRAY [01] OF WORD	D3876	%MW0.3876
	IOD_ADV_STS	ARRAY [063] OF WORD	D3878	%MW0.3878
		-		
<pre>vPN_CYCLIC_INPUTS</pre>	Name	Туре	MIT-Addr.	IEC-Addr.
	LIVE_WORD_X	WORD	D4592	%MW0.4592

# 9 Appendix

# 9.1 Troubleshooting

## 9.1.1 Factory Default Settings

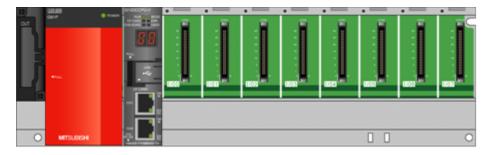
#### Problem

The ME1PN1FW-Q cannot be accessed from GX Configurator-PN, although network address settings and cabling are correct.

#### Solution

To reset the ME1PN1FW-Q to its factory default settings execute the following operations.

**Important:** the ME1PN1FW-Q must be placed alone in the first slot (marked 'CPU') of the PLC backplane and the CF card must be removed from its card reader slot! ).



**Note**: the position of the LEDs and the switches is indicated in the section '<u>PROFINET Controller</u> <u>ME1PN1FW-Q</u>'.

1. set the MODE/STOP/RUN switch on the front to the MODE position

2. reset the module by setting the RESET/SELECT switch to the RESET position and then back to the middle position or power-cycle the CPU

3. confirm that the mode LED shows an orange light and the 7-segment LED displays '00'

4. set the MODE/STOP/RUN switch to the STOP position

5. set the RESET/SELECT switch to the SELECT position multiple times, until the 7-segment display displays '11'

6. set the MODE/STOP/RUN switch to the RUN position

7. confirm that the **green** RUN LED is flashing first and then turns off with the 7-segment LED displaying '00'

8. set the MODE/STOP/RUN switch to the STOP position

9. reset the module by setting the RESET/SELECT switch to the RESET position and then back to the middle position

10. confirm that the MODE LED shows a steady **green** light and both RUN and USER LEDs show a flashing **green** light

11. confirm that after a while both RUN and USER LEDs turn off and the MODE LED flashes green

**Note**: for the following steps the controlling Qn-CPU can be inserted into the PLC rack and the PROFINET Controller module can be moved to the slot next to it, after power has been turned off.

Activate the PROFINET functionality on the ME1PN1FW-Q with these operations

1. insert the CF card with the PROFINET I/O software and reset the module.

2. wait, until the 7-segment LED shows 'AA'

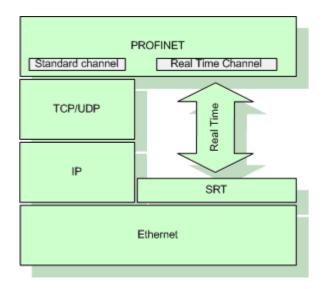
3. start GX Configurator-PN and download the configuration (this includes setting the IP address from the default setting 192.168.3.3 to the address assigned in the GX Configurator-PN project)

# 9.2 Introduction to PROFINET IO

PROFINET is an industrial communications protocol based on Ethernet which was created by PROFIBUS International. Depending on the tasks to be carried out, PROFINET uses different communication layers of the OSI model:

- ✓ Layer 4 (transport): "TCP/UDP" for all configuration exchanges.
- ✓ Layer 2 (Link): "Ethernet" for process data exchanges such as inputs/outputs and alarms.

The network controller is called the IO-Controller (Master) and the Devices called IO-Device (Slave). With PROFINET, different network topologies may be realized. The most common are the star and the bus.



### **Protocols Used by PROFINET**

#### **Discovery and basic Configuration Protocol (DCP)**

This protocol is based on Ethernet (level 2). Amongst other things it enables the presence of an IO-Device to be detected on the network and its IP configuration to be read or written. This protocol will be mainly used in two phases:

- Network configuration: assignment of names and IP addresses to the IO-Devices.
- Establishing a connection: detection of the presence of the IO-Device and the control/adaptation of its IP address

#### **Remote Procedure Call (RPC)**

This protocol is based on TCP/UDP. It is used to execute the connection phase to an IO-Device together with all data block read/write accesses.

#### Real Time Acyclic (RTA)

This protocol is based on Ethernet (level 2). This protocol is used to exchange alarms between the IO-Device and the IO-Controller.

