APPLICATION'S BULLETIN

System302 - Bulletin

smar

FIRST IN FIELDBUS

- System302

Nov / 05

System302
Bulletin

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web: www.smar.com/contactus.asp

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INTRODUCTION

This document is intended to serve as a “what to do” applications guide for users and integrators that have adopted **Smar**’s *System302* as process control solution. **Smar**’s *System302* is compliant to the Foundation^{TM} Fieldbus Standards.

After studying the contents of this document, one should know the procedures to setup a non-redundant or redundant system in communication, to get the system in operation, to maintain the system, to set and operate redundancy, and how to use additional applications for system supervision, diagnosis and maintenance.

To follow the contents of this manual, the user should be familiar mostly with fieldbus concepts, such as how a fieldbus physical installation is organized in separated channels or segments, the concept of function blocks processing the control inside field devices (which is the essence of fieldbus technology) and so on. It is also necessary to know how to deal with the software *Syscon*, how to configure Foundation function blocks in order to make the control strategy work, etc.

However, do not worry if you are not familiar with all these, because references to other **Smar** publications will be made throughout the development of this manual. So, it is always possible to learn while using the software according the needs by consulting the other available manuals.

Chapter 1

PROCEDURE TO THE FIRST SYSTEM STARTUP (NON-REDUNDANT)

1.1 – Software Installation

System302 runs under *Windows*, and it is necessary having administrator rights for the *System302* installation. After the installation, it is necessary to get the License keys from Smar for the software *Syscon* and *OLE Server* (PCI OLE Server, DFI OLE Server, etc).

1.1.1 – Installing the Software

Install all the parts of the *System302* 6.1.10 CD-ROM. Follow the instructions of the installation guide. These parts are the *Syscon*, Logic View, FCView, *OLE Server (DFI and DF65 Servers)*, Device *Support, FBView*, *FBTools*, and Documentation

SYSCON - SYSTEM CONFIGURATION is a software tool specially developed for configuring the FOUNDATION Fieldbus TM devices and network. You can run *Syscon* in off-line mode to do the configuration of your FOUNDATION Fieldbus TM system without any communication. And, of course, you can also run *Syscon* in the on-line mode.

Logic View is the software toll used to configure the DF65 Logic Coprocessor. The configuration is done in Ladder logic according IEC-1131-3EE. It is easy to learn and use.

FCView is a software tool used in the system operational stage , it means, after the installation, configuration and start up of the AuditFlow system. Using FCView its possible to monitor and act in the main function blocks, manage process, create reports, all things made in a way to warranty the system inviolability.

OLE Server for Windows is the server-side software used to carry out connection between client-side software and PCI cards and/or DFI302 plugged in the local computer. The access to this *OLE Server* may be done locally (local connection – server installed at the same station of the OLE client) or through a network (remote connection – server installed in other station).

Device Support is a package with DD (Device Description) and CF (Capability File) files. This set of files has information about Smar and 3rd party equipments that assure the interoperability of the system.

FBView provides the user with the messages that pass through the Fieldbus buses. FBView can capture, analyze and decode the messages through an interface also connected to the bus.

FBTools is the utility software used to perform Firmware Download (to load an executable program into the FLASH memory) on any **Smar** Fieldbus equipment (PCI cards, Field Devices and Fieldbus Modules).

All *Documententation* is provide by System302. The documentation includes manuals of field devices, controllers and software, showing information that help the user in the installation, configuration, control and operation of the system.

1.1.2 – License Key

Syscon and *OLE Server* require **license keys** to operate. The license can be through softkey, hardkey and demo license. In order to get these licenses from **Smar** proceed as follows:

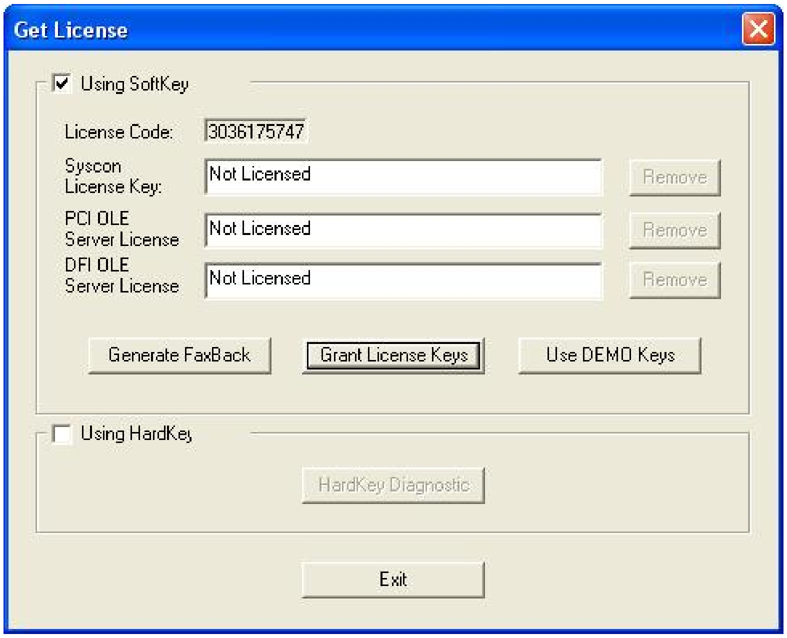
1.1.3 – Softkey

Step 1 – Getting the License Code

It is necessary to send to **Smar** a License Code, which is a number that is generated after the software installation.

