

Profibus Remote Master Library V1

a SoCollaborative library User Manual

04/2010



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Safety Information

Important Information

NOTICE

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



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



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

DANGER

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

WARNING

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

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result in** injury or equipment damage.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

PLEASE NOTE

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

About the Book

Document Scope

This manual describes the PRM library dedicated to the Profibus Remote Master (PRM) module.

Related Documents

- The PRM user manual available as an online help from the PRM Master DTM and also as a PDF file in the PRM CD-ROM.

This manual must be read before, especially the chapters about the exchanges from the PLC and variables, and the PRM start.

- The UnityPro online help, especially the chapters about the Type Library Manager

Validity Note

The data and illustrations found in this book are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Product related Warnings

Schneider Electric assumes no responsibility for any errors that may appear in this document. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When controllers are used for applications with technical safety requirements, please follow the relevant instructions.

Failure to use Schneider Electric software or approved software with our hardware products may result in improper operating results.

Failure to observe this product related warning can result in injury or equipment damage.

User Comments

We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Introduction

Presentation

The PRM library has been designed to provide the following ready-to-use services to the PLC application:

- start the PRM (mandatory)
- get a full diagnostic of the PRM (optional)
- do explicit exchanges with a Profibus slave to read or write a process data record or to get the diagnosis status, in class 1 or in class 2 (optional)
- send SYNC and FREEZE commands to a group of Profibus slaves (optional)

Compatibility

The PRM library V1 offer is compatible with the following versions:

- Unity Pro V5.0 or later
- PRM V1.0
- Premium, Quantum and M340 PLCs; refer to the Release Notes delivered in the PRM CD-ROM for a precise description of the versions to be used.

Glossary

Term	Definition
PRM	Profibus Remote Master
DFB	Derived Function Block
DDT	Derived Data Types

Installation of the library

The library is installed using a dedicated setup.

During the setup phase it is mandatory to close all running instances of Unity Pro on your PC.

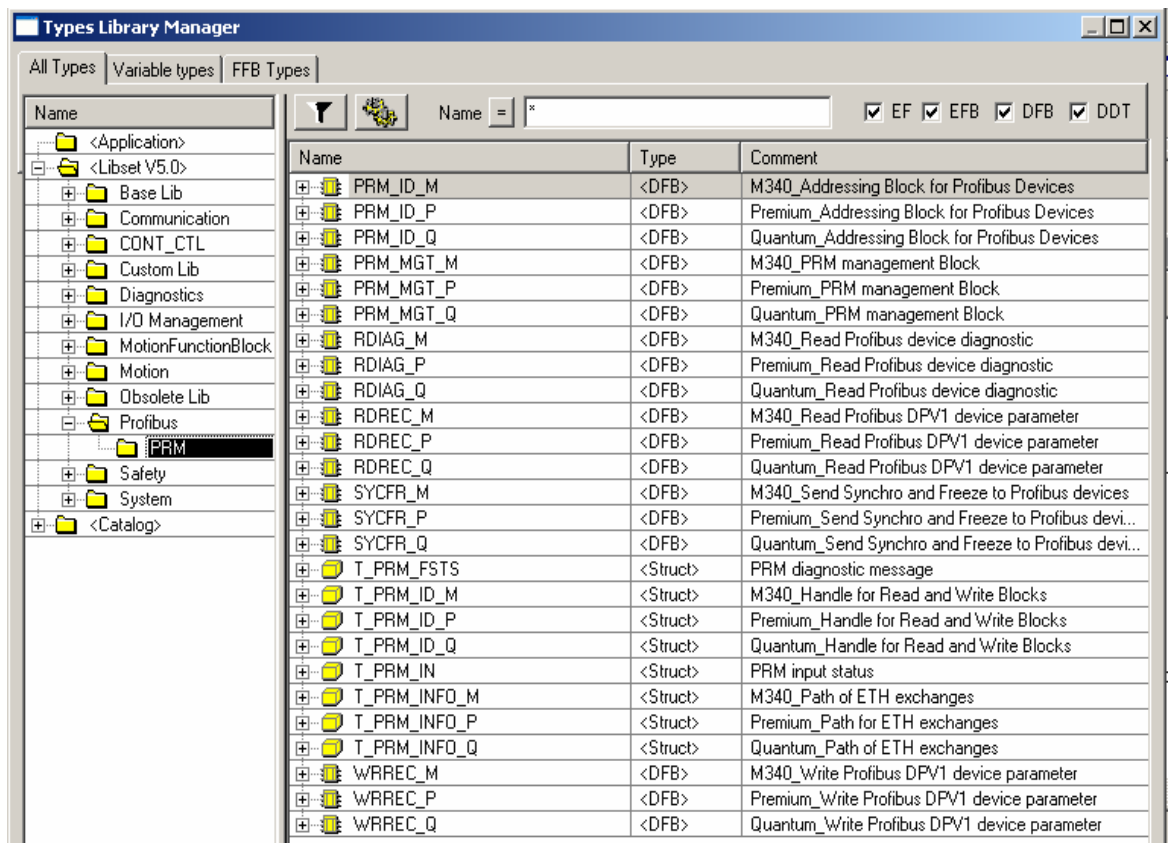
Step	Action
1	Insert the PRM installation CD-ROM in the CD or DVD optical drive of the computer.
2	A menu is automatically opened. If it is not the case, go to the CD root with the Windows Explorer and open the Readme file to know how to proceed.
3	Select the PRM library installation.
4	Choose to display the content of the Readme file
5	Read the complete Setup procedure included in the Readme file
6	Follow the instructions

How to ... inside UnityPro

View the PRM DFBs in the Unity Pro libset

The PRM library has been added to the libset. Its content can be seen using the Types Library Manager:

- Step 1: Select **Tools** → **Types Library Manager...**
- Step 2: In the tree select the libset, the **Profibus** library and the **PRM** family



The DFBs and some of the DDTs are platform dependent. They have a name extension defining on which platform they are working on:

- **_M**: M340
- **_P**: Premium
- **_Q**: Quantum

Update the project following a library update

In case of a new version of the library:

