

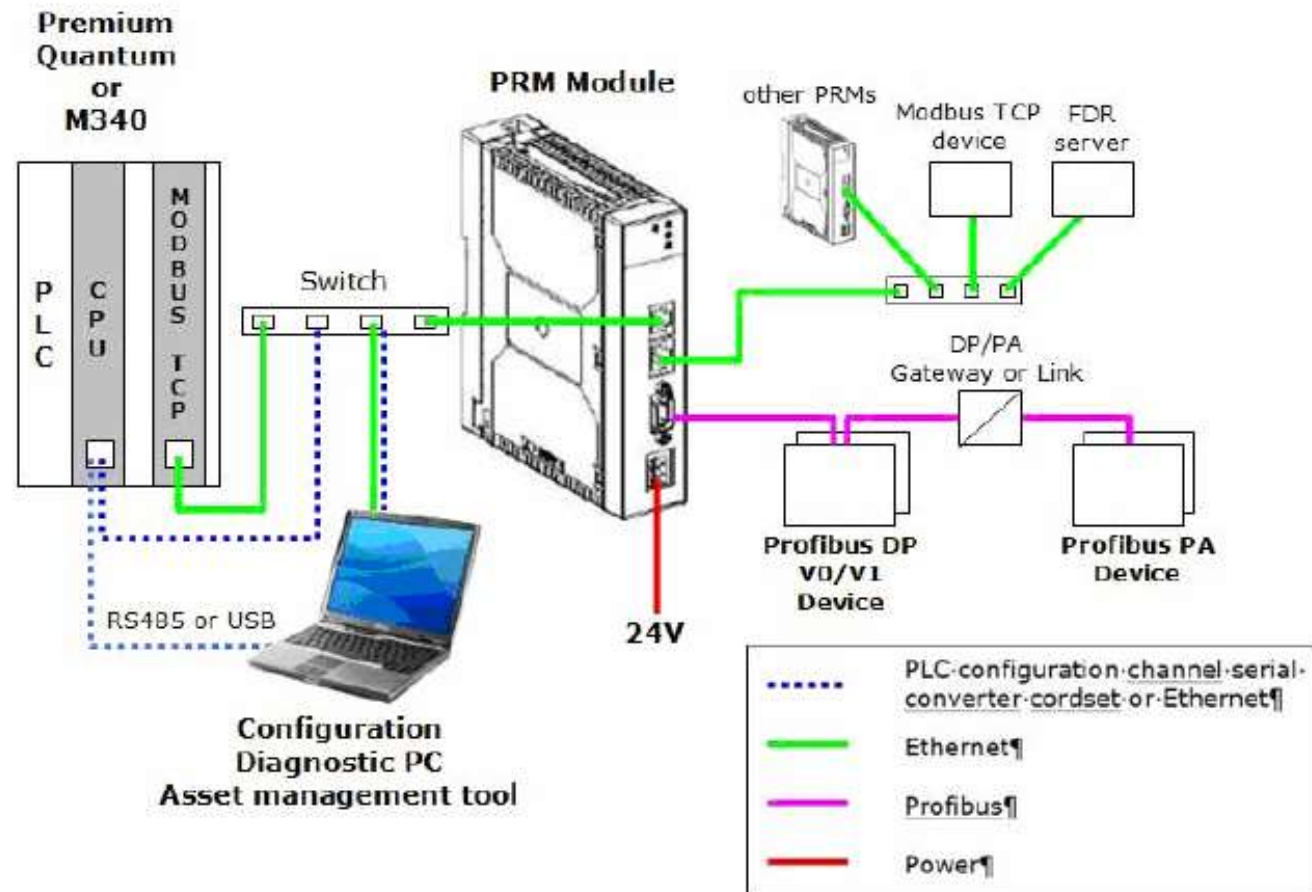
Modicon Quantum

Comunicação ATV61 em Profibus DPV0 através do módulo
Profibus Remote Master (PRM) - TCSEGPA23F14F

Arquitetura

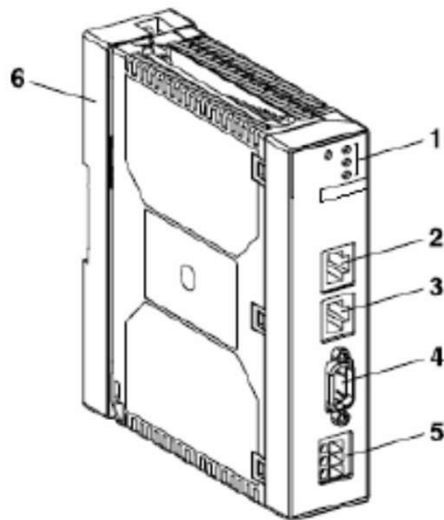
- Profibus Remote Master (PRM):

PRM module in its operating environment



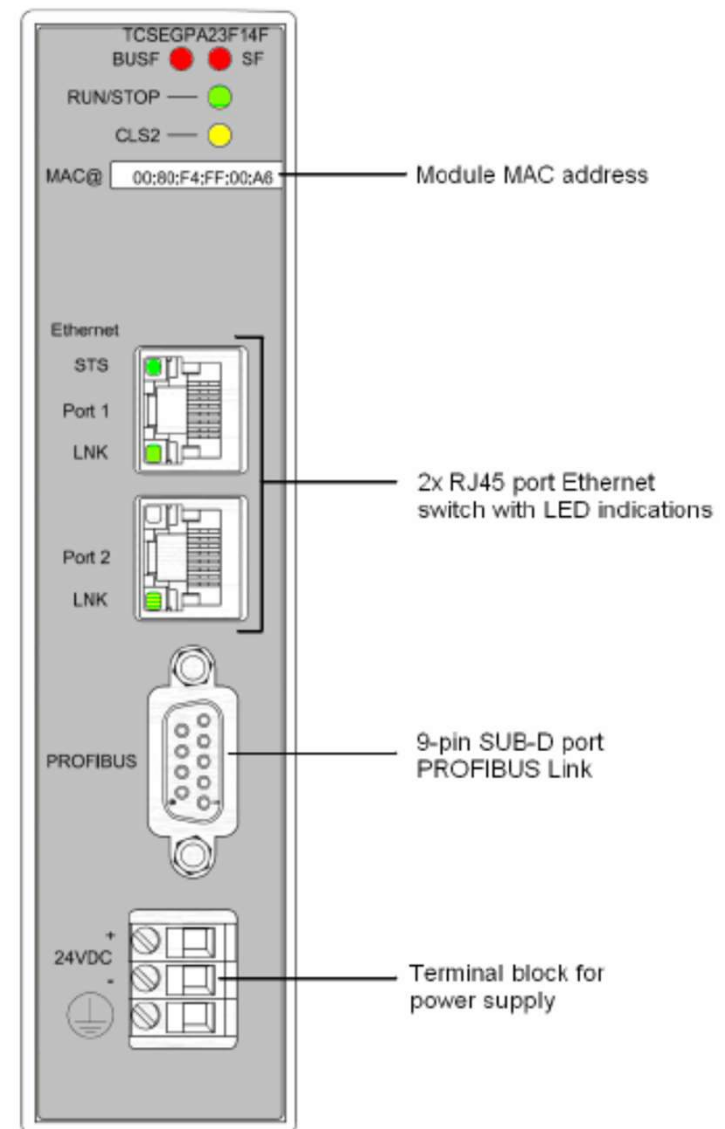
Arquitetura

● Profibus Remote Master (PRM):



PRM module

Reference	Description
1	4 LED indicators (See Diagnostics):
	- System fault detected
	- Bus fault detected
	- Run
	- CLS2
2 and 3	RJ45 connectors for Ethernet link (integrated switch)
4	9-pin SUB D connector for Profibus link
5	Screw terminal for 24 VDC power supply connection (See Power Supply)
6	Support plate for fixing the module directly to an AM1-DE200/DP200 DIN rail or to a Telequick AM1-PA pre-slotted plate



Arquitetura

● Profibus Remote Master (PRM):

The rotary switches are on the back of the module and must be set up prior to mounting the PRM module. Once the module is mounted, they will no longer be accessible.

Their primary role is to define the PRM IP address assignment mode:

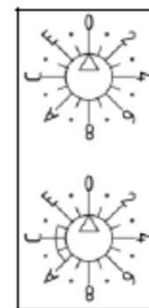
By default, the PRM is configured to use the **factory IP address**: 10.10.xxx.yyy, where xxx and yyy are the last two numbers of the MAC address in decimal form. The MAC address is written on the front panel of the module.

The lower switch is used to choose the IP addressing mode between **DHCP** and **Stored**; the upper switch is used in the DHCP mode for additional information:

- **DHCP**: the IP address is requested by the PRM to a DHCP server using a hardware device name.
The device name is a string
 - starting with the module reference: **TCSEGPA23F14F**
 - followed by a configurable numerical extension, in decimal from 000 to 159, based on the switches values:
Extension = Tens value (upper switch setting x 10)
+ Unit value (Lower switch setting).For example if the upper switch is set to F (15) and the lower switch to 2, then the device name is TCSEGPA23F14F152
- **Stored**: the IP address is configured by the DTM ("Dedicated IP address" setting) and stored in the PRM as part of the PRM configuration file.

2 additional modes can also be triggered in some specific cases:

- **Clear IP**: temporary mode to delete the PRM configuration file including the stored IP address
- **Recovery**: specific Firmware update mode when the normal mode using the DTM is not working. To be used with the assistance of technical support only.



