Using the F809F diagnostic module with the Softing Linking device and the National Instruments Configuration tool

1 Introduction

This technical support note is intended to give the user an understanding of how to integrate in the National Instruments Configuration Tool the F809F diagnostic module with the Softing HSE/H1 linking device FG-100 FF/HSE.

2 References

INM F809F	FOUNDATION fieldbus ™ diagnostics module manual
FG_100_FF_HSE_Manual	FOUNDATION fieldbus ™ linking device manual

FOUNDATION fieldbus ™ is a trademark of the Fieldbus Foundation

3 Overview

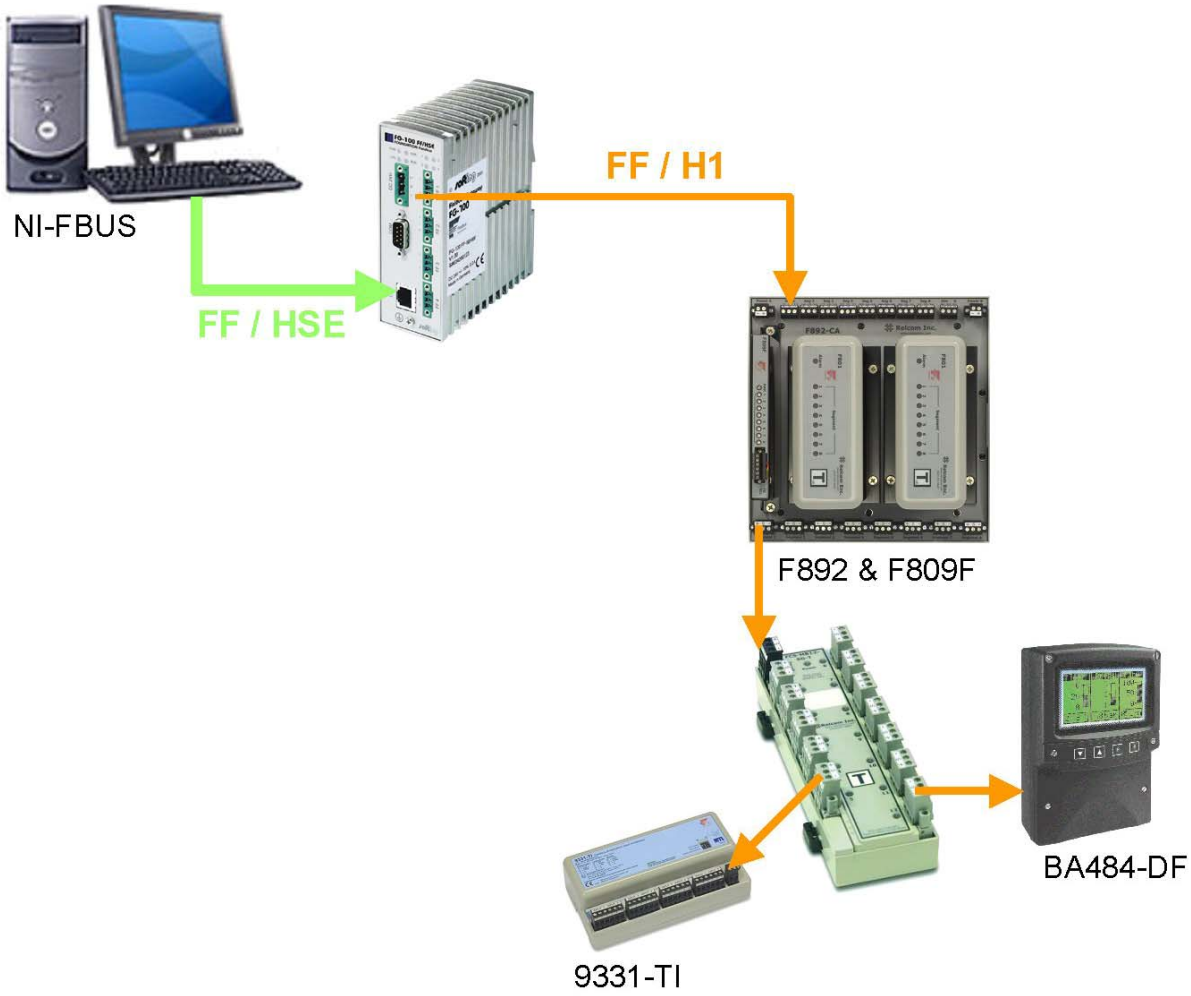
This document is intended to provide a “walk-through” for the NI FBUS Configuration tool and the F809F module. The F809F fieldbus module monitors the health of fieldbus segments and provides an indication of possible network failure.

The linking device is a gateway between a FF High Speed Ethernet (FF-HSE) subnet and FF-H1 links. It supports up to four separate FF-H1 links. In each of these links, the linking device operates as the Link Master as well as the SM Time Publisher.

It also provides instructions to integrate other FOUNDATION fieldbus ™ field devices such as MTL 9331-TI and the Beka fieldbus displays.

4 Hardware Requirements / Installation

4.1 Installation for communication



4.2 Configuration of fieldbus communication segment

The communication segment that will be used is determined by configuring the connector on the front face of the module. A 6-pin comb, supplied with the module, is used to define the communication segment by inserting it one of the two ways into the connector.

For communication on segment 8, place the comb in the connector so that the number 8 is visible on the top left surface.

For communication on segment 1, place the comb in the connector so that the number 1 is visible on the top left surface.

5 HSE / H1 Linking device configuration

5.1 IP Configuration

Although the Linking Device is delivered with a pre-configured IP address (192.168.177.177), it must be assigned an IP address from your LAN address range. Furthermore, the subnet mask and gateway IP address must be set accordingly.

Parameter Name	Pre-Configured Value	Remark
Host Name	FF_LD	Not used: you may leave this unchanged or empty
IP address	192.168.177.177	Mandatory see next pages
Subnet Mask	255.255.0.0	Mandatory see next pages
Maintenance IP Address	172.20.11.198	See Softing manual for detail
Broadcast Address	172.17.255.255	Not used
Default Gateway	192.168.177.178	It is not necessary to configure a default gateway; if the host and the linking device share the same network. For details see Softing manual

The IP address can be changed using one of the following methods:

- Via Ethernet, using a web browser
- Via the serial port (RS232), using a terminal program

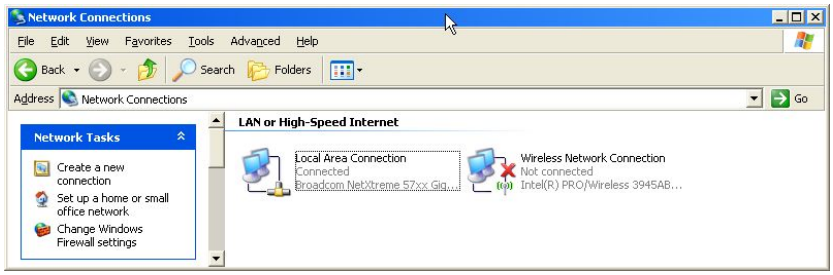
Using a web browser is the most convenient way but access via Ethernet requires an operational IP connection between the Linking Device and a PC and therefore a valid IP configuration in the Linking Device.

5.1.1 Setting up an IP connection between PC and Linking device

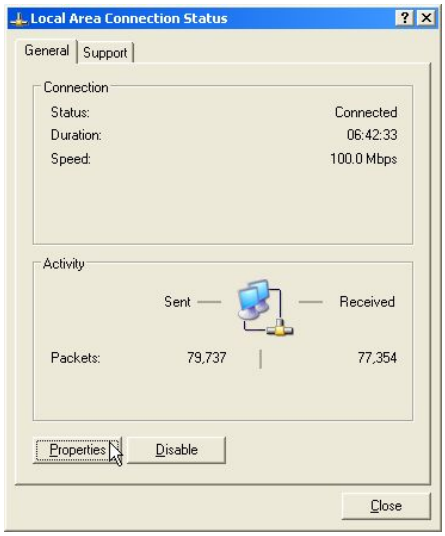
Connect the Linking Device to your PC. For a direct connection between them, a *crossover* cable is required, but if a hub or a switch is used, a standard Ethernet patch cable can be used.

Assign a second IP address to your PC

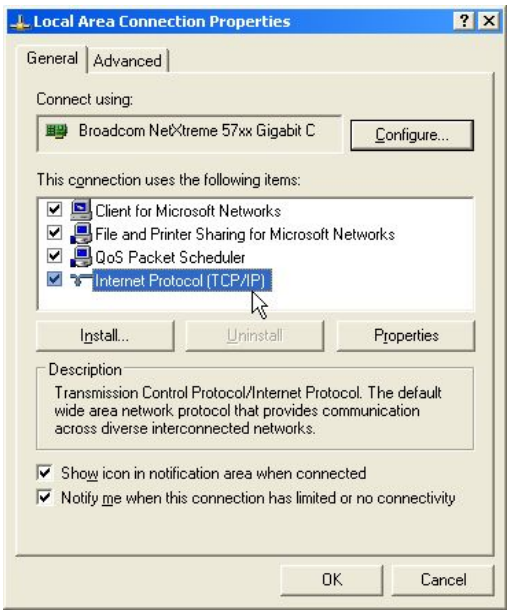
- Select Start > Settings > Control Panel
- Double click the **Network Connections** icon



- Double click **Local Area Connection**

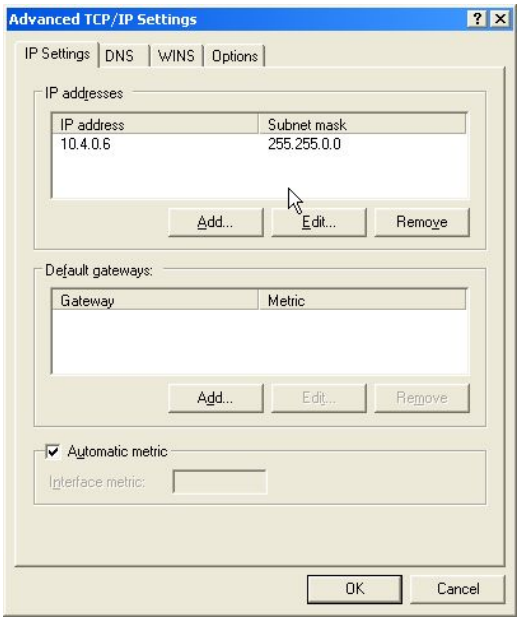


- Click on **Properties**

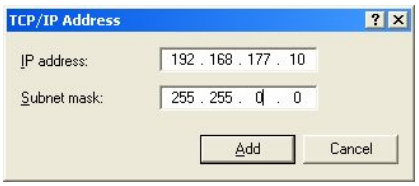


- Select Internet Protocol (TCP/IP)
- Click **Properties**

In the dialog Internet Protocol (TCP/IP) Properties, the regular first IP address, the subnet mask and the standard gateway address are shown. To add a second IP address click on Advanced



- Click the **Add** button in the IP Addresses box



- Enter the IP address and the Subnet mask
- Click on **Add**
- Confirm all windows with **OK** until you get back to the desktop

After an IP connection between the PC and the Linking Device has been set up, you can keep this configuration as a basis in order to be able to find the Linking Device with the NI Configurator. If you don't want to use this setting, start the web browser with the URL http://192.168.177.177 (default address) or with the current IP address of the Linking Device. The page System Status will be displayed.

5.1.2 Setting up an IP address with an RS232 connection between PC and Linking Device

Usually it is not necessary to set up a serial RS232 connection to the Linking Device; however there are two occasions when it is required:

- when there is no valid IP configuration in the Linking Device and therefore, it is not possible to set up an IP connection
- when the firmware is corrupted and the device is not able to boot

Connect your PC and the Linking Device with a serial RS232 null modem cable.

Common Null-Modem Connection

Signal Name	DB-25 Pin	DB-9 Pin		DB-9 Pin	DB-25 Pin	
FG (Frame Ground)	1	-	X	-	1	FG
TD (Transmit Data)	2	3	-	2	3	RD
RD (Receive Data)	3	2	-	3	2	TD
RTS (Request To Send)	4	7	-	8	5	CTS
CTS (Clear To Send)	5	8	-	7	4	RTS
SG (Signal Ground)	7	5	-	5	7	SG
DSR (Data Set Ready)	6	6	-	4	20	DTR
CD (Carrier Detect)	8	1	-	4	20	DTR
DTR (Data Terminal Ready)	20	4	-	1	8	CD
DTR (Data Terminal Ready)	20	4	-	6	6	DSR

In most cases a three-wire cable (RD, TD and SG) works fine.

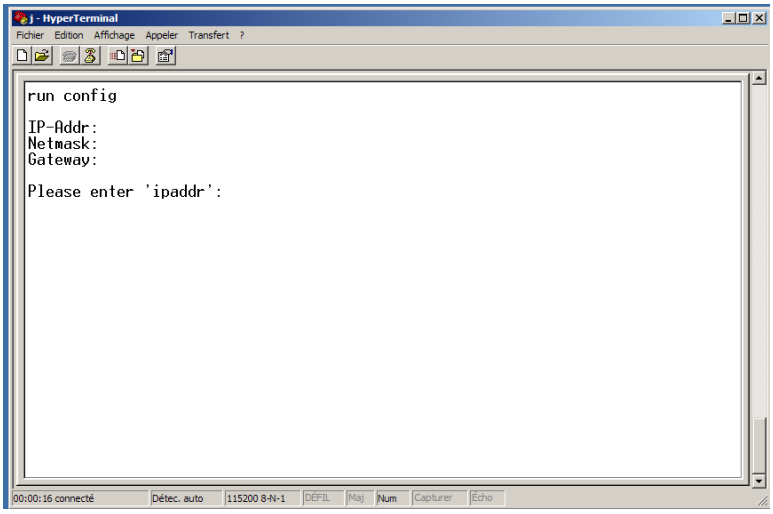
Open the terminal program (e.g. Hyper Terminal) with the following port settings:

- Baud rate: 115200 bit/s
- Data bits: 8
- Parity: No
- Flow control: none

When using HyperTerminal the setting Function, “arrow and ctrl keys act as terminal keys” must be selected in the settings tab.