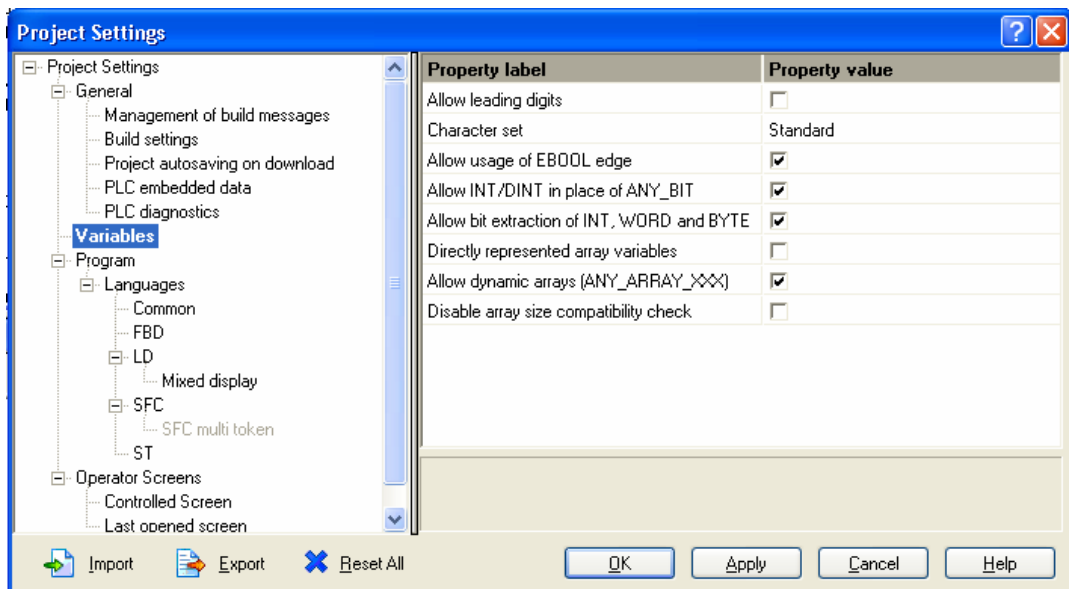
Step	Action
1	Install the new version. An information panel will ask to confirm the replacement, click “Yes”
2	Compare the project with the new library: <ul style="list-style-type: none">- Open the Types Library Manager tool- Select the PRM family- Right click and select Compare Project with library ...
3	Click Update All button to make your Project running with the latest version of DFB

Mandatory settings in Unity Pro for the PRM DFBs

“Allow dynamic arrays” must be checked on.

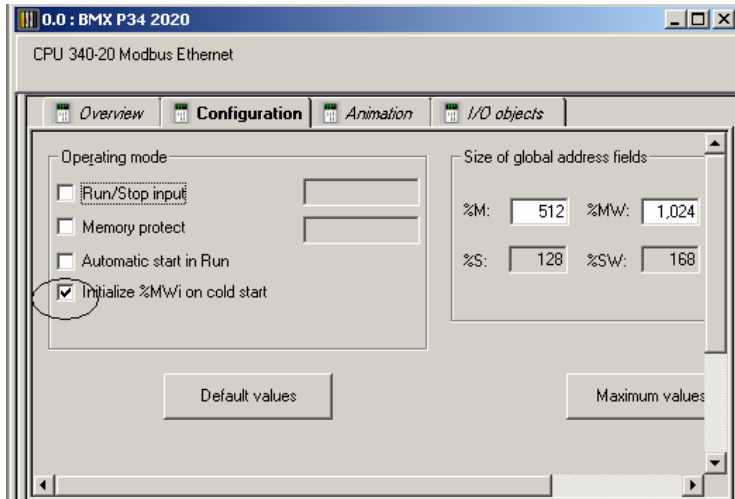
Select **Tools** → **Project Settings** → **Variables**

Enable the option **Allow dynamic arrays [ANY_ARRAY_XXX]**.



“Initialize %MWi on cold start” must be checked on

- Open the configuration screen of the processor.
- Check the option **Initialize %MWi on cold start**.



This option is selected by default when creating a new project.

If this option is checked:

- The internal words %MWi are initialized on cold start triggered by software (application download, initialize command, restore command, %S0 activation, cold start button on the PLC screen). They are handled like other global variables: initialized at 0 or at the initial value defined in the application, in all cold start cases.
- On a PRM point of view, at each update done in the I/O scanner tab, the initial value of the CRC_IOMAPPING is updated in sync with the PRM configuration. This value is taken into account by the PLC after an application download. The CRC written by the PLC is the one expected by the PRM. Nothing to do, everything is managed automatically.

If for any reason this option is not selected:

- The %MWi will keep their current values after an application download for example.
- The initial value of the CRC_IOMAPPING is not taken into account by the PLC.
- This variable must be initialized manually after each PRM update. See the [Initialize the CRC IOMAPPING](#) section.

PRM library content

DFB types

Block name	Description	Functions
PRM management		
PRM_MGT_M PRM_MGT_Q PRM_MGT_P	Management Block for one PRM	- This block is mandatory and must be used to start the PRM - Read the PRM full status.
SYNC and FREEZE commands		
SYCFR_M SYCFR_Q SYCFR_P	Send a SYNC and/or FREEZE command to a group of DP-Slaves	- SYNC: synchronize the outputs - FREEZE: freeze the inputs
Explicit exchanges with the slaves		
PRM_ID_M PRM_ID_Q PRM_ID_P	Address conversion to use with RDREC; WRREC and RDIAG	- Conversion of a device physical address to a handle (ID) - Open/Close a communication channel to access to a DP-Slave in Class 2
RDREC_M RDREC_Q RDREC_P	Read Data Record	- Read a Process Data Record from a DP-Slave
WRREC_M WRREC_Q WRREC_P	Write Data Record	- Write a Process Data to a DP-Slave
RDIAG_M RDIAG_Q RDIAG_P	Read Diagnosis	- Get the diagnosis status information of a DP-Slave

This last group of function blocks is designed based on the PROFIBUS International guideline "Function Blocks on PROFIBUS DP and PROFINET IO".

Variables types

Type name	Variable content and usage	Origin of the type
T_PRM_IN (common to the 3 platforms)	Implicit status from the PRM. Used by the DFBs (Master_Sts inputs). Automatically updated as part of the I/O scanner variables.	Defined in the PRM library Also imported when clicking on “update” in the I/O scanner tab.
T_PRM_FSTS (common to the 3 platforms)	Explicit Full Status from the PRM. Generated by the PRM_MGT block.	Defined in the PRM library
T_PRM_ID_M T_PRM_ID_Q T_PRM_ID_P	Handle generated by the PRM_ID block	Defined in the PRM library
T_PRM_Info_M T_PRM_Info_Q T_PRM_Info_P	Static information to address the PRM. To be filled by the user. Used by the DFBs (Master_Info input)	Defined in the PRM library

PRM_ID block

Presentation

The function PRM_ID converts the physical identification of a slot to a handle called "ID".

It has to be used with the following DFBs: RDREC, WRREC or RDIAG.

The physical identification must contain:

- The station: unique number of the DP-Slave within DP system.
- The slot: unique slot number within a DP-Slave,
- The DP system: identified by the "master_info" (see [Initialize the master_info variable](#) section)
- A sub_station is only required for some Profibus DP/PA link to identify a device not directly declared onto the DP system.