Switch	Position	Description/Meaning
Lower	0-9	DHCP mode selection Unit value of the device name extension (0,1,2,...9)
	A, B, C or D	Stored mode: IP comes with Conf file
	E	Clear IP : Configuration file deletion
	F	Recovery
Upper	0 to F (hexa)	Tens value of the device name extension (0, 1, .. 15). Used when the DHCP mode is selected.

Note: the factory default setting is: upper switch at 0, lower switch at C

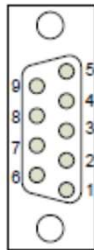
Note: the rotary switches position is read at power up only.

Arquitetura

● Profibus Remote Master (PRM):

Profibus connection

PRM Profibus
Connector

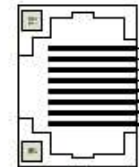


No.	Signal
1	Earth
2	Not connected
3	PFB B
4	RTS
5	PFB 0Vdc
6	PFB 5Vdc
7	Not connected
8	PFB A
9	Not connected

Ethernet connection

RJ45 Ethernet
Connector

Illustration of the RJ45 shielded connector for the Ethernet link :



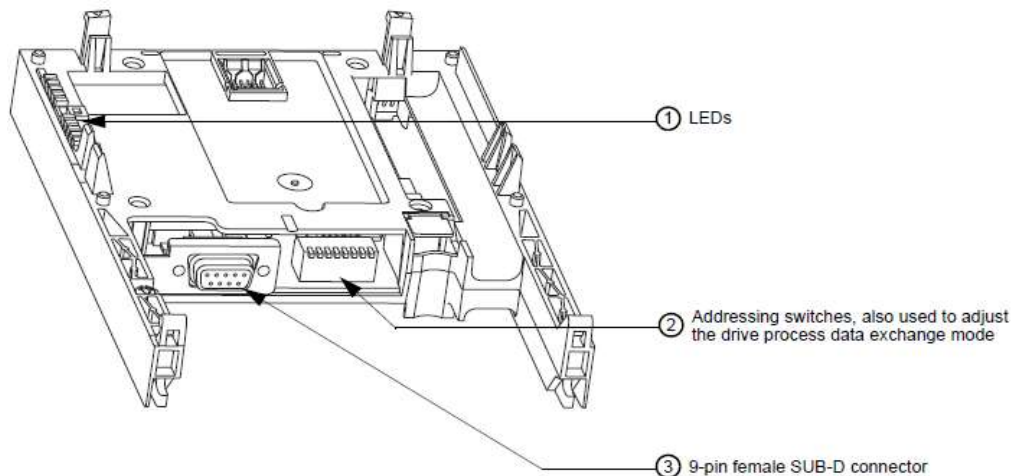
No.	Signal
1	Tx+
2	Tx-
3	Rx+
4	Not connected
5	Not connected
6	Rx-
7	Not connected
8	Not connected
9	Link/Activity LED
10	Link Status LED

Ethernet cables

Category 5 Shielded Twisted Pair (STP) with RJ45 connectors conforming to TIA-EIA-568A.

Arquitetura

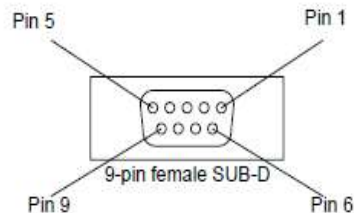
● Profibus DPV1 – Altivar 61:



Connection to the bus

Connector pinout

The transmission interface conforms to the RS 485 standard and is electrically isolated from the drive.



Pin	Signal	Pin	Signal	Pin	Signal
1	Not connected	4	Not connected	7	Not connected
2	Not connected	5	DGND (Ground)	8	RxD/TxD-P (Reception/Transmission +)
3	RxD/TxD-N (Reception/Transmission -)	6	VP (5 volts)	9	Not connected

Arquitetura

● Profibus DPV1 – Altivar 61:

Coding the drive address

An Altivar 71 is identified on the bus by its address, coded between 0 and 126.

The address corresponds to the binary number given by position 0 (up/OFF) or 1 (down/ON) of the 7 switches on the right of the card.

The least significant bits are on the right.

- Addresses 0 and 1 are usually reserved for the Profibus DP masters and must not be used to configure the Profibus DP address on an Altivar 71.
- It is not advised to use address 126, which is incompatible with SSA service (Set Slave Address) and with some network configuration softwares (Sycon, ...).

Examples:



Address 23



Address 89

The address can be checked via the display terminal (see Diagnostics section).

Altivar 61

● Configuração da comunicação:

Configuring PZDs (communication scanner)

PZDs are configured by configuring the communication scanner.

The 8 periodic output variables are assigned by means of parameters nCA1 to nCA8. They are configured using the graphic display terminal via the **[1.9 - COMMUNICATION] (C 0 9 -)** menu and **[COM. SCANNER OUTPUT] (0 C 5 -)** submenu. An nCA parameter with a value of zero does not designate any parameter in the drive. These 8 words are described in the table below:

Parameter name	Profibus variable	Default assignment
[Scan. Out1 address] (n C A 1)	PZD1	Command word (CMD)
[Scan. Out2 address] (n C A 2)	PZD2	Speed target (LFRD)
[Scan. Out3 address] (n C A 3)	PZD3	Not used
[Scan. Out4 address] (n C A 4)	PZD4	Not used
[Scan. Out5 address] (n C A 5)	PZD5	Not used
[Scan. Out6 address] (n C A 6)	PZD6	Not used
[Scan. Out7 address] (n C A 7)	PZD7	Not used
[Scan. Out8 address] (n C A 8)	PZD8	Not used

The 8 periodic input variables are assigned by means of parameters nMA1 to nMA8. They are configured using the graphic display terminal via the **[1.9 - COMMUNICATION] (C 0 9 -)** menu and **[COM. SCANNER INPUT] (1 C 5 -)** submenu. An nMA parameter with a value of zero does not designate any parameter in the drive. These 8 words are described in the table below:

Parameter name	Profibus variable	Default assignment
[Scan. In1 address] (n M A 1)	PZD1	Status word (ETA)
[Scan. In2 address] (n M A 2)	PZD2	Output speed (RFRD)
[Scan. In3 address] (n M A 3)	PZD3	Not used
[Scan. In4 address] (n M A 4)	PZD4	Not used
[Scan. In5 address] (n M A 5)	PZD5	Not used
[Scan. In6 address] (n M A 6)	PZD6	Not used
[Scan. In7 address] (n M A 7)	PZD7	Not used
[Scan. In8 address] (n M A 8)	PZD8	Not used

Altivar 61

- Configuração da comunicação:

Example of configuring PZDs via the graphic display terminal:

RDY	NET	+0.00Hz	0A
COM. SCANNER INPUT ☐			
Scan. In1 address	:		3201
Scan. In2 address	:		8604
Scan. In3 address	:		0
Scan. In4 address	:		0
Scan. In5 address	:		0
Code		Quick	☒
Scan. In6 address	:		0
Scan. In7 address	:		0
Scan. In8 address	:		0

RDY	NET	+0.00Hz	0A
COM. SCANNER OUTPUT ☐			
Scan. Out1 address	:		8501
Scan. Out2 address	:		8602
Scan. Out3 address	:		0
Scan. Out4 address	:		0
Scan. Out5 address	:		0
Code		Quick	☒
Scan. Out6 address	:		0
Scan. Out7 address	:		0
Scan. Out8 address	:		0

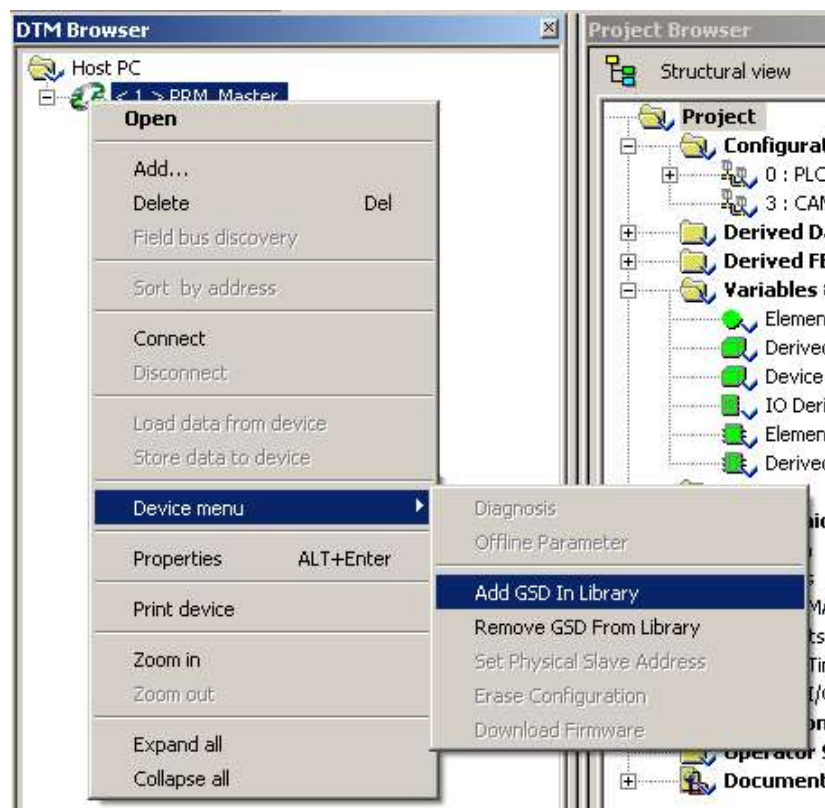
Note:

All modifications to parameters nMA1 ... nMA8 or nCA1 ... nCA8 must be made with the motor stopped.
The master PLC program should be updated to take account of this modification.

