Connecting DeltaV to MTL8000 1/1 system via the MTL850-BI-DP Profibus BIM

1 Introduction

This document walks a user through the steps required to establish communications between the DeltaV Profibus module and the MTL8000 1/1 system via the 850-BI-DP Profibus BIM (configured with modules 818-DX-08, 815-DO-04, 801-HI-04 and 804-AO-04). The 850-BI-DP Profibus DP BIM matches physical modules to the logical modules configured within the Profibus Master configuration software. All BIM & module parameters are configured from the DeltaV Explorer configuration software.
There are 2 .gsd files for this product. The first and recommended is MTL_05F0.gsd where all module parameters are set on a per module basis. The second MTL205F0.gsd is more complicated & parameters are set on a per channel basis.

This support note is intended to provide guidance to achieving communication between 8000 and DeltaV. It demonstrates data-exchange between Master & Slave and how to retrieve diagnostic data. The programmer is responsible for error handling and control algorithms.

2 Documentation

User documentation and .gsd files are available off the MTL website (http:// www.mtl-inst.com); Publications button.

INM8001.pdf	MTL8000 1/1 system Installation Guide.
MTL_05f0.gsd	MTL850-BI-DP Profibus BIM .gsd file – mode 1.
MTL205f0.gsd	MTL850-BI-DP Profibus BIM .gsd file – mode 2.

3 DeltaV Explorer

3.1 Hardware configuration

To add the MTL850-BI-DP Profibus BIM to the library, the .gsd file is imported. Expand the library view in the tree and right-click on Profibus DP Devices. Select Add Device Definition. (see figure 1). A dialog box allows the user to select the .gsd file to import.

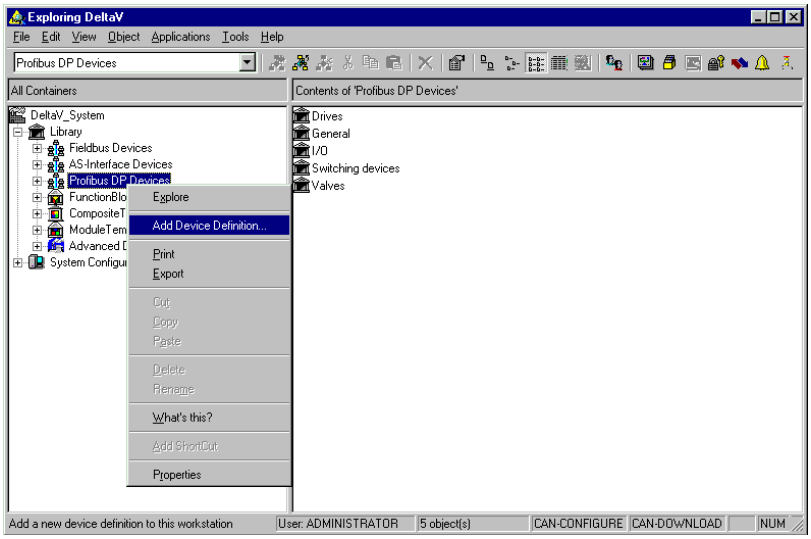


Figure 1.

Expanding the library into Profibus DP Devices, I/O, MTL Instruments shows the MTL8000 1/1 seen below in figure 2.

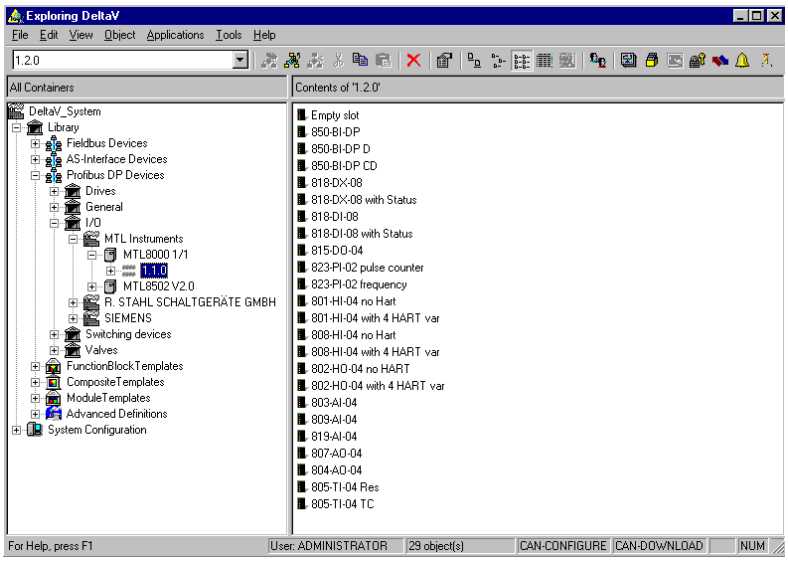


Figure 2.

It is now possible to use a MTL850-BI-DP Profibus BIM in a DeltaV project. First open (or create) a project (the project name is Test_ProfiBIM in this example). Add a controller to the physical network as shown in figure 3.

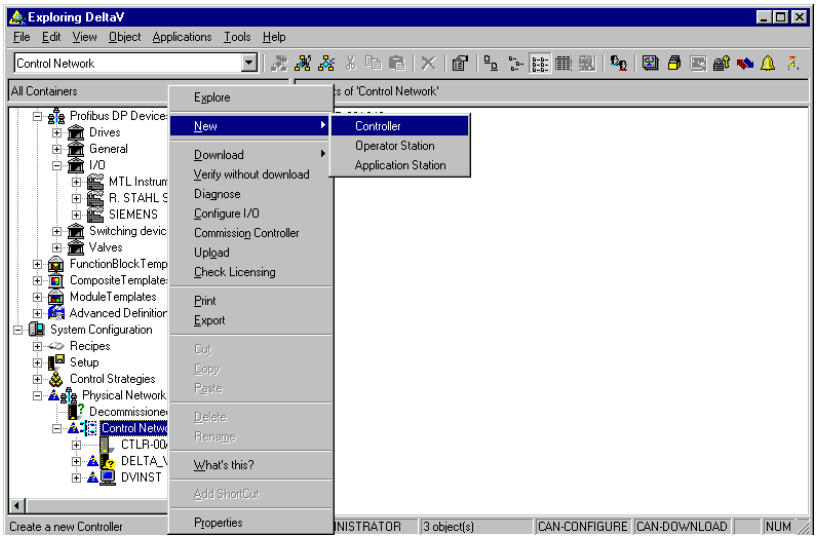


Figure 3.

In this example, the controller was named Test_ProfiBIM1_1. On the controller, right-click on I/O and select New Card, see figure 4.

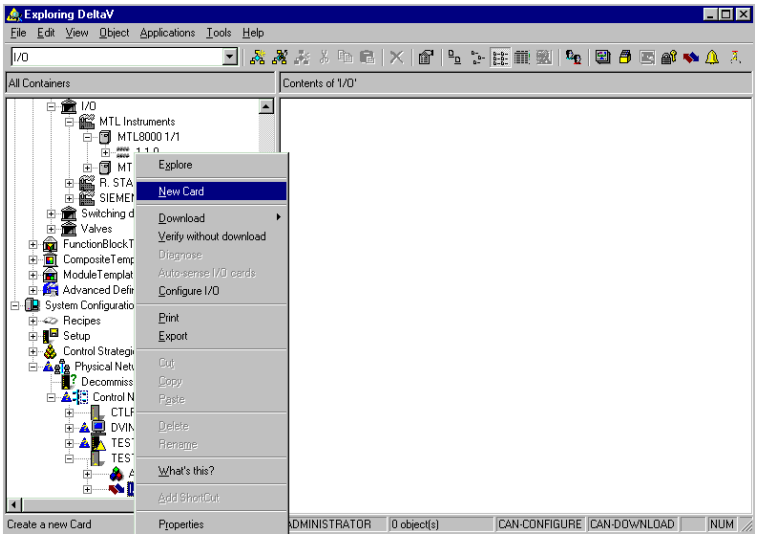


Figure 4.

Select the slot and card (Profibus DP card, 1 port).

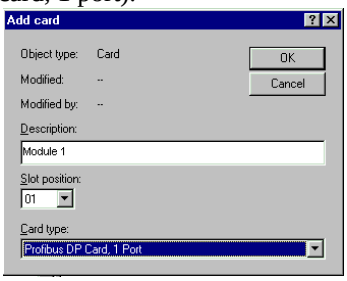


Figure 5.

To configure the card, expand the tree (I/O, C01, P01). Right click on the port P01, select Properties and set the Profibus Master address and the network Baudrate.

