FieldServer
Technologies

Driver Manual
(Supplement to the FieldServer Instruction Manual)

FS-8700-122

PROFIBUS DP Master

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after June 2013

Driver Version:	1.01
Document Revision:	0

TABLE OF CONTENTS

1   PROFIBUS DP MASTER DESCRIPTION

The FieldServer PROFIBUS DP Master driver can be used to transfer I/O data with up to 125 PROFIBUS DP Slave devices. The FieldServer is programmed with an embedded database using the required 3rd party configuration tool. The embedded database contains information on the number of slaves and I/O modules to be transferred with each slave. The tool requires the input of GSD/E files for each slave to be connected.

Max Nodes Supported

FieldServer Mode	Nodes	Comments
Client DPV1 MASTER (CLASS 1) ONLY	125	This is the maximum number of PROFIBUS DP Slaves that can be connected to the FieldServer. A maximum total of 1536 bytes can be transferred with all DP Slaves.

2   DRIVER SCOPE OF SUPPLY

2.1   Supplied by FieldServer Technologies for this driver

FieldServer Technologies PART #	Description
52201	PROFIBUS Connector
FS-8915-31	Adapter Card, PROFIBUS Master FS-B3

2.2   Provided by the Supplier of 3rd Party Equipment

2.2.1   Required 3rd Party Software

| Part #	Description	Comments
	HMS Anybus NetTool for PROFIBUS	Used to configure the PROFIBUS network configuration and load it directly into the PROFIBUS card
	Vendor gsd's	*.gsd files for all vendor devices to be on the network are required by HMS NetTool for completion of network configuration.

2.2.2   Required 3rd Party Configuration

Connection to a correctly terminated PROFIBUS network.

3   HARDWARE CONNECTIONS

The FieldServer is connected to the PROFIBUS network and NetTool as shown in the connection drawing below.
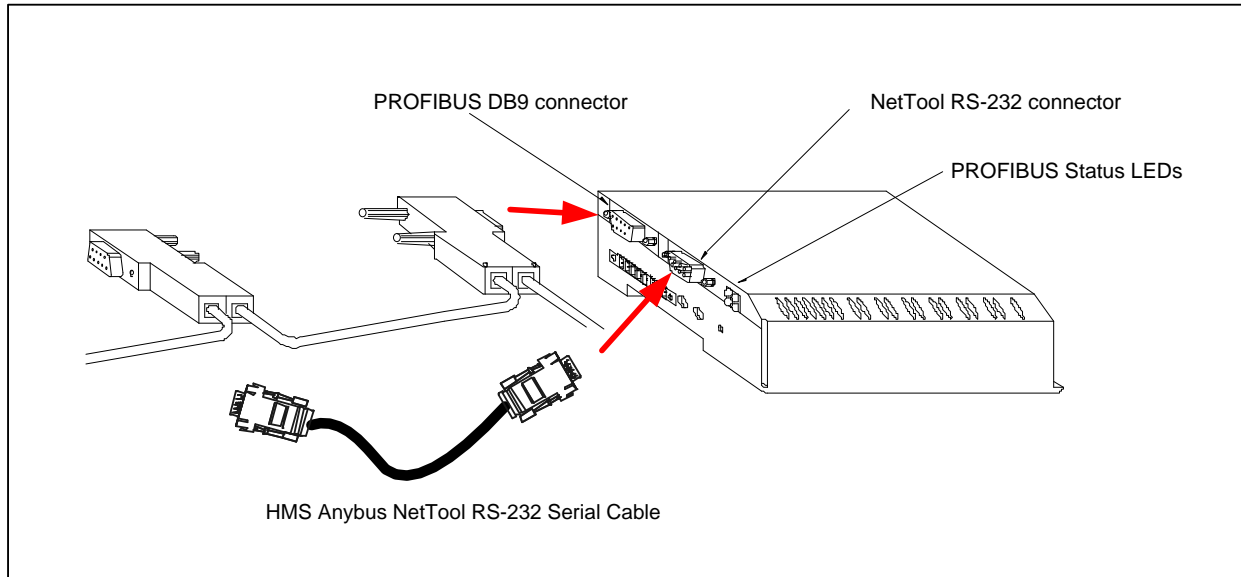
PROFIBUS DB9 Connector Pinouts

Pin	Name	Description
Housing	Shield	Connected to PE
1	Not connected	-
2	Not connected	-
3	B-Line	Positive RxD/TxD according to RS-485 specification
4	RTS[1]	Request to Send
5	GND BUS[2]	Isolated GND from RS-485 side
6	+5V BUS[2]	Isolated +5V from RS-485 side
7	Not connected	-
8	A-Line	Negative RxD/TxD according to RS-485 specification
9	Not connected	-

Only A-line, B-line and Shield are used for most applications.