UnityPro

• Configuração PRM (Profibus Remote Master):

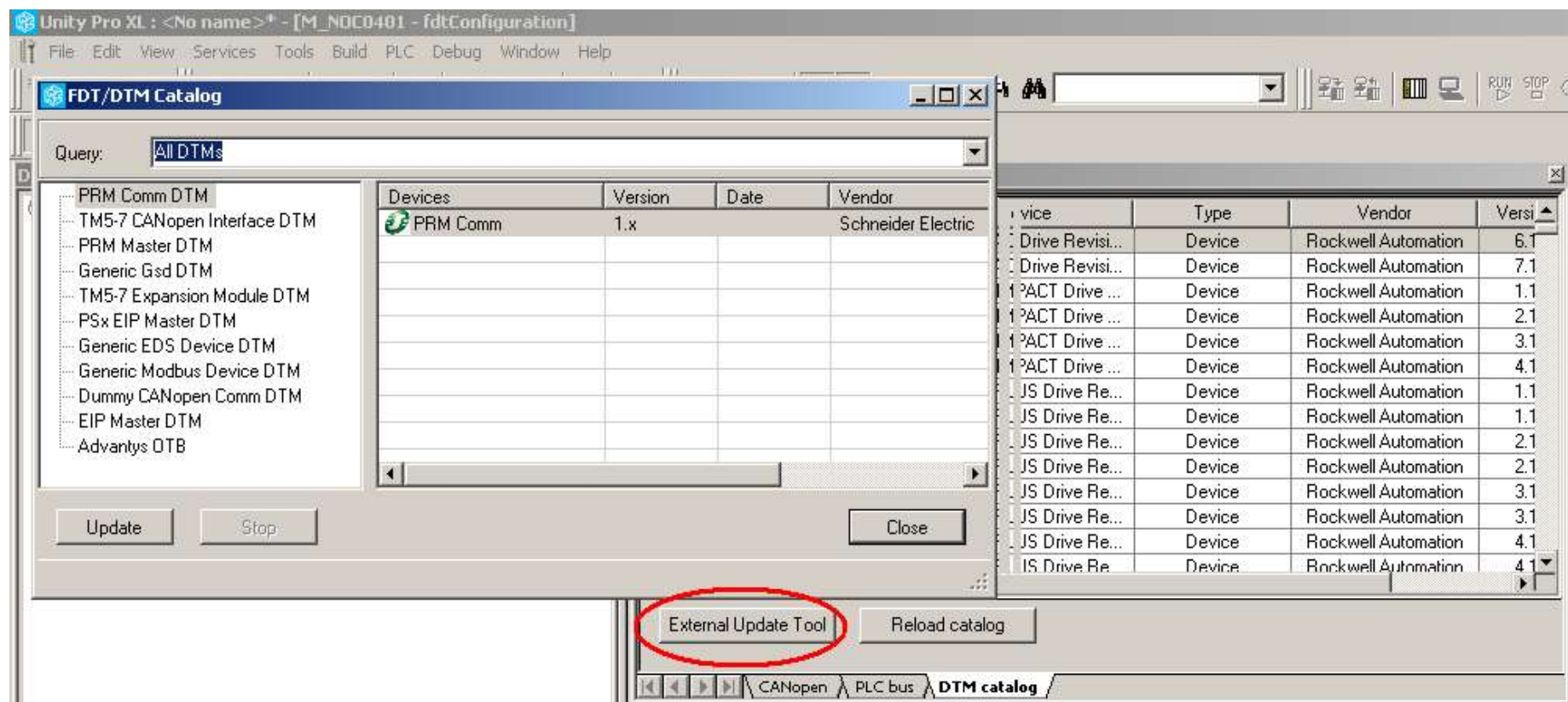
Acrescentar o arquivo GSD do dispositivo escravo Profibus DPV1 através do DTM Browser:



UnityPro

- Configuração PRM (Profibus Remote Master):

Após inserir o novo GSD na biblioteca, em **External Update Tool**, atualiza-se a biblioteca com os arquivos GSD para Profibus DP-V0:

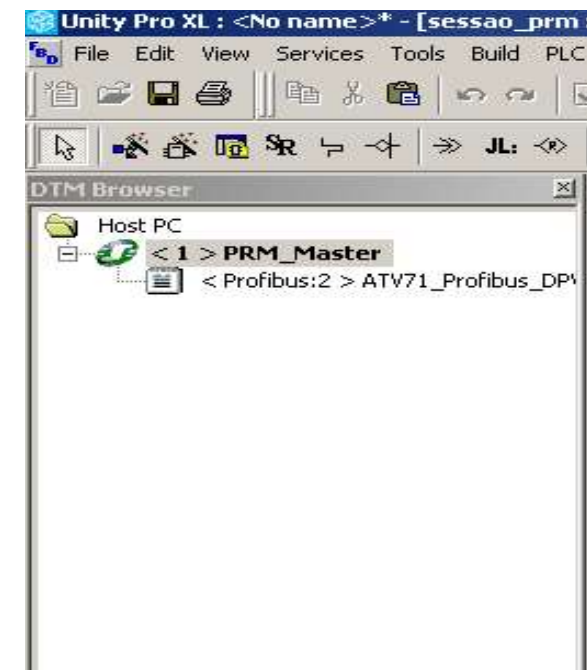
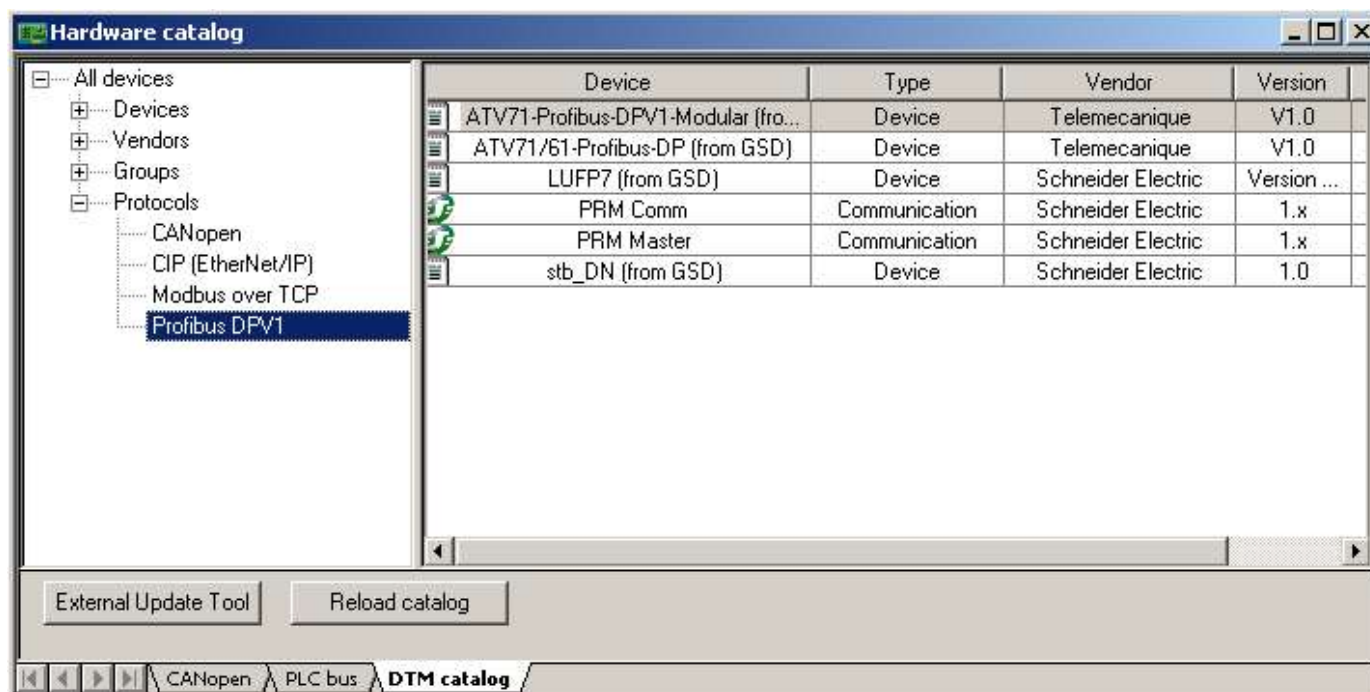


Em seguida, deve-se realizar o **Reload Catalog** para ter disponível o arquivo inserido na biblioteca.

UnityPro

- Configuração PRM (Profibus Remote Master):

Acrescentar o arquivo GSD do dispositivo escravo Profibus DPV0 através do DTM Browser:



UnityPro

• Configuração PRM (Profibus Remote Master):

Variáveis criadas para o dispositivo escravo e para o módulo PRM:

The screenshot displays the UnityPro software interface. On the left is the 'Project Browser' showing a hierarchical tree of the project structure. The main area on the right is the 'Variables' table, which lists the variables created for the PRM module and the slave device.