#### Real Time Cyclic (RTC)

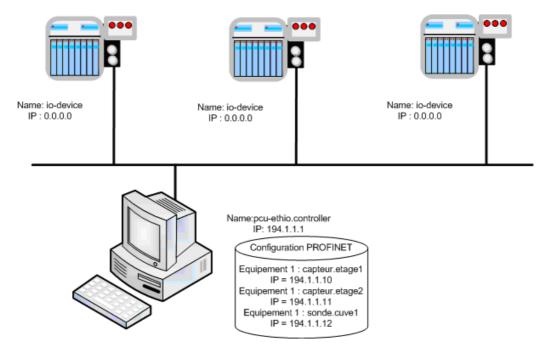
This protocol is based on Ethernet (level 2). This protocol is used to exchange cyclic input/output data.

#### Addressing of PROFINET components on the Ethernet network

The DCP protocol is used to detect the presence of a PROFINET station on the network. DCP is a layer 2 protocol (Ethernet). For this reason it does not use IP addressing to find PROFINET components, but their PROFINET name. One of the features of the PROFINET protocol is that each PROFINET component must be named. This name is known as its PROFINET name (DCP Name). Then once the component has been identified on the network, DCP gives the option of assigning the IP configuration of the IO-Device. This addressing is mandatory as PROFINET uses TCP/UDP and IP layers.

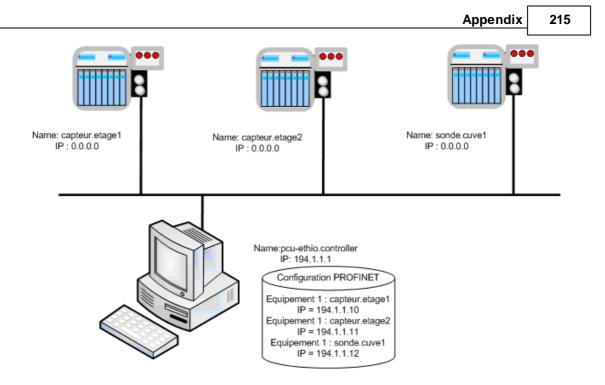
When a PROFINET network is installed, the first thing to do is to name all the IO-Devices present on the network uniquely. This task can be carried out using the '<u>Online Action Tool</u>' in GX Configurator-PN.

A newly-wired PROFINET network:



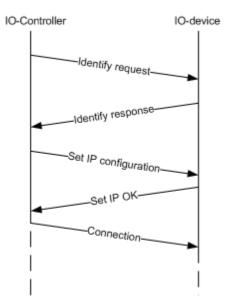
Note that at startup, each IO-Device has the same name and same IP address.

A PROFINET network with IO-Devices named correctly from the engineering tool:

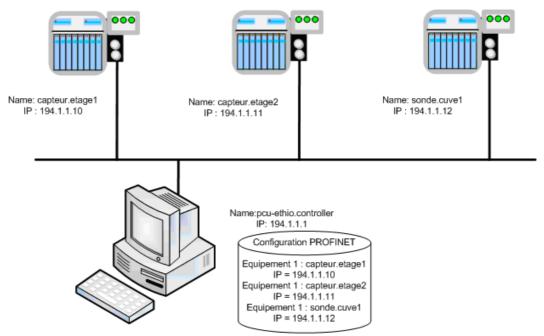


Note that all the IO-Devices present have a unique name (sensor.stage1, sensor.stage2 and probe.tank1). However, the IP addresses of these IO-Devices remain set to 0.0.0.0.

During a connection phase, the IO-Controller starts by searching for an IO-Device using a multicast request commonly called "identify". When the IO-Device replies, the IO-Controller checks if the IP parameters of the IO-Device are definitely those configured. If not, then the IP-Controller assigns the correct IP configuration to the IO-Device. Once this sequence has been completed, the IO-Controller will be able to establish a connection with the IO-Device.



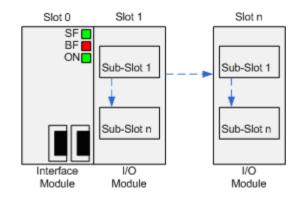
A PROFINET network with IO-Devices connected to an IO-Controller:



During the connection, the IO-Controller assigns the IP address to each of the IO-Devices. After this, the PROFINET network is correctly configured. IP address conflicts have been avoided. The whole of this sequence is made possible by the DCP protocol.