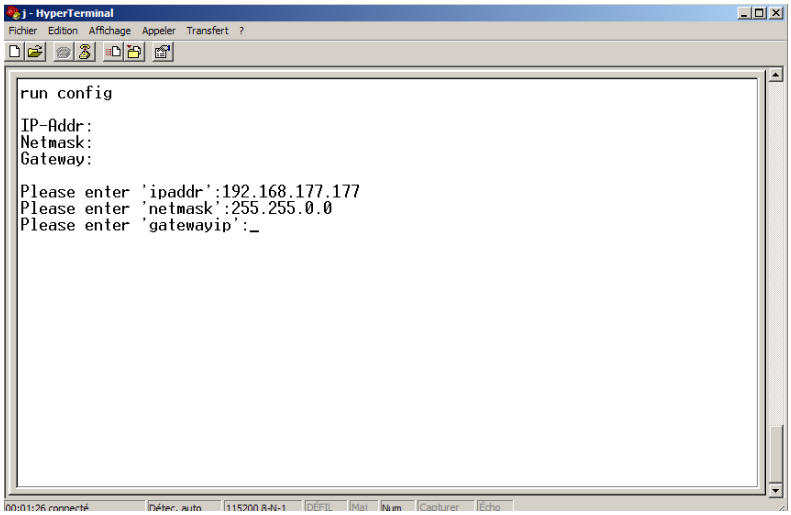
Connect the Linking Device to the power supply in order to start the boot sequence. During the boot sequence enter the command **Stop** immediately after power on. The boot process will be stopped.

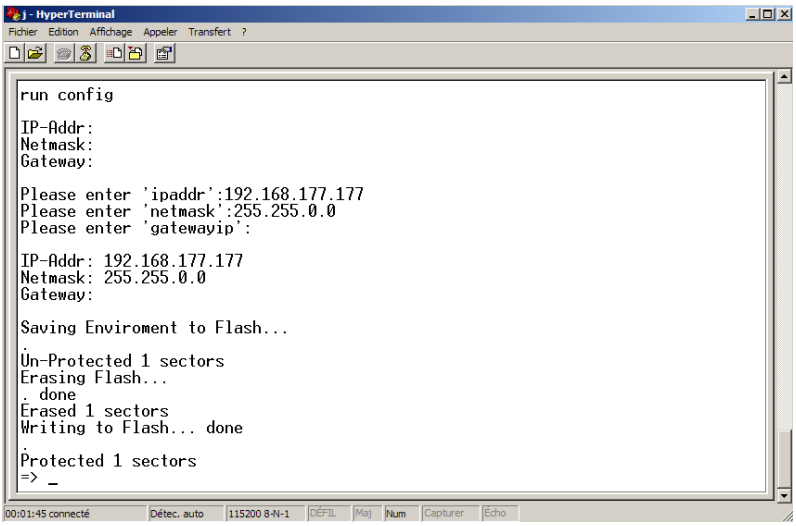
Type run config and the following prompt will appear:



The following example shows how to use this command. User input requests are displayed in quotes followed by a colon (:).

The IP address must be entered, even if it will not be changed. The default values are 0.





After this configuration, you should have an IP connection between the PC and the Linking Device. You may want to start the web browser with the URL http://192.168.177.177 (default address) or with the current IP address of the Linking Device. The page System Status will be displayed.

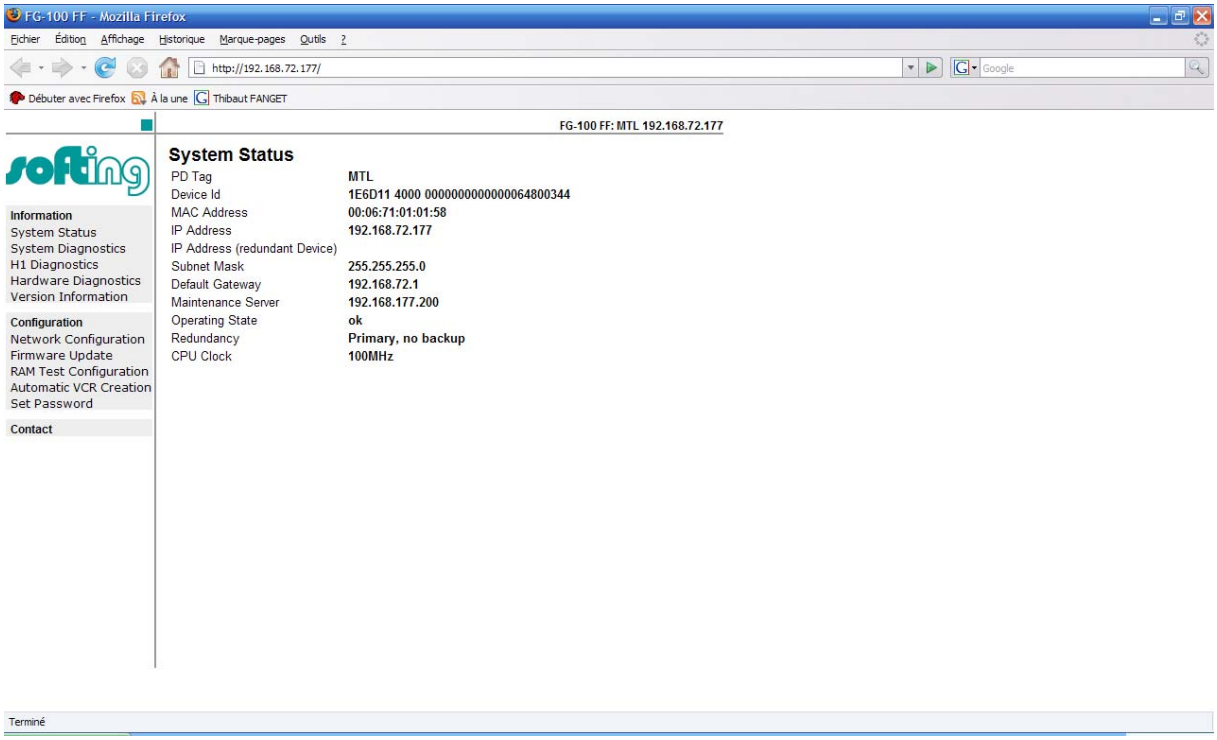
5.2 Web based IP configuration

After an IP connection between your PC and Linking Device has been set up, as described, you may access the Linking Device from your PC using a web browser.

Start your web browser with the URL http://192.168.177.177 (pre-set IP address). The page **System Status** will be displayed. The menu bar offers four information pages, four configuration pages.

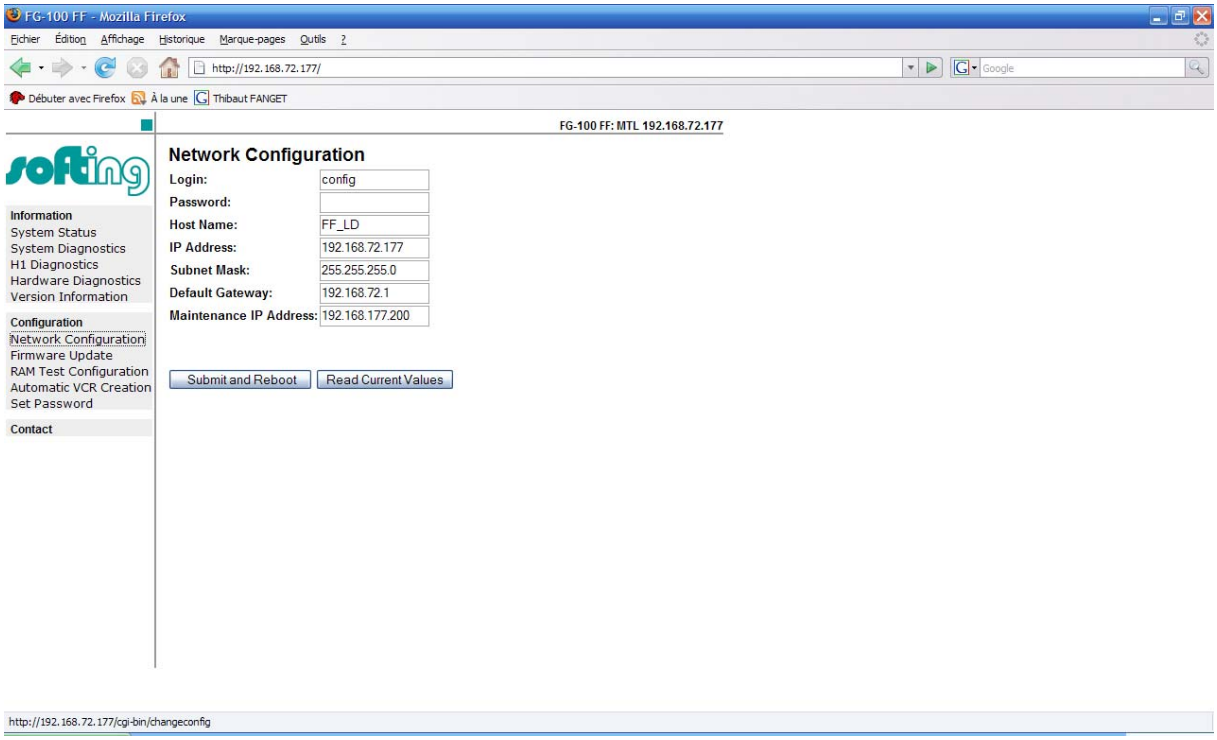
- Network configuration
- Firmware update
- RAM test configuration
- Set Password

All configuration pages require a login name and a password to execute the functions. The login name is **config**. The password is an empty string.



Main page

5.2.1 Network configuration



Enter the new IP configuration information

- IP address and Subnet Mask must be present in any case
- You may leave the Host name empty. It is reserved for future use

- It is not necessary to configure a Default Gateway, if the Host and the Linking Device share the same network.
- The Maintenance IP Address is required to download the Linking Device Firmware from a Maintenance server.

When the entries are complete, click the Submit and Reboot button. The Linking Device will be rebooted after a few seconds and the new values will be accepted.

6 NI-FBUS configuration Software

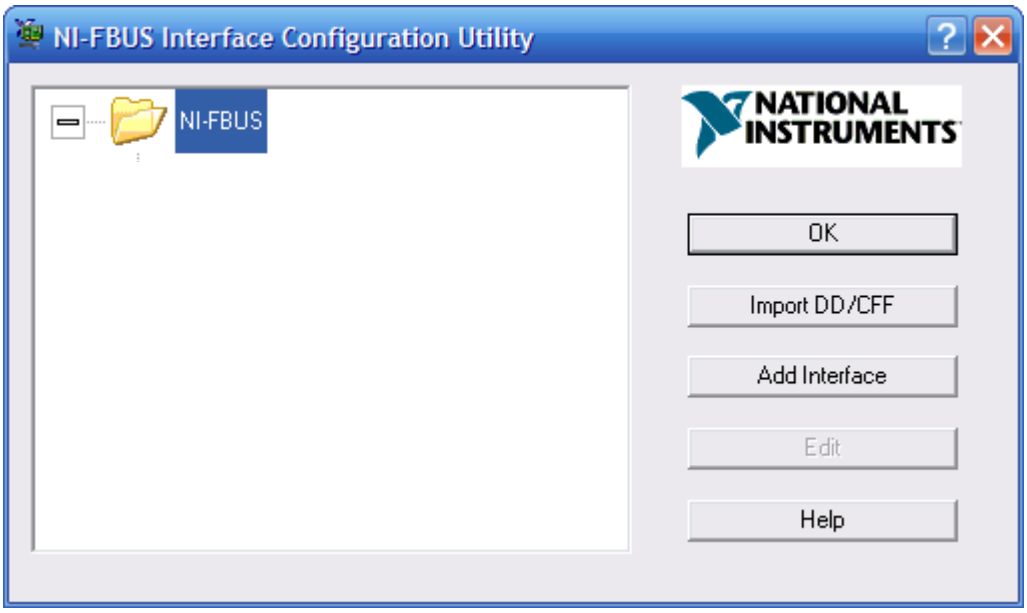
The National Instruments configuration software is used to configure and demonstrate the Foundation Fieldbus F809F diagnostic module.

6.1 Configuring Communication Devices

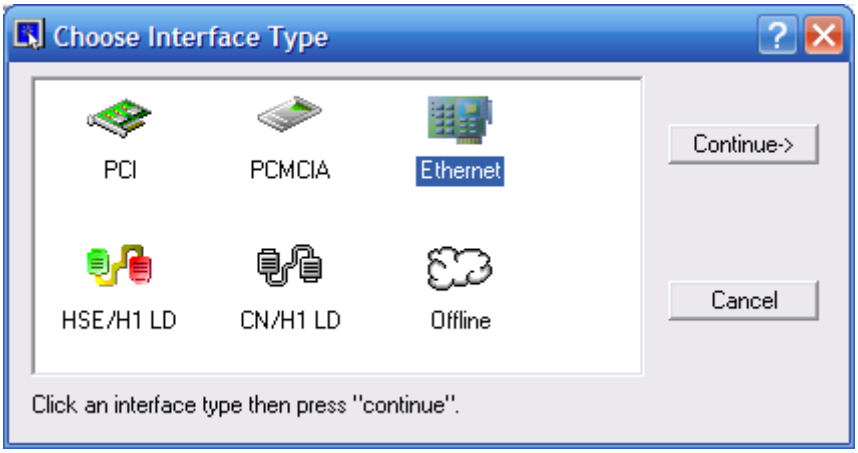
This section describes how to configure communication devices using the National Instruments Configurator. Through the configuration, the Fieldbus network learns which network communication devices were installed.