Project Browser Structure:

- Project
 - Configuration
 - 1 : Local Bus
 - 1 : Local Quantum
 - Derived Data Types
 - T_ATV71_61_Profibus_
 - T_ATV71_61_Profibus_
 - T_PRM_FSTS
 - T_PRM_ID_Q
 - T_PRM_IN
 - T_PRM_INFO_Q
 - T_PRM_OUT
 - Derived FB Types
 - PRM_ID_Q
 - PRM_MGT_Q
 - RDREC_Q
 - Variables & FB instance:
 - Elementary Variables
 - Derived Variables
 - Device DDT Variables
 - IO Derived Variables
 - Elementary FB Instance
 - Derived FB Instances
 - Communication
 - Networks
 - Ethernet_1
 - Program
 - Tasks
 - MAST
 - Sections
 - sessao_1
 - SR Sections
 - Events
 - Timer Events

Variables Table:

Name	Type	Address	Value	Com...	984 Address	Save
[ATV71_61_Profibus_D_Y3S7U_IN	T_ATV71_61_Profibus_D_Y3S7U_IN	%Mw27			400027	
[ATV71_61_Profibus_D_Y3S7U_OUT	T_ATV71_61_Profibus_D_Y3S7U_OUT	%Mw502			400502	
busy_RDREC_Q	BOOL					
error_RDREC_Q	BOOL					
exchange_buffer_id_q	ARRAY[1..5] OF INT	%mw800			400800	
exchange_buffer_prm	ARRAY[1..25] OF INT	%mw700			400700	
exchange_buffer_RDREC_Q	ARRAY[1..5] OF INT	%mw900			400900	
index_RDREC_Q	INT					
len_RDREC_Q	INT					
master_info_prm	T_PRM_INFO_Q					
MLEN_RDREQ_Q	INT					
prm_error	BOOL					
prm_full_status	T_PRM_FSTS					
PRM_Master_IN	T_PRM_IN	%Mw1			400001	
PRM_Master_OUT	T_PRM_OUT	%Mw500			400500	
prm_stop_mode	BOOL					
read_completed_valid	BOOL					
record_RDREQ_Q	ARRAY[1..5] OF INT					
req_class2	BOOL					
req_fsts	BOOL					
req_RDREC_Q	BOOL					
retry_restart	BOOL					
slot	BYTE					
start_in_progress_busy	BOOL					
station	BYTE					
status_RDREC_Q	DWORD					
substation	BYTE					
valid_RDREC_Q	BOOL					

UnityPro

- Configuração PRM (Profibus Remote Master):

Variáveis estruturadas da configuração da rede Profibus DPV0 através do DTM Browser:

The screenshot displays the UnityPro DTM Browser interface. On the left, the 'Project Browser' shows a tree structure with 'Configuration' and 'Derived Data Types'. Under 'Derived Data Types', several variables are listed: T_ATV71_61_Profibus_, T_ATV71_61_Profibus_, T_PRM_FSTS, T_PRM_ID_Q, T_PRM_IN, and T_PRM_INFO_Q. On the right, the 'DTM Browser' window is open, showing the 'DDT Types' tab. A filter is set to 'Name = *'. Below the filter, a table lists the DDT types and their comments.

Name	Type	Comment
T_ATV71_61_Profibus_D_Y3S7U_IN	<Struct>	
T_ATV71_61_Profibus_D_Y3S7U_OUT	<Struct>	
T_PRM_FSTS	<Struct>	PRM Full Status
T_PRM_ID_Q	<Struct>	Quantum - Handle for Read and Write Blocks
T_PRM_IN	<Struct>	PRM status
T_PRM_INFO_Q	<Struct>	Quantum - Path of ETH exchanges
T_PRM_OUT	<Struct>	

As variáveis estruturadas (*DDT Types*) e as sessões de programa de gerenciamento da comunicação (*Derived FB Types*) para utilização do módulo PRM são geradas a partir do término da configuração da rede Profibus DPV1 no **DTM Browser** e após realizar o **Build** da aplicação.

Em seguida, realiza-se a configuração do I/O Scanning, onde na configuração são exigidas as quantidade de registros de entrada e saída para a comunicação de maneira transparente com o escravo em Profibus DPV1.

UnityPro

• Configuração PRM (Profibus Remote Master):

Function Blocks criados para sessão de programa para o funcionamento do módulo PRM:

The screenshot shows the UnityPro Project Browser on the left and the Function Blocks list on the right. The Project Browser displays a hierarchical structure under 'Project' with 'Configuration' (1 : Local Bus, 1 : Local Quantum) and 'Derived Data Types' (T_ATV71_61_Profibus_, T_PRM_FSTS, T_PRM_ID_Q, T_PRM_IN). The Function Blocks list on the right has tabs for Variables, DDT Types, Function Blocks, and DFB Types. The Function Blocks tab is active, showing a table of function blocks.

Name	no.	Type	Val
PRM_ID_Q_0		PRM_ID_Q	
PRM_MGT_Q_0		PRM_MGT_Q	
R_TRIG_0		R_TRIG	
R_TRIG_1		R_TRIG	
R_TRIG_2		R_TRIG	
RDREC_Q_0		RDREC_Q	

DFB Types para o funcionamento do módulo PRM:

The screenshot shows the UnityPro Project Browser on the left and the DFB Types list on the right. The Project Browser displays a hierarchical structure under 'Project' with 'Configuration' (1 : Local Bus, 1 : Local Quantum) and 'Derived Data Types' (T_ATV71_61_Profibus_, T_ATV71_61_Profibus_). The DFB Types list on the right has tabs for Variables, DDT Types, Function Blocks, and DFB Types. The DFB Types tab is active, showing a table of DFB types.

Name	no.	Type	Value	Comment
PRM_ID_Q		<DFB>		Quantum - Addressing Block for Profibus Devices
PRM_MGT_Q		<DFB>		Quantum - PRM management Block
RDREC_Q		<DFB>		Quantum - Read Profibus DPV1 device parameter

UnityPro

- Configuração PRM (Profibus Remote Master):

Aponta-se o endereço IP do módulo PRM e reserva-se os registros para leitura e escrita no escravo Profibus DPV1 (RD Master Object e WR Master Object):

The screenshot displays the UnityPro configuration interface for an Ethernet module. On the left, a 'Structural view' pane shows the project hierarchy, including 'Configuration', 'Derived Data Types', 'Derived FB Types', and 'Variables & FB instances'. The main window is titled 'Ethernet_1' and contains several configuration sections:

- Model Family:** Set to 'TCP/IP 10/100 Extended connection'.
- Module Address:** Rack 1, Module 2.
- Module IP Address:** IP Address: 10.161.47.22, Subnetwork Mask: 255.255.255.0, Gateway Address: 0.0.0.0.
- Module Utilities:** YES for IO Scanning, NO for Global Data, YES for SNMP, NO for Address Server.
- IO Scanning Tab:** Shows a table of scanned peripherals.

The 'IO Scanning' tab is active, displaying a table of scanned peripherals. The table has the following columns: IP address, Device Name, Unit ID, Slave Syntax, Health Timeout (ms), Repetitive rate (ms), RD Master Object, RD Ref Slave, RD length, Last value (Input), WR Master Object, WR Ref Slave, and WR length.

	IP address	Device Name	Unit ID	Slave Syntax	Health Timeout (ms)	Repetitive rate (ms)	RD Master Object	RD Ref Slave	RD length	Last value (Input)	WR Master Object	WR Ref Slave	WR length
1	10.161.47.59	PRM_Master	255	Index	1500	280	%Mw1	0	40	Set to 0	%Mw500	4096	16
2													
3													

UnityPro

- Configuração PRM (Profibus Remote Master):

Configuração do PRM_Master para comunicação em Profibus DPV1:

The screenshot shows the 'Property' dialog box for configuring a PRM (Profibus Remote Master) device. The dialog is divided into several sections:

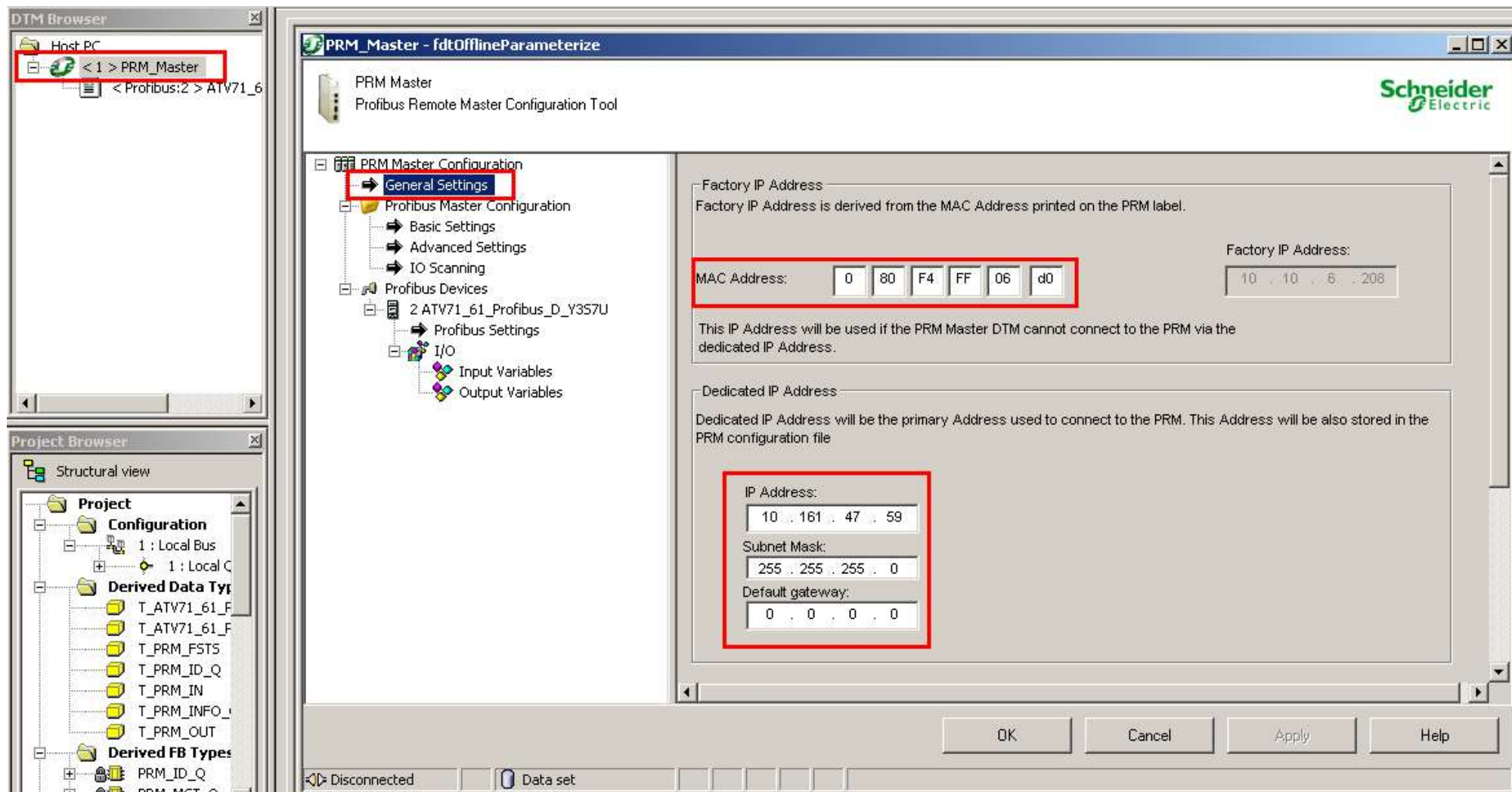
- Device Type:** A dropdown menu showing 'DTM'.
- DTM Protocol:** A dropdown menu showing 'Profibus DPV1'.
- DTM Name:** A dropdown menu showing 'PRM_Master'.
- Data Exchange Required:** A section containing two input fields:
 - Input words:** A text box containing the value '40'.
 - Output words:** A text box containing the value '16'.
- Buttons:** At the bottom, there are four buttons: 'OK', 'Launch No Tool', 'Update', and 'Close'.

A quantidade de registros estipulada pelo Data Exchange Required é a quantidade de registros de entrada e saída para comunicação com o escravo em Profibus DPV1 que deve ser acrescentada nos campos RD Ref Length e WR Length no I/O Scanning.

UnityPro

- Configuração PRM (Profibus Remote Master):

Configuração endereço IP do PRM:



UnityPro

- Configuração PRM (Profibus Remote Master):

Definição do endereço escravo Profibus DPV1

The screenshot displays the PRM Master Configuration Tool interface. On the left, the 'DTM Browser' shows a tree structure with 'Host PC' and '< 1 > PRM_Master'. The 'Project Browser' at the bottom shows 'Structural view' and 'Project Configuration' with '1 : Local Bus'. The main window is titled 'PRM Master Profibus Remote Master Configuration Tool'. It features a tree view on the left with 'PRM Master Configuration' expanded, showing 'General Settings', 'Profibus Master Configuration', 'Basic Settings', 'Advanced Settings', 'IO Scanning', and 'Profibus Devices' (which is selected). Under 'Profibus Devices', there is a list of '2 ATV71_61_Profibus_D_Y357U' with sub-items for 'Profibus Settings', 'I/O', 'Input Variables', and 'Output Variables'. The right pane is titled 'Assign Station Addresses to Devices' and contains a table with the following data:

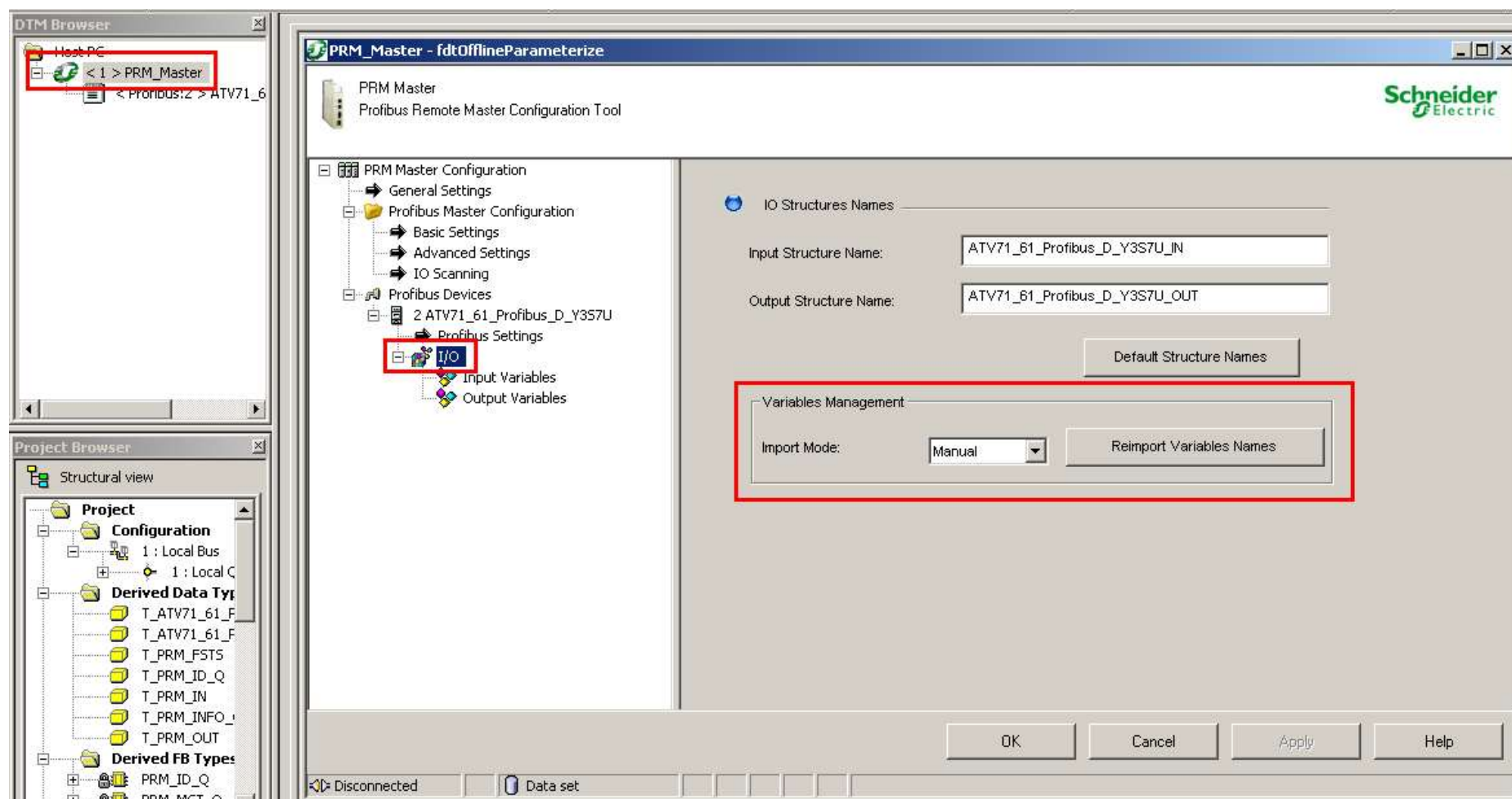
Address	Device Name	Vendor	Type	Version
2	ATV71_61_Profibus_...	Telemecanique	ATV71/61-Pr...	V1.0

At the bottom of the right pane, there is a section for 'Address (0-126):' with a text box containing '0', an 'Assign Address' button, and a label 'Directly Applied to the selected device...'.