PROFIBUS NetTool connector Pinouts

PC Side DB9 Female	FieldServer Side DB9 Female
2	3
3	2
5	5

3.1   Hardware Connection Tips / Hints

Use the recommended network cable and terminators as specified by the PROFIBUS network organization and/or the manufacturer of the network equipment.

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[1] Used in some equipment to determine the direction of transmission.
[2] Used for bus termination. Some devices, e.g. optical transceivers (RS-485 to fiber optics) require an external power supply from these pins.

4   CONFIGURING THE FIELDSERVER AS A PROFIBUS DP MASTER CLIENT

For a detailed discussion on FieldServer configuration, please refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (See ".csv" sample files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with up to 125 PROFIBUS DP Slaves.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for PROFIBUS DP Master communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the destination device addresses need to be declared in the "Client Side Nodes" section, and the data required from the Servers needs to be mapped in the "Client Side Map Descriptors" section. Details on how to do this can be found below.

Note that in the tables, * indicates an optional parameter, with the bold legal value being the default.

4.1   FieldServer

Section Title		
FieldServer		
Column Title	**Function**	**Legal Values**
System_Station_Address	PROFIBUS address of the DP Master	0-125

4.2   Data Arrays/Descriptors

Section Title		
Data_Arrays		
Column Title	**Function**	**Legal Values**
Data_Array_Name	Provide name for Data Array	Up to 15 alphanumeric characters
Data_Array_Format	Provide data format. Each Data Array can only take on one format.	Float, Bit, UInt16, SInt16, Packed_Bit, Byte, Packed_Byte, Swapped_Byte
Data_Array_Length	Number of Data Objects. Must be larger than the data storage area required by the Map Descriptors for the data being placed in this array.	1-10,000

Example

```
//   Data Arrays

Data_Arrays
Data_Array_Name    ,Data_Array_Format    ,Data_Array_Length
Byte_Output        , Byte                , 10
Byte_Input         , Byte                , 10
Word_Output        , Uint16              , 10
Word_Input         , Uint16              , 10
Float_Output       , Float               , 10
Float_Input        , Float               , 10
```

4.3   Client Side Connection Descriptors

Section Title		
Connections		
Column Title	Function	Legal Values
Adapter	Adapter Name	Prof_DP

Example

```
//   Client Side Connections

Adapters
Adapter
Prof_DP
```

4.4   Client Side Node Descriptors

Section Title		
Nodes		
Column Title	Function	Legal Values
Node_Name	Provide name for Node	Up to 32 alphanumeric characters
Node_ID	Station address of physical remote PROFIBUS Slave	0-125
Protocol	Specify Protocol used	Prof_Master

Example

```
//   Client Side Nodes

Nodes
Node_Name                  , Node_ID                , Protocol
PDP_SLV003                 , 3                       , Prof_Master
PDP_SLV125                 , 125                     , Prof_Master
```

4.5   Client Side Map Descriptors

4.5.1   FieldServer Related Map Descriptor Parameters

Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from "Data Array" section above
Data_Array_Offset	Starting location in Data Array	0 to (Data_Array_Length-1) as specified in "Data_Array" section
Function	Function of Client Map Descriptor	Rdbc, Wrbc

4.5.2   Driver Related Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to fetch data from	One of the node names specified in "Client Node Descriptor" above
PROFIBUS_Data_Type	Arrangement of buffer data	Byte, Word, Bool, Float
Address	Starting address of buffer in bytes	0 - 243
Length	Length of Map Descriptor[3]	1 - 244 (BYTE) 1 - 122 (WORD) 1 - 1952 (BOOL) 1 - 61 (FLOAT)

4.5.3   Timing Parameters

Column Title	Function	Legal Values
Scan_Interval	Rate at which data is transferred from FieldServer data arrays to PROFIBUS Master buffers.	≥0.001s

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[3] A maximum combined total length of 1536 bytes are permitted for all Map Descriptors accessing Slave devices.