From the **Start** menu, select **Programs/System302/System302 Browser** and select **OPC License**.

The *Get License* dialog box will appear. Click the button **Generate FaxBack**.



Get License

☑ Using SoftKey

License Code: 3036175747

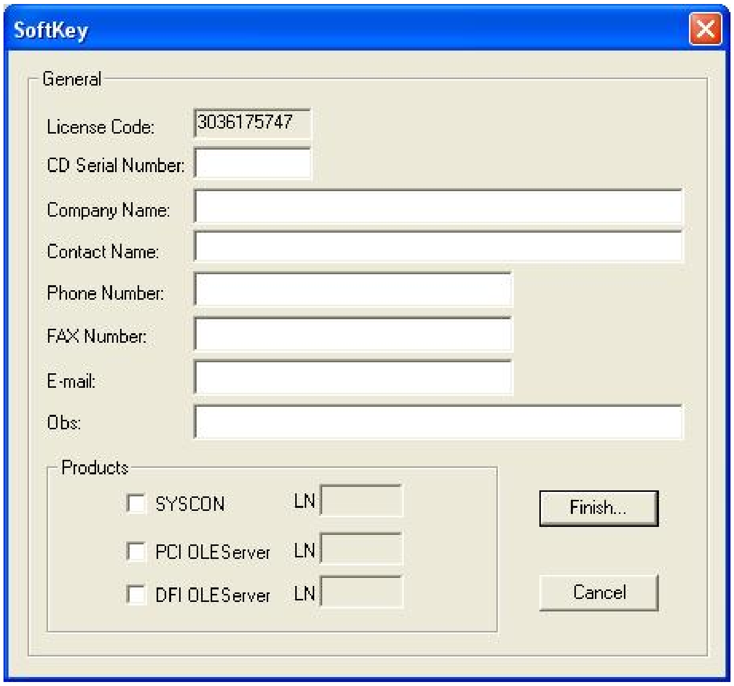
Syscon License Key: Not Licensed

PCI OLE Server License: Not Licensed

DFI OLE Server License: Not Licensed

☐ Using HardKey

The *Softkey* dialog box will appear. Fill in the boxes and click the button **Finish**. The FaxBack form will be promptly generated.



SoftKey

General

License Code: 3036175747

CD Serial Number:

Company Name:

Contact Name:

Phone Number:

FAX Number:

E-mail:

Obs:

Products

☐ SYSCON LN

☐ PCI OLEServer LN

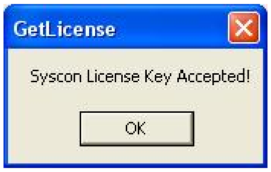
☐ DFI OLEServer LN

Step 2 – Transmitting the fax

Fax your FAX-BACK form to **Smar** using the fax number listed on it. **Smar** will issue you license keys to authorize your installed products and reply it to you.

Step 3 – Entering the License Keys

After you have received your license keys, run ***OPC License*** again and type the returned license keys numbers just as they are printed in the fax. Click the button **Grant my License Key**.
For instance, if you got *Syscon*'s License Key, the following dialog box will show up:



Syscon License Key Accepted!

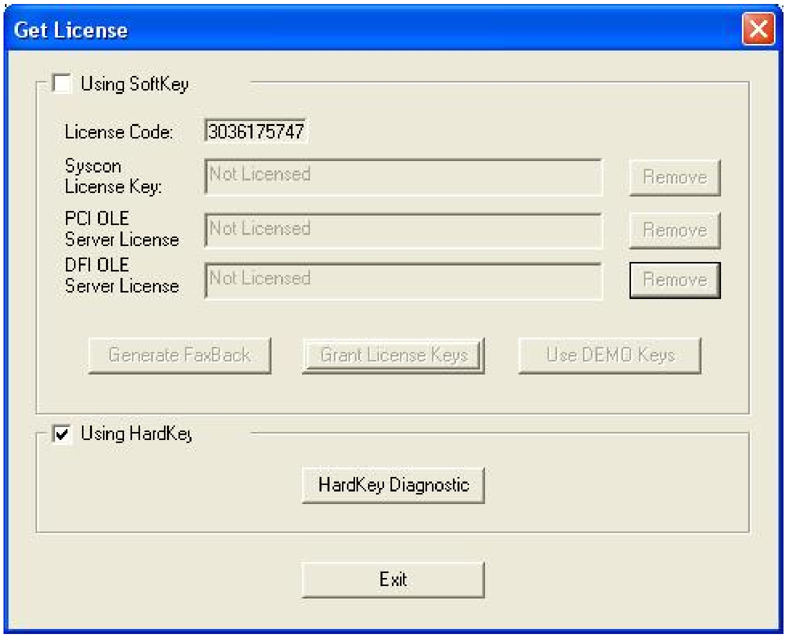
Now, *Syscon* and *OLE Server* are ready to run.

1.1.4 - HardKey

Connect the HardKey on the computer parallel port.

From the **Start** menu, select **Programs\System302\GetLicense.**

The *Get License* dialog box will appear. Check the item *Using HardKey* and click the button **Hard key Diagnostic**.