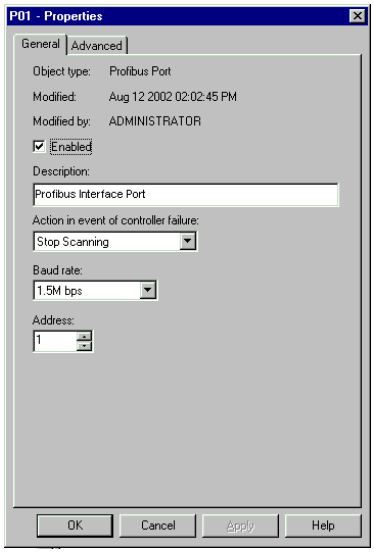


Figure 6.

Right click on the port P01 again and select New Profibus Device, see figure 7.

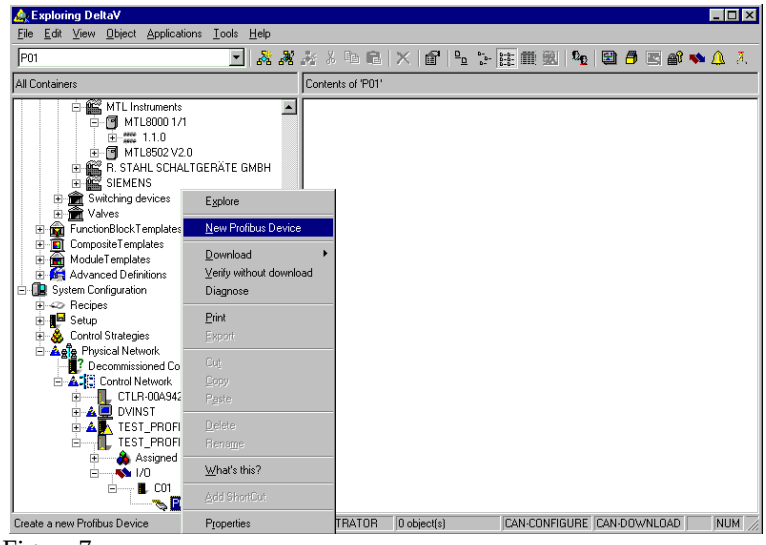


Figure 7.

Browse to select the Profibus device in the library as shown in figures 8a, 8b, 8c and 8d.

Figure 8a.

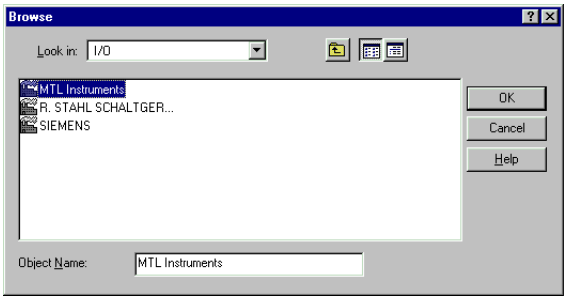


Figure 8b.

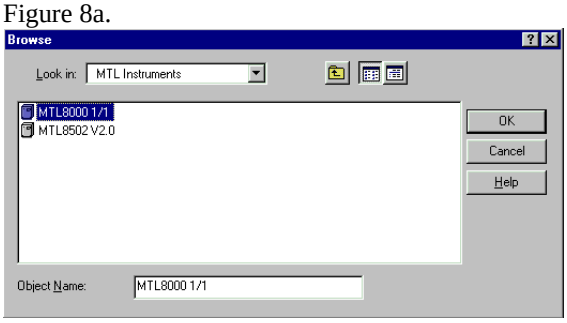


Figure 8c.

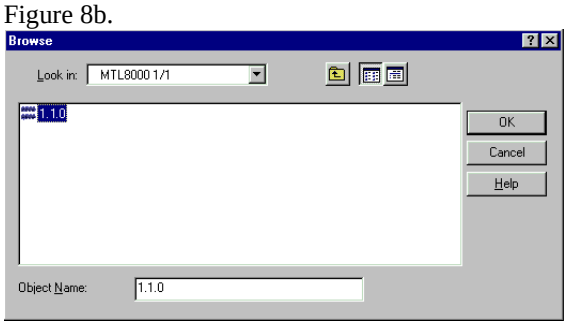


Figure 8d.

Expand the tree below port P01 to show PDT2. Right click on PDT2 and select New Profibus Slot.

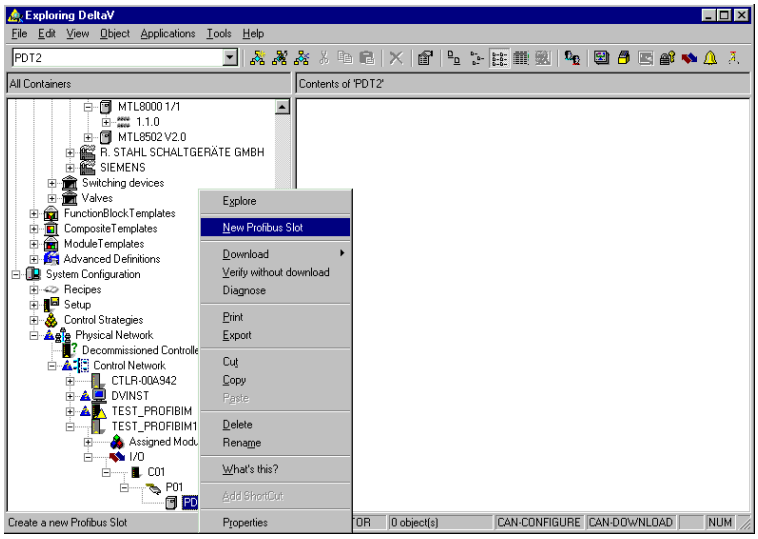


Figure 9.

Insert the MTL850-BI-DP BIM module into slot 0 and continue to add the other IO modules as shown in figures 10a to 10e. (BIM MTL850-BI-DP in slot 0, 818-DX-08 in slot 1, 818-DX-08 in slot 2, 803-AI-04 in slot 3, and 804-AO-04 in slot 4). The telegram information (data size) is shown in each figure as modules are added.

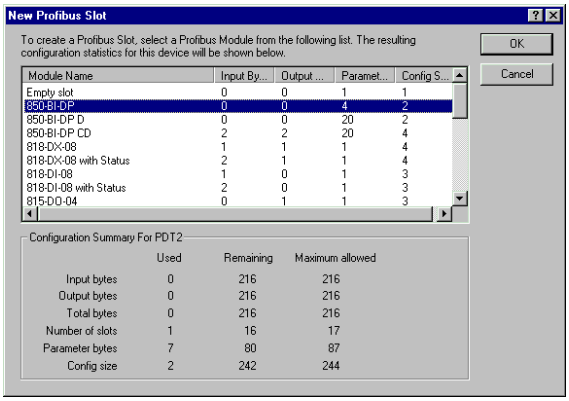


Figure 10a.

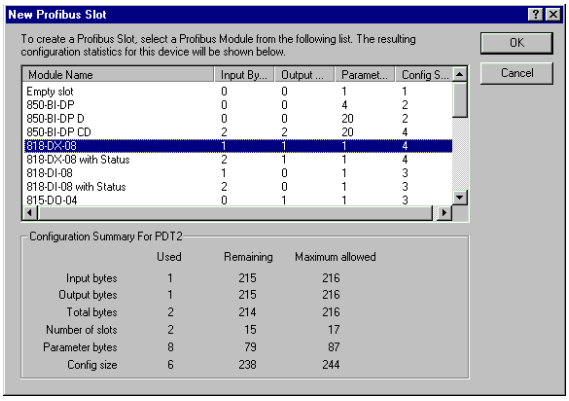


Figure 10b.

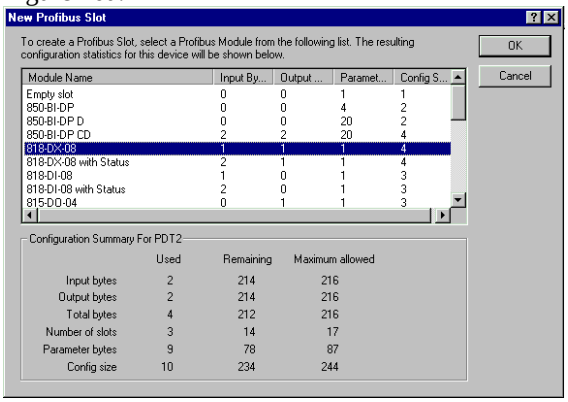


Figure 10c.

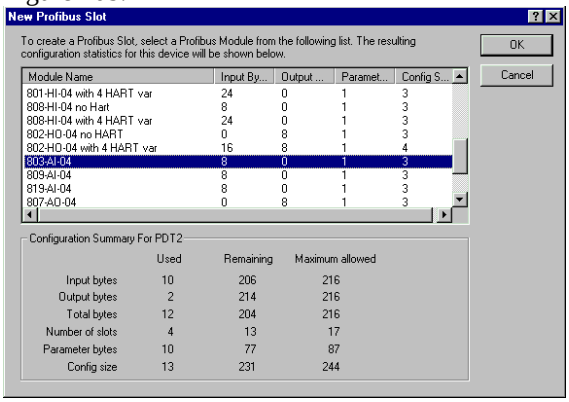


Figure 10d.