UnityPro

- Configuração PRM (Profibus Remote Master):

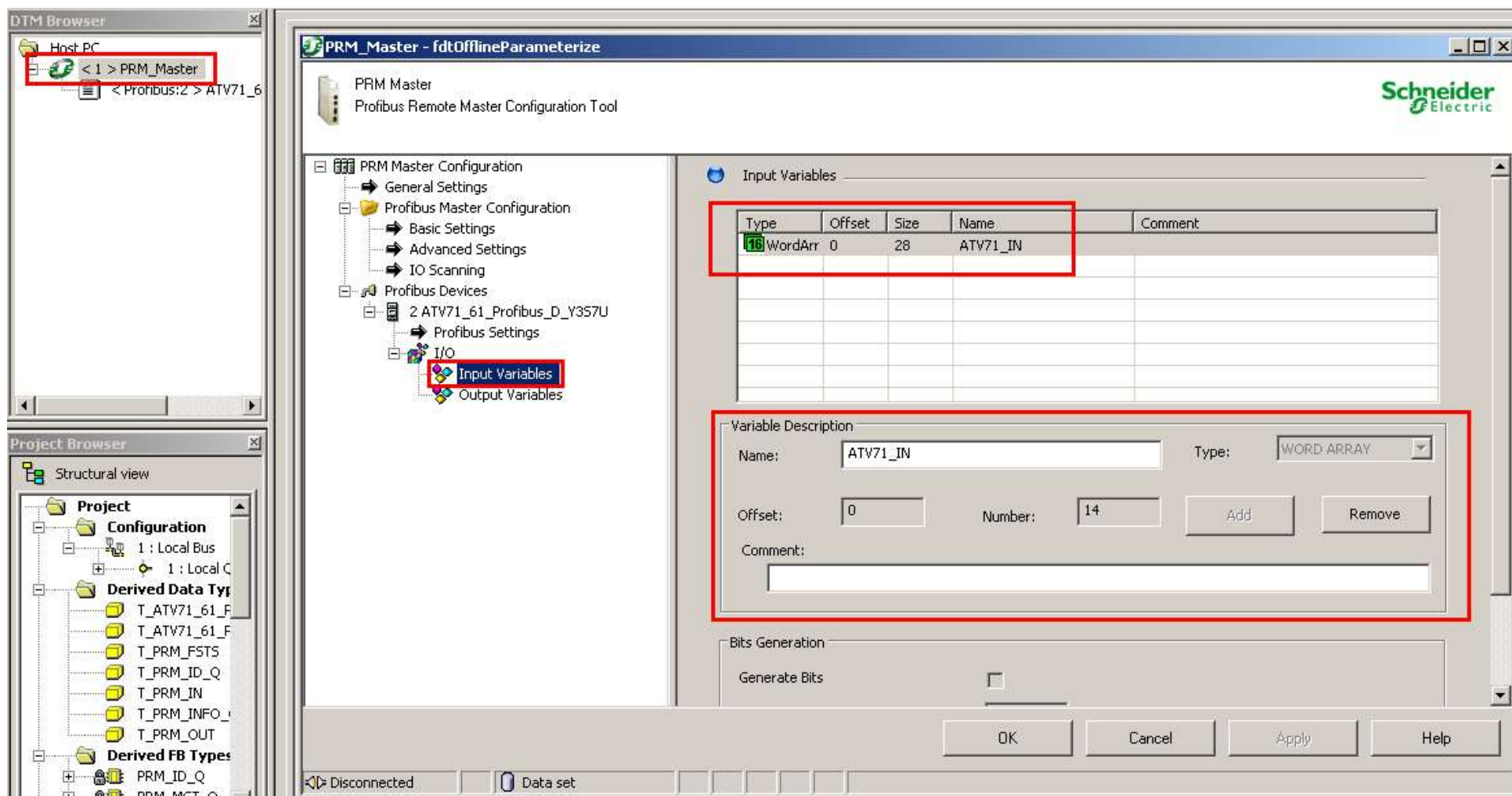
Configuração do mapa de variáveis do ATV61 – Manual.



UnityPro

- Configuração PRM (Profibus Remote Master):

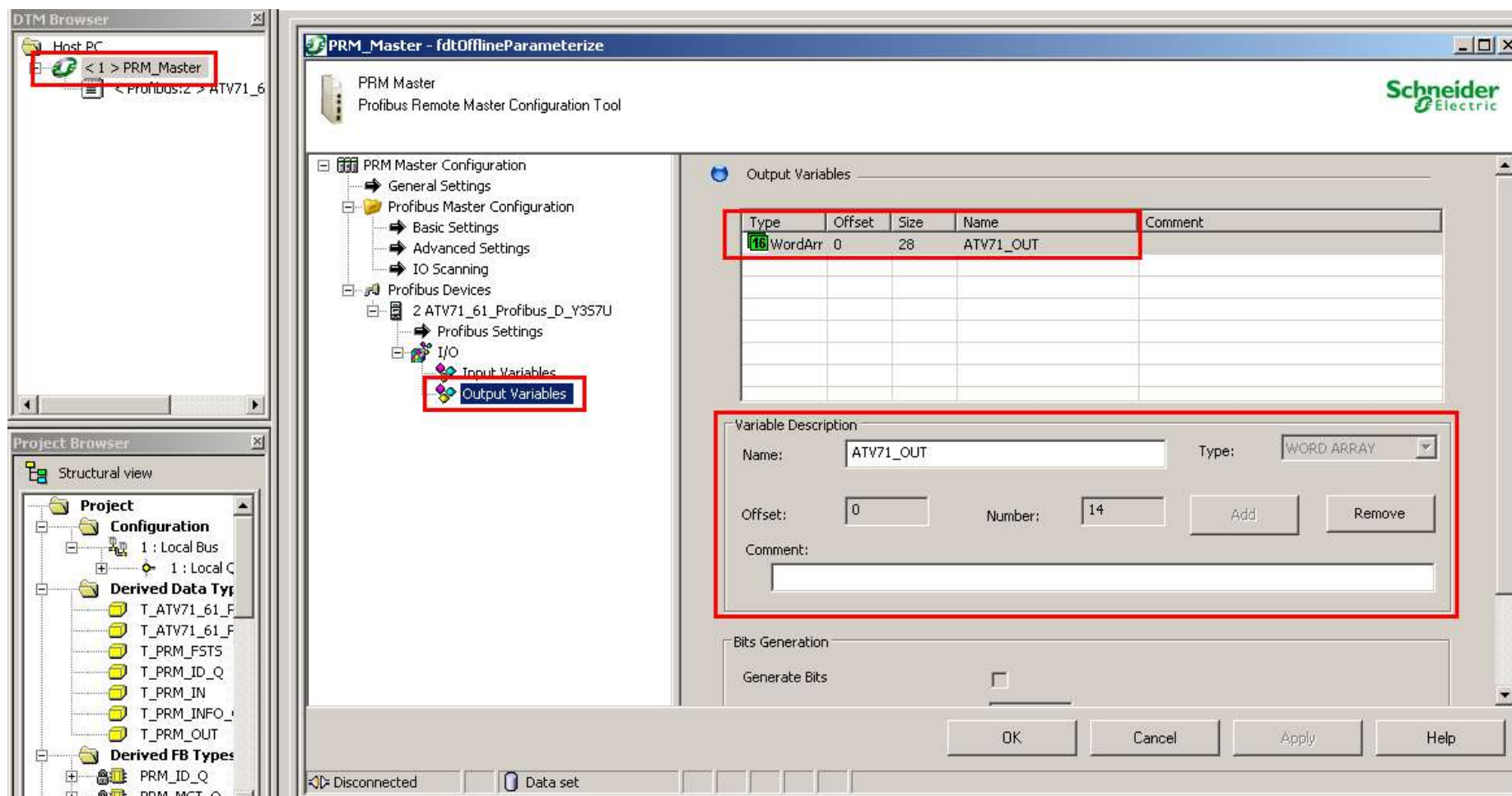
Configuração do mapa de variáveis de entrada do ATV61.



UnityPro

- Configuração PRM (Profibus Remote Master):

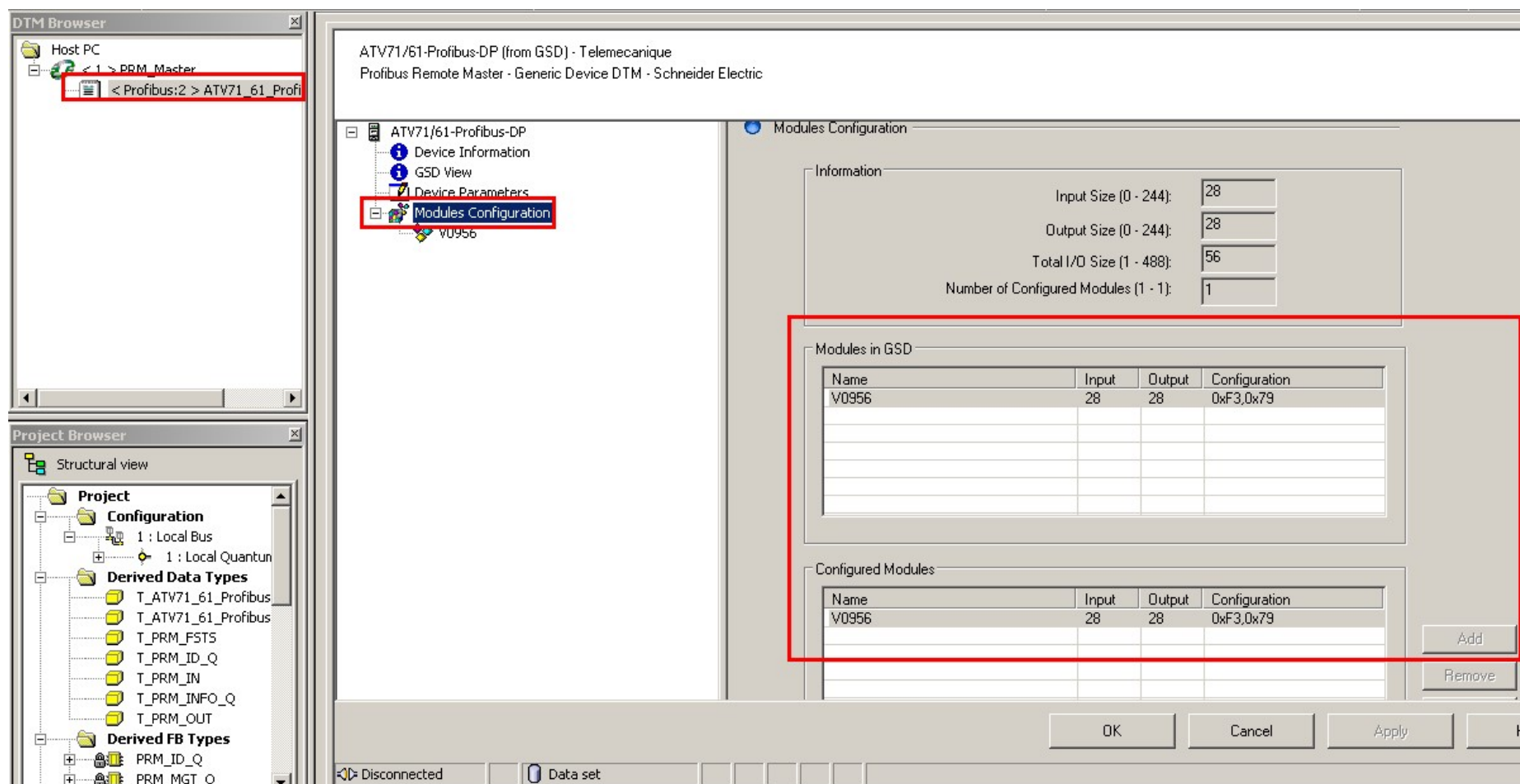
Configuração do mapa de variáveis de saída do ATV61.



