



Remote Configuration of HART Devices over PROFIBUS Networks

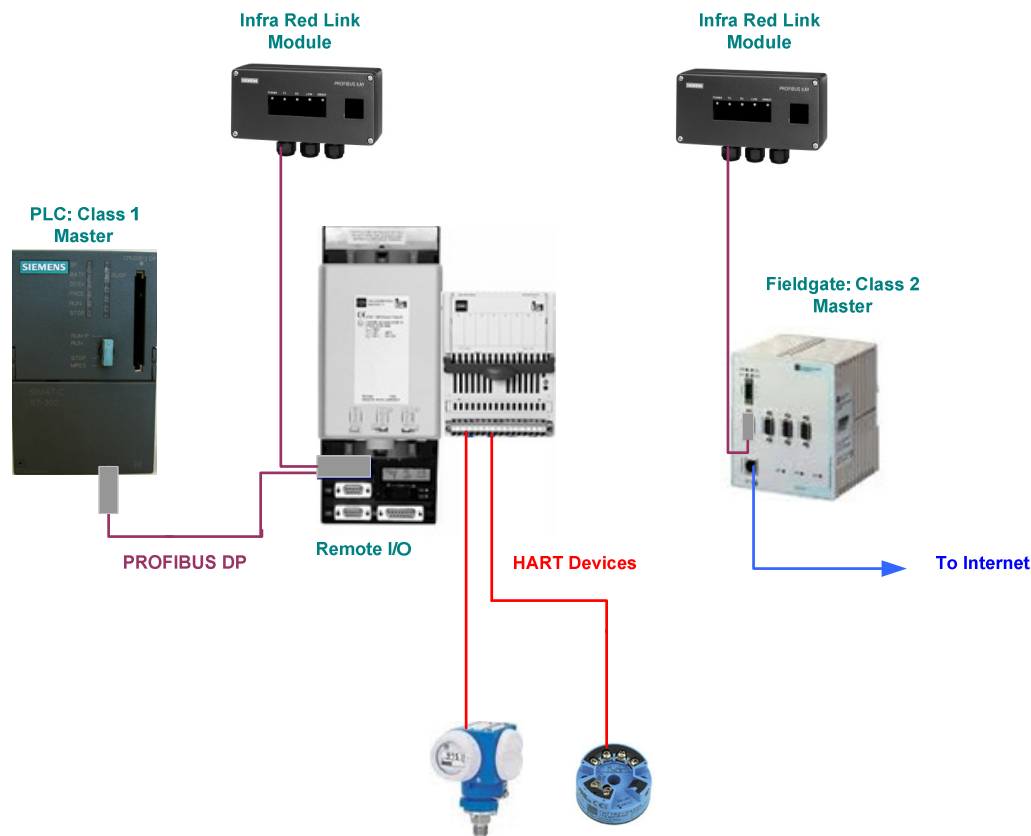
Synopsis: Remote configuration, parameterization and diagnosis of HART devices connected to a remote PROFIBUS I/O.

In industry most smart devices are configurable using the HART protocol and in some cases are connected to the control system via a PROFIBUS networked remote I/O.

Whereas a remote I/O can diagnose whether the 4-20mA HART signal is within its limits, i.e. wire break alarms, it does not in itself allow any real connectivity to the device. In the absence of a HART multiplexer, these devices are usually only configurable using a handheld communicator or a HART modem such as Endress+Hauser FXA195. Unlike PROFIBUS PA instruments that can be viewed in a multidrop mode, this necessitates connecting to each device separately in order to set the desired parameters. The result is that the user must go into the field to do a job that other protocols facilitate from the control room.

This problem can be solved however if the HART bypass capability of the remote I/O modules is utilized, making it possible to monitor and configure these devices without the need to connect to each individually. This is a commonly unused capability of HART devices connected to remote I/O stations. Units such as Endress+Hausers Fieldgate FXA720 facilitate such technology and can be connected to the internet allowing communication with the HART devices from any location in the world.