# Architecture of an IO-Device

The PROFINET IO input/output devices obey a uniform device model. This model allows compact field devices to be configured as modules.



A PROFINET IO input/output device is made up of slots, themselves made up of sub-slots. The input/output data is situated at sub-slot level. This organization may reflect a real or virtual situation. In addition to the input/output modules, each IO-Device contains at least one DAP (Device Access Point). To establish a connection, the IO-Controller connects to the DAP. The standard defines the DAP as an input module like any other. However, the DAP is often a module found on slot 0 of the IO-Device with an output size equal to 0.

A PROFINET IO-Device is configured by means of a GSD file. This file, in XML format, concentrates all the features and essential data in one place:

- Properties of the device (transmission parameters, etc.)
- Number and size of compatible modules
- Configuration of each module
- Module parameters

The GSD files are provided by the manufacturer of your equipment.

#### Data Exchange (I/O)

The exchange of input/output data in PROFINET-IO is based on the producer/consumer model. This model is asynchronous. The IO-Controller produces outputs for the IO-Device and the IO-Controller consumes inputs from the IO-Device and vice versa.

The refresh period determines the production/consumption time. This time is defined for each IO-Device. In a complete configuration, the network cycle time is equivalent to the largest refresh period of the configuration.

#### Example

IO-Device Name	Refresh Period
io-device1	8 ms
io-device2	32 ms
io-device3	16 ms

In the case of configuration 1, the largest refresh period is 32 ms (io-device2). The network cycle time is 32 ms. This means that every 32 ms, all inputs/outputs will have been refreshed at least once. The diagnostic model of PROFINET input/output exchanges defines, in addition to process data, IOxS (IOPS or IOCS) typed data:

#### IOPS - Input Output Object Provider Status

An IOPS is associated with the input/outputs from each slot/sub-slot. This status indicates the quality of the data produced from each slot/sub-slot to the consumer.

- The possible values are:
- GOOD (0x80)
- BAD_BY_DEVICE (0x60)
- BAD_BY_CONTROLLER (0x40)
- BAD_BY_SUBSLOT (0x00)

#### IOCS - Input Output Object Consumer Status

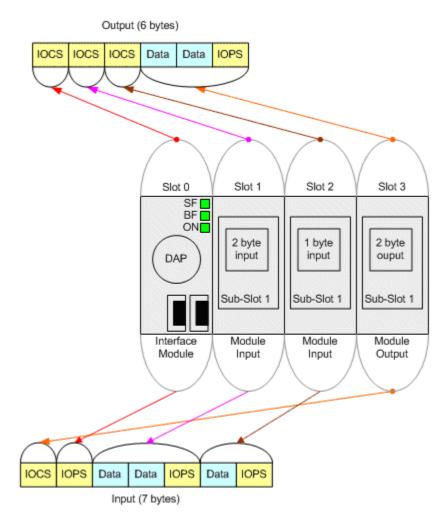
An IOCS is associated with the input/outputs from each slot/sub-slot. This status indicates the quality of the data consumed at each slot/sub-slot to the producer.

The possible values are:

- GOOD (0x80)
- BAD_BY_DEVICE (0x60)
- BAD_BY_CONTROLLER (0x40)
- BAD_BY_SUBSLOT (0x00)

The representation of the inputs/outputs of an IO-Device in engineering tool includes the process data (I/O data) and the diagnostic data (IOPS and IOCS).

Example 1: The inputs/outputs of an IO-Device contains the process data (I/O data) and the diagnostic data (IOPS and IOCS)



In the example above, the IO-Device is made up of:

- 1 2-byte input module
- 1 1-byte input module
- 1 2-byte output module

For the IO-Device taken in the example, with 2 process output bytes and 3 input bytes, the IO-Controller has to manage 7 input bytes and 6 output bytes.