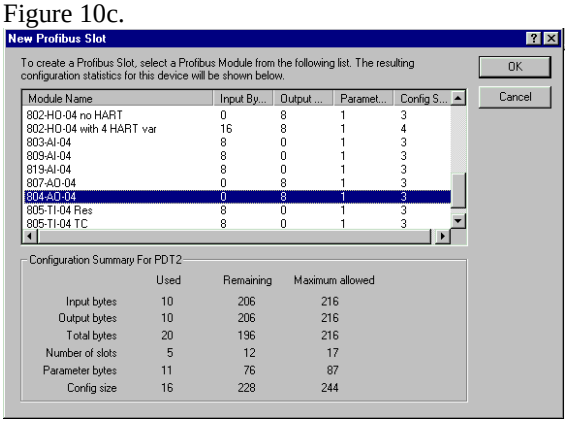


Figure 10e.

Each module now needs to be configured. By clicking on each module, the configurable parameters are shown on the right hand side. Double click on each line in the right hand view to set the parameters. For the MTL850-BI-DP, click on Slot000 etc. Figure 11 below shows the options for setting the 'direction' for the MTL818-DX-08 module. In this example, this module is set to 8 inputs in slot 1 and 8 outputs for slot2.

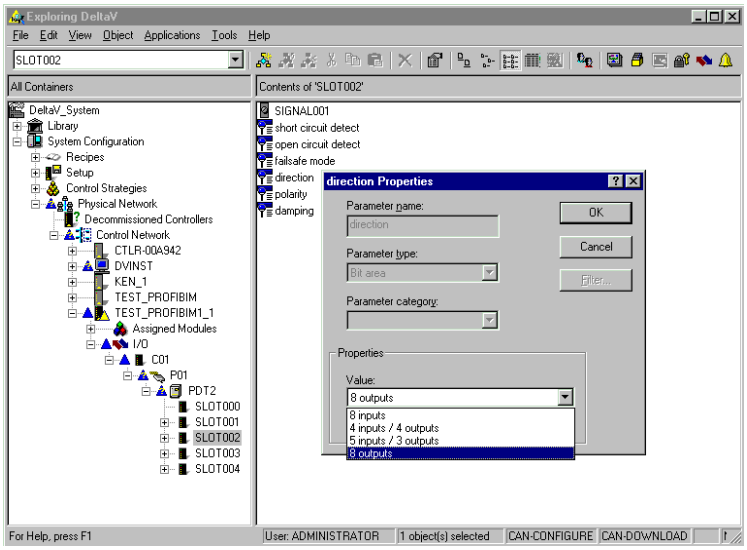


Figure 11.

Please refer to the user manual INM8001 for further info on each setting.

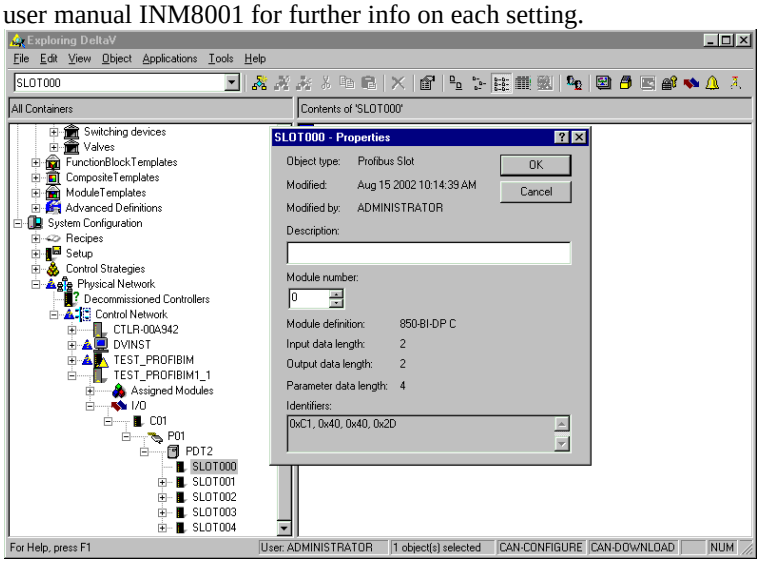


Figure 12.

In the MTL850-BI-DP itself, setting switch on carrier can configure the slave address:

To set the slaves address in the DeltaV Explorer Profibus configuration, right-click on PDT1 and select properties. See figure 13.

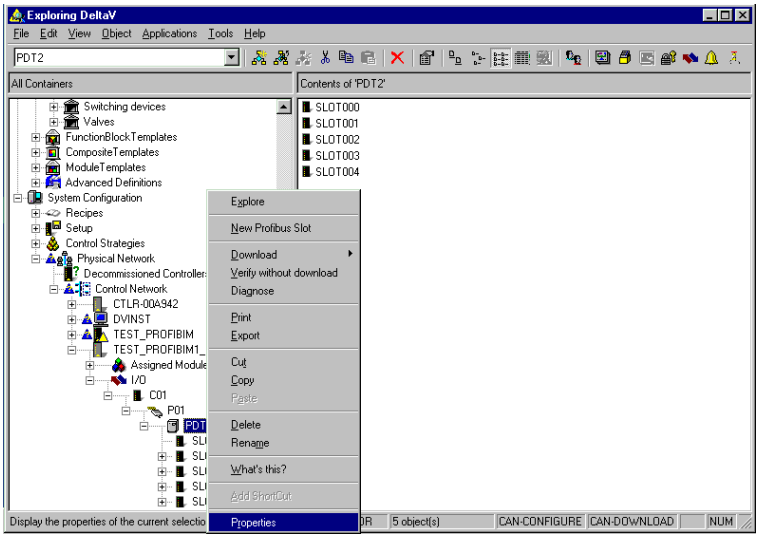


Figure 13.

The slave address can be set. See figure 14.

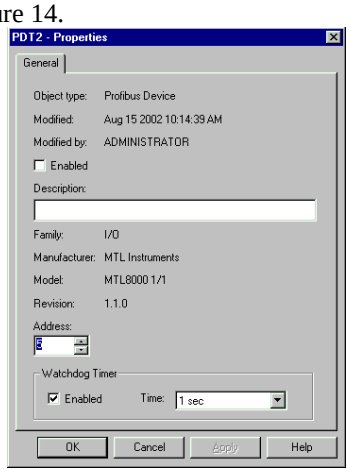


Figure 14.

3.2 Configuring the signals & tags.

To access the slave data, the user will need to configure signals. This is done by right clicking on required module (slot) and selecting New Profibus Signal. In the signal properties, it is possible to set signal description, tag name, direction, byte offset and type of signal.

Figure 15 defines a binary input (DI) for channel 1 slot 1. Figure 16 shows channel 3 of the DI module in slot 1 is defined as Boolean. Figure 17 shows the DO channel 1 in slot 2 defined as binary and figure 18 shows channel 3.

Figure 19 shows the declaration of channel 1 of the AI in slot 3 as a 16 bit unsigned integer. Figure 20 shows channel 3 of the AI in slot 3 and figure 21 shows channel 1 of the AO in slot 4. Both are declared as 16 bit unsigned integers.

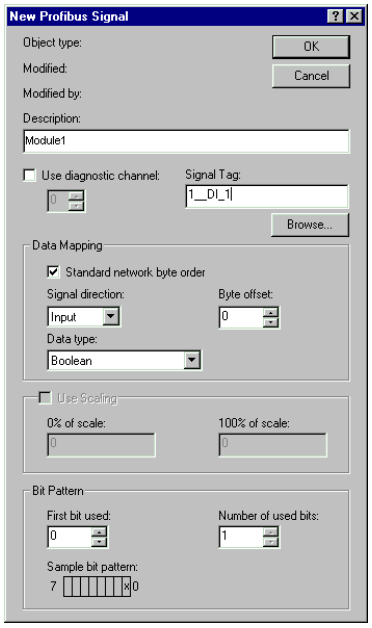


Figure 15.

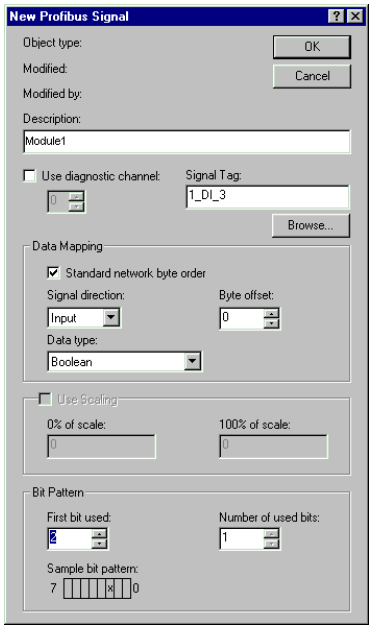


Figure 16.