☐ Using SoftKey

License Code: 3036175747

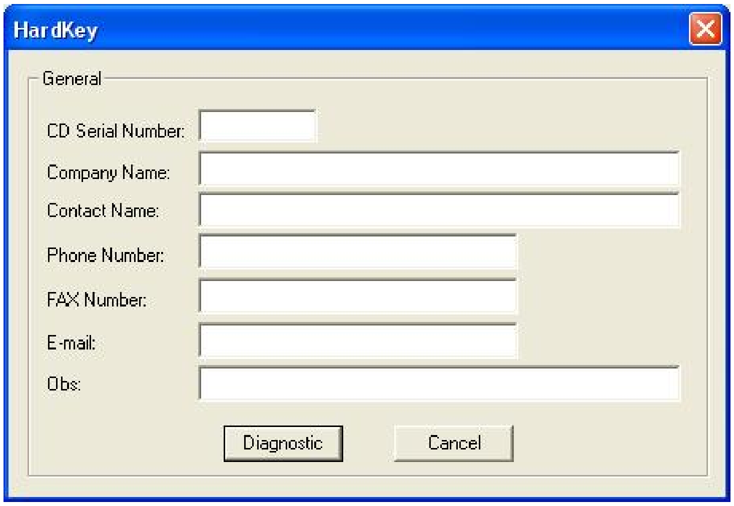
Syscon License Key: Not Licensed

PCI OLE Server License: Not Licensed

DFI OLE Server License: Not Licensed

☑ Using HardKey

The *Hard key* dialog box will appear. Click in the *Diagnostic* button.



CD Serial Number:

Company Name:

Contact Name:

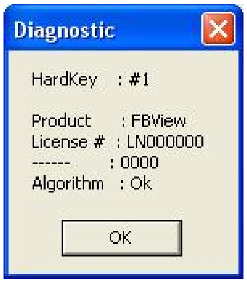
Phone Number:

FAX Number:

E-mail:

Obs:

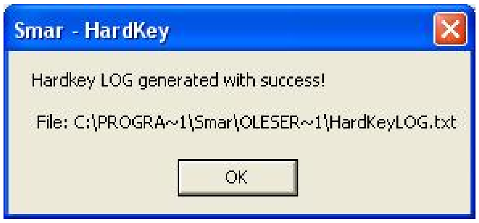
The following window will open. Click *OK*.



HardKey : #1

Product : FBView
License # : LN000000
------ : 0000
Algorithm : Ok

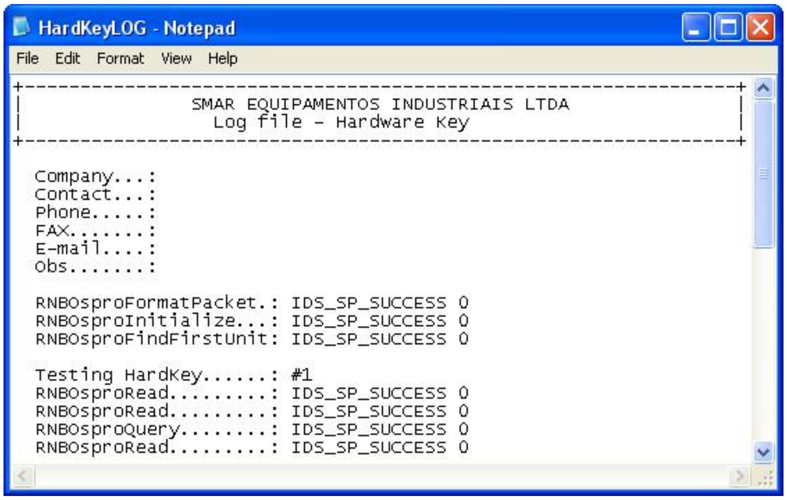
The following window will appear.



Hardkey LOG generated with success!

File: C:\PROGRA~1\Smar\OLESER~1\HardKeyLOG.txt

Now, *Syscon* and *OLE Server* are ready to run. Click *OK* to open the HardKey Log file.



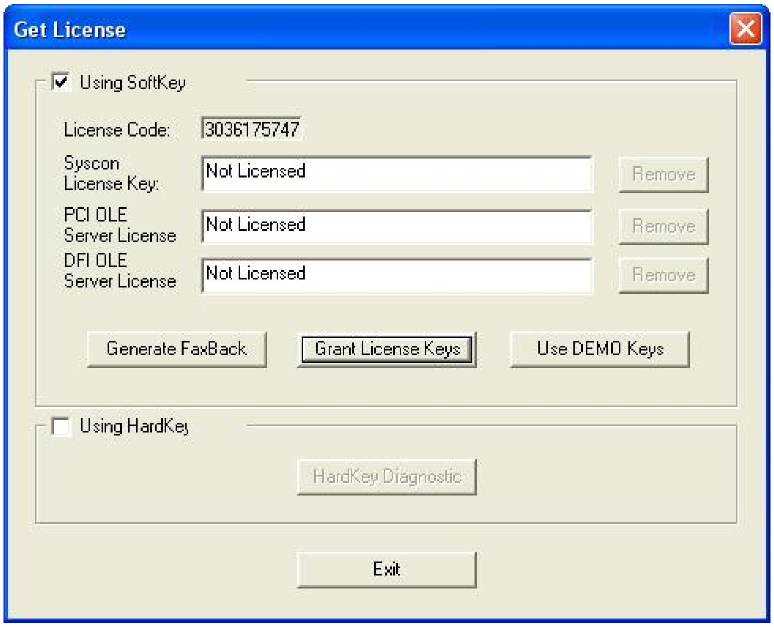
```
+----------------------------------------------------------------------+
|                  SMAR EQUIPAMENTOS INDUSTRIAIS LTDA                  |
|                      Log file - Hardware Key                         |
+----------------------------------------------------------------------+

  Company...:
  Contact...:
  Phone.....:
  FAX.......:
  E-mail....:
  Obs.......:

  RNBOsproFormatPacket.: IDS_SP_SUCCESS 0
  RNBOsproInitialize...: IDS_SP_SUCCESS 0
  RNBOsproFindFirstUnit: IDS_SP_SUCCESS 0

  Testing HardKey......: #1
  RNBOsproRead.........: IDS_SP_SUCCESS 0
  RNBOsproRead.........: IDS_SP_SUCCESS 0
  RNBOsproQuery........: IDS_SP_SUCCESS 0
  RNBOsproRead.........: IDS_SP_SUCCESS 0
```