4.6   Map Descriptor Example

This example demonstrates the transfer of I/O data with Remote PROFIBUS DP Slaves using Station Addresses of 1 and 125.

Map Descriptor Map_Descriptor_Name	, Data_Array_Name	, Data_Array_Offset	, Function	, Node_Name	, PROFIBUS_Data_Type	, Address	, Length	, Scan_Interval
Word_In_003	, Word_Input	, 0	, Rdbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Word_Out_003	, Word_Output	, 0	, Wrbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Byte_In_125	, Byte_Input	, 0	, Rdbc	, PDP_SLV125	, Byte	, 0	, 120	, 1s
Byte_Out_125	, Byte_Output	, 0.	, Wrbc	, PDP_SLV125	, Byte	, 0	, 120	, 1s

4.6.1   Example if the device only has an Input buffer

Map Descriptor Map_Descriptor_Name	, Data_Array_Name	, Data_Array_Offset	, Function	, Node_Name	, PROFIBUS_Data_Type	, Address	, Length	, Scan_Interval
Word_In	, Word_Input	, 0	, Rdbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Byte_In	, Byte_Input	, 0	, Rdbc	, PDP_SLV003	, Byte	, 0	, 120	, 1s

4.6.2   Example if the device only has an Output buffer

Map Descriptor Map_Descriptor_Name	, Data_Array_Name	, Data_Array_Offset	, Function	, Node_Name	, PROFIBUS_Data_Type	, Address	, Length	, Scan_Interval
Word_Out	, Word_Out	, 0	, Wrbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Byte_Out	, Byte_Out	, 0	, Wrbc	, PDP_SLV003	, Byte	, 0	, 120	, 1s

4.6.3   Example if the device has both an Input and an Output buffer

| Map Descriptor Map_Descriptor_Name	, Data_Array_Name	, Data_Array_Offset	, Function	, Node_Name	, PROFIBUS_Data_Type	, Address	, Length	, Scan_Interval
Word_In	, Word_Input	, 0	, Rdbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Word_Out	, Word_Output	, 0	, Wrbc	, PDP_SLV003	, Word	, 0	, 50	, 1s
Byte_In	, Byte_Input	, 0	, Rdbc	, PDP_SLV003	, Byte	, 0	, 120	, 1s
Byte_Out	, Byte_Output	, 0	, Wrbc	, PDP_SLV003	, Byte	, 0	, 120	, 1s

The table below shows the map descriptor function that should be used in the config.csv with a specific module.

| Module	Map Descriptor Function
In	Rdbc
Out	Wrbc
In/Out	Wrbc/Rdbc[4]

A PROFIBUS Slave device will have one of three types of I/O Modules, Input, Output or Input/Output. The I/O Module type can only be found by analyzing the GDS file of the device in a PROFIBUS Software system.

4.7   Configuring the Embedded PROFIBUS Database

The PROFIBUS Master has to be configured with an embedded database that contains information about the PROFIBUS Network data rate and remote Slave devices to access. The HMS Anybus NetTool for PROFIBUS software must be installed and used for this purpose. Connect a serial RS-232 cable from the PC with the tool installed to the serial connector on the X30 as shown in Section 3:
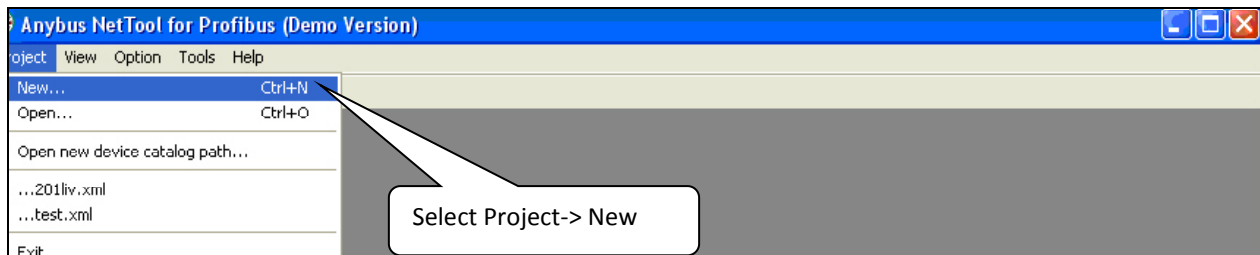

Expand the PROFIBUS Master Tree, select the ABM-DPV device and drag it onto the Bus Configuration Screen. This is the FieldServer PROFIBUS DP Master device.