Launch the NI-FBUS Interface Configuration Utility

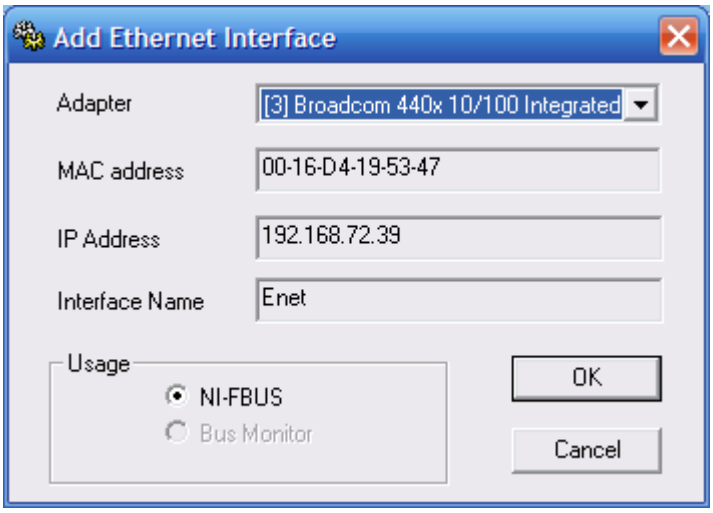
Start | Programs | National Instruments | NI-FBUS | Utilities | Interface Configuration Utility



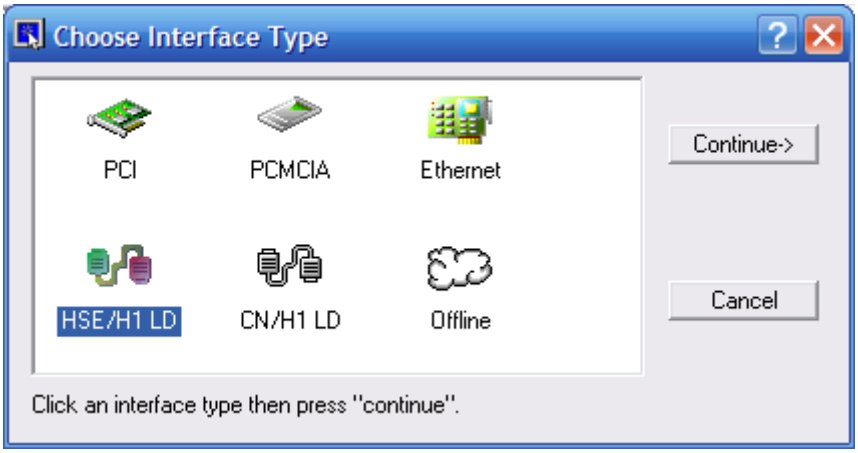
Click on Add Interface



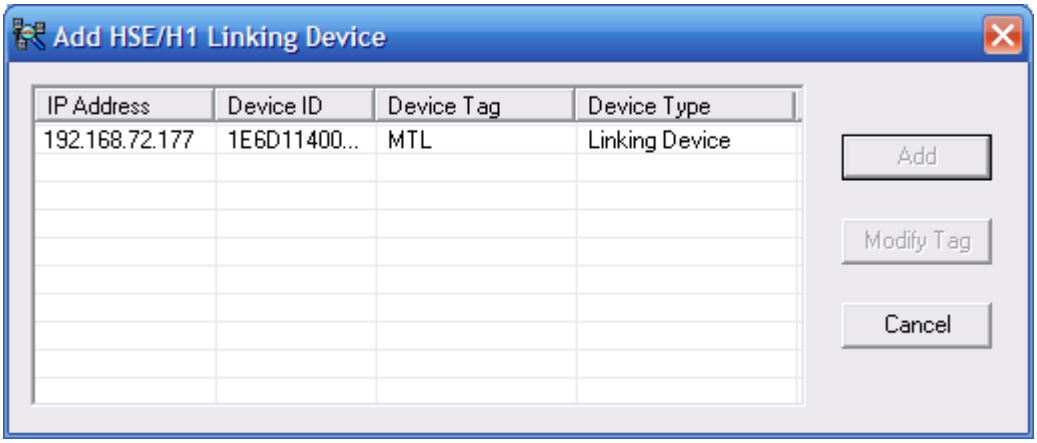
Select the Ethernet icon and click on Continue



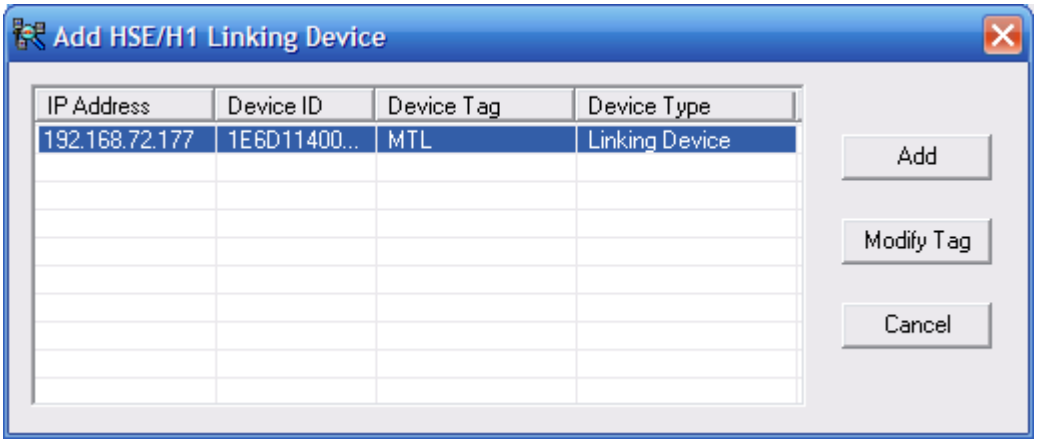
Select the Ethernet interface you want to use. You may have a Wireless card. Select the one you want to connect the Linking Devices to and click on OK



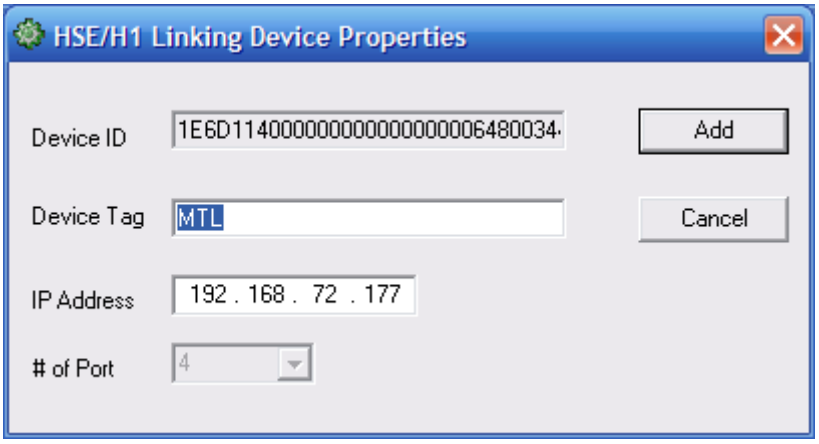
Select the HSE/H1 LD icon and click on continue



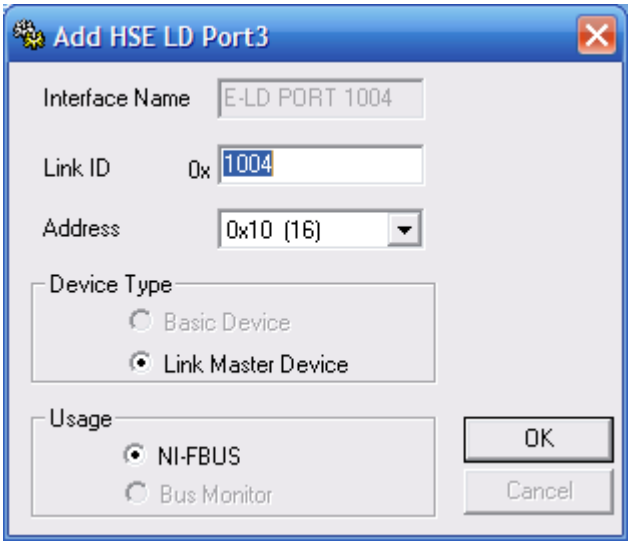
The configuration utility interrogates over the Ethernet port for the configured Linking Devices. In the example above, it finds a Linking Device at 192.168.72.177.



Select the Linking Device and click on Add

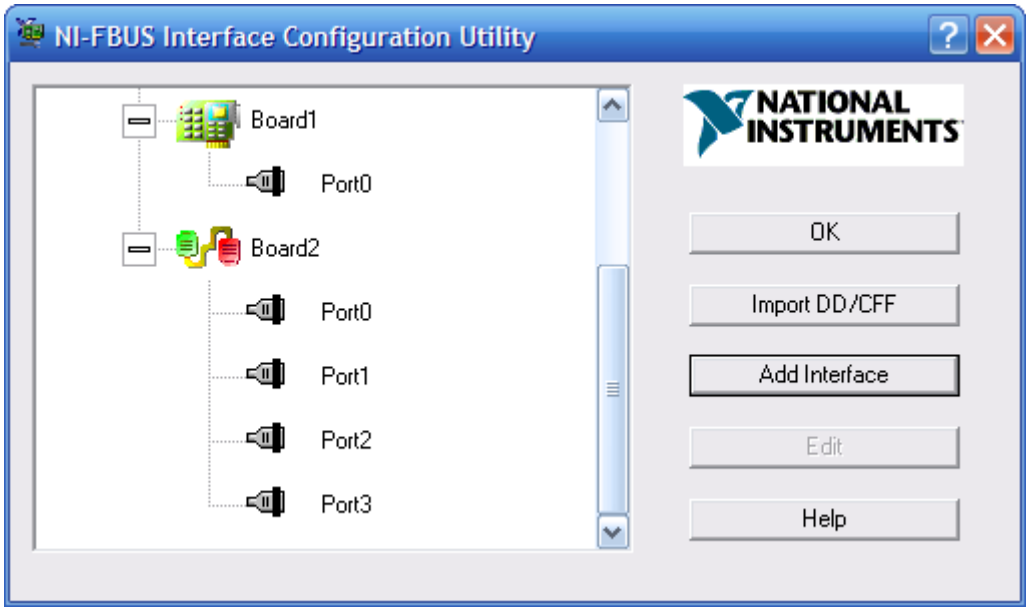


Enter the name of the Linking Device and click on OK



Leave the default parameters and click on Add. (four times, one per H1 interface)

The four H1 ports appear in the following screen, click on OK

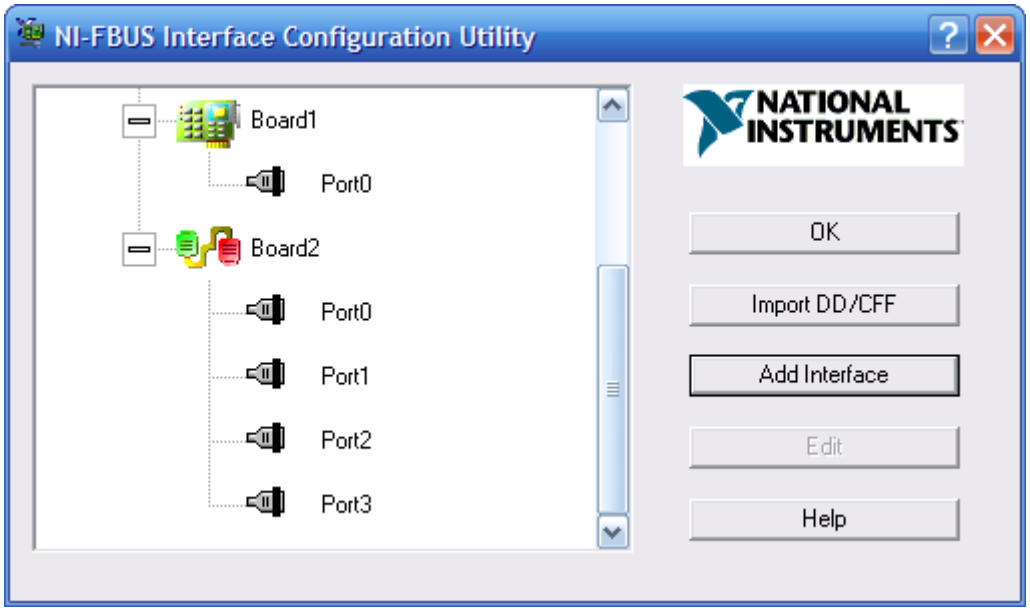


The hardware has now been installed and configured.

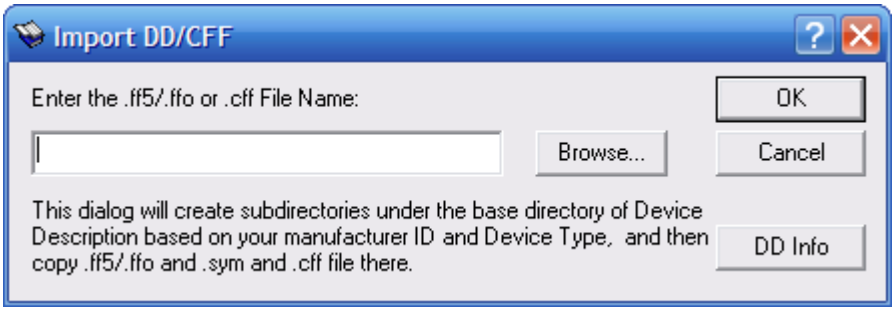
6.2 Import DD Files.

Launch the NI-FBUS Interface Configuration Utility

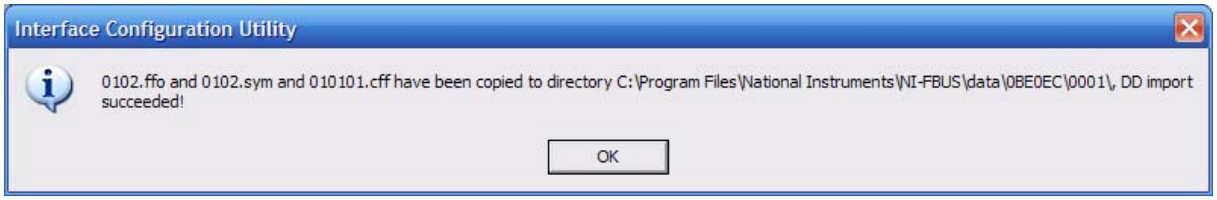
Start | Programs | National Instruments | NI-FBUS | Utilities | Interface Configuration Utility



Click on Import DD/CFF



Click on Browse to find the DD or CFF file you want to import in the National Instruments Configuration Software.