1.1.5 – Demo License

The Demo License allows the execution of a configuration with up to 8 function blocks (without counting transducer, resource and display blocks).

From **Start** menu, select **Programs\System302** and choose **Get License.**

The *Get License* dialog box will popup. Check the *Using Softkey* item and click the **Use DEMO Keys** button.



Get License

☑ Using SoftKey

License Code: 3036175747

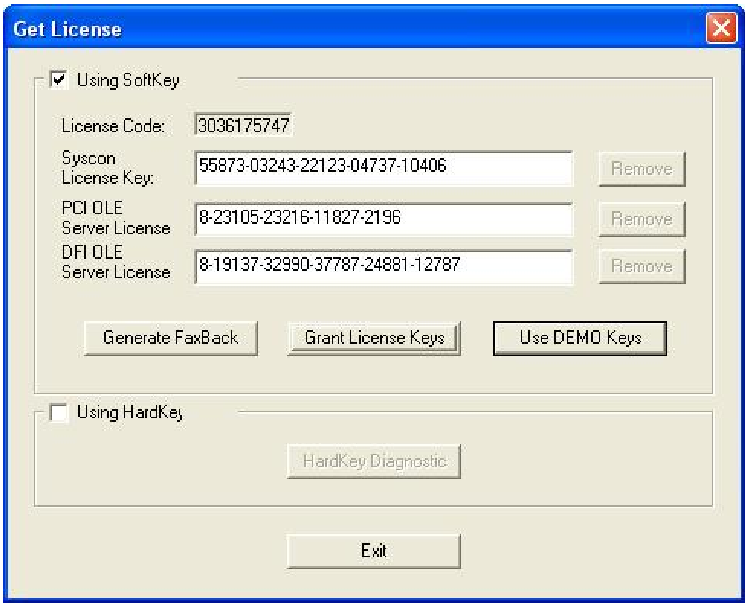
Syscon License Key: Not Licensed

PCI OLE Server License: Not Licensed

DFI OLE Server License: Not Licensed

☐ Using HardKey

The blank fields will be filled. Click on the **Grant License Keys** button.



Get License

☑ Using SoftKey

License Code: 3036175747

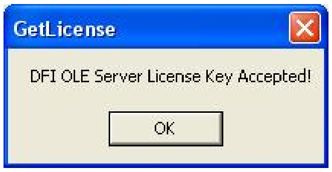
Syscon License Key: 55873-03243-22123-04737-10406

PCI OLE Server License: 8-23105-23216-11827-2196

DFI OLE Server License: 8-19137-32990-37787-24881-12787

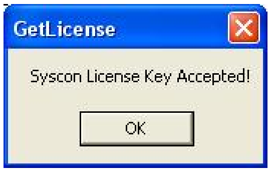
☐ Using HardKey

The following dialog boxes will appear. Now, software is ready to run.



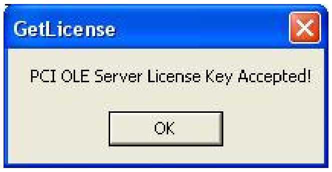
GetLicense

DFI OLE Server License Key Accepted!



GetLicense

Syscon License Key Accepted!



GetLicense

PCI OLE Server License Key Accepted!

1.2 – Interface Setup

1.2.1 – PCI Setup

After plugging the PCI in one ISA slots available, it is necessary to set its I/O port and its interruption. The setup needs to be done just once, in the very first time that the PCI card is used in the computer.

The following steps show hints for setting a working IRQ and I/O-port for the PCI Fieldbus Interface card.

Step 1 – Finding an available IRQ

An IRQ (Interrupt Request) is basically a work order sent by a peripheral device to the microprocessor in a computer. A processor will interrupt the task it is performing and execute the new instruction provided by the IRQ. When these instructions have been completed, the processor returns to its prior task.

An IRQ conflict occurs when the same IRQ is assigned to two devices. Since multiple signals to the computer on the same interrupt line might not be understood by the computer, a unique value must be specified for each device and its path to the computer. Please note that some peripherals can share the same interrupt, but many cannot.