Expand the PROFIBUS Master Tree, select the ABM-DPV device and drag it onto the Bus Configuration Screen. This is the X30 FieldServer PROFIBUS DP Master device.

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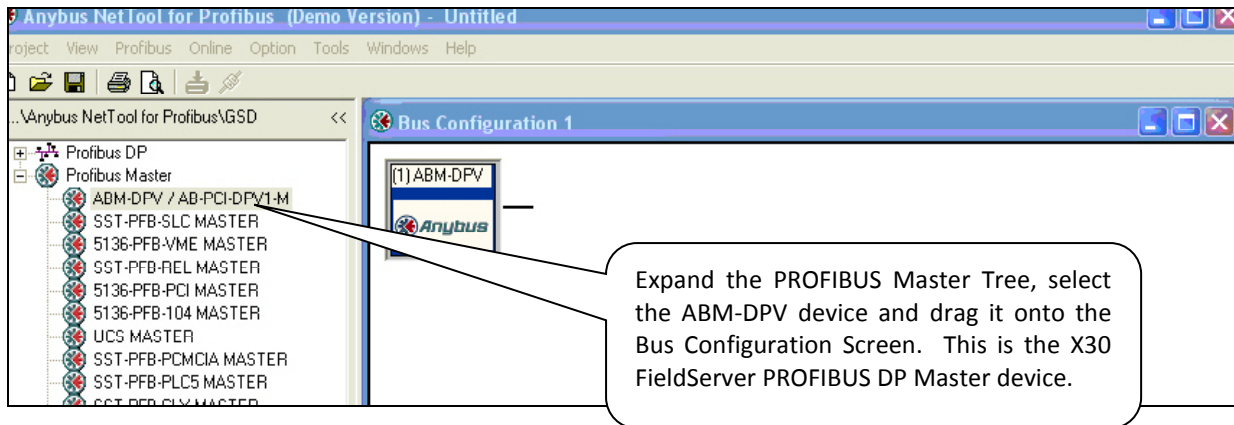
[4] 2 Map Descriptors need to be configured, one for the input module and one for the output
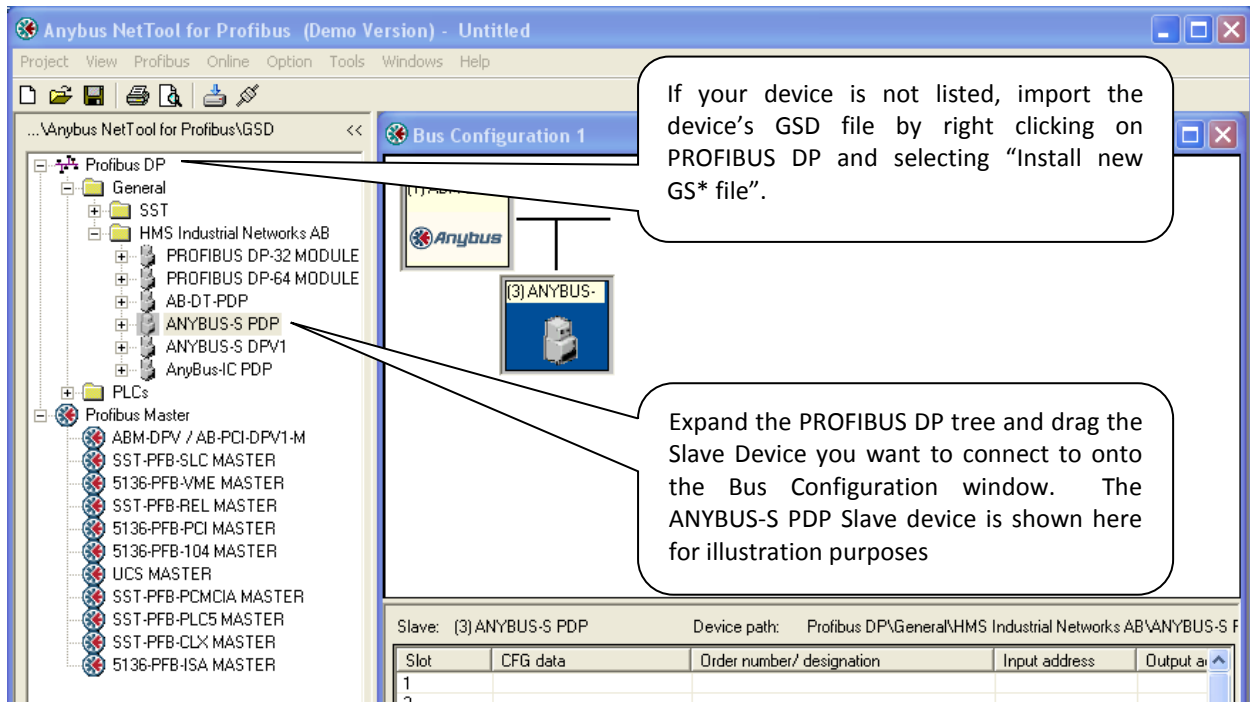
Right-click on the PROFIBUS Slave and assign its PROFIBUS address.
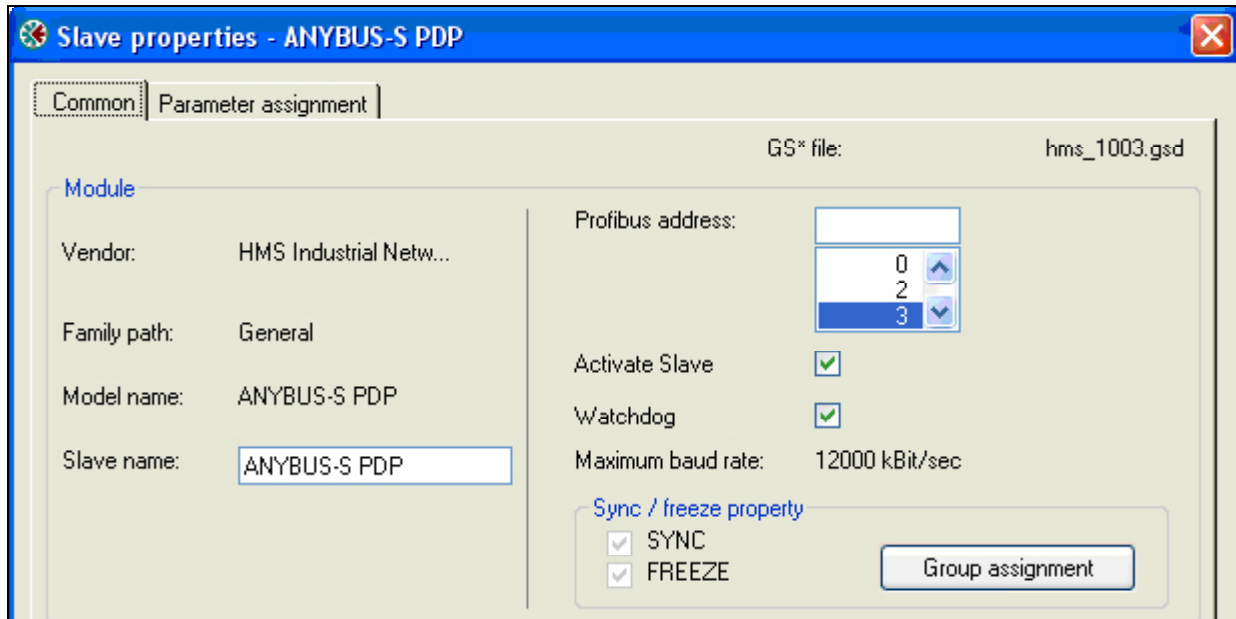
Continue adding all other Slaves and setting their PROFIBUS addresses.