		Slot 0			Slot 0			Slot 0			Slot (	)
	IOPS	IOCS	data	IOPS	IOCS	data	IOPS	IOCS	data	IOPS	IOC S	data
Output = 6 bytes		1			1			1		1		2
Input = 7 bytes	1		0	1		2	1		1		1	

# Index

# 7

7-Segment LED Display 56

Backup 124 Big Endian 136

С

configuration description128Configuraton Manager124

D

'Data Unit Types' (DUTs)205DCP100, 108device library89device name105DHCP100diagnostic mode105Duplicate Configuration126

Е

events log 123 Exit 87 Export 146

Function Block 'Alarm_Ack' 199 Function Block 'Alarm_Log' 201 Function Block 'Alarm_Request' 196 Function Block 'IO_Device_Info' 203 Function Block 'Net_Detect' 187 Function Block 'Read_Rec_Ex' 194 Function Block 'Read_Rec_Im' 190 Function Block 'Write Rec Ex' 192 **Function Blocks** 187



global variables 205

GSDML 92

Installation 59 IO Documentation 146 IP Address Manager 111 'Items Declaration' 119

# L

Little Endian 136 Log File Size 123

# M

Module Information145Module Parameters143modules134

# Ρ

PLC Settings 146 Preview 86 Print 86 Project menu 86 projects 124

R

Refresh Period 136 Rename 127 Restore 124 RPC 108 RTA 108

# S

Save 86 Scan 111 Starting I/O number 146

Watchdog 136



AITSUBISHI ELECTRIC EUROPE B.V.	EUROPE
erman Branch iothaer Straße 8	
)-40880 Ratingen 'hone: +49 (0)2102 / 486-0	
ax: +49 (0)2102 / 486-1120	
zech Branch	ZECH REP.
adlická 751/113e Avenir Business Park <b>Z-158 00 Praha 5</b>	
'hone: +420 251 551 470 ax: +420 251 551 471	
AITSUBISHI ELECTRIC EUROPE B.V.	FRANCE
rench Branch 5, Boulevard des Bouvets	
-92741 Nanterre Cedex	
'hone: +33 (0)1 / 55 68 55 68 'ax: +33 (0)1 / 55 68 57 57	
AITSUBISHI ELECTRIC EUROPE B.V. rish Branch	IRELAND
Vestgate Business Park, Ballymount	
<b>RL-Dublin 24</b> 'hone: +353 (0)1 4198800	
ax: +353 (0)1 4198890	
AITSUBISHI ELECTRIC EUROPE B.V. talian Branch	ITALY
'iale Colleoni 7 Palazzo Sirio - <b>20864 Agrate Brianza (MB)</b>	
hone: +39 039 / 60 53 1 ax: +39 039 / 60 53 312	
NITSUBISHI ELECTRIC EUROPE B.V.	POLAND
olish Branch I. Krakowska 50	
<b>L-32-083 Balice</b> hone: +48 (0) 12 630 47 00	
ax: +48 (0) 12 630 47 01	
AITSUBISHI ELECTRIC EUROPE B.V. Jussian Branch	RUSSIA
2, bld. 3 Kosmodamianskaya nab 8 floor	
<b>:U-115054 Moscow</b> hone: +7 495 / 721 2070	
ax: +7 495 / 721 2071	<b>CD</b> 410
AITSUBISHI ELECTRIC EUROPE B.V. panish Branch	SPAIN
arretera de Rubí 76-80 Apdo. 420 <b>-08190 Sant Cugat del Vallés (Barce</b>	lona)
hone: +34 (0) 93 / 5653131 ax: +34 (0) 93 / 5891579	
NITSUBISHI ELECTRIC SCANDINAVIA	SWEDEN
wedish Branch jelievägen 8	
<b>E-22736 Lund</b> hone: +46 (0) 8 625 10 00	
ax: +46 (0) 46 39 70 18	
AITSUBISHI ELECTRIC TÜRKIYE abrika Otomasyonu Merkezi	TURKEY
erifali Mahallesi Nutuk Sokak No.5	
R-34775 Umraniye-ISTANBUL	
hone: +90 (0)216 / 526 39 90	
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95	114
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 NITSUBISHI ELECTRIC EUROPE B.V. K Branch	UK
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 ITTSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane K-Hatfield, Herts. AL10 8XB	UK
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 IITSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane K-Hatfield, Herts, AL10 8XB hone: +44 (0)1707 / 28 87 80	UK
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 IITSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane K-Hatfield, Herts. AL10 8XB hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 IITSUBISHI ELECTRIC EUROPE B.V.	UK