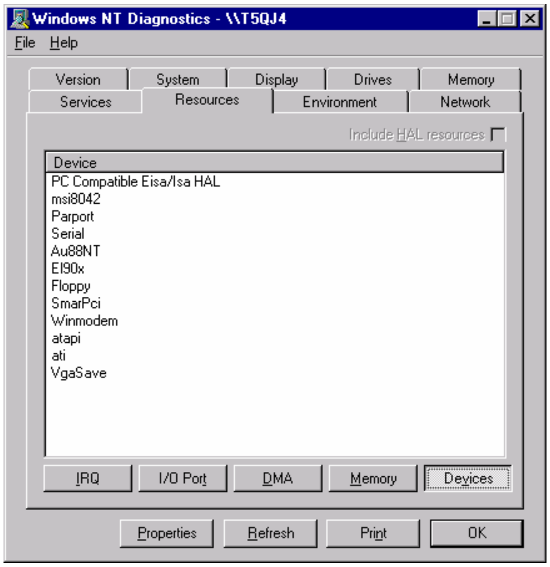
Follow the procedure bellow to check a free compatible IRQ according to the operational system (Windows NT, Windows 2000, Windows XP) used in your computer.

Windows NT

1. Click the **Start** button in the lower left corner of your screen.

2. Select **Programs** and click **Windows NT Diagnostics** from the **Administrative Tools** menu.

3. Click on the **Resources** tab to check for IRQ usage.



Device
PC Compatible Eisa/Isa HAL
msi8042
Parport
Serial
Au88NT
El90x
Floppy
SmarPci
Winmodem
atapi
ati
VgaSave

4. The Resources screen shows IRQ information. Windows NT only displays the IRQs being in use as services. It does not show all the IRQs used by the system. The IRQs used by typical systems are: 0, 1, 2, 6, 7, 8, 13, and 14. Select an IRQ from 5, 10, 11, 12 and 15 which is not already used.

Please see the IRQ reference chart below.

IRQ	Used by
0	system timer
1	keyboard
2	cascade to IRQ 9
3	COM2/COM4
4	COM1/COM3
5	Sound Card/(Free)
6	Floppy
7	Printer port LPT1
8	CMOS clock
9	Free

10	Free
11	Free
12	PS-2 mouse/(Free)
13	Math processor
14	Primary IDE
15	Secondary IDE

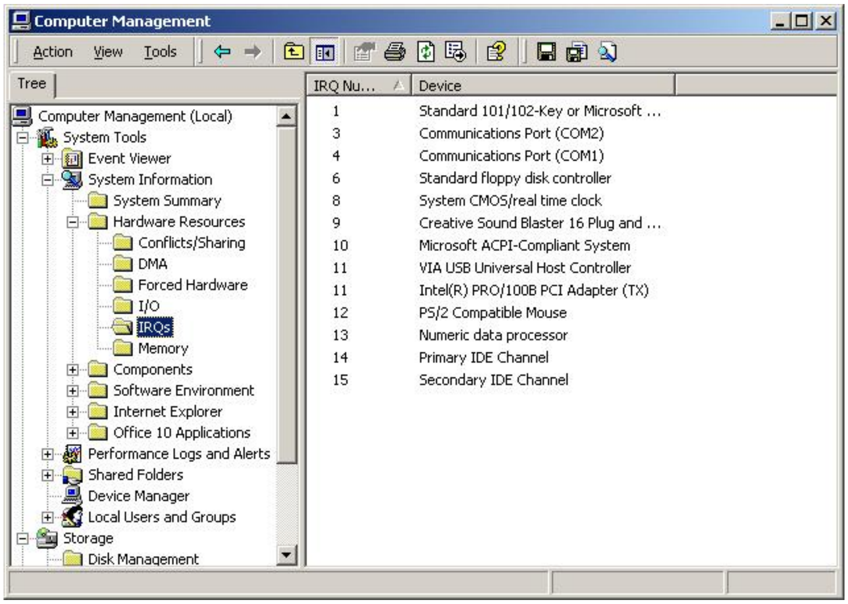
5. If there are no free IRQs on a system, it is necessary to free up an IRQ in order to install a NIC (network interface card). This should only be attempted by advanced users or trained professionals. These professionals should take proper steps to disable any COM ports not in use or remove any unnecessary cards.

Windows 2000

1. Click **Start**, and select the **Control Panel** option from the **Settings** menu.

2. Double-click on the **Administrative Tools** icon, and then double-click on **The Computer Management** icon.

3. In the *Computer Management* screen, click **System Information** → **Hardware Resources** → **IRQ**. The screen should now resemble the one below.



IRQ Nu...	Device
1	Standard 101/102-Key or Microsoft ...
3	Communications Port (COM2)
4	Communications Port (COM1)
6	Standard floppy disk controller
8	System CMOS/real time clock
9	Creative Sound Blaster 16 Plug and ...
10	Microsoft ACPI-Compliant System
11	VIA USB Universal Host Controller
11	Intel(R) PRO/100B PCI Adapter (TX)
12	PS/2 Compatible Mouse
13	Numeric data processor
14	Primary IDE Channel
15	Secondary IDE Channel

4. The Resources screen shows the IRQ information. Windows 2000 only displays the IRQs in use as services. It does not show all the IRQs used by the system. The IRQs used by typical systems are: 0, 1, 2, 6, 7, 8, 13, and 14. Select an IRQs from 5, 10, 11, 12 e 15 which is not already used.