Right click on the ABM-DPV Master device and select Object Properties. Set the Master Station Address to the same as the System_Station_Address used in the FieldServer's config.csv file. Also set the desired PROFIBUS Network Baud rate.
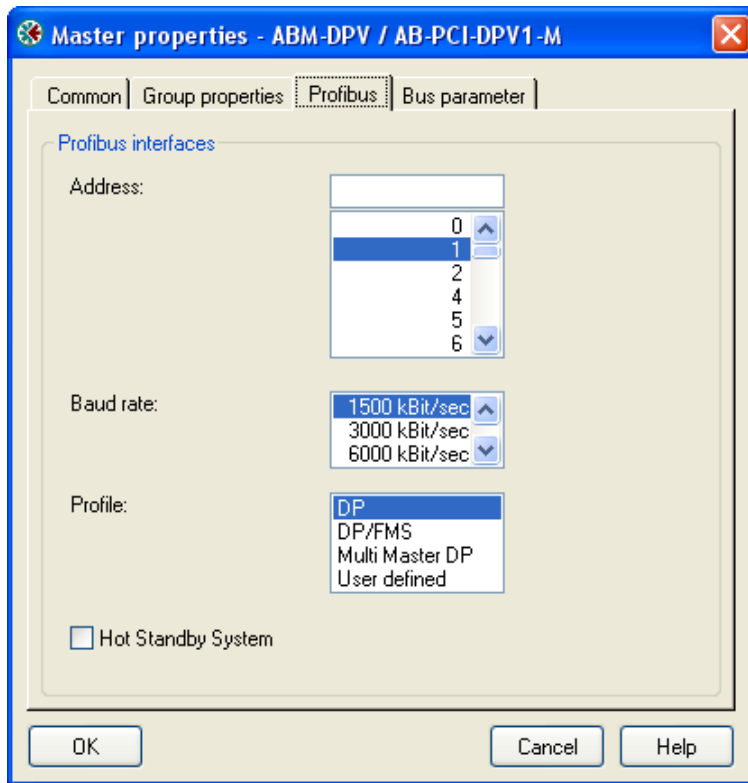
Select the first slave device, right-click on the Slot 1 line and choose Module selection. Now add I/O modules up to the total number of bytes or words that will be transferred with this Slave as set up in the config.csv file. For Example, for the Map Descriptor for Slave1 using 50 Words In and Out, you would choose the following modules:

Continue selecting other Slaves and adding modules for them as well.

Important Note: Changing of Input and Output Addresses are not allowed. All addresses must be contiguous for the PROFIBUS to work correctly.

Select Online-> Driver selection and on the serial Tab, choose the serial port on the PC connected to the X30 by clicking on Configure-> Configure path.
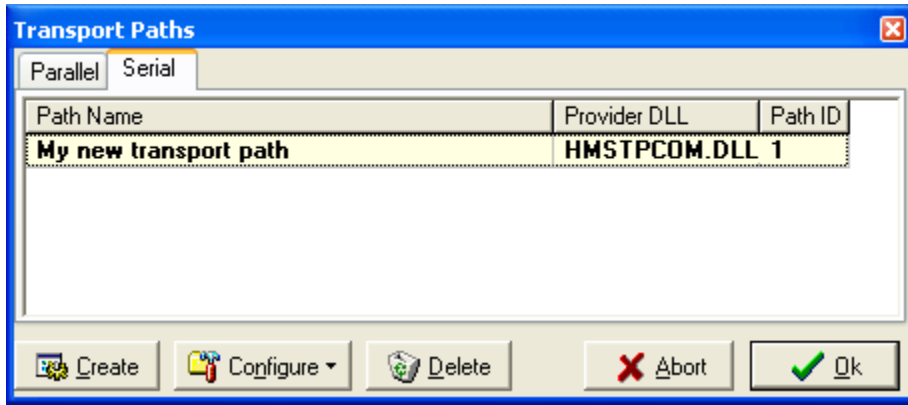
Ensure that the X30 FieldServer is running and that a matching configuration file with Node and Map Descriptors for each slave configured has been downloaded to the X-30.

Make sure you can connect with Ruinet to the X30 and there are no configuration errors.