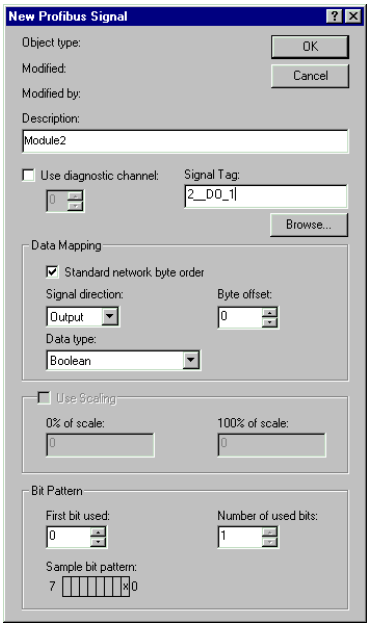


Figure 17.

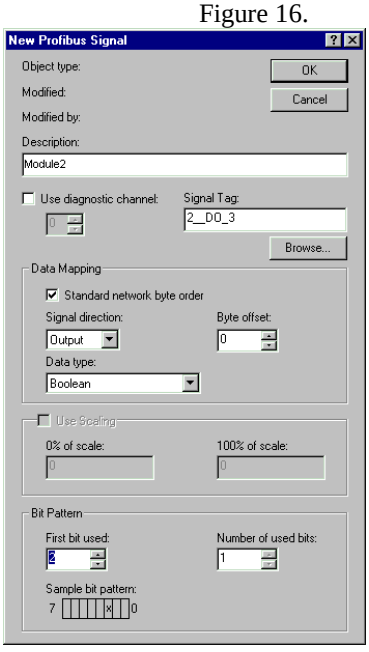


Figure 18.

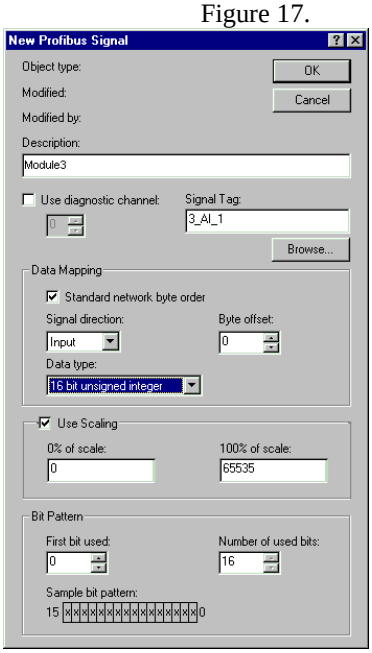


Figure 19.

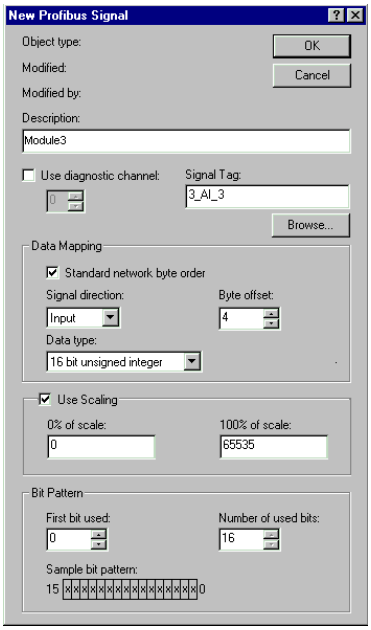


Figure 20.

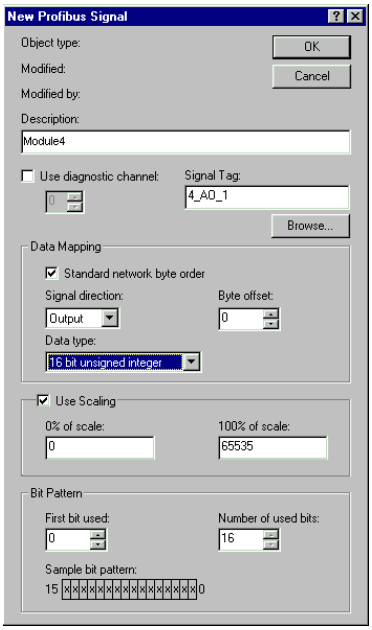


Figure 21.

3.3 Accessing the slave data.

At this point, the configuration is complete and the user could develop strategies using the signals created. Examples are provided below to show the slave IO data in the DeltaV explorer. This will go as far as reading inputs, writing outputs and showing the slave Profibus diagnostic data.

First it is necessary to create modules within a work area in the Control Strategy view. In DeltaV Explorer right-click on Area_A and select New Module.

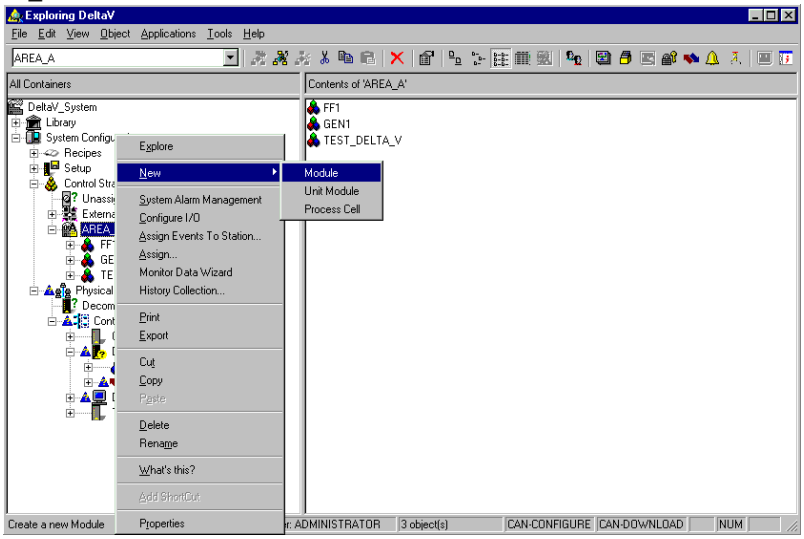


Figure 22.

Then choose name, for example Test_Profi_BIM_1 and press Enter.

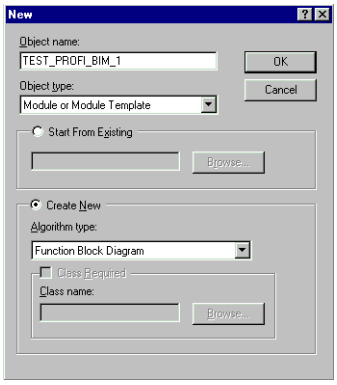


Figure 23.

Right-click on Test_Profi_BIM and select Open with Control Studio.

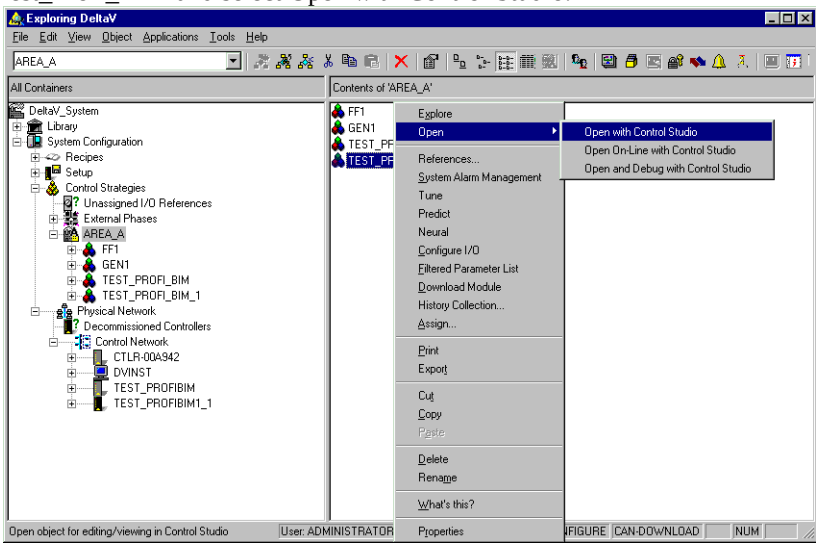


Figure 24.

Within Control Studio, choose the IO library, select an Analog Input block and drag & drop it in the work area.