UnityPro

- Configuração PRM (Profibus Remote Master):

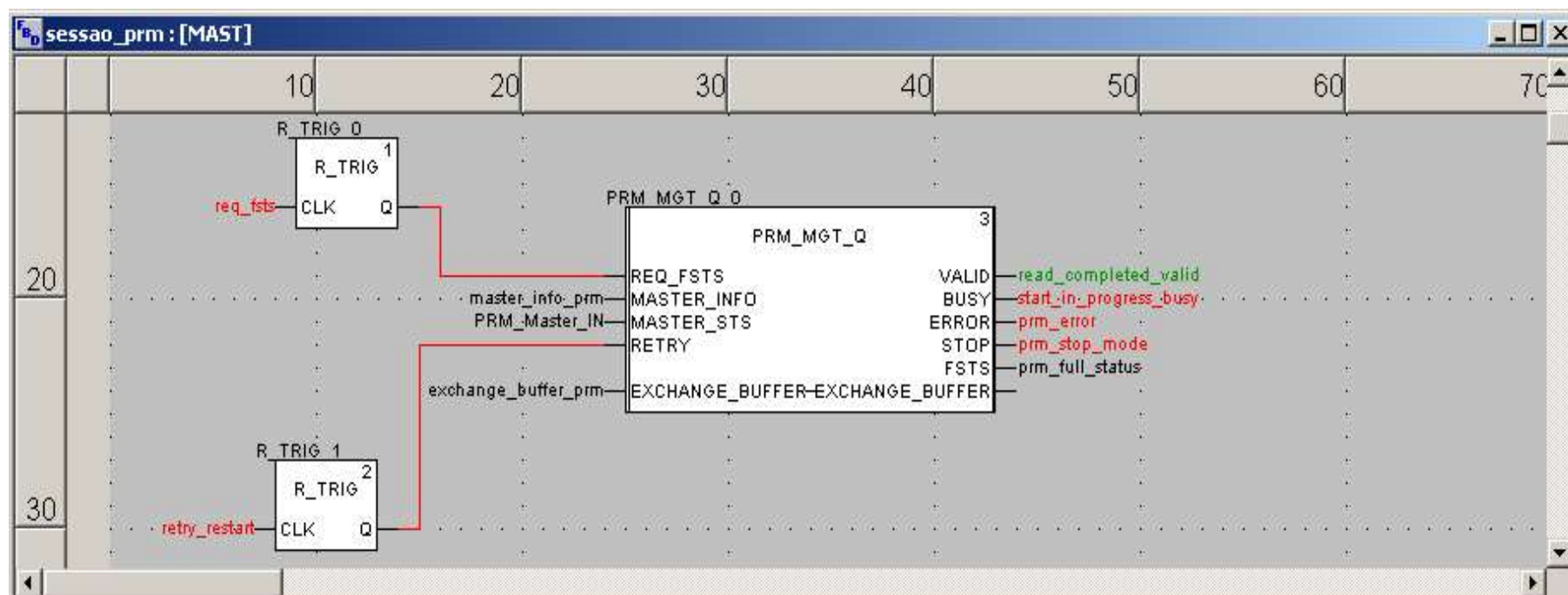
Definição da quantidade de registros periódicos que comunicação diretamente com o escravo (28 bytes de entrada e 28 bytes de saída).



UnityPro

- Configuração PRM (Profibus Remote Master):

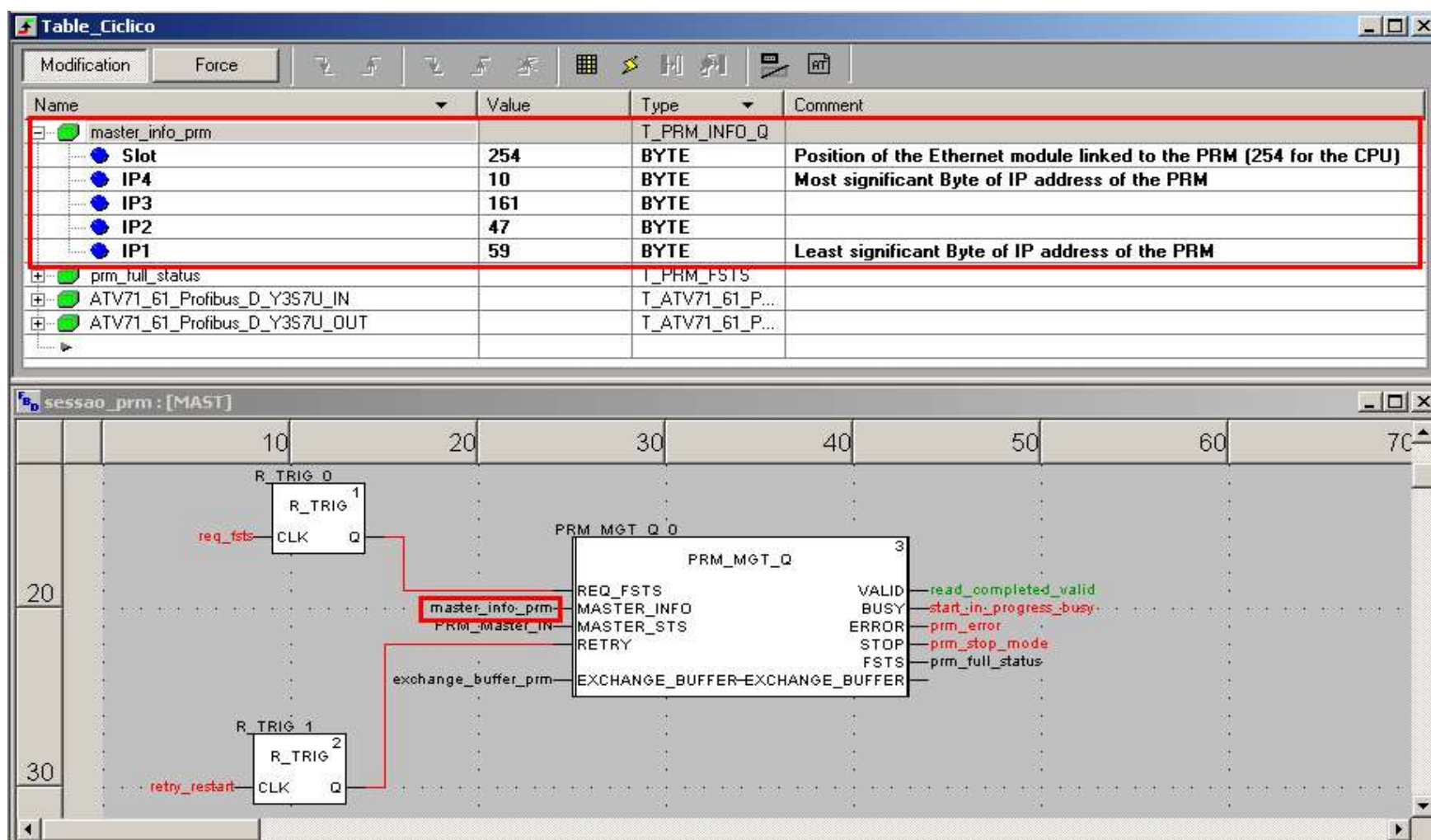
Utilizar o bloco **PRM_MGT_Q** para gerenciamento da utilização do módulo Profibus.