Choose Online-> Download configuration to install the embedded database in the X30.
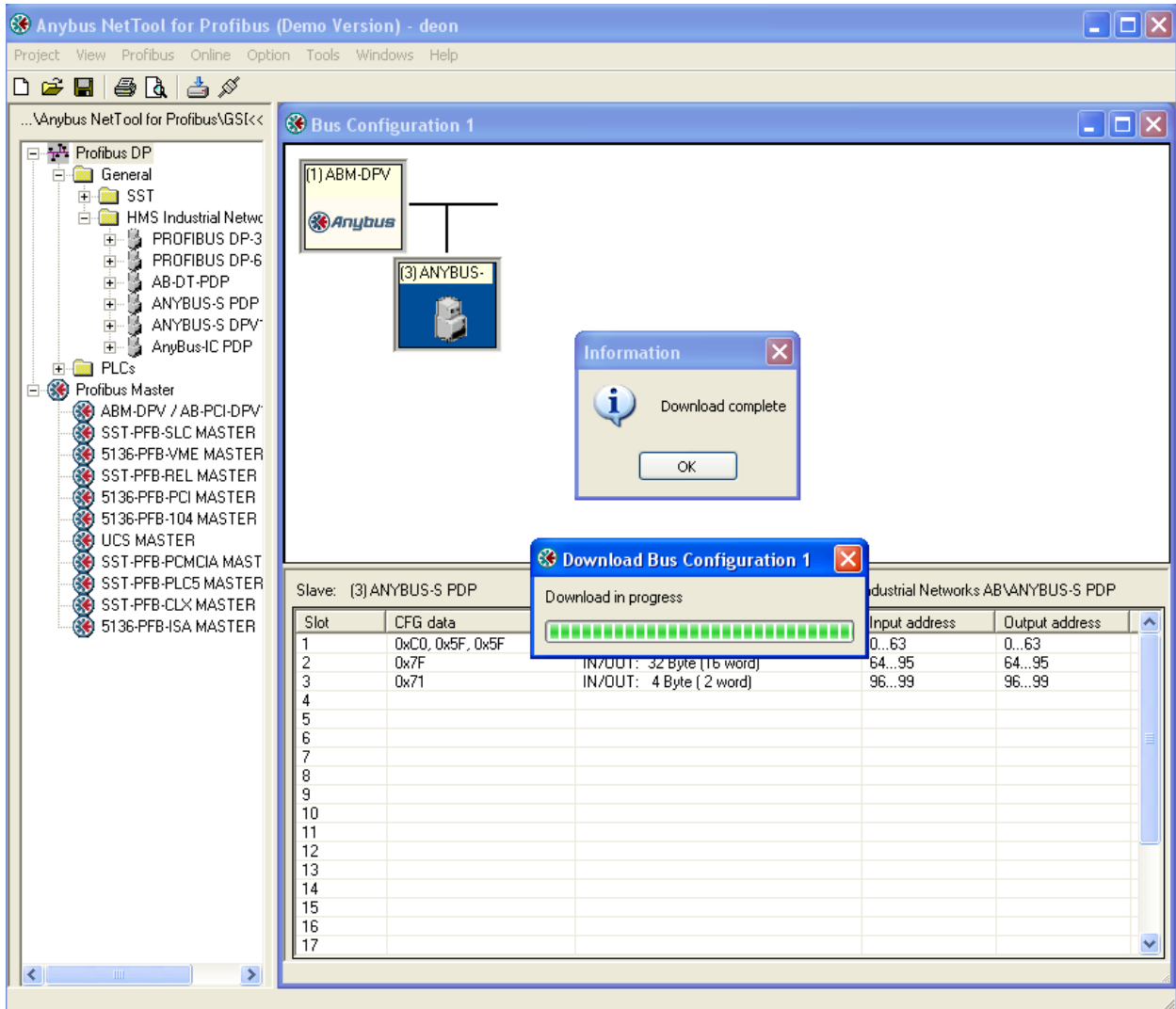
Important Note:

Note that the X30 must be running with a valid configuration file before it will allow download of a new database.

Appendix A. TROUBLESHOOTING

Appendix A.1. Connection Tips & Hints

Appendix A.1.1. An error message displays when trying to download the PROFIBUS database

Ensure that the correct serial port has been selected in the configure path setting.

Ensure that the X30 is powered up with a valid configuration file declaring all the Slaves to be communicated with.

Confirm that the Run Led is flashing.

The following message on the E screen of Ruinet is shown when the X30 detects a request for new database download:

> Detected New PROFIBUS Database!
> Restarting FieldServer in 10 seconds...

Appendix A.1.2. Configuration Error is reported

Ensure that the correct Map Descriptor function has been used. Refer to Sections 4.5.2 and 0

Ensure that the number of configured bytes on the card has not been exceeded. A maximum of 1536 bytes can be accessed.

Appendix A.1.3. Mismatched Slaves error is reported

This error message is caused when the number of Slaves (represented by node entries) in the configuration file does not match the number of Slaves configured and downloaded with the HMS AnyBus NetTool for PROFIBUS. Correct this error by removing unused slave devices from either the configuration file or the HMS Network configuration and downloading again, or simply ensure that the number of Slaves match between the 2 configurations.