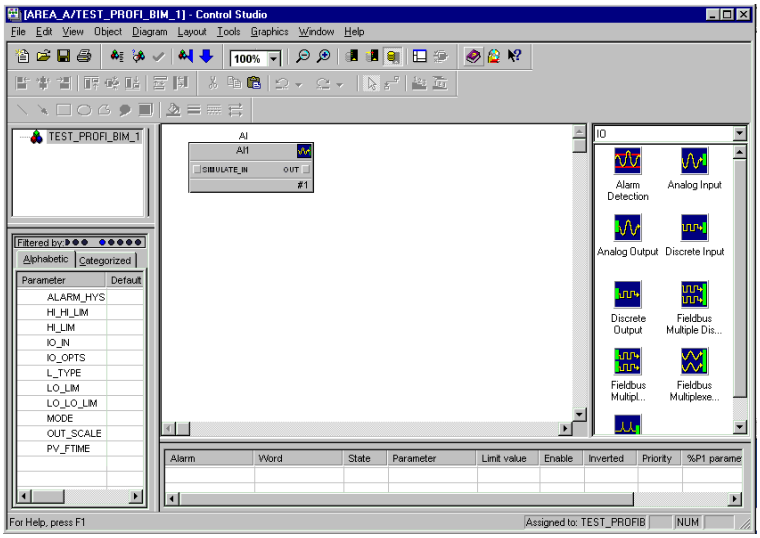


Figure 25.

Right click on AI block and select Assign I/O to Signal Tag.

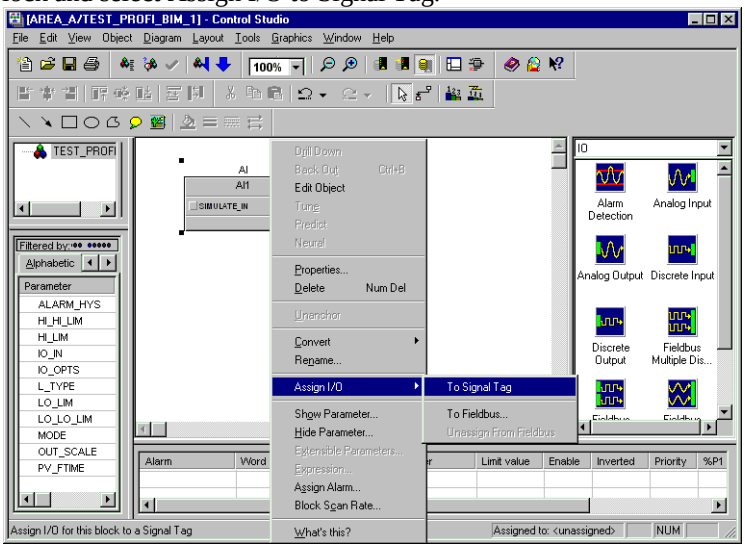


Figure 26.

Select Browse in the dialog box to find Test_ProfiBim1_1, which contains the input signals declared earlier. Select 3_AI_1 and press OK. Drag AI blocks in the same way for 3_AI_3 tag.

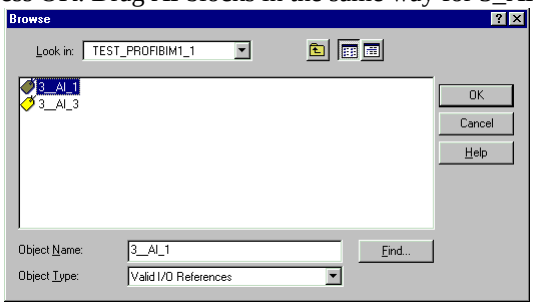


Figure 27.

Select a Discrete Input block and assign tags 1_DI_1 and 1_DI_3.

Repeat these for Analog Output block 4_AO_1. The view should be something like that shown in figure 28.

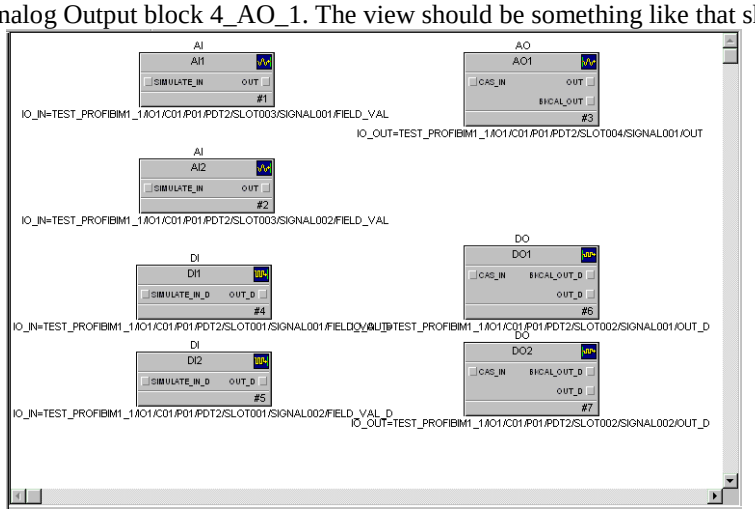


Figure 28.

To enable values to be written to output blocks, it is necessary to drag & drop Input Parameter blocks (found in Special Items library). For the Analog outputs select 16 bit unsigned integer & for the DO select 8 bit unsigned integer. A value can be assigned to this block.

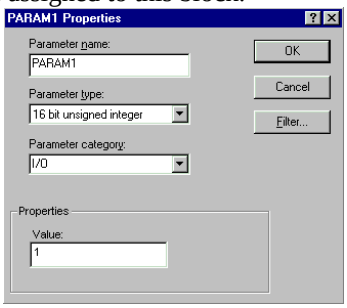


Figure 29.

Refer to figure 30 to see the three 'Param' blocks. To connect these blocks with their related output block, click on  in the tool bar and use the mouse to connect the blocks.

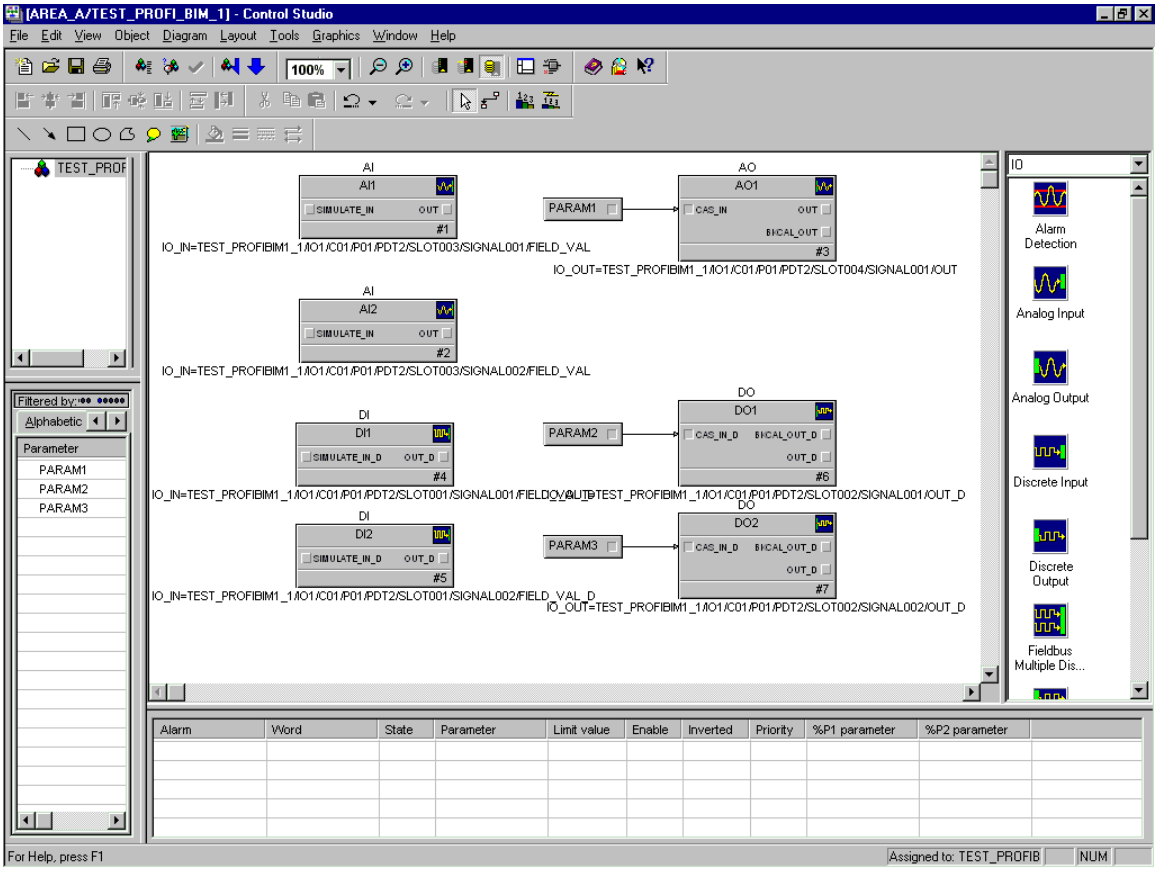


Figure 30.