Network and Devices Used:



A Siemens 315- 2DP PLC was connected to a Stahl IS1 Remote CPM & I/O which was used to connect the HART instruments, an Endress+Hauser Cerabar S pressure transmitter and a TMT182 temperature transmitter. The PLC was programmed to read the values on each analogue input channel and the CPM and I/O were configured on the network using the Stahl GSD file

An Endress+Hauser Fieldgate FXA720 running as a class 2 PROFIBUS master was used as the configuration tool on the network. This interrogated the HART instruments utilizing the remote I/O's HART bypass capability. The ILM's (Infra-Red Link Modules) allowed the Fieldgate device to be placed right beside the DMZ (De-Militarised Zone) internet port reducing the length of cable necessary. These modules are transparent on the network and do not require GSD files to be installed. The baud rate and terminations



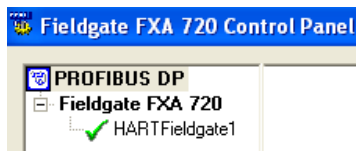
must be set correctly however. The DMZ port was not firewalled so it allowed external internet access to the Fieldgate device. The following software was also used.

- FDT: Endress+Hauser Fieldcare
- FXA720 device driver
- CommDTM: Softing PROFIdtm
- HART Comms: Stahl IS1 gateway DTM
- Instrument Comms: Device Specific DTM's (Endress+Hauser)

The FDT software provides the framework for connection to the network, facilitating the loading of the DTM's which allow configuration and diagnosis of the devices. Fieldcare is commonly used in industry for these purposes.

Procedure:

Firstly the fieldgate was connected to a PC using a LAN connection and its device driver installed. Here a communication node must be set up and the devices default IP address entered. If a connection is made the node should appear with a green tick beside it as



shown. This IP address can then be entered in the internet explorer address bar. The FXA720 screen should appear.

Upon logging on as a specialist the network settings of the new internet port can then be inserted and sent to the device. The PROFIBUS network settings must also be set here.

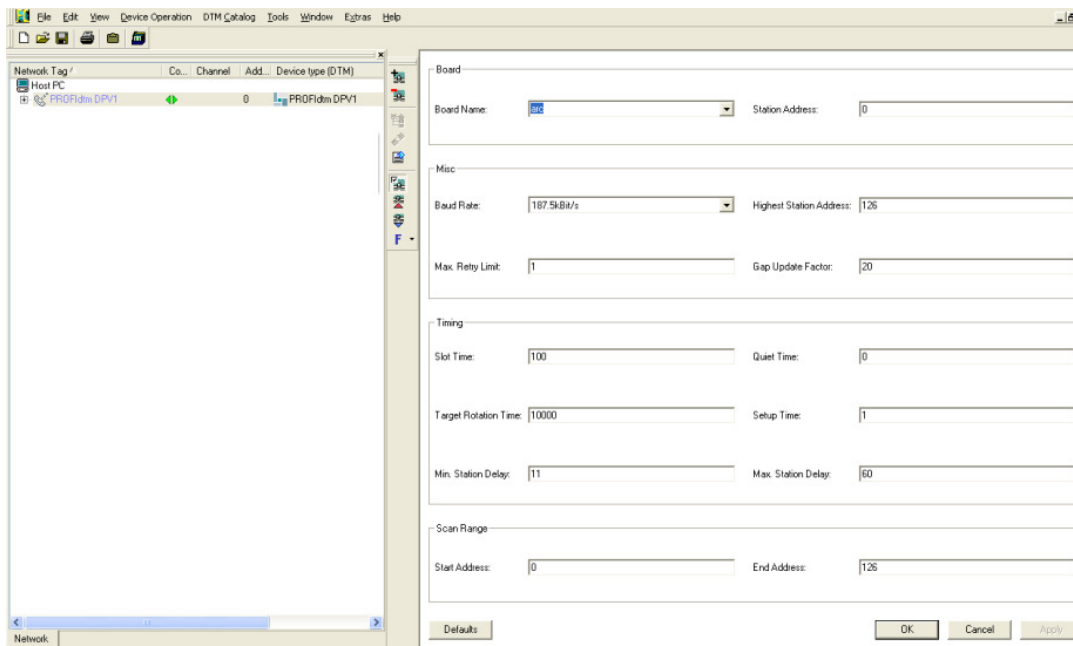
Refresh	Logout			Endress+
Overview of Selected Devices	Switch to User Mode			Fieldgate Config
Security Setup	Network Setup	PROFIBUS Setup	Service Setup	Java Applets