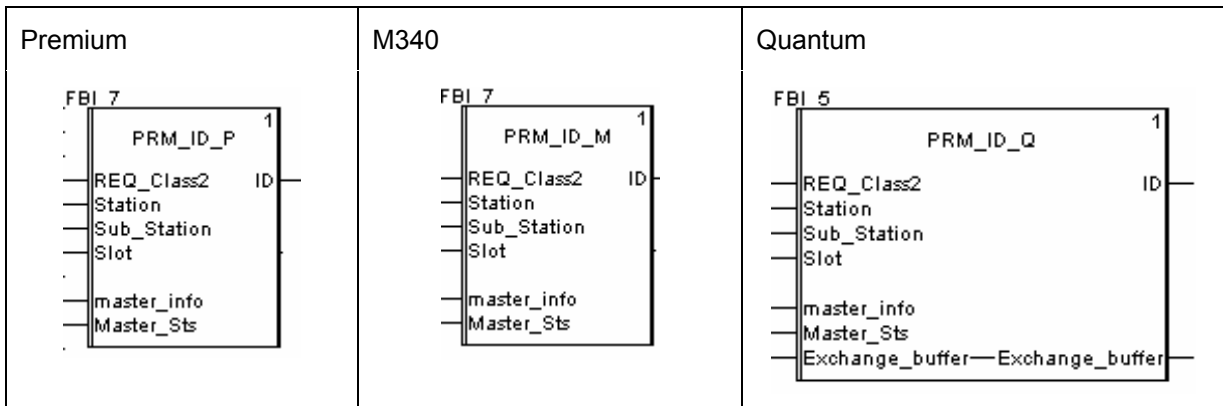
PRM_ID also controls the master class level used for the DPV1 read and write:

- Class 1 is chosen if the REQ_CLASS2 input is kept at 0
 - This is the easiest solution for DPV1 devices supporting it
 - RDREC and WRREC will trigger respectively MSAC1_Read and MSAC1_Write telegrams
- Class 2 is chosen if the REQ_CLASS2 input is set before starting the RDREC or WRREC blocks
 - To be used for DVP1 devices supporting only the class 2 read and write
 - PRM_ID will automatically initiate and maintain a class 2 connection. RDREC and WRECC will trigger respectively MSAC2_Read and MSAC2_Write telegrams.

Notes:

- Devices supporting Class 1 DPV1 read and write have the following key in the GSD: C1_Read_Write_supp = 1
- Two ID blocks must not address the same slot at the same time.
- **Between 2 executions of the PRM_ID block when changing the slot number, the REQ_CLASS2 input must be released to 0.** The previous class 2 connection must be closed; this is done at falling edge of REQ_CLASS2.

FBD representation



Input parameters description

Parameter	Type	Comment
REQ_Class2	Bool	Request to initiate Class 2 exchange(s) with a DP_Slave: <ul style="list-style-type: none"> For class 2 exchanges, must be set before starting the linked DFB (RDREC; WRREC) to initiate the communication channel, and must be released after its completion to close the communication channel. For class 1 exchanges, must be maintained at 0.
Station	Byte	Address of the DP-Slave in DP segment to Read or Write.
Sub-Station	Byte	Number of the DP-Slave under DP/PA link coupler. Must be 255 in other cases.
Slot	Byte	Slot Address within the Device
Master_Sts	T_PRM_IN	This input must be connected to the pre-defined PRM status variable managed by the PRM and exchanged cyclically. Its name is < PRM Master alias name>_IN, PRM Master alias name being the name of the DTM in the browser.
Master_Info	T_PRM_INFO	Provides the communication path to the PRM. Must be initialized, refer to the section Initialize the Master info variable .

Output parameters description

Parameter	Type	Comment
ID	T_PRM_ID	Contains the DP slot handle of the DP-slave

Input/Output parameter description

Parameter	Type	Comment
Exchange Buffer	ARRAY[1.. 5] OF INT	Quantum only. Must be connected to a located variable (%MW)

PRM_MGT block

Presentation

This block is mandatory and must be used in the application to start the PRM. It will activate the IO exchanges on Profibus.

While enabled (FBD, LD language) or continuously executed (ST language), PRM_MGT automatically starts the PRM using the information given by the "Master_info" structure.

The start is not possible in case of an error inside this structure. The block will try automatically to start the PRM 3 times. If it is unsuccessful, first the issue in the "Master_info" must be fixed and then the RETRY input must be triggered. The block will try again to start the PRM 3 times.

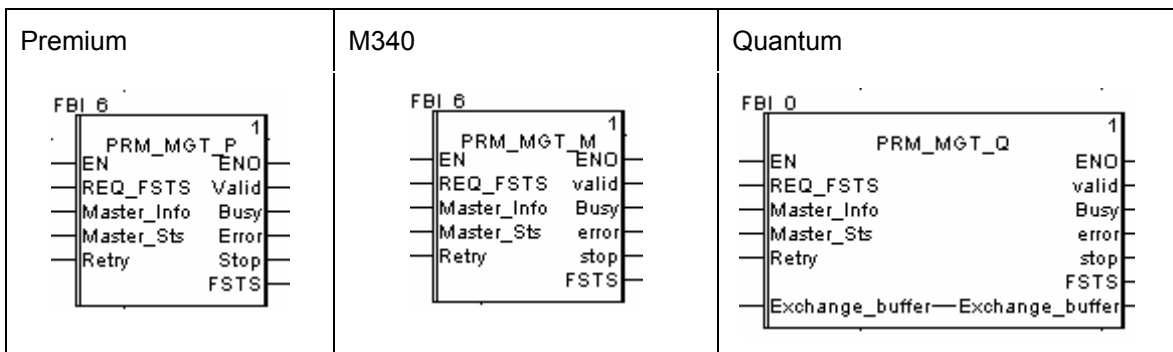
The second function of the PRM_MGT block is to get the PRM "Full Status" (complete diagnostic information) by activating the input "REQ_FSTS".

Conditions to read are:

DFB enable input = true

Error output = false

FBD representation



Input Parameters Description

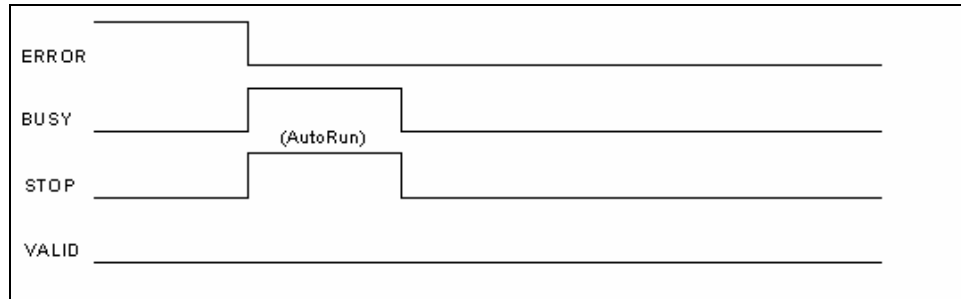
Parameter	Type	Comment
REQ_FSTS	Bool	Request to read the PRM Full Status and update the FSTS output accordingly
Retry	Bool	Request to retry to start the PRM
Master_Sts	T_PRM_IN	This input must be connected to the pre-defined PRM status variable managed by the PRM and exchanged cyclically. Its name is < PRM Master alias name>_IN, PRM Master alias name being the name of the DTM in the browser.
Master_Info	T_PRM_INFO	Provides the communication path to the PRM. Must be initialized, refer to the section Initialize the Master info variable .
Exchange Buffer	ARRAY[1..25] OF INT	Quantum only. Must be connected to a located variable (%MW)