5. If there are no free IRQs on a system, it is necessary to free up an IRQ in order to install a network interface card. This should only be attempted by advanced users or trained professionals. These professionals should take proper steps to disable any COM ports not in use or remove any unnecessary cards.

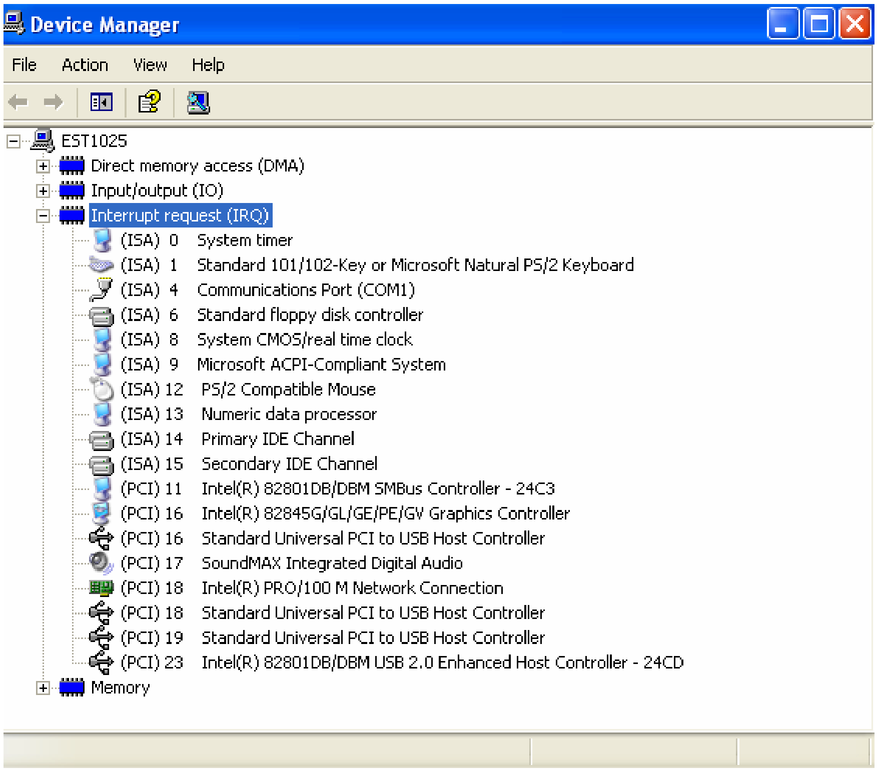
Windows XP

1. Close all applications.

2. Click **Start** then click **Control Panel** → **Performance and Maintenance** → **System**.

3. Click in **Hardware t**ab and choose **Device Manager**.

4. Click in **View** menu → **Resources by Type** → **Interrupt Request (IRQ)**. The IRQs will be displayed on your screen.



```
EST1025
  Direct memory access (DMA)
  Input/output (IO)
  Interrupt request (IRQ)
      (ISA)  0   System timer
      (ISA)  1   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
      (ISA)  4   Communications Port (COM1)
      (ISA)  6   Standard floppy disk controller
      (ISA)  8   System CMOS/real time clock
      (ISA)  9   Microsoft ACPI-Compliant System
      (ISA) 12   PS/2 Compatible Mouse
      (ISA) 13   Numeric data processor
      (ISA) 14   Primary IDE Channel
      (ISA) 15   Secondary IDE Channel
      (PCI) 11   Intel(R) 82801DB/DBM SMBus Controller - 24C3
      (PCI) 16   Intel(R) 82845G/GL/GE/PE/GV Graphics Controller
      (PCI) 16   Standard Universal PCI to USB Host Controller
      (PCI) 17   SoundMAX Integrated Digital Audio
      (PCI) 18   Intel(R) PRO/100 M Network Connection
      (PCI) 18   Standard Universal PCI to USB Host Controller
      (PCI) 19   Standard Universal PCI to USB Host Controller
      (PCI) 23   Intel(R) 82801DB/DBM USB 2.0 Enhanced Host Controller - 24CD
  Memory
```

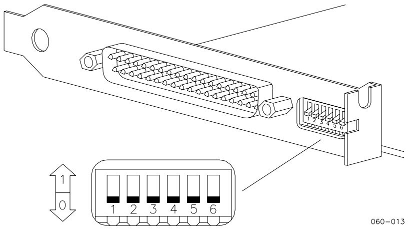
5. Windows XP only displays the IRQs in use as services. It does not show all the IRQs used by the system. The IRQs used by typical systems are: 0, 1, 2, 6, 7, 8, 13, and 14. Select an IRQ from 5, 10, 11, 12 and 15 which is not already used.

6. If there are no free IRQs on a system, it is necessary to free up an IRQ in order to install a network interface card. This should only be attempted by advanced users or trained professionals. These professionals should take proper steps to disable any COM ports not in use or remove any unnecessary cards.

Step 2 – Dip Switches Settings

Note: All PCIs installed on the PC bus should be configured with the same I/O PORT and INTERRUPT, and each one with a different CARD number, but the PCI PORT and IRQ should not conflict with cards or peripherals (other than PCIs) already installed in the PC.

The PCI hardware configuration is done through dip switches located on the rear part of the card.



PCI dip switches

Note: PCI dip switches have external access even after the card is installed inside the PC. The user can change their positions while the PC is turned on, but never while an application is running on the PC and accessing the PCI card.