FXA720		Network Setup	
Ethernet			
Fieldgate Hostname	<input type="text" value="FXA_720_DP_01"/>		
IP Address	<input type="text" value="193.1.101.53"/>		
Subnet Mask	<input type="text" value="255.255.255.0"/>		
Gateway	<input type="text" value="193.1.101.1"/>		
Broadcast	<input type="text" value="193.1.101.255"/>		
<input type="button" value="Send"/>			



The LAN should now be removed and the cable inserted into the DMZ port. Back in the FXA720 control panel this new IP address must be specified in the communication node settings as before. If a connection is made the green tick should appear again.

When the CommDTM is selected in Fieldcare, in this case PROFIdtm by Softing, the network setting must be established in the configuration menu.



Here the communication node must be selected in the board name section and the networks' baud rate set. Two green arrows on the left hand side indicate connection to the network. Clicking 'create network' will scan for the remote CPM and when this is found, the I/O can be added. Clicking 'create network' on the AIM (Analog Input Module) will allow the user to select the HART channels to be scanned for connected devices.

Provided the DTM library is up to date for the specific project, the DTM's of the HART devices connected should be assigned. It is important to note however that all the network settings on the Fieldgate and CommDTM match and are correct; otherwise it will not be possible to establish communication.



Network Tag	Connection	Channel	Address	Device type (DTM)	Physical Device
Host PC					
PROFIdtm DPV1	↕		3	PROFIdtm DPV1	
9461/12-08-11 ...	↕	Channel	8	9440/15-01-11 CPM Z2 24V Stahl PROFIBU...	
PT-13248(2)	↕	Slot 03	3	9461/12-08-11 AIMH 8 2w Exi	
TT001(2)	↕	Channel 0	0	Cerabar S / PMx x3x / V7.1	Cerabar S / PMx x3x
	↕	Channel 1	0	iTemp / TMT 182 / V1.1	iTemp / TMT 182

The connected devices can now be viewed in multidrop mode without the need for HART multiplexers or connecting to each individual 4-20mA loop. Clicking ‘online parameterize’ on one of the connected devices will show the device DTM where the device can be configured, monitored and diagnosed.

DeviceType: Cerabar S - PMx x3x - V7.2 Software rev: 71 MEASURED VALUE: 1016.22 mbar
 Model: CERABAR S SET TAG NUMBER: PT-13248 CURRENT: 13.89 mA
 DIAGNOSTIC CODE: 0

Label	MEASURED VALUE:	1016.22 mbar	
GROUP SELECT	SET 4 mA VALUE:	1002.0000 mbar	
CALIBRATION	SET 20 mA VALUE:	1025.0000 mbar	
MEASURED VALUE	4 mA VALUE AUTOM.:	>>	
SET 4 mA VALUE	20 mA VALUE AUTOM.:	>>	
SET 20 mA VALUE	SET BIAS PRESSURE:	0.0000 mbar	
4 mA VALUE AUTOM.	BIAS PRES. AUTOM.:	>>	
20 mA VALUE AUTOM.	SET OUTPUT DAMP.:	1.0 s	
SET BIAS PRESSURE	ALARM MODE:	MAX. ALARM	
BIAS PRES. AUTOM.	SELECT PRESS.UNIT:	mbar	
SET OUTPUT DAMP.			
ALARM MODE			
SELECT PRESS.UNIT			
ADDITIONAL FUNCT.			
TRANSMITTER INFO			
LINEARIZATION			
SERVICE			
USER INFORMATION			
DEVICE DATA			

Summary:

This technology is easily implemented and eliminates the need to go into the field to view and configure HART devices. Instruments can be monitored from the control room and as the Fieldgate is connected to the internet, provided the user has Fieldcare on his/her computer, a connection can be made with the HART devices from anywhere in the world. All the system requires is that the remote I/O has HART bypass capability and that the Fieldgate is running as a class 2 master on the bus.