Save the project and close Control Studio. The drawing created in Control Studio needs assigning to the Control Network. This is done by right clicking on the area as shown below & select Assign.

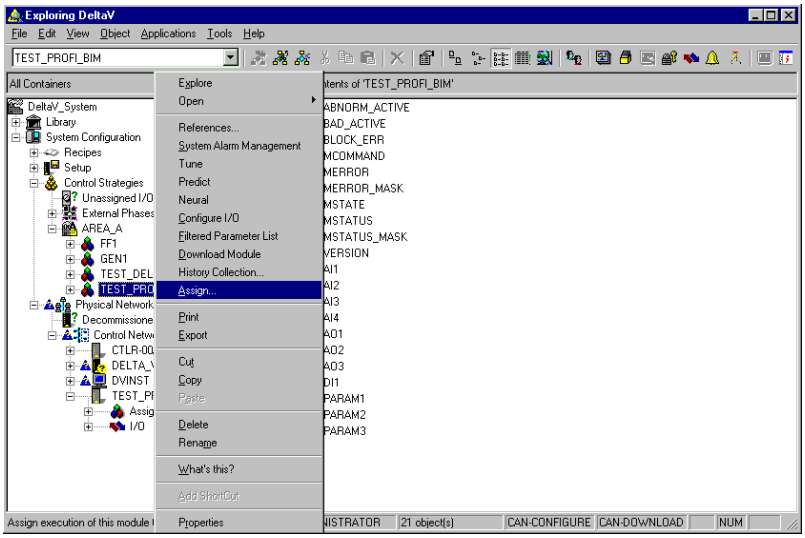


Figure 31.

Select the Control Network Test_ProfiBIM as shown in figure 34. It maybe necessary to commission the controller. This is done by right clicking on the controller & select Commission.

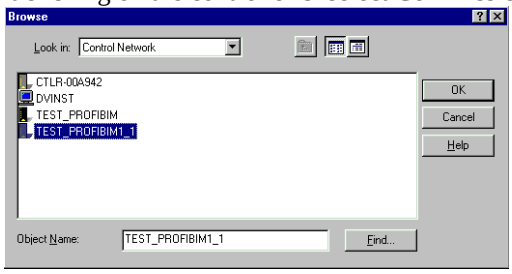


Figure 32.

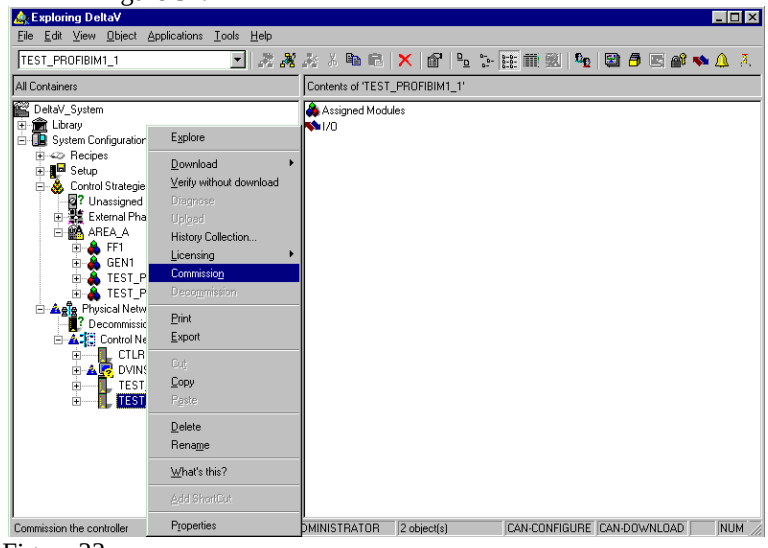


Figure 33.

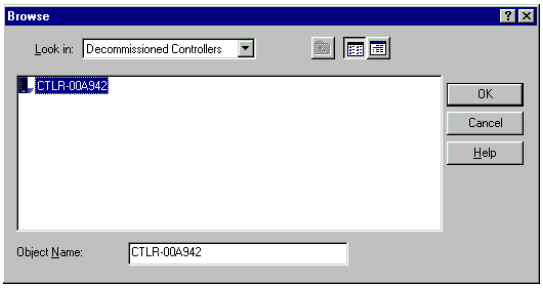


Figure 34.

Select the controller and press Ok. After clicking OK, a dialogue appears to check modules connected to controller, click Yes and wait until the symbol in the Physical Network changes from a red cross to a yellow triangle. If this occurs, the project is ready for downloading.

3.4 Profibus connection to the slave.

Before continuing, it is necessary to physically connect the Profibus segment using standard Profibus cable. Figure 36 shows the pin connections for the flying leads connected to the Profibus module in DeltaV and the 9-way d-type connector on the MTL850 side. Remember to terminate segments in accordance with Profibus guidelines.
Note that it is necessary to connect the Profibus through an IS isolator (MTL853 & MTL854) for the IO system to mounted in Zone 1. Figure 35 shows the connection without the isolator for demonstration purposes only.

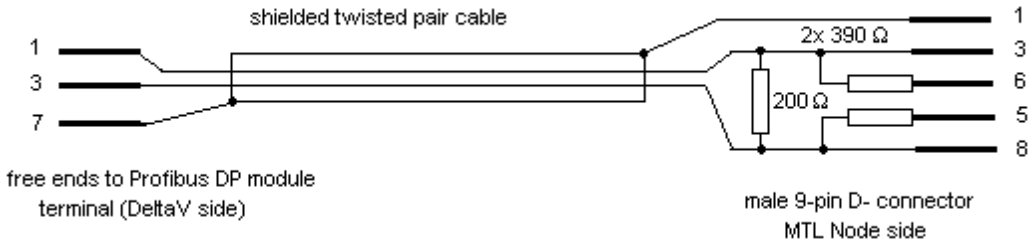


Figure 35.

3.5 Going online.

To download the project, right-click on the controller & select Download Controller. See figure 38.

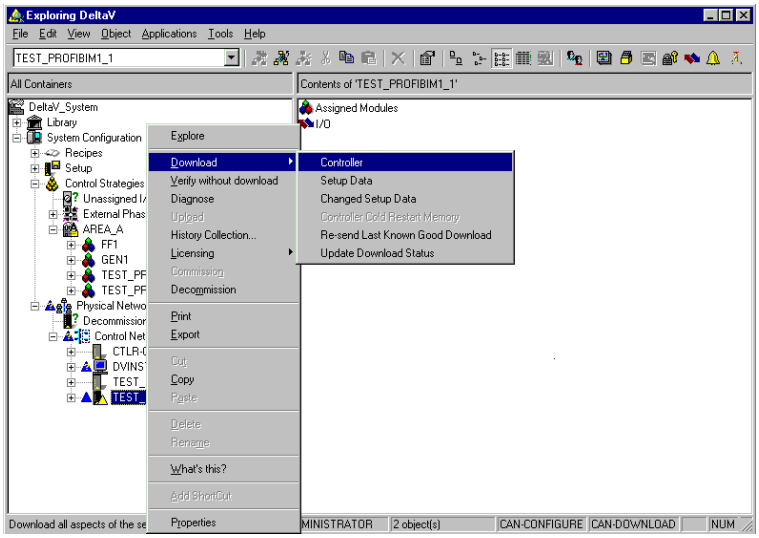


Figure 36.

Confirm the download request.

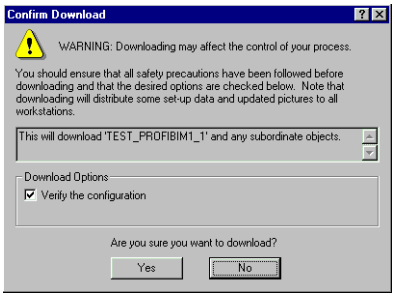


Figure 37.

To see live data, right-click on the Control Area Test_Profi_Bim and select Open, Open with Control Studio.

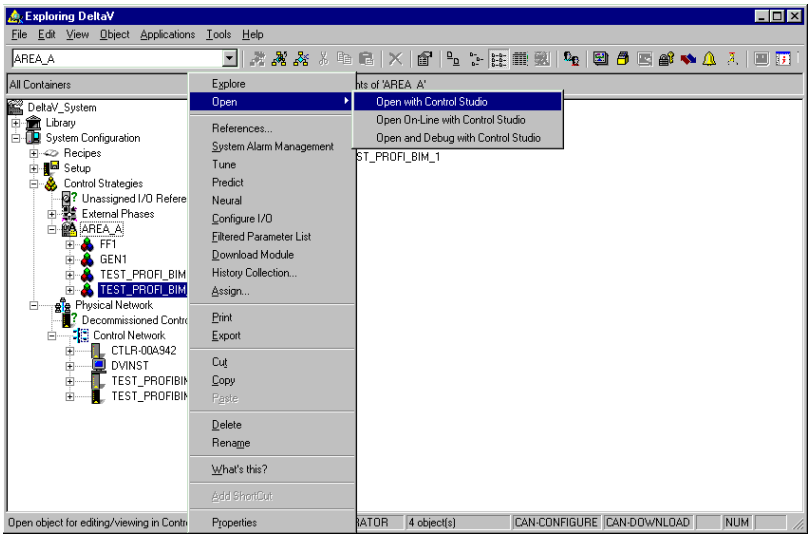


Figure 38.