Output parameters description

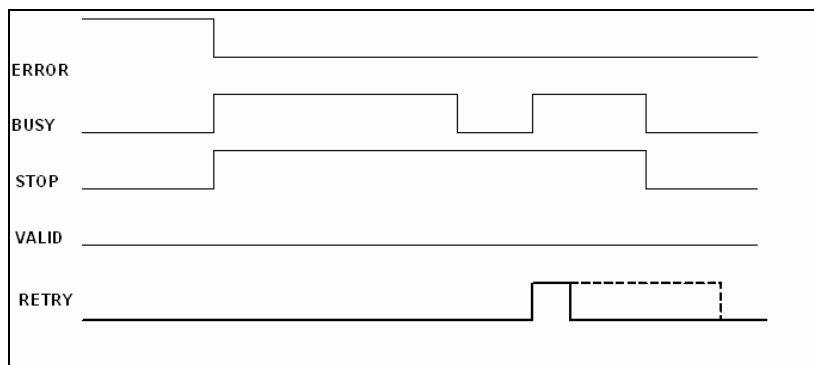
Parameter	Type	Comment
Valid	Bool	Valid PRM diagnostic (FSTS) received
Busy	Bool	DFB working – Other outputs are undefined
Error	Bool	No link established between the PRM and the PLC. PRM_Master_Status is in the INIT, NO CONF or NO LINK state.
Stop	Bool	The PRM is ready, the link is established with the PLC, but the PRM is waiting for a Start from the PLC. PRM_Master_Status is in the STOP state.
FSTS	T_PRM_FSTS	Record of the PRM Full Status For Quantum: Must be connected to a located variable (%MW)

Timing Diagrams

- Start of the PRM
 - Successful auto-start: the first try is starting as soon as Error is at 0 (link established between the PRM and the PLC):

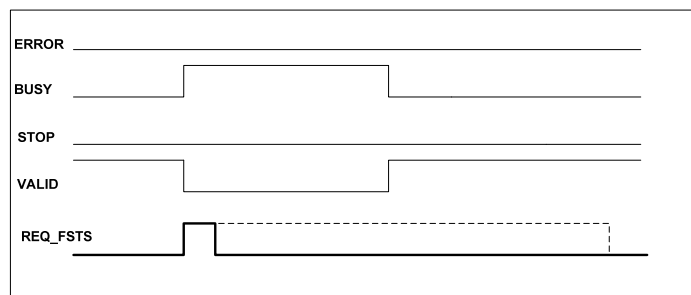


- Using the Retry input after an unsuccessful auto-start:

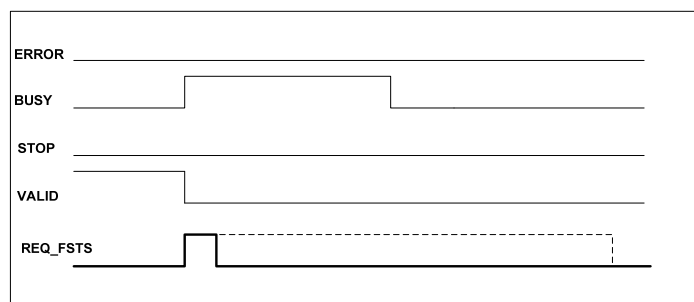


- Read of the PRM Full Status using the REQ_FSTS request:

- Successful:



- Unsuccessful, Valid stays at 0:



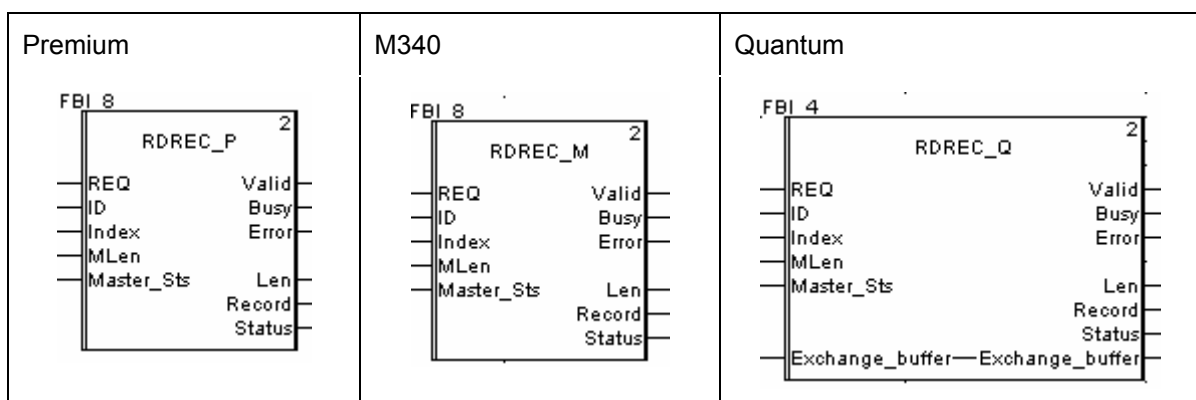
RDREC block

Presentation

The RDREC block provides the Profibus standard function **Read Process Data Record** for the PRM.

It is used in conjunction with the PRM_ID block and will trigger a class 1 or class 2 DPV1 read depending on the choice done on the PRM_ID block.

FBD representation



Input Parameters Description

Parameter	Type	Comment
REQ	BOOL	Request to Read the Process Data Record
ID	T_PRM_ID	DP slot handle of a DP-Slave, is an output of the PRM_ID block
INDEX	INT	Index of the data record
MLEN	INT	Maximum length of data to be read from the device, in byte. From 1 to 240.
MASTER_STS	T_PRM_IN	This input must be connected to the pre-defined PRM status variable managed by the PRM and exchanged cyclically. Its name is < PRM Master alias name>_IN, PRM Master alias name being the name of the DTM in the browser.
Exchange Buffer	ARRAY[1..5] OF INT	Quantum only. Must be connected to a located variable (%MW)

Output Parameters Description

Parameter	Type	Comment
VALID	BOOL	Read data record completed. A valid Record is available.
BUSY	BOOL	DFB working – Other outputs are undefined
ERROR	Bool	Error detected during the read process. The error code is provided in STATUS.
STATUS	DWORD	Reports the last encountered error. Details in the Decoding the Status Dword section.
RECORD	ANY_ARRAY_INT	Read Data Record: length of the data from the device (in byte) followed by the data themselves, details on the coding below. The Record size must be of at least MLEN bytes + 2 bytes. For Quantum: must be connected to a located variable (%MW).
LEN	INT	Length of the read data from the device, in byte (is equal to Record[0])

Read Data Record Coding

The Profibus DP frame from the device is reported to the Record Array of INT starting at the second element.

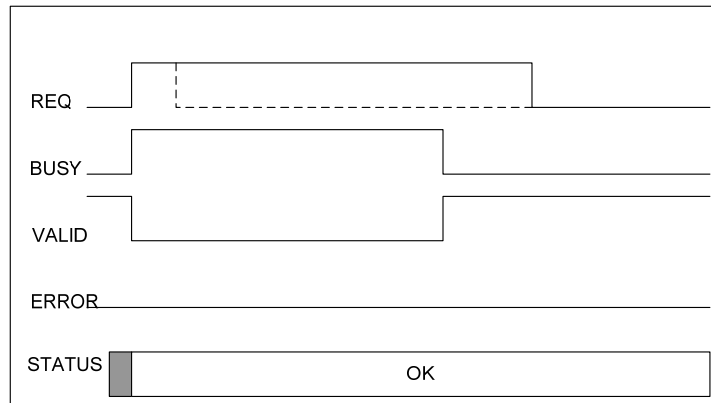
Record ARRAY of INT	MSB	LSB
Record[0]	Length of DP frame (DU)	
Record[1]	DP-Byte 1	DP-Byte 0
Record[2]	DP-Byte 3	DP-Byte 2
...