PCI DIP-SWITCHES										
W1	**W2**	**W3**	**CARD**		**W4**	**W5**	**PORT**		**W6**	**NVRAM BATTERY**
0	0	0	0*		0	0	240..26FH		0	ON (data retention)
0	0	1	1		0	1	280..2AFH*		1	OFF (data loss)*
0	1	0	2		1	0	300..32FH			
0	1	1	3		1	1	340..36FH			
1	0	0	4							
1	0	1	5							
1	1	0	6							
1	1	1	7		* Default settings					

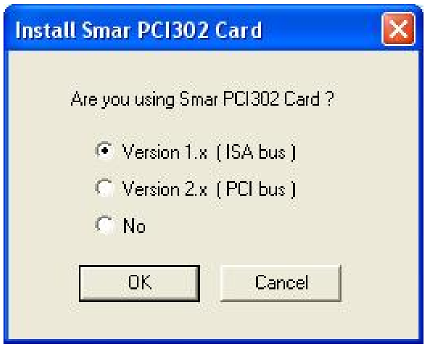
Select a different CARD NUMBER, usually starting from 0, for each PCI card to be installed in the PC. Write down each CARD NUMBER and its respective SERIAL NUMBER.

Note: Dip-switch W6 (NVRAM BATTERY) is factory set to OFF, in order to avoid energy loss while the card is stored or not in use. W6 SHOULD BE TURNED ON BEFORE USING THE PCI.

Step 3 – Setting the IRQ

To set the IRQ (or port) use the PCI setup utility. The PCI I/O Port configured here must be the same one set in Step 2.

From the **Start** menu, select **Programs\System302\Interfaces\ItfSetup**. The following screen will show up:

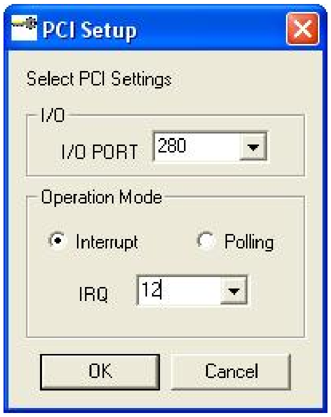


Install Smar PCI302 Card

Are you using Smar PCI302 Card ?

● Version 1.x (ISA bus)
○ Version 2.x (PCI bus)
○ No

Select **PCI** and click the button **Ok**. The *PCI Setup* dialog box will show up.



PCI Setup

Select PCI Settings

I/O

I/O PORT: 280

Operation Mode

● Interrupt ○ Polling

IRQ: 12

Choose an I/O Port and an IRQ (interruption) that were not being already used and hit **OK**.

WARNING

Some computers come without IRQ assigned to ISA slots in its BIOS configuration. So, sometimes, it will be necessary to access the BIOS configuration and change it. We will notice that the IRQ is not working only if we have problems in the section 1.6.

As there are so many BIOS configuration types, we will not cover all possibilities here, however here follows one example: Once upon a time, a certain computer wouldn't communicate even though the PCI was using an interruption that was not being used by any other component of the computer. Then, it was necessary to access its BIOS configuration, and, in the part where the IRQs are assigned to slots PCI / ISA, we saw that the interruption we chose was assigned to "**PCI/ISA Pnp**" (Slots type PCI or ISA and plug and play). Then, we changed it to "**Legacy ISA**" and the communication got established.

1.2.2 – DFI302 Setup

For further information about the *DFI302* setup, see DFI302 manual, chapter 2.

1.3 – Firmware download

1.3.1 – PCI Firmware download

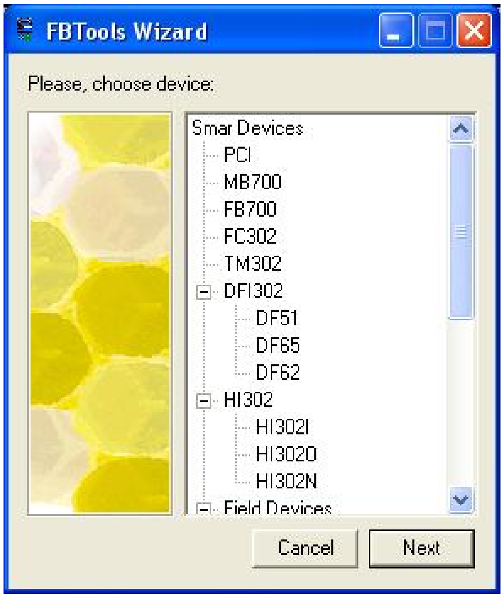
The next thing to do is to download the PCI firmware to the PCIs. For this, it is necessary to run the *FBTools* software.

Step 1 – Opening the FBTools

From the **Start** menu, select **Programs\System302\System302 Application**, and double click in the item **FBTools Wizard**.