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 INTSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane <b>IK-Hatfield, Herts, AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 INTSUBISHI ELECTRIC EUROPE B.V. ubai Branch	
hone: +90 (0)216 / 526 39 90 hone: +90 (0)216 / 526 39 95 ITTSUBISHI ELECTRIC EUROPE B.V. K Branch avellers Lane <b>K-Hatfield, Herts. AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 hone: +44 (0)1707 / 28 695 ITTSUBISHI ELECTRIC EUROPE B.V. ubai Silicon Oasis nited Arab Emirates - Dubai	
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 MTSUBISHI ELECTRIC EUROPE B.V. IK Branch ravellers Lane <b>IK-Hatfield, Herts. AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 MITSUBISH ELECTRIC EUROPE B.V. uubai Stanch rubai Silicon Oasis <b>Inited Arab Emirates - Dubai</b> hone: +971 4 3724716 ax: +971 4 3724721	
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 MITSUBISHI ELECTRIC EUROPE B.V. IK Branch ravellers Lane <b>IK-Hatfield, Herts, AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 MITSUBISHI ELECTRIC EUROPE B.V. ubai Branch ubai Silicon Oasis <b>Inited Arab Emirates - Dubai</b> hone: +971 4 3724716 ax: +971 4 3724721 MITSUBISHI ELECTRIC CORPORATION	UAE
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 ITSUBISHI ELECTRIC EUROPE B.V. K Branch Ak Hatfield, Herts. AL10 8XB hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 ITSUBISHI ELECTRIC EUROPE B.V. ubai Branch ubai Silicon Oasis <b>nited Arab Emirates - Dubai</b> hone: +971 4 3724716 ax: +971 4 3724716 ax: +971 4 3724721 ITSUBISHI ELECTRIC CORPORATION okyo Building 2-7-3 larunouchi, Chiyoda-ku	
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 ITSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane <b>IK-Hatfield, Herts. AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 ITSUBISHI ELECTRIC EUROPE B.V. ubai Branch ubai Silicon Oasis <b>nited Arab Emirates - Dubai</b> hone: +971 4 3724716 ax: +9714 3724716 ax: +9714 3724721 ITSUBISHI ELECTRIC CORPORATION okyo Building 2-7-3 Iarumouchi, Chiyoda-ku okyo <b>100-8310</b> hone: +81 (3) 3218-2111	UAE
hone: +90 (0)216 / 526 39 90 ax: +90 (0)216 / 526 39 95 ITSUBISHI ELECTRIC EUROPE B.V. K Branch ravellers Lane <b>IK-Hatfield, Herts. AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 28 87 80 ax: +44 (0)1707 / 27 86 95 ITSUBISHI ELECTRIC EUROPE B.V. ubai Silicon Oasis Inited Arab Emirates - Dubai hone: +971 4 3724716 ax: +971 4 3724716 ax: +971 4 3724721 ITSUBISHI ELECTRIC CORPORATION bkyo Building 2-7-3 tarunouchi, Chiyoda-ku okyo 100-8310 hone: +81 (3) 3218-2111 ax: +81 (3) 3218-2185	UAE
hone: +90 (0)216 / 526 39 90 ix: +90 (0)216 / 526 39 95 ITSUBISHI ELECTRIC EUROPE B.V. K Branch avellers Lane K Hatfield, Herts. AL10 8XB hone: +44 (0)1707 / 28 87 80 ix: +44 (0)1707 / 28 86 95 ITSUBISHI ELECTRIC EUROPE B.V. ubai Stranch ubai Silicon Oasis nited Arab Emirates - Dubai hone: +971 4 3724716 ix: +971 4 3724716 ix: +971 4 3724721 ITSUBISHI ELECTRIC CORPORATION kyo Building 2-7-3 larunouchi, Chyoda-ku okyo 100-8310 hone: +81 (3) 3218-2111 ix: +81	UAE
hone: +90 (0)216 / 526 39 90 ix: +90 (0)216 / 526 39 95 ITSUBISHI ELECTRIC EUROPE B.V. K Branch aveilers Lane <b>K-Hatfield, Herts. AL10 8XB</b> hone: +44 (0)1707 / 28 87 80 ix: +44 (0)1707 / 28 87 80 ix: +44 (0)1707 / 28 87 80 ix: +44 (0)1707 / 28 89 ITSUBISHI ELECTRIC EUROPE B.V. ubai Silicon Oasis nited Arab Emirates - Dubai hone: +971 4 3724716 ix: +9714 3724721 ITSUBISHI ELECTRIC CORPORATION kyo Building 2-7-3 larumouchi, Chiyoda-ku okyo 100-8310 hone: +81 (3) 3218-2111	UAE