Import succeeded.

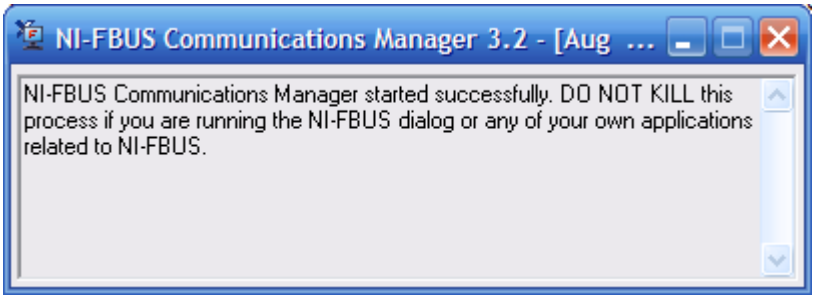
Import all DD files you want to use in your application (F809F, BEKA, 9331-TI…)

6.3 Field devices configuration

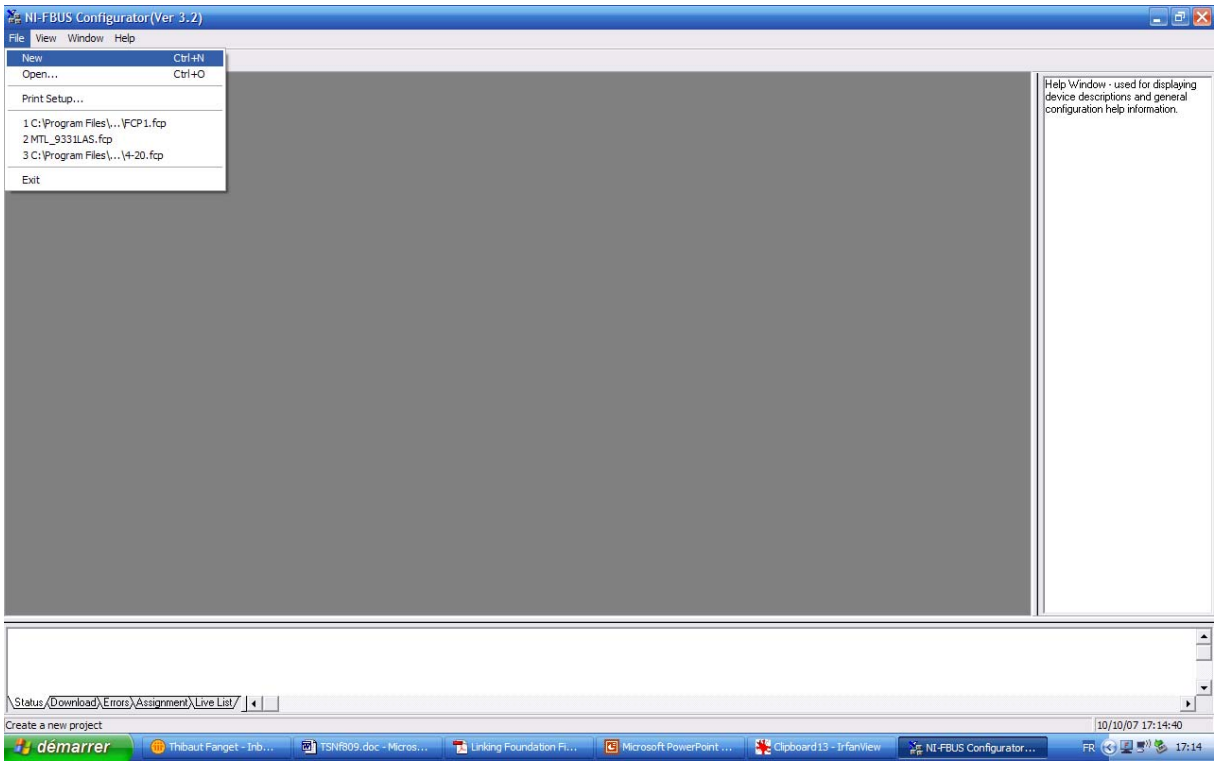
Now that the communication devices have been configured and all DD files imported, the National Instruments Configurator is used to configure the Fieldbus devices and to demonstrate how to use the F809F module.

Run the NI-FBUS Configurator: Start | Programs | National Instruments | NI-FBUS | NI-FBUS Configurator

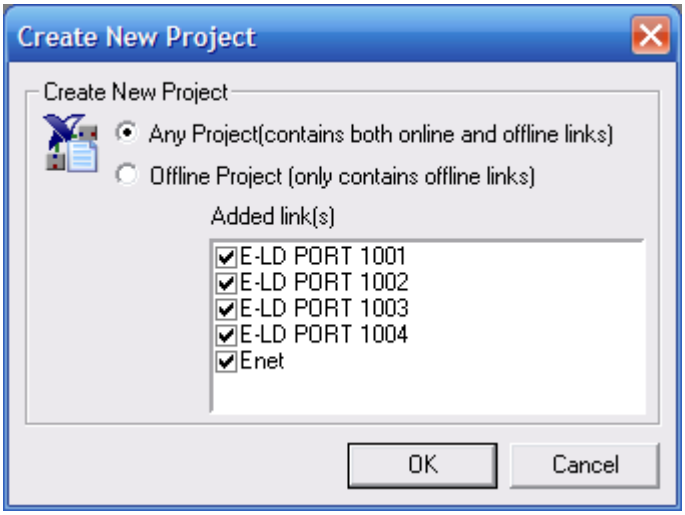
Click on yes to run the NI-FBUS communication manager.



Create a new project: File | New



The following dialog indicates that four FF channels in the Linking Devices were found and that it is connected via Ethernet.

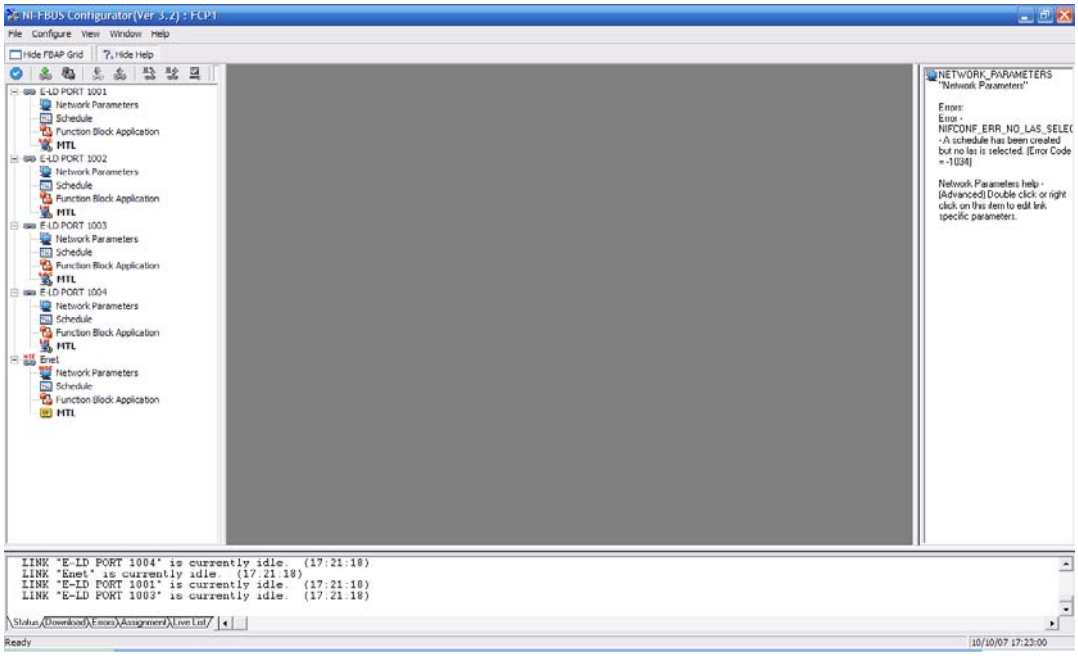


Select the port you want to use.

- E-LD PORT 1001 for FF 1 port
- E-LD PORT 1002 for FF 2 port
- E-LD PORT 1003 for FF 3 port
- E-LD PORT 1004 for FF 4 port

By default, keep the fourth port active in your configuration and click on OK

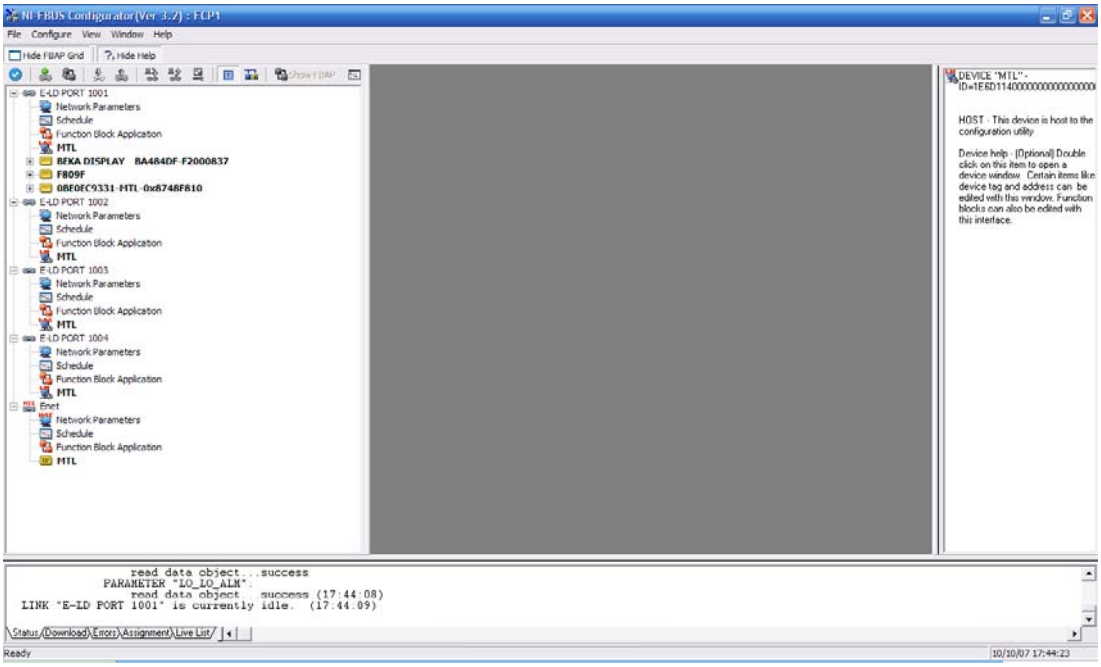
The system performs a learn function to determine what is connected to the Foundation fieldbus segment. In the example no device is connected.



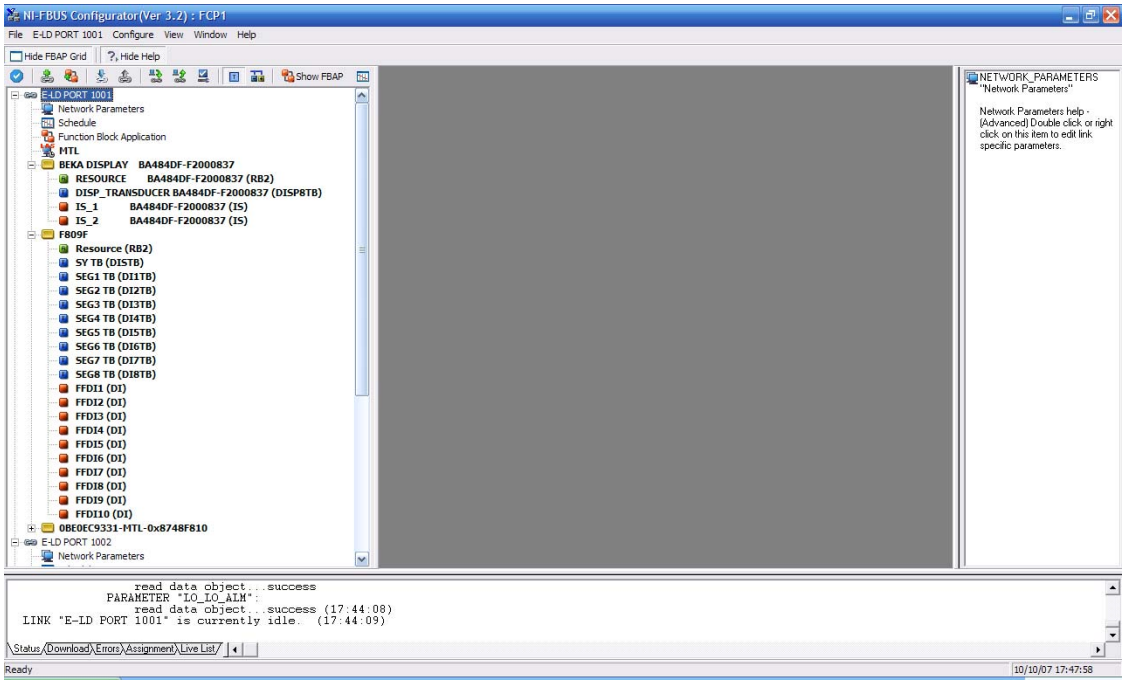
Once a device is connected, the configurator will automatically update the live list.

In this example we have three devices on the port 1001

- A Beka display BA484DF
- A MTL diagnostic module F809F
- A MTL temperature multiplexer 9331-TI



Expand the trees in order to see all available blocks in your devices.