Most DP-Devices providing data in “Big Endian”, it is necessary to do by program the appropriate byte swapping before the type conversion:

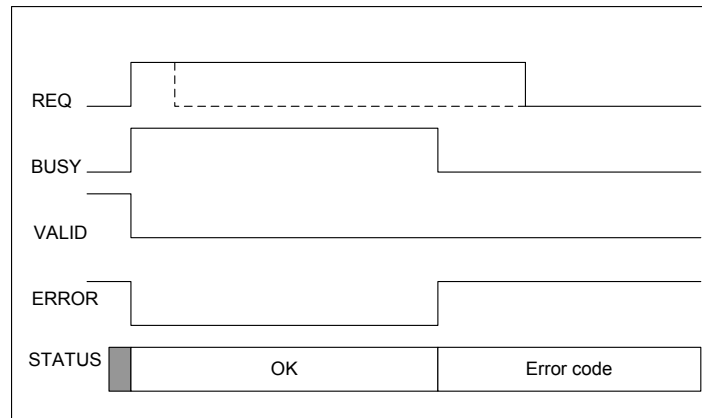
Object Type	Operation to do
INT or WORD	Byte swap in the WORD
DINT or DWORD or REAL	DP-Byte[0] → Dword [3] ... DP-Byte[3] → Dword [0]

Timing Diagrams

- Read Process Data Record, successful:



- Read Process Data Record, with an error:



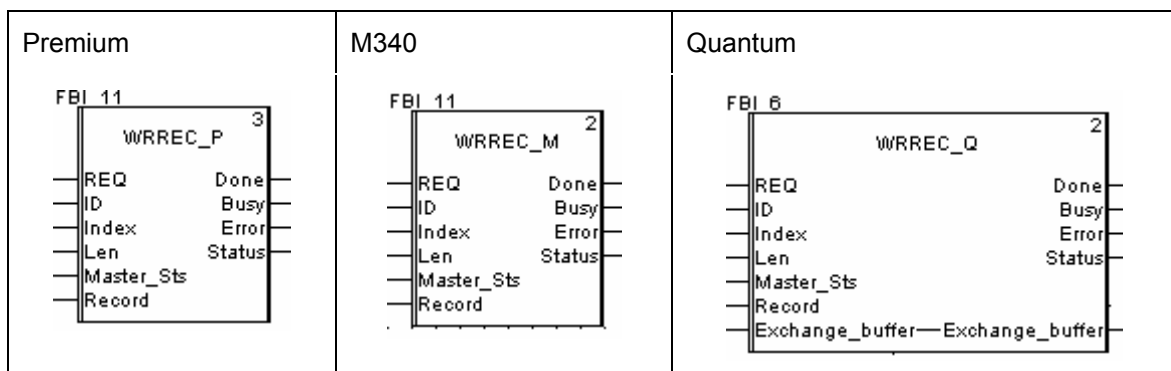
WRREC block

Presentation

The WRREC block provides the Profibus standard function **Write Process Data Record** for the PRM.

It is used in conjunction with the PRM_ID block and will trigger a class 1 or class 2 DPV1 write depending on the choice done on the PRM_ID block.

FBD representation



Input Parameters Description

Parameter	Type	Comment
REQ	BOOL	Request to Write a Process Data record
ID	T_PRM_ID	DP slot handle of a DP-Slave, is an output of the PRM_ID block
INDEX	INT	Index of the parameter to write to the DP-Slave
LEN	INT	Length of the data record to write (in Byte). From 1 to 240 in M340 and Premium version From 1 to 200 in Quantum version
MASTER_STS	T_PRM_IN	This input must be connected to the pre-defined PRM status variable managed by the PRM and exchanged cyclically. Its name is < PRM Master alias name>_IN, PRM Master alias name being the name of the DTM in the browser.
RECORD	ANY_ARRRY_INT	Data Record to write, details below on the coding. The Record size must be of at least LEN bytes For Quantum: Must be connected to a located variable (%MW)

Parameter	Type	Comment
Exchange Buffer	ARRAY[1..5] OF INT	Quantum only. Must be connected to a located variable (%MW)

NOTE: The values of the RECORD and LEN parameters must not be changed as long as the BUSY output is active.

Output Parameters Description

Parameter	Type	Comment
DONE	BOOL	Data record successfully written
BUSY	BOOL	DFB working – Other outputs are undefined
ERROR	Bool	Error detected during the Write process. The error code is provided in STATUS.
STATUS	DWORD	Reports the last encountered error. Details in the Decoding the Status Dword section.

Write Record Coding:

The Profibus DP frame sent to the DP-Device is extracted from the Record Array of INT.

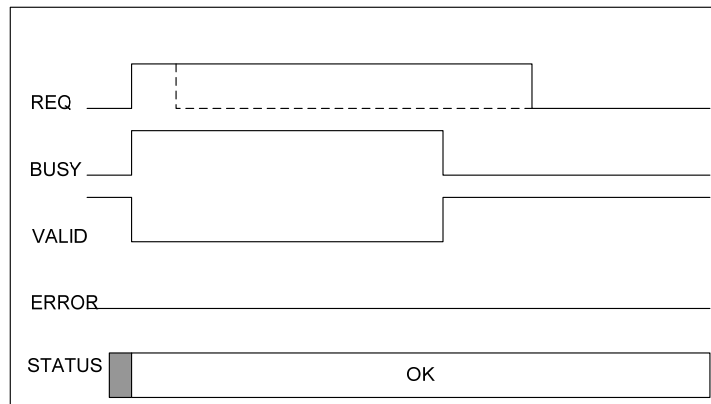
Record ARRAY of INT	High Byte	Low Byte
Record[0]	DP-Byte 1	DP-Byte 0
Record[1]	DP-Byte 3	DP-Byte 2
...

Most DP-Devices providing data in “Big Endian”, it is necessary to do by program the appropriate byte swapping before the type conversion:

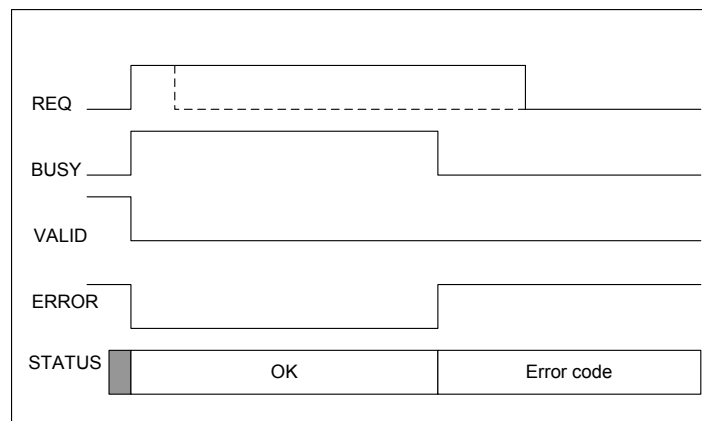
Object Type	Operation to do
INT or WORD	Byte swap in the WORD
DINT or DWORD or REAL	Dword [3] → DP-Byte[0] ... Dword [0] → DP-Byte[3]