EUROPEAN REPRES	ENTATIVES
GEVA Niener Straße 89	AUSTRIA
<b>A-2500 Baden</b> Phone: +43 (0)2252 / 85 55 20	
Fax: +43 (0)2252 / 488 60	
DOO TECHNIKON Prospect Nezavisimosti 177-9	BELARUS
<b>3Y-220125 Minsk</b> Phone: +375 (0)17 / 393 1177	
Fax: +375 (0)17 / 393 0081	
ESCO DRIVES Culliganlaan 3	BELGIUN
<b>3E-1831 Diegem</b> Phone: +32 (0)2 / 717 64 60 Fax: +32 (0)2 / 717 64 61	
ONING & HARTMAN B.V.	BELGIUN
Woluwelaan 31 <b>3E-1800 Vilvoorde</b>	
Phone: +32 (0)2 / 257 02 40 Fax: +32 (0)2 / 257 02 49	
NEA RBT d.o.o. BOSNIA A Stegne 11	ND HERZEGOVINA
<b>51-1000 Ljubljana</b> Phone: +386 (0)1/ 513 8116 Fax: +386 (0)1/ 513 8170	
AKHNATON	BULGARIA
4, Andrei Ljapchev Blvd., PO Box 3 3 <b>G-1756 Sofia</b>	21
Phone: +359 (0)2 / 817 6000 Fax: +359 (0)2 / 97 44 06 1	
NEA CR	CROATIA
.osinjska 4 a <b>IR-10000 Zagreb</b>	
Phone: +385 (0)1 / 36 940 - 01/ Fax: +385 (0)1 / 36 940 - 03	-02/ -03
AutoCont C. S. S.R.O.	CZECH REPUBLIC
(afkova 1853/3 <b>52-702 00 Ostrava 2</b>	
Phone: +420 595 691 150 Fax: +420 595 691 199	
Beijer Electronics A/S	DENMARK
ykkegardsvej 17 DK-4000 Roskilde	
Phone: +45 (0)46/ 75 76 66 Fax: +45 (0)46 / 75 56 26	
HANS FØLSGAARD A/S	DENMARK
Theilgaards Torv 1 D <b>K-4600 Køge</b>	
Phone: +45 4320 8600 Fax: +45 4396 8855	
Beijer Electronics Eesti OÜ	ESTONIA
Pärnu mnt.160i E <b>E-11317 Tallinn</b>	
Phone: +372 (0)6 / 51 81 40 Fax: +372 (0)6 / 51 81 49	
Beijer Electronics OY	FINLAND
/anha Nurmijärventie 62 FIN-01670 Vantaa	
Phone: +358 (0)207 / 463 500 Fax: +358 (0)207 / 463 501	
PROVENDOR OY	FINLAND
feljänkatu 8 A3 F <b>IN-28130 Pori</b>	
Phone: +358 (0) 2 / 522 3300 Fax: +358 (0) 2 / 522 3322	
TECO A.B.E.E.	GREECI
5, Mavrogenous Str. 5 <b>R-18542 Piraeus</b>	
Phone: +30 (0)211 / 1206-900	
Fax: +30 (0)211 / 1206-999 MELTRADE Kft.	HUNGARY
ertő utca 14.	nonoani
<b>HU-1107 Budapest</b> Phone: +36 (0)1 / 431-9726	
Fax: +36 (0)1 / 431-9727	