6.4 Fieldbus Device F809F

6.4.1 Resource Block

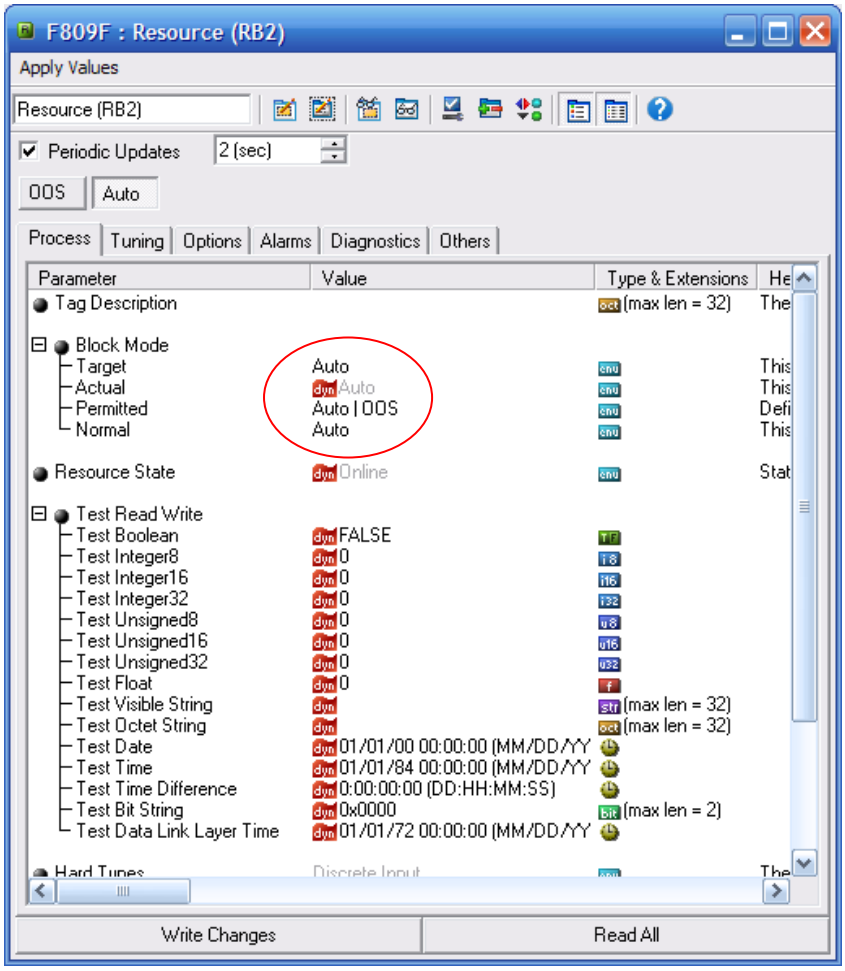
The resource block defines the physical resources of the device including type of measurement, memory, etc. The resource block also defines functionality, such as shed times, that is common across multiple blocks. The block has no linkable inputs or outputs.

The resource block supports two modes of operation as defined by the MODE_BLK parameter:

Automatic (Auto): The block is processing its normal background memory checks. In this mode, changes can be made to all configurable parameters.

Out of Service (OOS): The block is not processing its tasks. The BLOCK_ERR parameter shows Out Of Service. In this mode, changes can not be made to any configurable parameter.

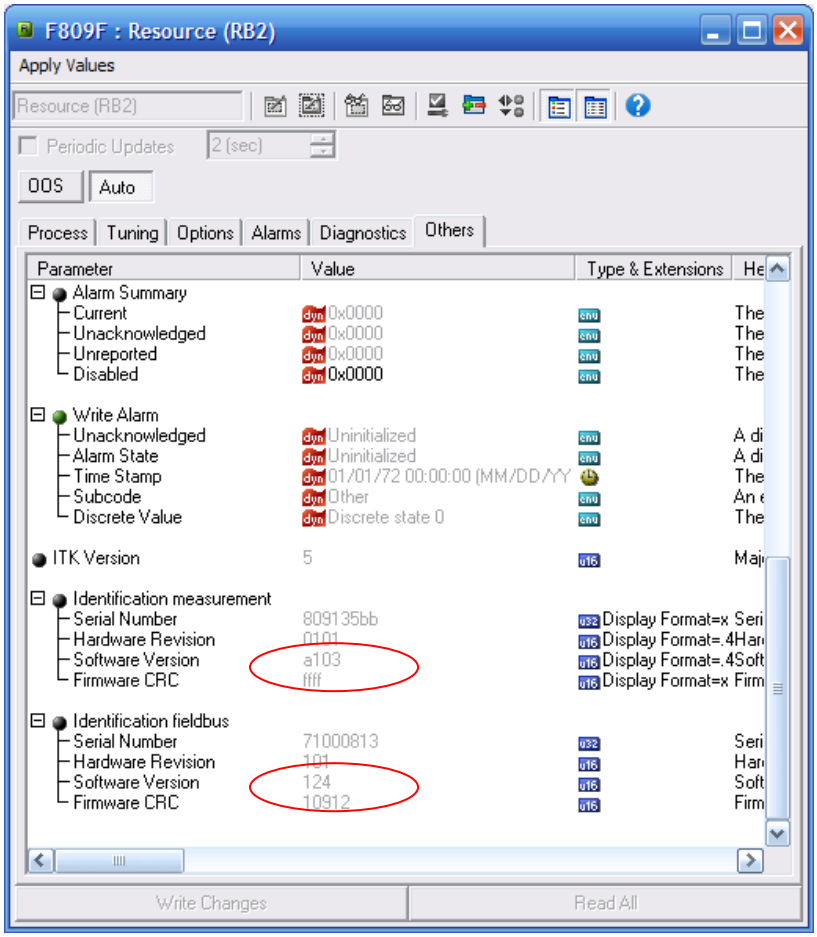
In normal operation, the Block should be in AUTO



Process TAB

Resource block: Permitted modes (AUTO / OOS), Actual Mode (Auto)

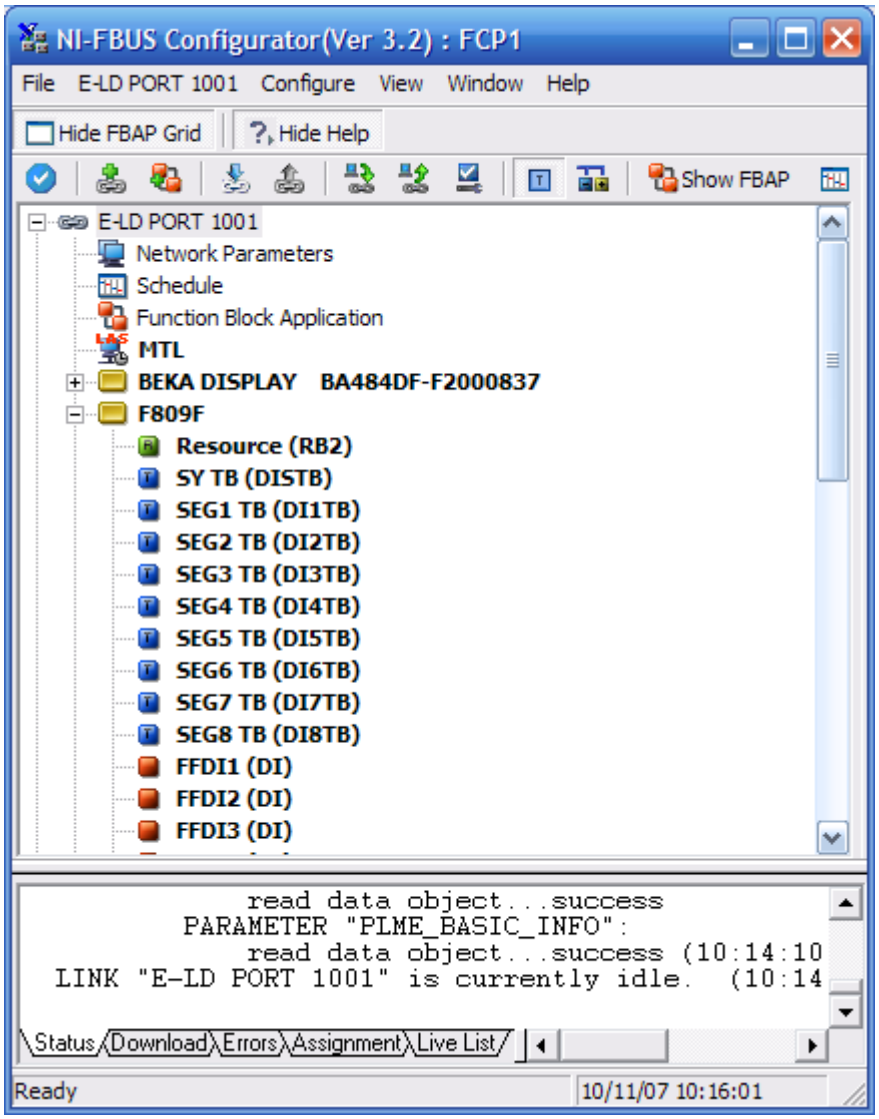
The resource block is often used to get the software revision for both, the measurement board and the Fieldbus Communication Board.



6.4.2 Transducer blocks

There are two types of transducer block:

- Sys TB: System Transducer Block
- Seg TB: Segment Transducer Block



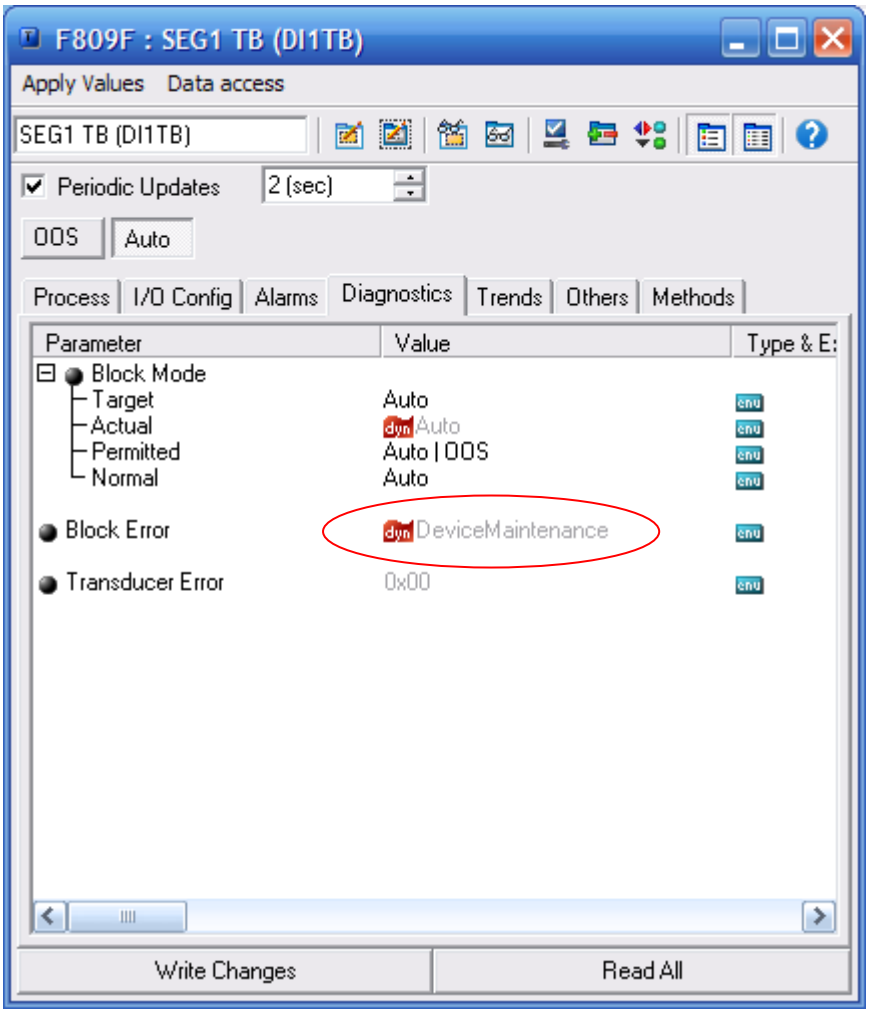
The transducer block supports two modes of operation as defined by the MODE_BLK parameter

- **Automatic (Auto)**: The block is processing its normal background memory checks. In this mode, changes can be made to all configurable parameters.
- **Out of Service (OOS)**: The block is not processing its tasks. The BLOCK_ERR parameter shows Out Of Service. In this mode, changes can not be made to any configurable parameter.

6.4.2.1 Transducer Block Alarm Detection

If any alarm (except the new and removed device alerts) is set within the Transducer Block then the "NEED MAINTENANCE SOON BIT" is set in the BLOCK_ERR parameter.