Timing Diagrams

- Write Process Data, successful:



- Write Process Data, with an error:



RDIAG block

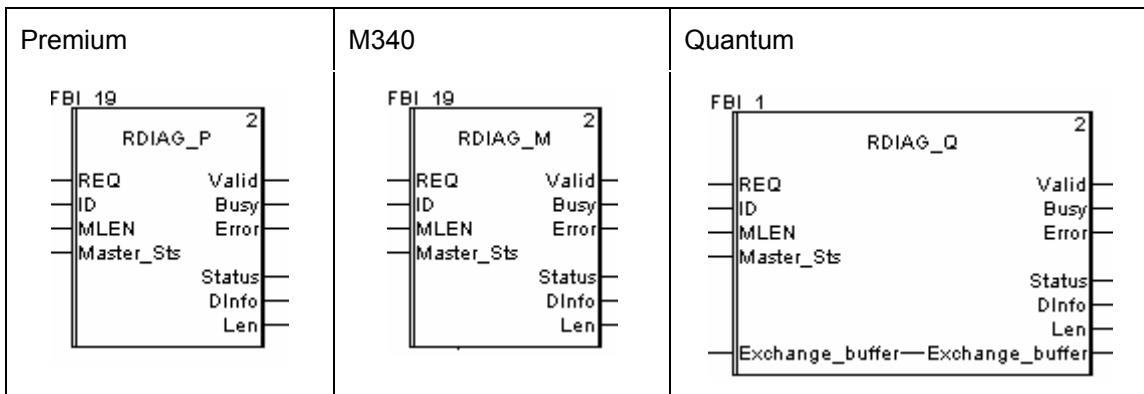
Presentation

The RDIAG block provides the Profibus standard function **Read Diagnosis** for the PRM.

It can be used to get from a device the last memorized Diagnosis Message when the bit relative to this device in the DIAG_LIST (1) is active. This bit will be reset by the block.

(1) The DIAG_LIST is part of the <PRM Master alias name>_IN variable.

FBD representation



Input Parameters Description

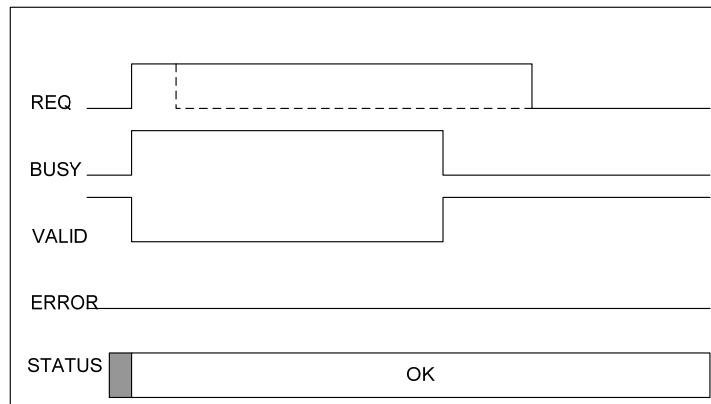
Parameter	Type	Comment
REQ	BOOL	Request to Read the Diag Record
ID	T_PRM_ID	DP slot handle of a DP-Slave, is an output of the PRM_ID block
INDEX	INT	Index of the data record
MLEN	INT	Maximum length to be read, in byte. From 1 to 244.
MASTER_STS	T_PRM_IN	This input must be connected to the pre-defined PRM status variable managed by the PRM and exchanged cyclically. Its name is < <i>PRM Master alias name</i> >_IN, <i>PRM Master alias name</i> being the name of the DTM in the browser.
Exchange Buffer	ARRAY[1..5] OF INT	Quantum only. Must be connected to a located variable (%MW)

Output Parameters description

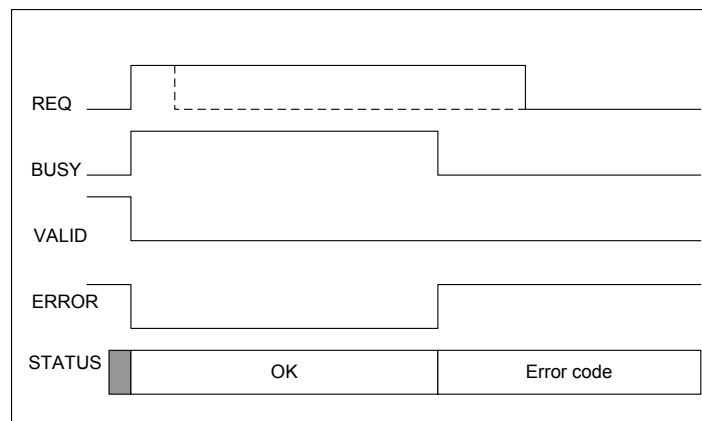
Parameter	Type	Comment
VALID	BOOL	New diagnosis data record received and is valid
BUSY	BOOL	DFB working – Other outputs are undefined
ERROR	BOOL	Error detected during the read diagnosis process. The error code is provided in STATUS.
STATUS	DWORD	Reports the last encountered error. Details in the Decoding the Status Dword section.
DINFO	ANY_ARRRY_INT	Record of Diagnosis data. Its size must be of at least MLEN bytes. For Quantum: Must be connected to a located variable (%MW) The 6 first bytes are standard, the other ones are optional and device specific.
LEN	INT	Length of the read data from the device, in byte.

Timing Diagrams

- Read Diagnostic, successful:



- Read Diagnostic, with an error:



SYCFR block

Presentation

SYCFR function activates or releases the SYNC mode and/or the FREEZE mode to a group of DP Devices. A Global_control telegram is sent to the Profibus devices with the bits SYNC, UNSYNC, FREEZE and UNFREEZE as provided on the inputs of the block.

The FREEZE command is intended to synchronize the capture of the Input Data of slaves.

- The slaves begin FREEZE mode when they receive a FREEZE command. The inputs are frozen in their current states.
- The inputs are updated at next FREEZE command (or UNFREEZE command)
- Terminated with the UNFREEZE command

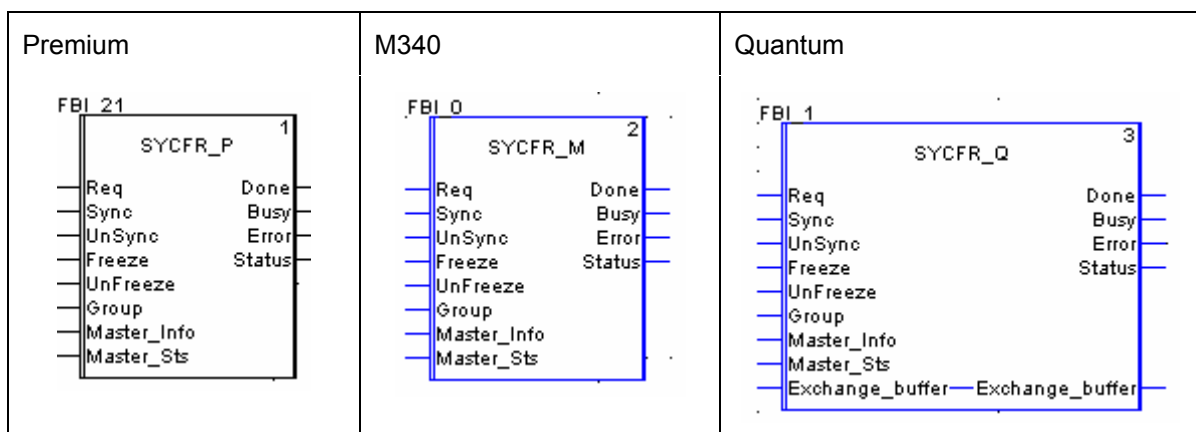
The SYNC message is intended to synchronize the activation of the Output Data of slaves.