EUROPEAN REPRESE	NTATIVES	EURASIAN REPRESENTATIVES
Beijer Electronics SIA Ritausmas iela 23 <b>LV-1058 Riga</b> Phone: +371 (0)6 / 784 2280 Fax: +371 (0)6 / 784 2281	LATVIA	TOO Kazpromavtomatika UL. ZHAMBYLA 28, KAZ-100017 Karaganda Phone: +7 7212 / 50 10 00 Fax: +7 7212 / 50 11 50
Beijer Electronics UAB Goštautų g. 3	LITHUANIA	
<b>.T-48324 Kaunas</b> Phone: +370 37 262707		MIDDLE EAST REPRESENTATIVE
ax: +370 37 455605 ALFATRADE Ltd. J9, Paola Hill <b>Malta-Paola PLA 1702</b> Phone: +356 (0)21 / 697 816	MALTA	I.C. SYSTEMS Ltd. EGYF 23 AI-Saad-AI-Alee St. EG-Sarayat, Maadi, Cairo Phone: +20 (0) 2 / 235 98 548 Fax: +20 (0) 2 / 235 96 625
ax: +356 (0)21 / 697 817 NTEHSIS SRL Id. Traian 23/1 <b>AD-2060 Kishinev</b> rhone: +373 (0)22 / 66 4242	MOLDOVA	GIRIT CELADON Ltd. ISRAI 12 H'aomanut Street IL-42505 Netanya Phone: +972 (0)9 / 863 39 80 Fax: +972 (0)9 / 885 24 30
ax: +373 (0)22 / 66 4280 IIFLEX AUTOM. B.V. Volweverstraat 22 <b>IL-2984 CD Ridderkerk</b> Phone: +31 (0)180 / 46 60 04 ax: +31 (0)180 / 44 23 55	NETHERLANDS	ILAN & GAVISH Ltd. ISRAI 24 Shenkar St., Kiryat Ariet IL-49001 Petah-Tikva Phone: +972 (0)3 / 922 18 24 Fax: +972 (0)3 / 924 0761
AX. +31 (0)100 / 4423 33 (ONING & HARTMAN B.V. laarlerbergweg 21-23 <b>IL-1101 CH Amsterdam</b> (hone: +31 (0)20 / 587 76 00 ax: +31 (0)20 / 587 76 05	NETHERLANDS	CEG LIBAN LEBANO Cebaco Center/Block A Autostrade DORA Lebanon-Beirut Phone: +961 (0)1 / 240 445 Fax: +961 (0)1 / 240 193
Beijer Electronics AS	NORWAY	
Postboks 487 <b>NO-3002 Drammen</b> Phone: +47 (0)32 / 24 30 00 Fax: +47 (0)32 / 84 85 77		AFRICAN REPRESENTATIVE
onseca S.A. . João Francisco do Casal 87/89 <b>T-3801-997 Aveiro, Esgueira</b> hone: +351 (0)234 / 303 900 ax: +351 (0)234 / 303 910	PORTUGAL	20 Waterford Office Park 189 Witkoppen Road <b>ZA-Fourways</b> Phone: + 27 (0)11 / 658 8100 <u>Fax:</u> + 27 (0)11 / 658 8101
IRIUS TRADING & SERVICES SRL leea Lacul Morii Nr. 3 <b>80-060841 Bucuresti, Sector 6</b> hone: +40 (0)21 / 430 40 06 ax: +40 (0)21 / 430 40 02	ROMANIA	
NEA SR zletnicka 10 <b>ER-113000 Smederevo</b> hone: +381 (0)26 / 615 401 ax: +381 (0)26 / 615 401	SERBIA	
IMAP SK (Západné Slovensko) ána Derku 1671 <b>K-911 01 Trenčín</b> Phone: +421 (0)32 743 04 72 ax: +421 (0)32 743 75 20	SLOVAKIA	
NEA RBT d.o.o. tegne 11 5 <b>I-1000 Ljubljana</b> Phone: +386 (0)1 / 513 8116 Fax: +386 (0)1 / 513 8170	SLOVENIA	
Beijer Electronics Automation AB Box 426 <b>SE-20124 Malmö</b> Phone: +46 (0)40 / 35 86 00 Fax: +46 (0)40 / 93 23 01	SWEDEN	
DMNI RAY AG m Schörli 5 <b>CH-8600 Dübendorf</b> Phone: +41 (0)44 / 802 28 80 Fax: +41 (0)44 / 802 28 28	SWITZERLAND	
000 "CSC-AUTOMATION" 1-B, M. Raskovoyi St. J <b>JA-02660 Kiev</b> Phone: +380 (0)44 / 494 33 44 Fax: +380 (0)44 / 494-33-66	UKRAINE	

# KAZAKHSTAN omatika .o, **iraganda** / 50 10 00 0 11 50 AST REPRESENTATIVE EGYPT . ee St. **adi, Cairo** 2 / 235 98 548 235 96 625 td. ISRAEL reet **iya** 9 / 863 39 80 885 24 30 ISRAEL b td. Ciryat Ariet 1**-Tikva** 3 / 922 18 24 924 0761 LEBANON ock A Autostrade DORA t 1 / 240 445 240 193

# N REPRESENTATIVE OGIES SOUTH AFRICA 11 / 658 8100 ' 658 8101