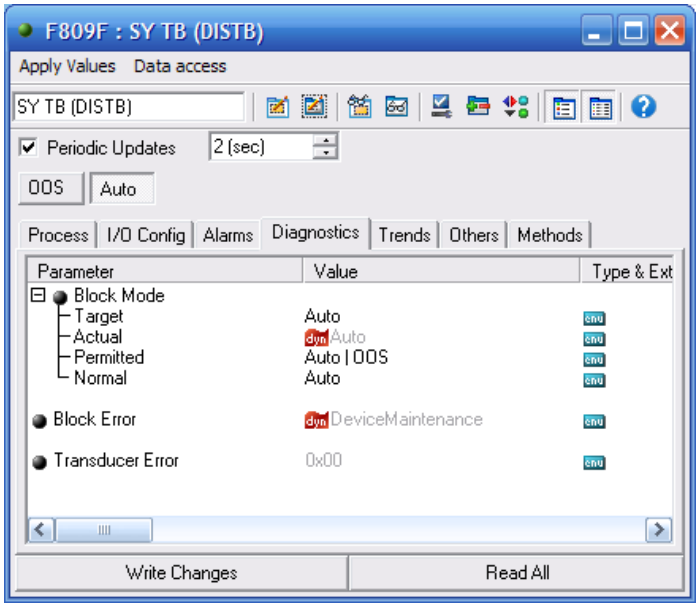
Additionally, if any alarm is set in the Transducer Block then the Segment alarm DI BLOCK PV_D will be set to 1. See chapter configuring the DI block in the fieldbus cyclic messaging (6.4.3)



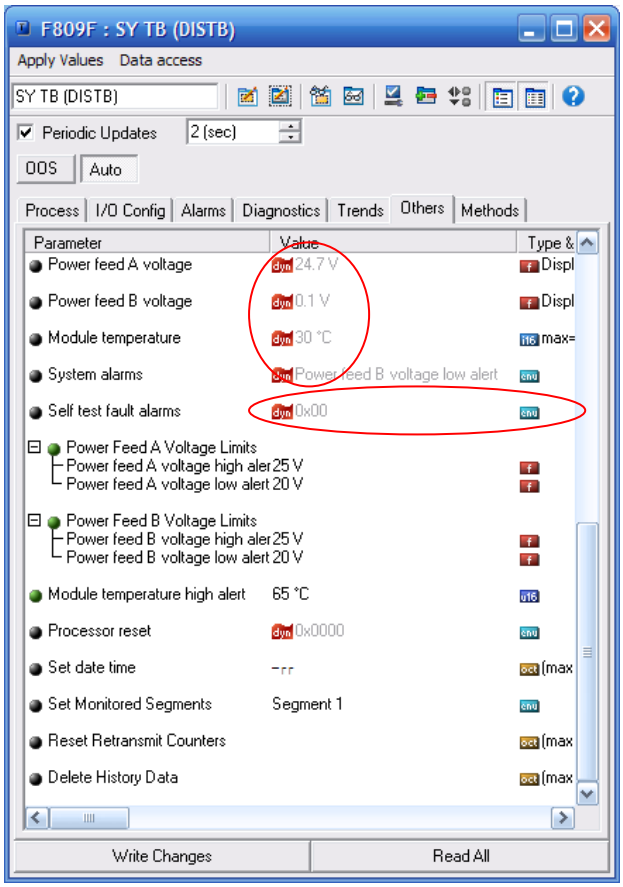
Device Need Maintenance Soon in the Diagnostic TAB

6.4.2.2 System Transducer Block (SysTB)

There is one Sys TB in the F809F, which allows the user to view system and self-test alarms together with the system power feed voltages and temperature. The SysTB allow configuration of the time, the date and the segments monitored. Additionally, for each device on each of the 8 monitored fieldbus segments, the retransmission counter can be reset and device history data can be deleted from within this block.



Diagnostics TAB: Device Need Maintenance soon



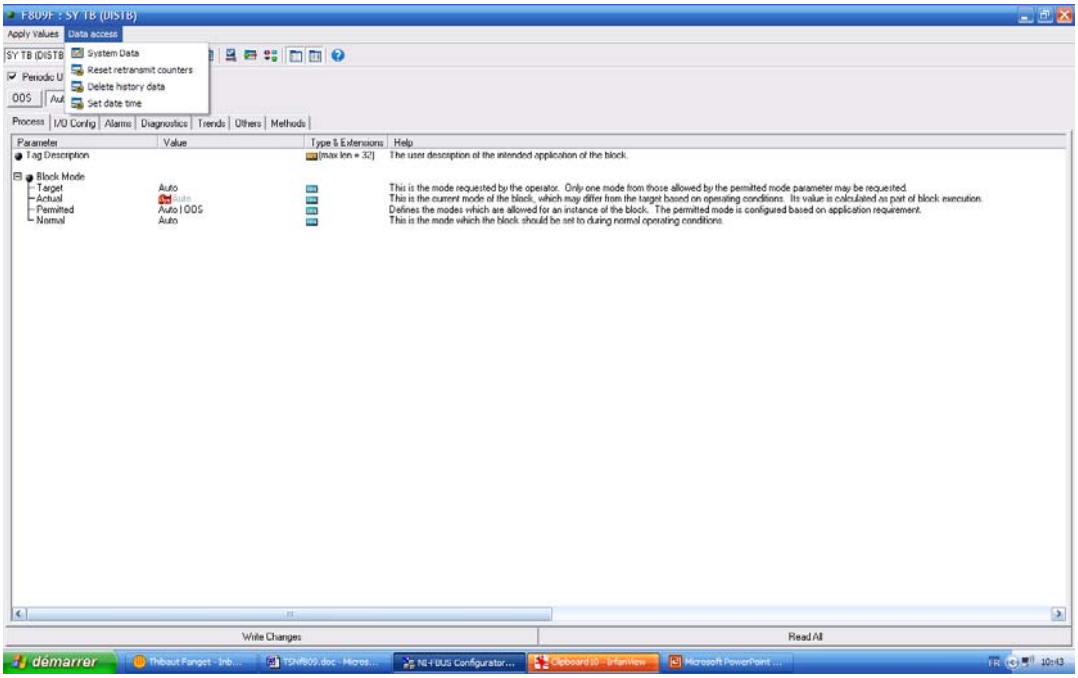
Others TAB: Power Feed A/B voltage, module temperature, System Alarms, alarms settings, monitored segment

6.4.2.2.1 Methods

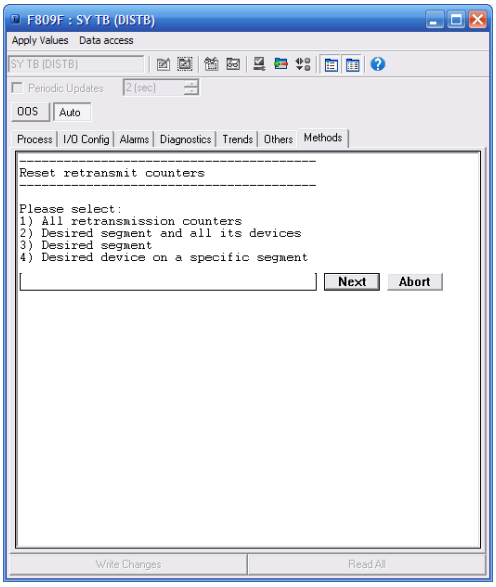
For Foundation Fieldbus hosts or configuration tools that support DD methods, there are 3 configuration methods available in the Systems Transducer Block. These methods are included with the Device Description (DD) software.

- Setting Date and Time
- Resetting retransmission counters
- Deleting device history data

To access the methods open the Sys TB and click on the menu Data Access

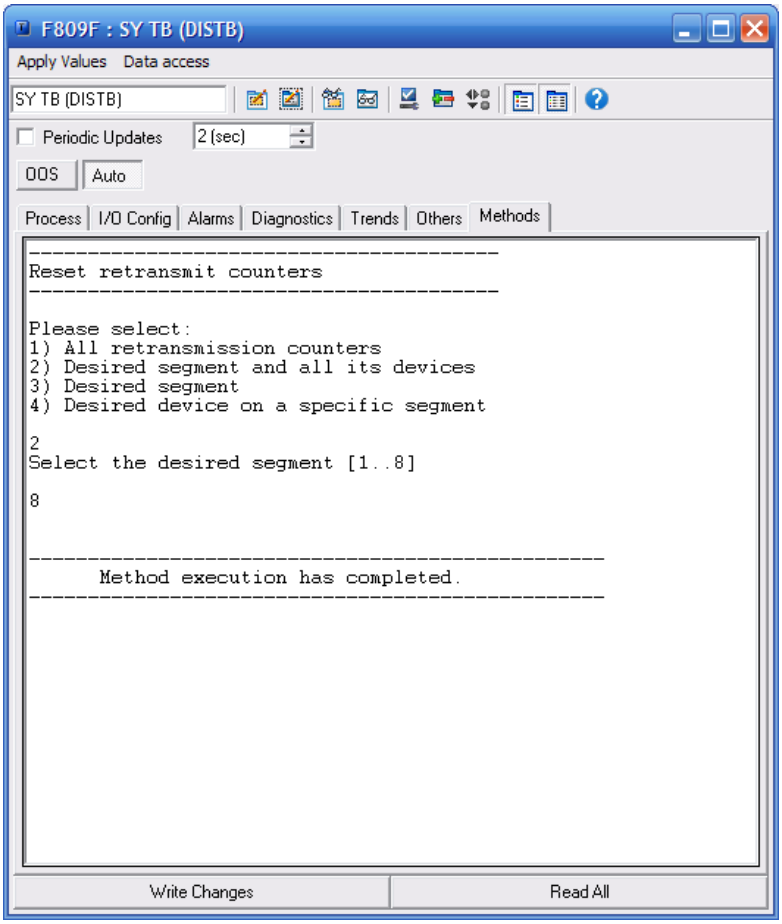


Choose the require method to run. In this example, **Reset retransmit counters** was selected



Reset retransmit counters

- All retransmission counters: Delete all counters
- Desired segment and all its devices: Delete counters for one complete segment with all devices
- Desired segment: Delete counters for the segment (keep the devices counters)
- Desired device on a specific segment: Delete counter for a specific device



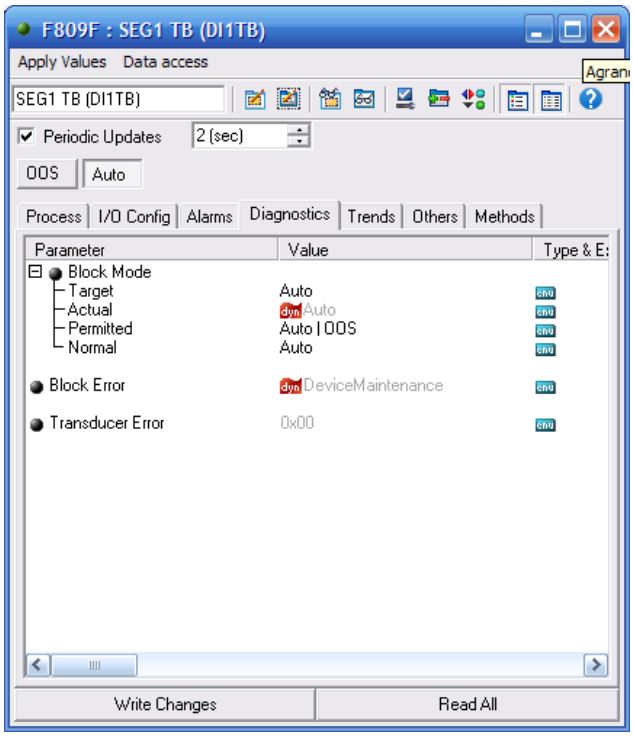
Method Execution: desired segment and all its devices on segment 8

6.4.2.3 Segment Transducer Block (SegTB)

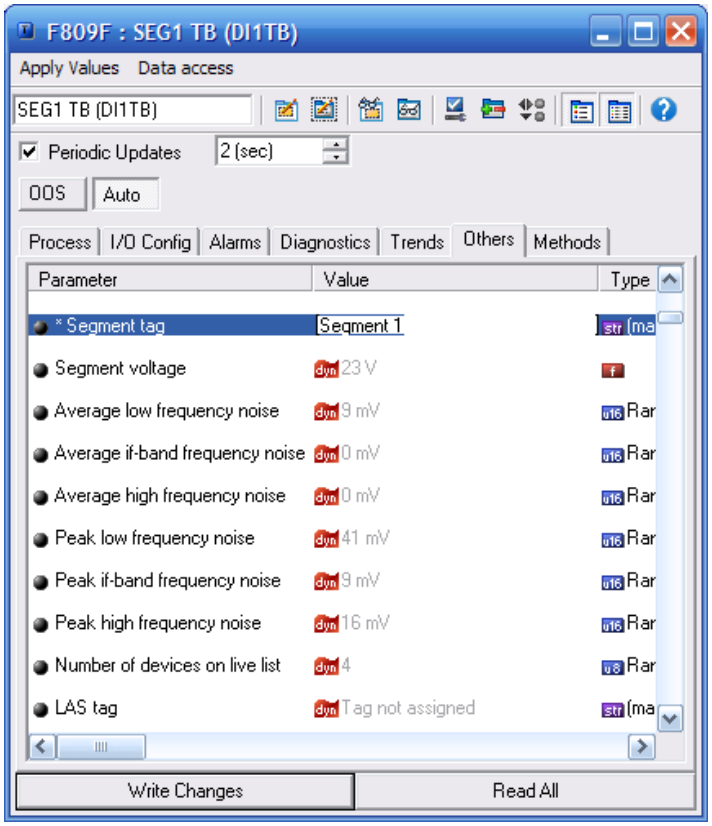
Each of the eight monitored segments are supported by a Seg TB that provides all the measured parameters and associated alarms for the fieldbus segment and devices. You can assign segment and device tags within this block.

The segment and device alarm limits may also be changed in this block.

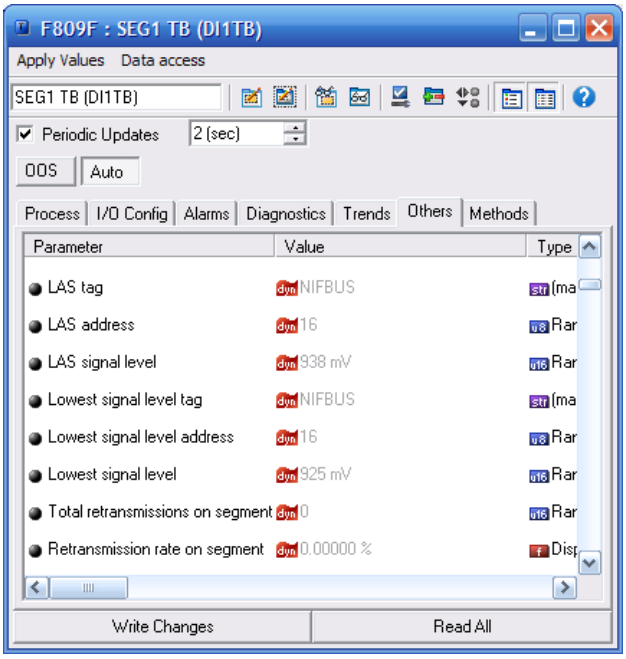
Warning: the tags are held in volatile memory. If both power feeds fail at the same time, or the F809F is removed from the carrier, then the segment and device tag data will be lost.