- The slaves begin SYNC mode when they receive a SYNC command. The outputs are frozen in their current states. The output data are stored but the output states remain unchanged.
- The stored data are sent to the outputs at the next SYNC command (or UNSYNC command)
- Terminated with the UNSYNC command

The function is invoked when the REQ input goes to 1.

ERROR output indicates an error during exchange; in addition the STATUS output contains the error code. The STATUS values are defined in “Decoding the Status Dword” section.

FBD representation



Input Parameters Description

Parameter	Type	Comment								
REQ	BOOL	Request to apply a new mode for SYNC FREEZE onto the defined group(s) of device(s). Active on Rising edge.								
Sync UnSync	BOOL BOOL	New SYNC mode to apply: <table border="1" data-bbox="767 510 1407 792"> <thead> <tr> <th>Sync - UnSync</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>No function</td> </tr> <tr> <td>10</td> <td>SYNC command, SYNC mode activated</td> </tr> <tr> <td>11 or 01</td> <td>UNSYNC command, SYNC mode deactivated</td> </tr> </tbody> </table>	Sync - UnSync	Description	00	No function	10	SYNC command, SYNC mode activated	11 or 01	UNSYNC command, SYNC mode deactivated
Sync - UnSync	Description									
00	No function									
10	SYNC command, SYNC mode activated									
11 or 01	UNSYNC command, SYNC mode deactivated									
Freeze UnFreeze	BOOL BOOL	New FREEZE mode to apply: <table border="1" data-bbox="767 887 1407 1169"> <thead> <tr> <th>Freeze - UnFreeze</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>No function</td> </tr> <tr> <td>10</td> <td>FREEZE command, FREEZE mode activated</td> </tr> <tr> <td>11 or 01</td> <td>UNFREEZE command, FREEZE mode deactivated</td> </tr> </tbody> </table>	Freeze - UnFreeze	Description	00	No function	10	FREEZE command, FREEZE mode activated	11 or 01	UNFREEZE command, FREEZE mode deactivated
Freeze - UnFreeze	Description									
00	No function									
10	FREEZE command, FREEZE mode activated									
11 or 01	UNFREEZE command, FREEZE mode deactivated									
Group	WORD	Group(s) of devices: Bit 0 : Group of devices #1 Bit 1 : Group of devices #2 .. Bit 7 : Group of devices #8 New mode is applied to all devices when Group = 0.								
Exchange Buffer	ARRAY[1..5] OF INT	Quantum only. Must be connected to a located variable (%MW)								

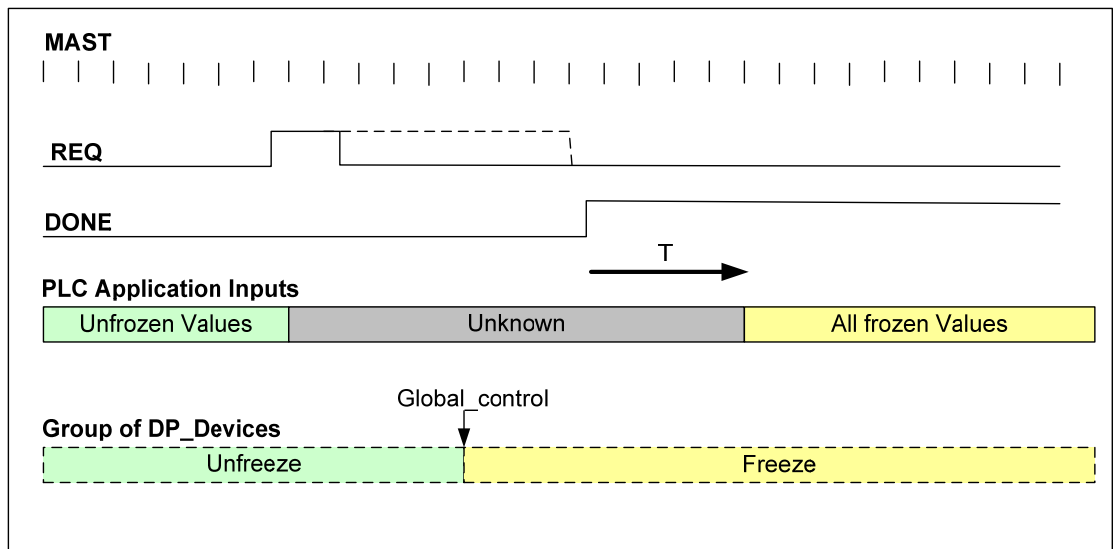
Output Parameters description

Parameter	Type	Comment
Done	BOOL	New Mode is applied
Busy	BOOL	DFB working – Other outputs are undefined
Error	BOOL	Error detected during the DFB execution
Status	DWORD	Reports the last encountered error. Details in the Decoding the Status Dword section.

Timing Diagrams

- FREEZE / UNFREEZE

Consecutively to a FREEZE (or UNFREEZE) command, the application program must wait “T” time after the DFB execution (DONE active) before considering the device inputs values as being all “Frozen” (or “Unfrozen”):