UnityPro

- Configuração PRM (Profibus Remote Master):

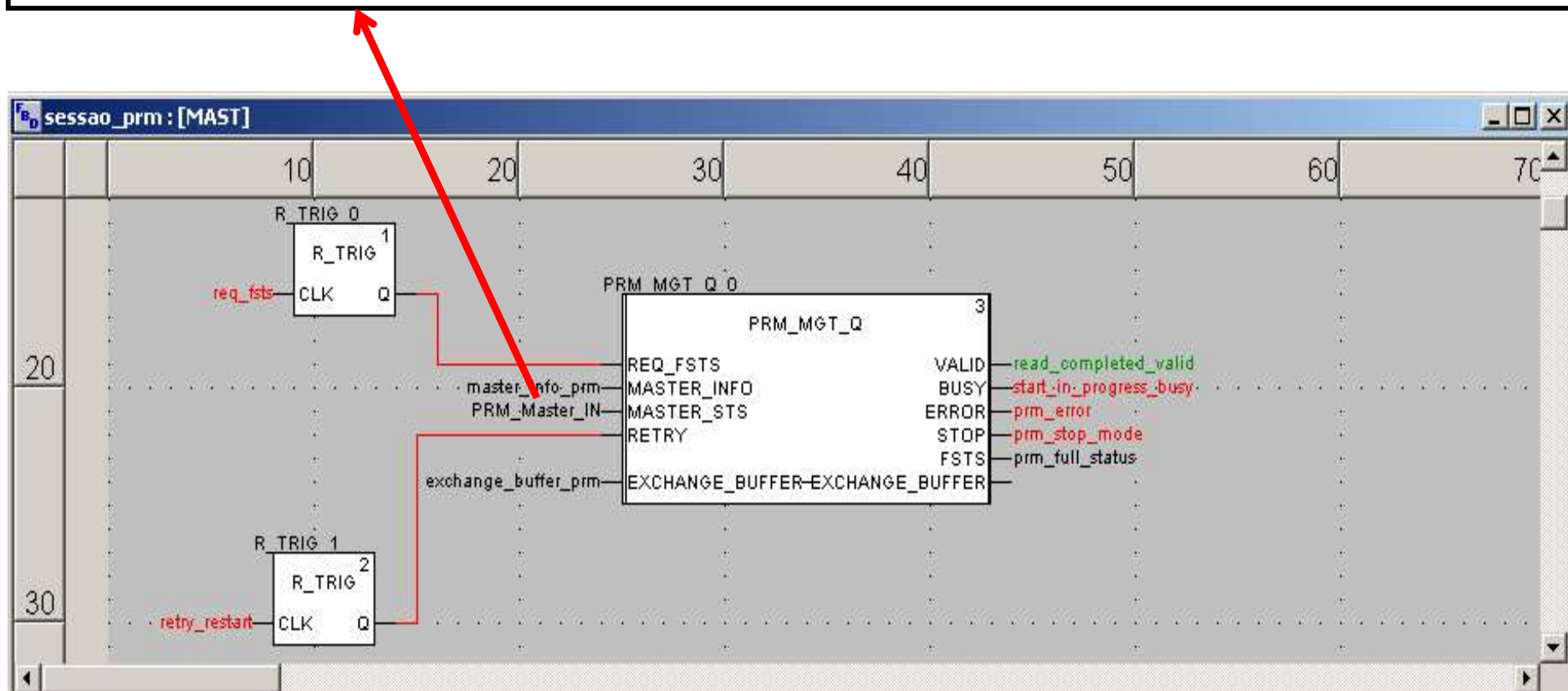
Na variável estruturada **MASTER_INFO**, carregar o endereço IP do módulo PRM e declarar o slot de utilização do módulo Ethernet configurado no I/O Scanning.



UnityPro

- Configuração PRM (Profibus Remote Master):

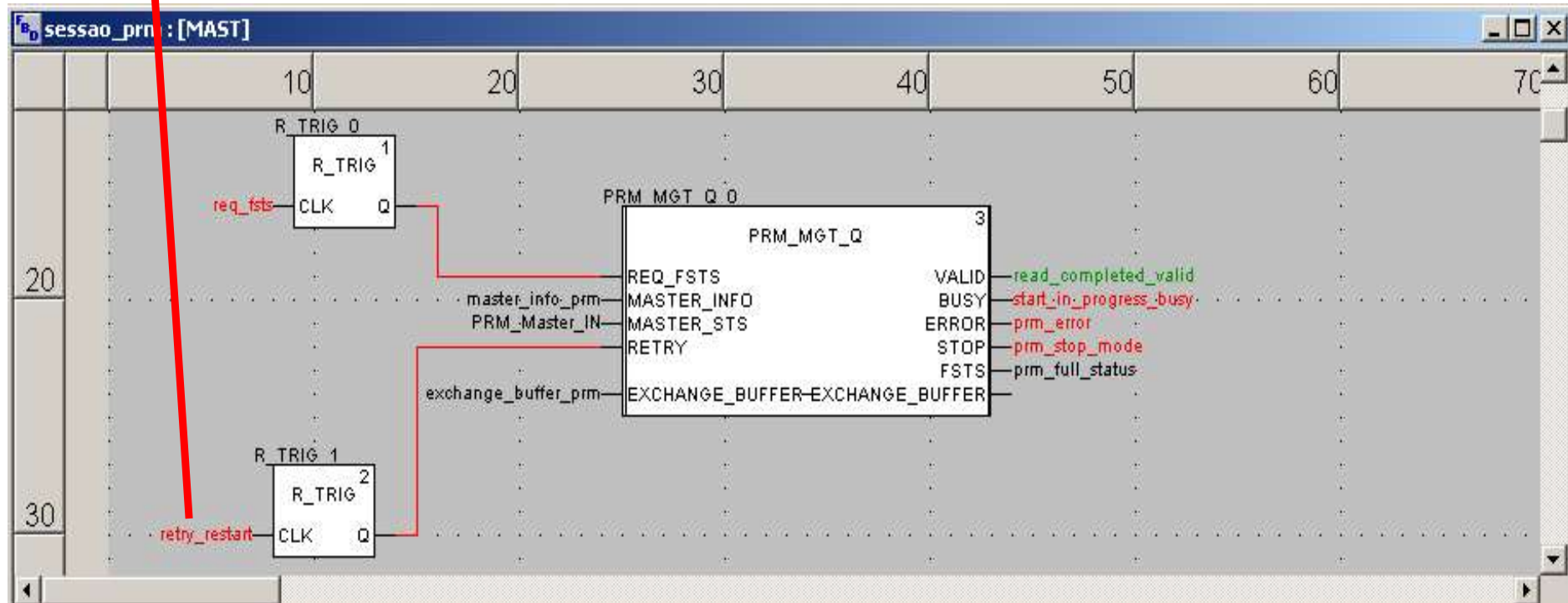
Utilizar o bloco **PRM_Master_IN** conforme criado pelo DTM Browser em **MASTER_STS**



UnityPro

- Configuração PRM (Profibus Remote Master):

Habilita e envia o módulo para modo RUN.



UnityPro

- Configuração PRM (Profibus Remote Master):

Modo On-Line obtendo os diagnósticos:

The screenshot displays the Schneider Electric UnityPro software interface. On the left, the 'Project Browser' shows a hierarchical tree structure with folders for 'Structural view', 'Derived FB Types', 'Variables & FB instances', 'Motion', 'Communication', 'Program', and 'Animation Tables'. The 'Communication' folder is expanded, showing 'CONEXAO_PRM'. The main window is titled 'PRM Master - Diagnostic' and features the Schneider Electric logo. It contains a tree view on the left with 'PRM' selected, and a table on the right displaying diagnostic data.

Parameter	Value
**** PRM Hw/ and Fw ****	
Hardware Version	0.2
CPLD Version	3
Bootrom Version	1.3
Firmware Version	1.0.23.0
EIP Interface Version	1.0
Modbus Interface Version	1.0
Supported Configuration File Version	1.3
EIP Serial Number	0x10ff06d0
Product Serial Number	21104800022
MAC Address	00 80 f4 ff 06 d0
**** PRM Rotary Switches ****	
Upper Rotary Switch Value	0x0
Lower Rotary Switch Value	0xC
IP Address Allocation	IP From Configuration File
**** PRM Configuration File ****	
Configuration File Presence	Yes
Configuration File Version	1.3
Configuration CRC ID	0xe7b6a451

At the bottom of the window, there is a status bar with 'Connected' and 'Device' indicators, and a taskbar showing 'PLC bus', 'Table', 'sessao_prm...', and 'PRM_Master...'.

UnityPro

- Configuração PRM (Profibus Remote Master):

Modo On-Line – Animation Tables:

Name	Value	Type
ATV71_61_Profibus_D_Y3S7U_IN		T_ATV71_61_P...
ATV71_IN		ARRAY[0..13] O...
ATV71_IN[0]	0	WORD
ATV71_IN[1]	0	WORD
ATV71_IN[2]	0	WORD
ATV71_IN[3]	0	WORD
ATV71_IN[4]	16#0637	WORD
ATV71_IN[5]	500	WORD
ATV71_IN[6]	0	WORD
ATV71_IN[7]	0	WORD
ATV71_IN[8]	0	WORD
ATV71_IN[9]	0	WORD
ATV71_IN[10]	0	WORD
ATV71_IN[11]	0	WORD
ATV71_IN[12]	32768	WORD
ATV71_IN[13]	32768	WORD
ATV71_61_Profibus_D_Y3S7U_OUT		T_ATV71_61_P...
ATV71_OUT		ARRAY[0..13] O...
ATV71_OUT[0]	0	WORD
ATV71_OUT[1]	0	WORD
ATV71_OUT[2]	0	WORD
ATV71_OUT[3]	0	WORD
ATV71_OUT[4]	16#000F	WORD
ATV71_OUT[5]	500	WORD
ATV71_OUT[6]	0	WORD
ATV71_OUT[7]	0	WORD
ATV71_OUT[8]	0	WORD
ATV71_OUT[9]	0	WORD
ATV71_OUT[10]	0	WORD
ATV71_OUT[11]	0	WORD
ATV71_OUT[12]	0	WORD
ATV71_OUT[13]	0	WORD

ETA

rFr

CMD

Target velocity