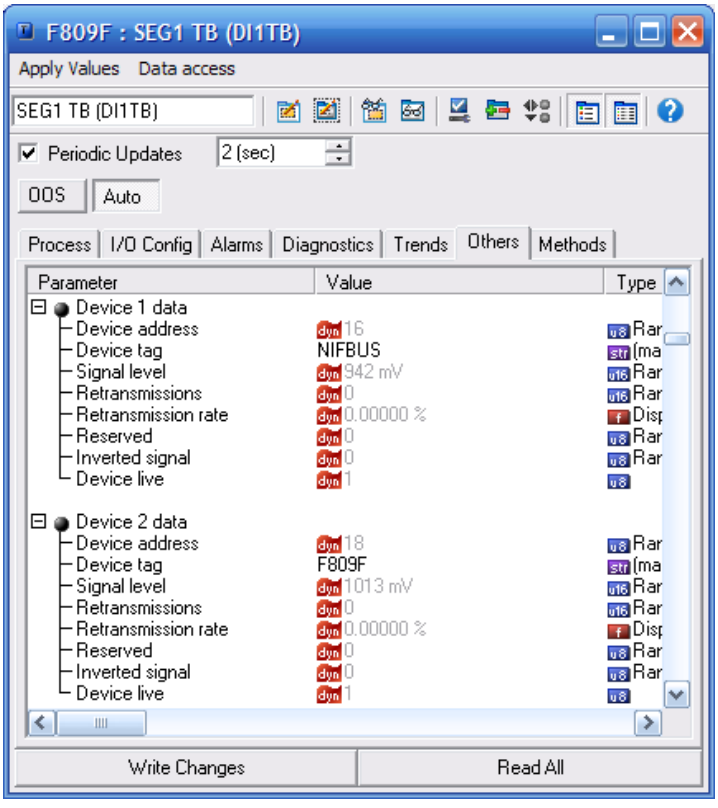
Diagnostics TAB for the SegTB: Device Needs Maintenance soon bit set



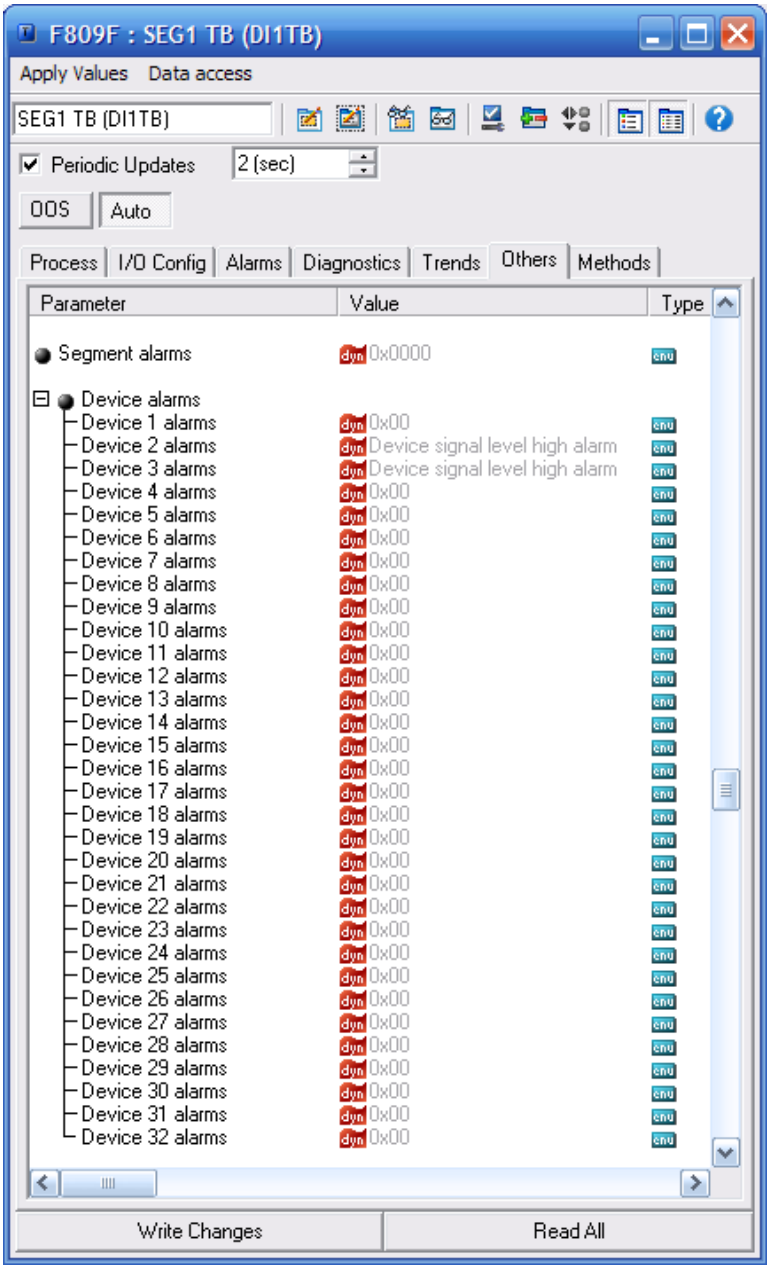
Others TAB: Segment tag and segment measurements



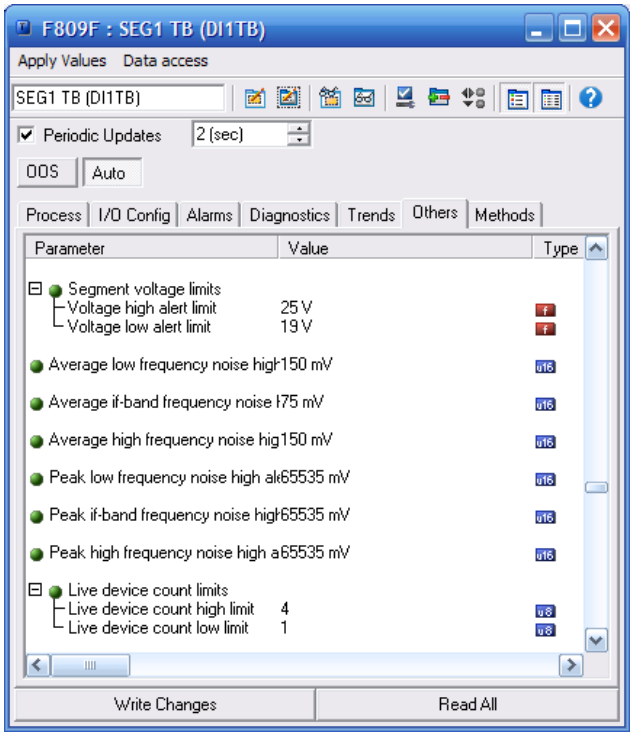
Others TAB: Information on the LAS



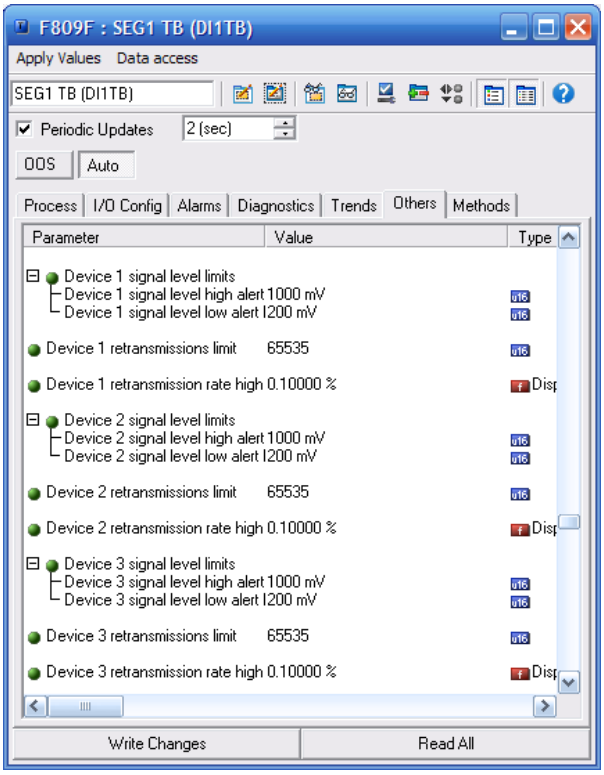
Others TAB: Device Data for 32 devices



Others TAB: Segment alarms and Device alarms



Others TAB: Segment alarm limits



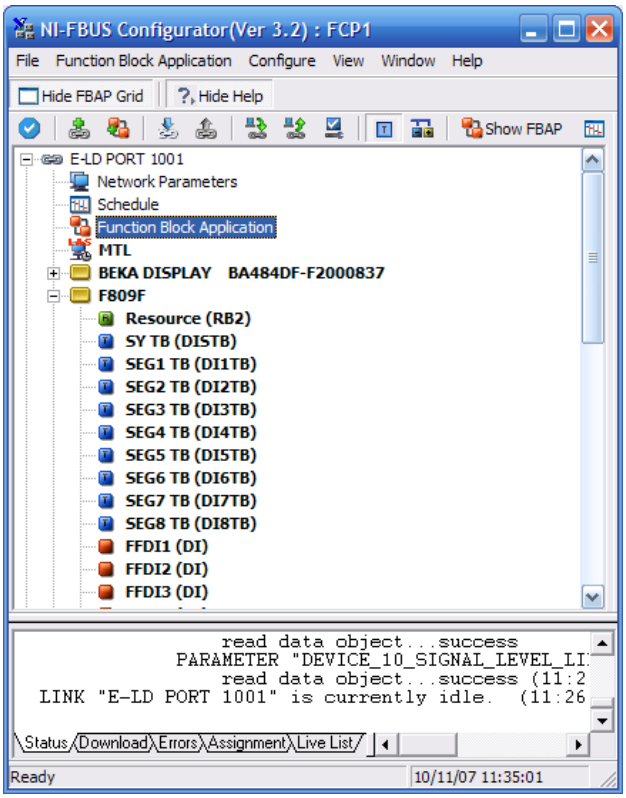
Others TAB: Device alarm limits for 32 devices

6.4.3 Discrete Input Block

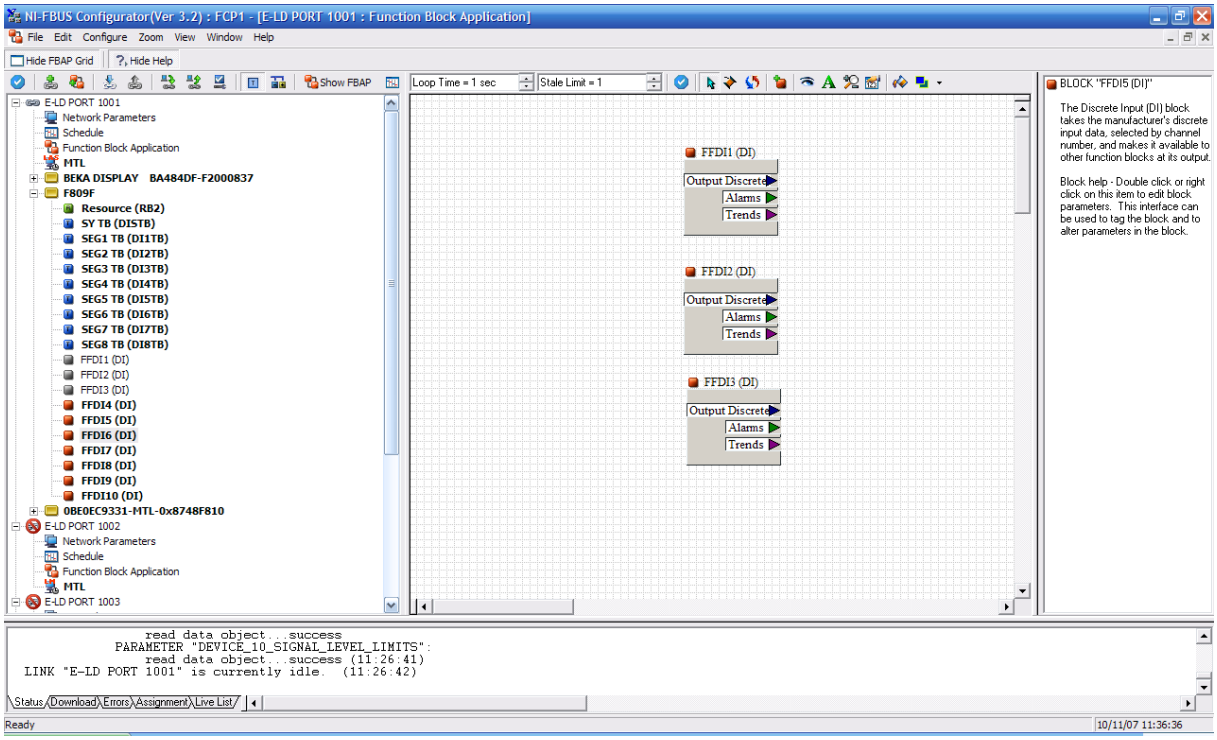
The discrete input blocks' PV_D value is calculated from the current value of the alarm parameters of the transducer blocks and the OUT_D value is calculated according to the Discrete Input Block algorithm.

- Alarm DI Block: PV_D will be set to 1 if any system alarm, segment / device alarm or self-test fault alarm bits are set. Selected by channel value 12.
- System Alarm DI Block: PV_D will be set to 1 if any System alarm and self-test fault alarm bits are set. Selected by channel value 13.
- Segment Alarm DI Block 1-8: PV_D will be set to 1 if any of the segment / device alarm bits are set for the specific segment. Selected by channel value 14 – 21 for segments 1 – 8.