“T” time maximum value = $PB_cycle + Mbd_Cycle + Mast_Cycle$

PB_Cycle = Profibus Cycle value given by the DTM

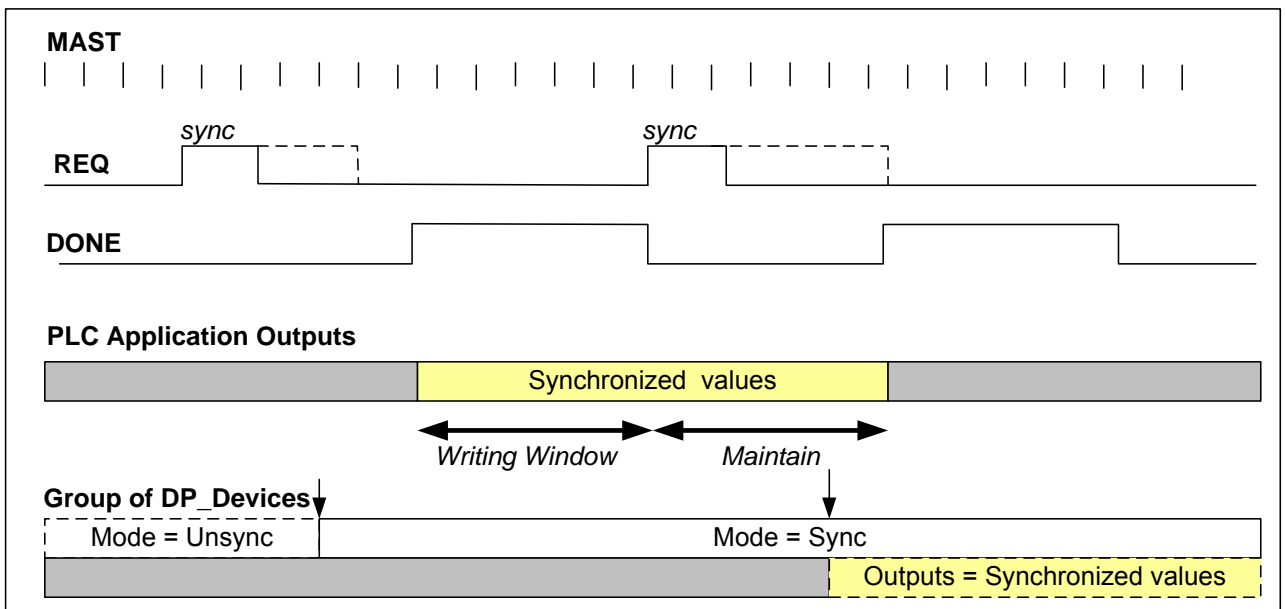
Mbd_Cycle = Modbus Repetive rate value

$Mast_Cycle$ = Actual period of the Mast task.

- SYNC / UNSYNC

Step	Action
1	Send a SYNC command to the group of devices (SYCFR with Sync at 1)
2	Wait the end of the DFB execution (DONE active)
3	Assign the consistent values to be synchronized to the output variables
4	Send another SYNC command (SYCFR with Sync at 1) or an UNSYNC command (SYCFR with UnSync at 1)
5	Maintain the output values while DFB is executing (until DONE is active)

Example:



Variables to initialize

Initialize the “Master_Info” variable

The “Master_Info” input of the 3 following blocks PRM_ID, PRM_MGT and SYCFR must be connected to a variable with the “T_PRM_INFO” structure type.

This variable provides to the DFB the communication path to the PRM. It has to be filled carefully to make the DFB able to address the PRM.

The T_PRM_INFO structure depends on the platform

- T_PRM_INFO_M for M340 applications
- T_PRM_INFO_P for Premium applications
- T_PRM_INFO_M for Quantum applications

M340:

Variable	Type	Content
Master_Info	T_PRM_INFO_M	
- Rack_number	BYTE	Rack number of the Ethernet module linked to the PRM (0 if only 1 rack)
- Module_number	BYTE	Position of the Ethernet module in the Rack
- Channel_number	BYTE	Channel number of the Ethernet port into the Ethernet module
- IP4	BYTE	IP address of the PRM described as 4 bytes: IP4.IP3.IP2.IP1
- IP3	BYTE	
- IP2	BYTE	
- IP1	BYTE	

Quantum:

Variable	Type	Content
Master_Info	T_PRM_INFO_Q	
- Slot	BYTE	Position the Ethernet module (or CPU) linked to the PRM (254 for the CPU)
- IP4	BYTE	IP address of the PRM described as 4 bytes: IP4.IP3.IP2.IP1
- IP3	BYTE	
- IP2	BYTE	
- IP1	BYTE	

Premium:

Variable	Type	Content
Master_Info	T_PRM_INFO_P	
- XW_NW	BYTE	XWAY network
- XW_ST	BYTE	XWAY Station, must be greater then 100 (Modbus TCP)

These parameters must be the same as those provided in the **Messaging** tab of the Ethernet communication configuration screens.

Xway address = network.station

Example:

If the Xway address is set to 1.103, the variables must be initialized as follows:

Master_Info.XW_NW:=1;

Master_Info.XW_ST:= 103;

Initialize the “CRC_IOMAPPING”

This section explains a way to set manually the CRC_IOMAPPING variable. It is necessary only if the option “Initialize %MWi on cold start” is unchecked in the processor configuration.

- 1- At each update of the PRM configuration, if the PLC must be downloaded, copy by hand the CRC_IO value in the initial value of an unlocated variable:
 - Open the Data Editor by clicking on **Derived Variables** in the UnityPro Project Browser
 - Select the variable <PRM alias name>_OUT, <PRM alias name> being the name of the PRM Master shown in the DTM browser. The CRC_IO is shown in the **Value** column.
 - Create an unlocated variable with the same T_PRM_OUT type, for example PRM_CRC_IOMapping
 - Copy the initial values of the 2 elementary variables CRC_IOMAPPING_LOW and CRC_IOMAPPING_HIGH as initial values of your new variable PRM_CRC_IOMapping:

Name	Type	A...	Value
PRM_Master_OUT	T_PRM_OUT	%MW500	
CRC_IOMAPPING_LOW	UINT	%MW500	8823
CRC_IOMAPPING_HIGH	UINT	%MW501	22183
PRM_CRC_IOMapping	T_PRM_OUT		
CRC_IOMAPPING_LOW	UINT		8823
CRC_IOMAPPING_HIGH	UINT		22183

- 2- In the program, assign your unlocated variable to <PRM alias name>_OUT

In ST, for example: PRM_Master_OUT := PRM_CRC_IOMapping;

Decoding the Status Dword

The Status variable reports the last encountered error. It has the data type DWORD which is interpreted as a packed array of 4 bytes as described in the following table:

Table1 – Structure of the Status DWORD

STATUS DWORD			
Byte 3 (MSB)	Byte 2	Byte 1	Byte 0 (LSB)
ERROR_2	ERROR_1	ERROR_Decode	0
Device specific extended code	See table 2		No Role

Table 2 – Error codes

ERROR_Decode	ERROR_1	Meaning
Error detected at the DP device Level.		
16#80	16# A0	Read error
	16# A1	Write error
	16# B0	Invalid Index
	16# B1	Length Error
	16# B2	Invalid slot
	16# B3	Type conflict
	16# B4	Invalid area
	16# B5	State conflict
	16# B6	Access denied
	16# B7	Invalid Range
	16# B8	Invalid Parameter
	16# B9	Invalid Type
	Other Codes	Device specific
Error detected at the PRM level		
16#81	1	PRM not accessible
	2	PRM Stop
	3	PRM Explicit Exchanges not allowed
Error detected at the DFB level		
16#82	1	Request not allowed
	2	MLEN or LEN Parameter Error
	3	Modbus exchange error
	4	Modbus Register Access denied
	5	Mailbox access error
	6	Mailbox conflict
	7	Mailbox usage error
	8	Some IO of DFB are not located in %MW (Quantum)
	9	Not able to open a Class2 connection
	16#10	Unexpected Master_Status (application error)

ERROR_Decode	ERROR_1	Meaning
Error detected at the Profibus master level		
16#83	2	Buffer command full
Error detected at the FDL level (Profibus protocol)		
16#84	1	User error, SAP locked
	2	No resource for sending data, tried to send to SAP that was not configured
	3	No service available (SAP does not exist)
	4	Access point blocked
	16# 80	Short character, problems with wiring, termination, etc.
	16# 8F	Noise at SM command, problems with wiring, termination, etc.
	16# 9F	No access
	16#AF	Double token detected, problems with wiring, termination, etc.
	16# BF	Response buffer too small