Go to on-line/debug (pull down menu) within Control Studio. See figure 41.

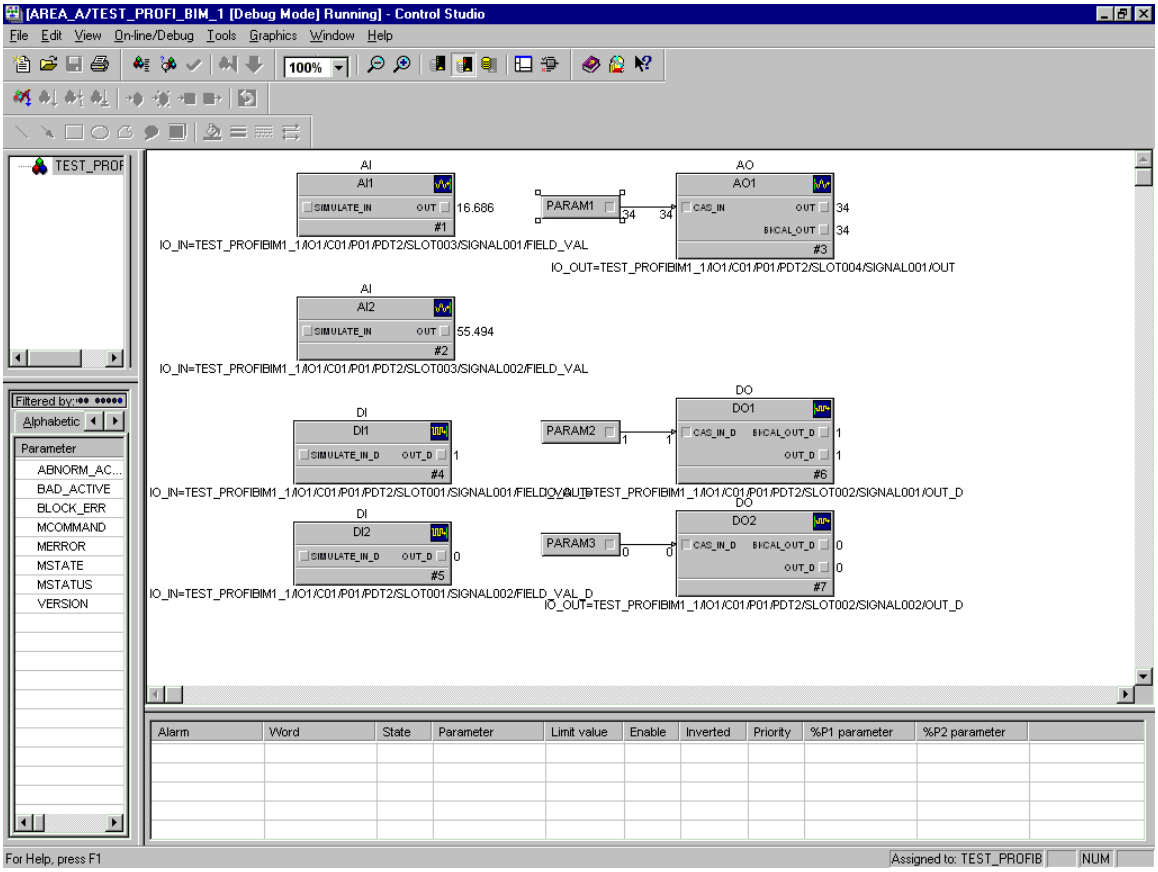


Figure 39.

The AI1 block shows slot 3 channel 1 data, in this case 16.686%.
The AI2 block shows slot 3 channel 3 data, in this case 55.494%.
The DI1 block reads the DX module in slot 1, channel 1 which is ON.
The DI2 block reads the DX module in slot 1, channel 3 which is OFF.
The AO1 block writes the data (34%) to AO slot 4 channel 1.
The DO1 block sets the DX slot 2, channel 1 ON.
The DO2 block sets the DX slot 2, channel 3 OFF.

4 Slave Profibus diagnostic data.

Although it is not possible to use data in the diagnostic telegram, it is possible to view this online. Right clicking on the controller and selecting Diagnose goes online.

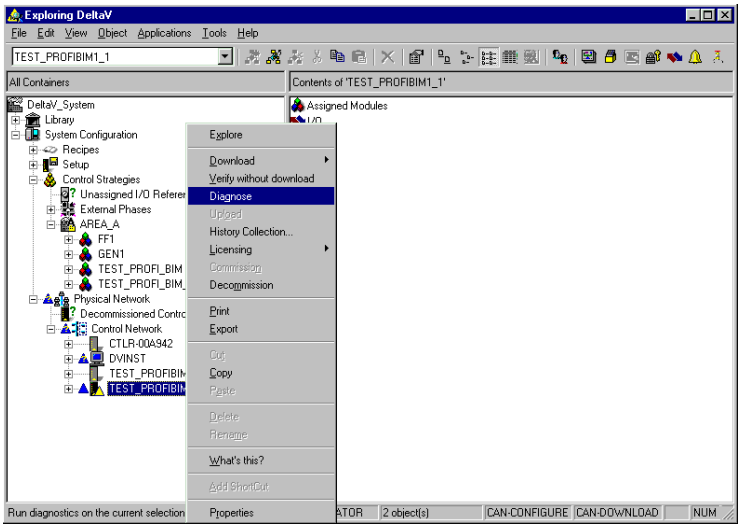


Figure 40.

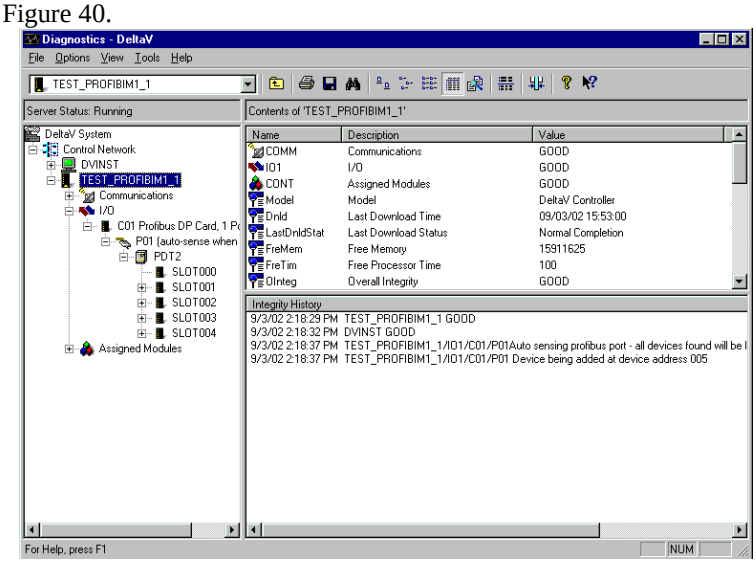


Figure 41.

Expand the tree until you see PDT1, the MTL8000. Right-click on PDT1 and select Display Device Information.

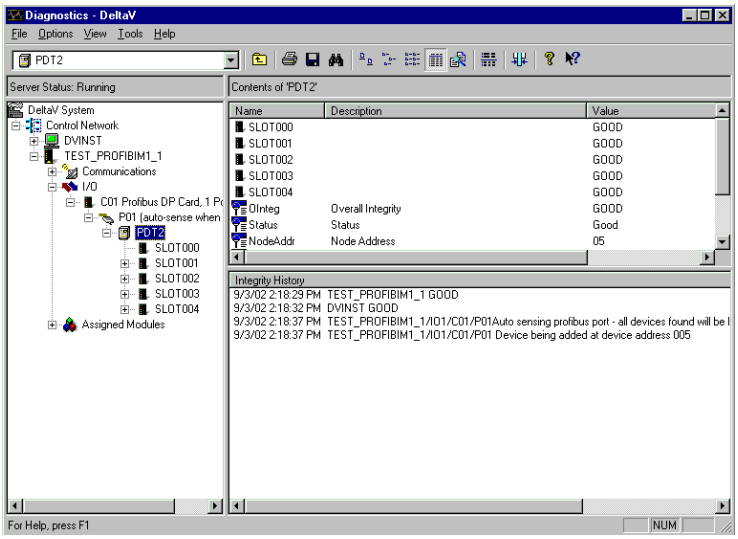


Figure 42.