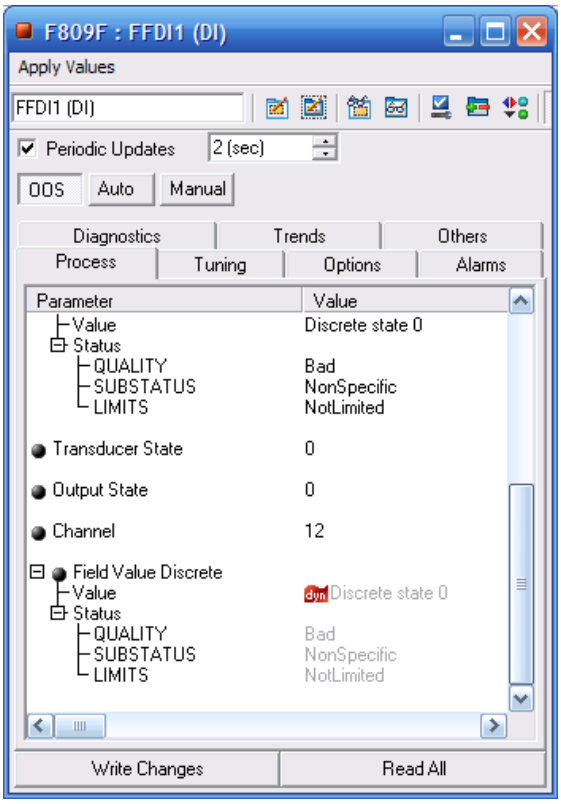
In order to use the DI block, launch the Function block application by double clicking the application name



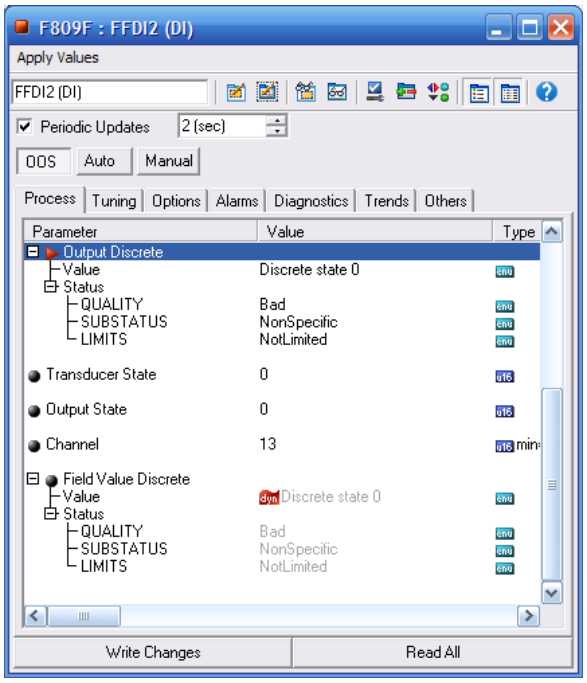
Launch Function Block application



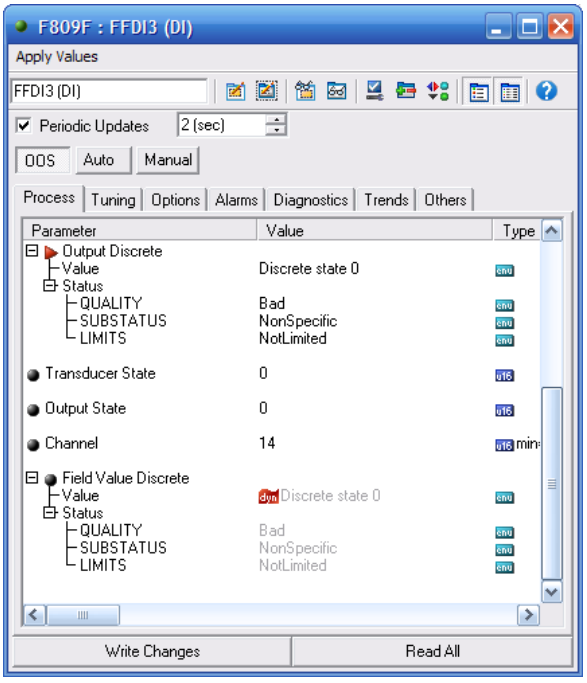
Drag and drop the DI function blocks in the application window. Three DI function blocks are shown in this example.



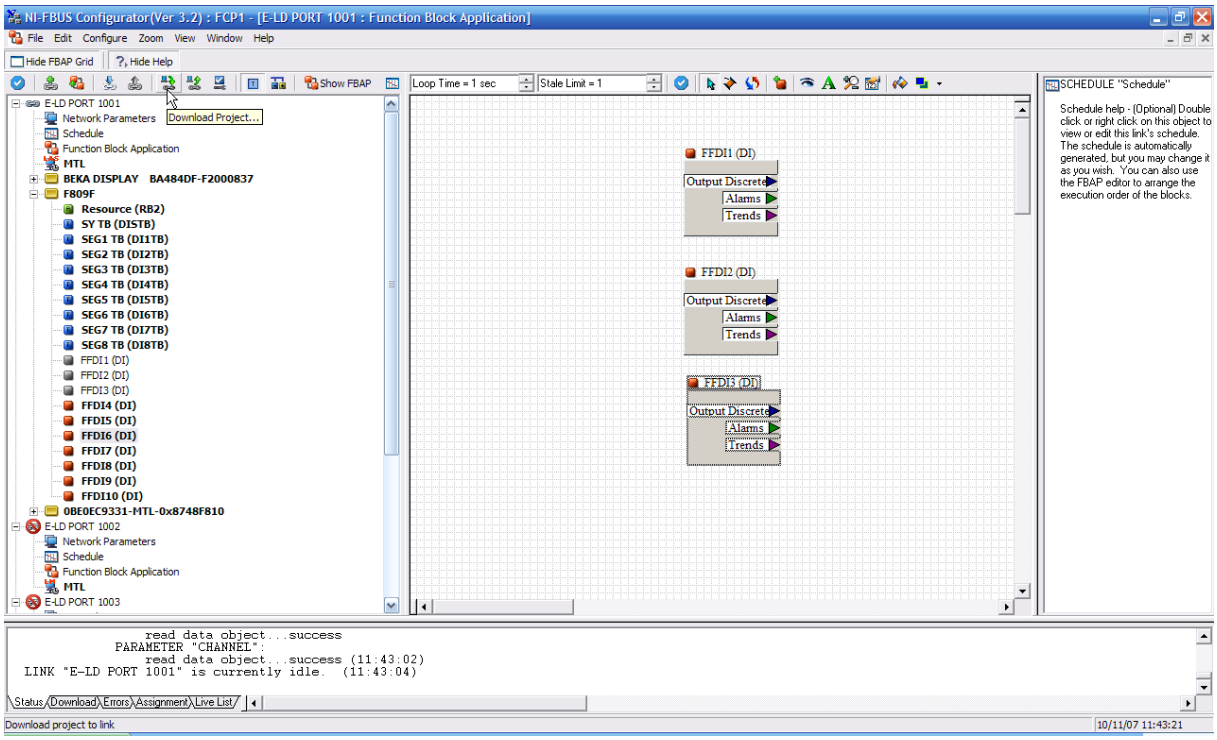
Open the Process TAB of the DI block in order to configure the channel value: 12 this block will be used for the System, Segment / device or self test fault alarms



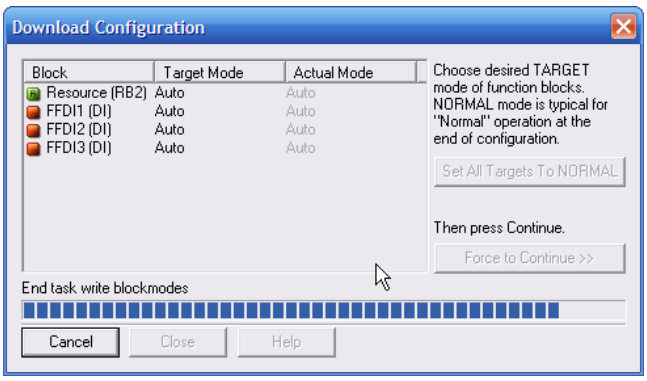
Open the Process TAB of the DI block in order to configure the channel value: 13 this block will be used for the System alarms



Open the Process TAB of the DI block in order to configure the channel value: 14 this block will be used for the Segment / Device alarms for the segment 1

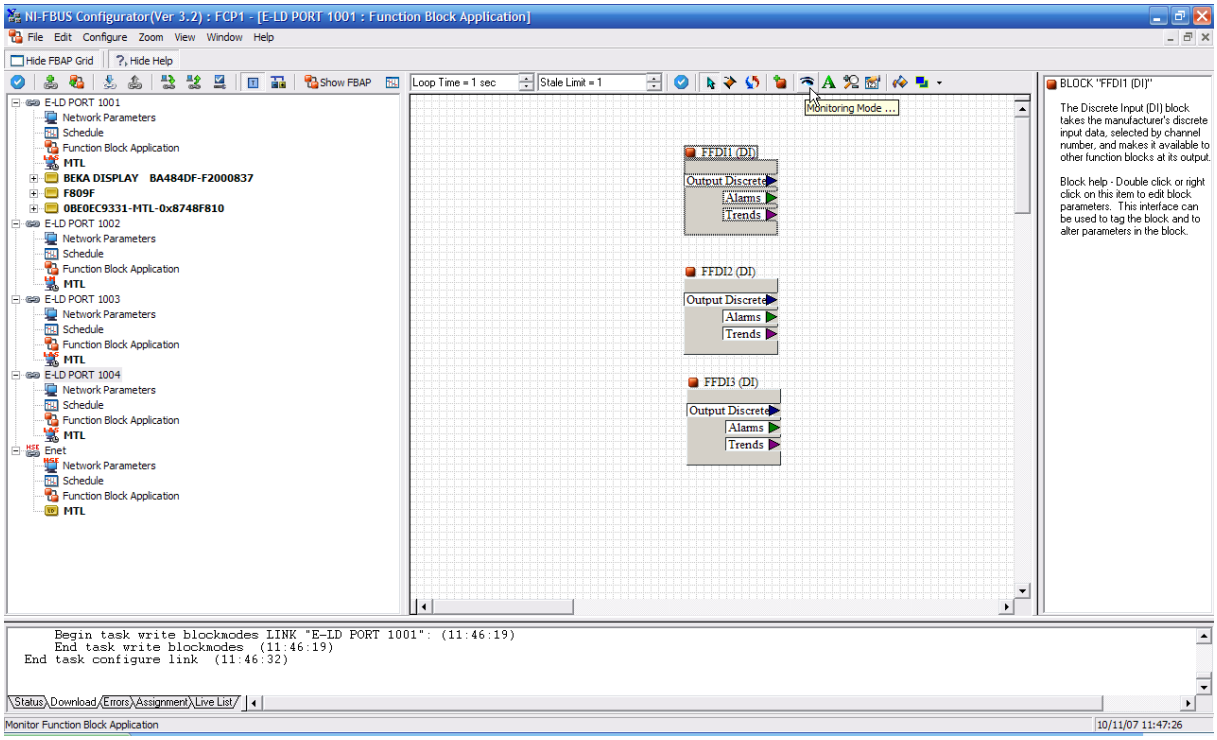


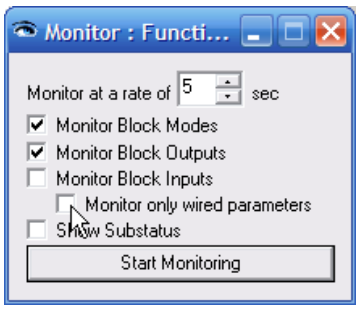
Download the application by clicking the download project button in the tool bar



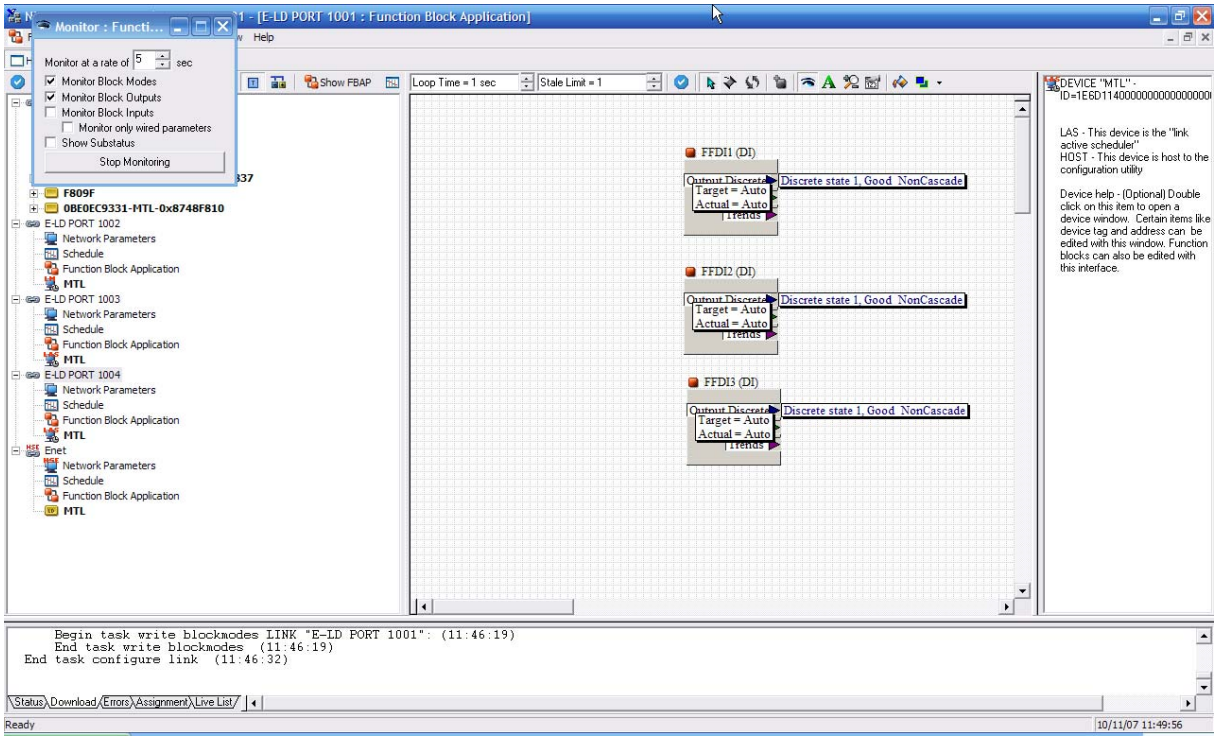
After the download make sure that all blocks are in AUTO.

Go online in order to see the PV_D values, click on the monitoring mode button in the tool bar





*Uncheck the **Monitor only wired parameters** box and click the **Start Monitoring** button*



The outputs of the alarm blocks can then be seen on screen..