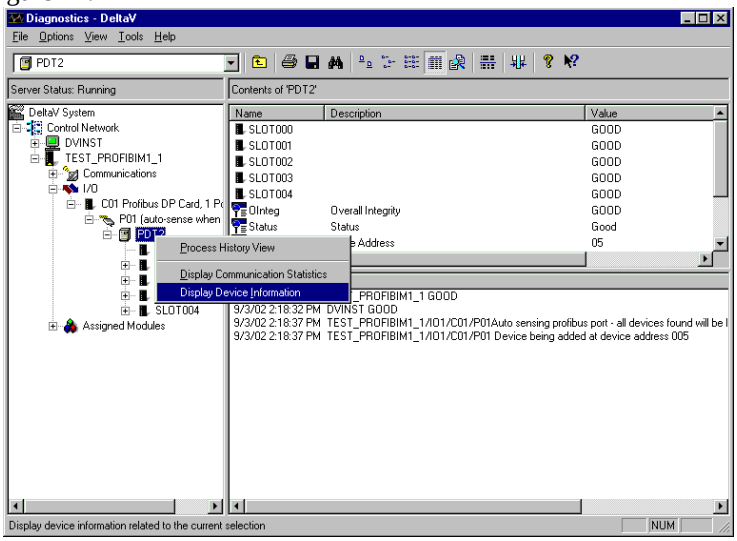


Figure 43.

The MTL8000 Profibus DP diagnostic data is shown in figures 44 a to g.

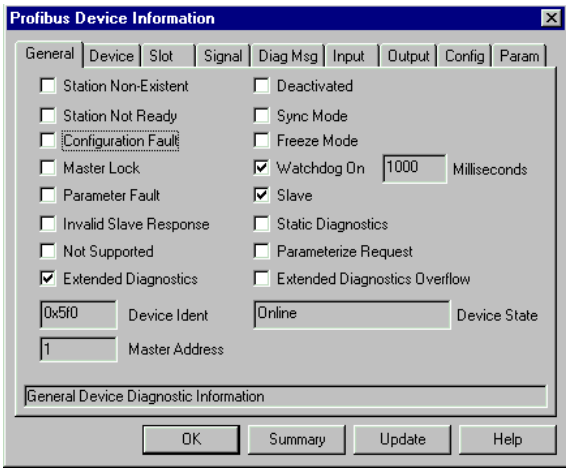


Figure 44a.

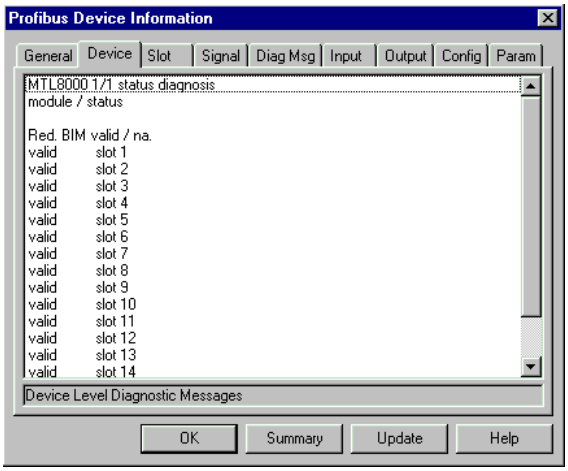


Figure 44b.

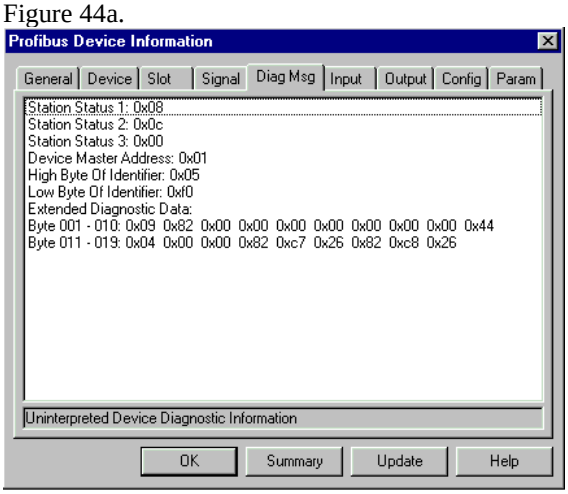


Figure 44c.

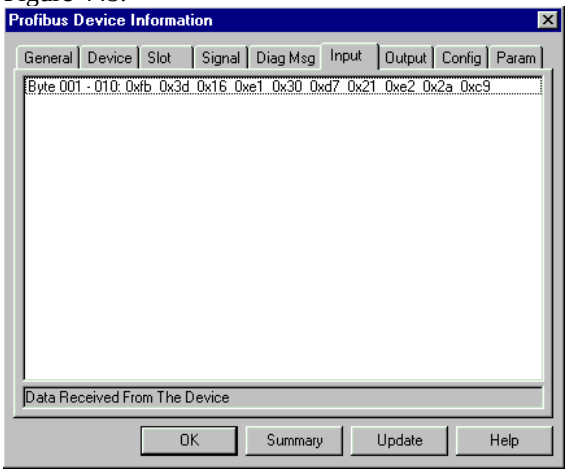


Figure 44d.

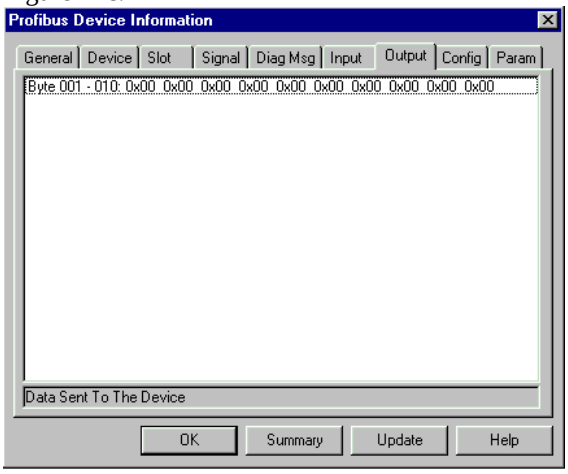


Figure 44e.

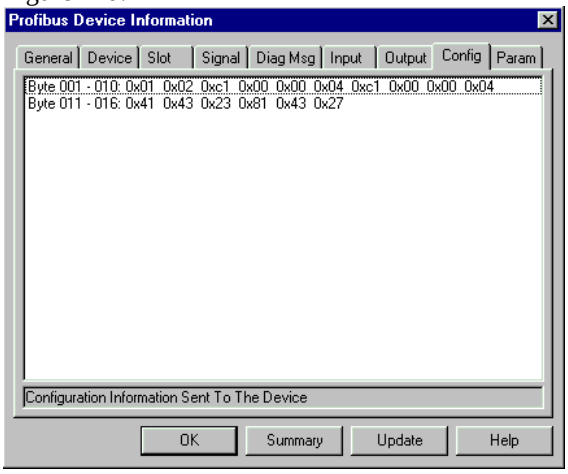
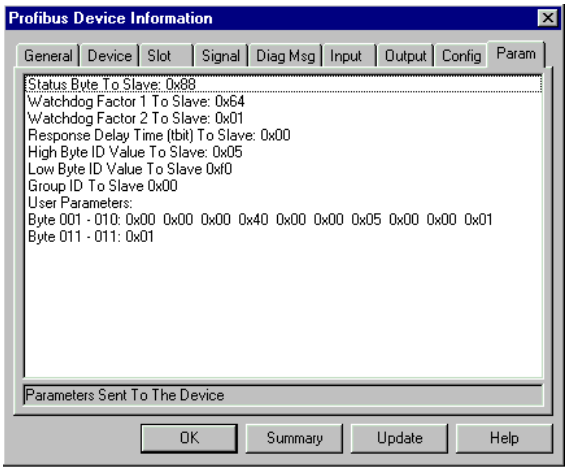


Figure 44f.


Profibus Device Information
General
Device
Slot
Signal
Diag Msg
Input
Output
Config
Param
Status Byte To Slave: 0x88
Watchdog Factor 1 To Slave: 0x64
Watchdog Factor 2 To Slave: 0x01
Response Delay Time (tbit) To Slave: 0x00
High Byte ID Value To Slave: 0x05
Low Byte ID Value To Slave 0xf0
Group ID To Slave 0x00
User Parameters:
Byte 001 - 010: 0x00 0x00 0x00 0x40 0x00 0x00 0x05 0x00 0x00 0x01
Byte 011 - 011: 0x01
Parameters Sent To The Device
OK
Summary
Update
Help
Figure 44g.