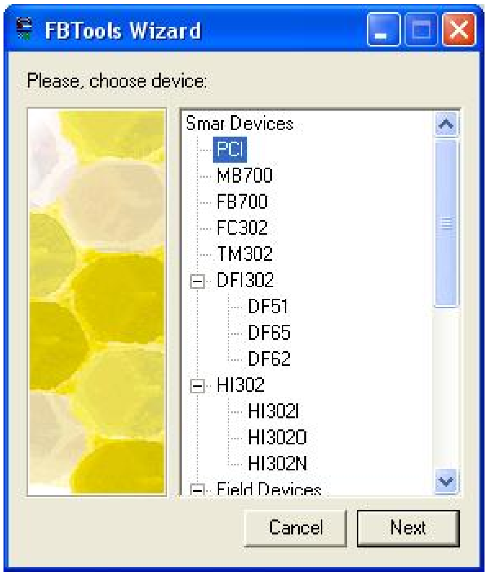
You can also activate it from the **Start** menu, selecting **Programs\System302\Interfaces\FBTools Wizard**.

The following screen will pop up:

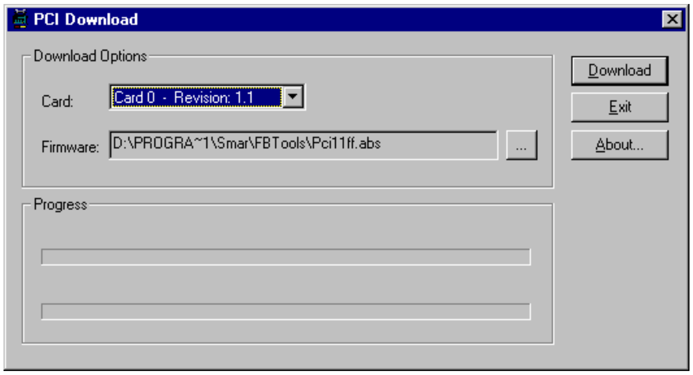


Step 2 – Selecting the PCI

Make sure that it is selected PCI on the Device scroll box (see picture below) and hit the button **Finish**.



This next screen will pop up:



Card: Card 0 - Revision: 1.1

Firmware: D:\PROGRA~1\Smar\FBTools\Pci11ff.abs

The first field on the window, which is designated "Card", will show all the PCIs that are physically installed in the computer and that were recognized by the *FBTools* application.

WARNING

If you did not get any card found at the field "**Card**", it means that you have set a loaded I/O port in the previous section (1.2.1). In this case, it is necessary to make a check for any overlapping port configuration (as described in section 1.3.1, step 3) and then, go back to the previous section (1.2.1, step 3) and correct the I/O port option.

The above example window is showing "Card 0 – Revision 1.1". If you open up the options of this field, it will show also Card 1, 2, 3 and so on, accordingly to the number of installed PCIs.

WARNING

The PCI card number is set through positioning dip switches that are located on the rear side of the PCI card. If you have problems in this step, please go back to section 1.2.1, step 2, and correct the dip switches positions related to card numbers. Each PCI must have a different card number.

The second field named "Firmware", shows where the firmware file is. If you are using PCI version 1.1, the firmware file will be "Pci11ff.abs", for PCI version 1.2 the firmware file will be "Pci12ff.abs". The default firmware location is showed in the PCI Download window. So, it is not necessary to choose anything for that, except if you want to upgrade your PCI firmware. In this case, it is necessary to copy the new firmware file you got from **Smar** (file with extension ".abs") to a location of your choice and then, at the firmware download window above, click the browse button ... and select that file.

Step 3 – Checking for any overlapping port configurations

In the PCI installation, case the user choose an I/O port already in use, he will have problems to select the PCI.

Follow the procedure bellow to check a free compatible I/O port according to the operational system (Windows NT, Windows 2000, Windows XP) used in your computer.

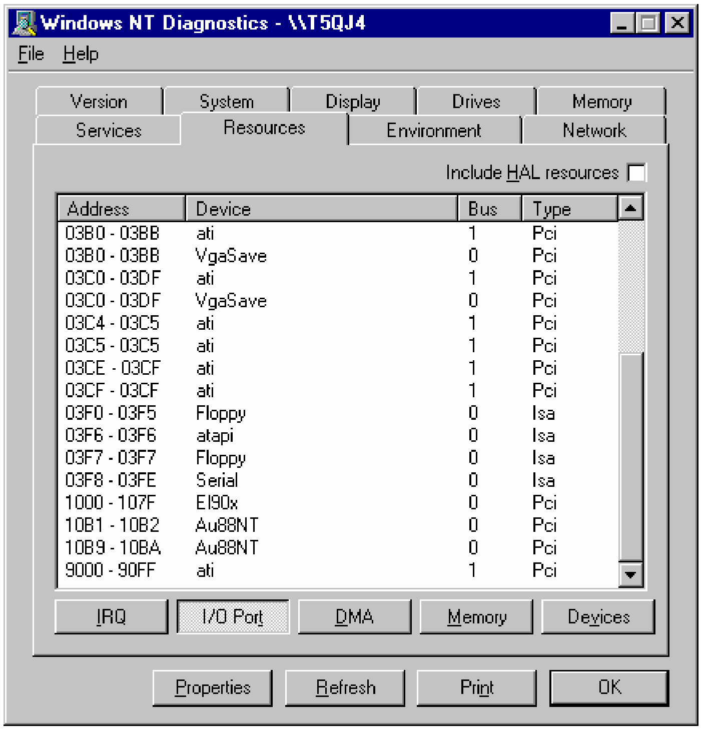
> Note: Proceed with this step only if you had problems in the steps 1 and 2 of this section. Otherwise, go straight to Step 4.

Windows NT

1. Click **Start**, and select the **Administrative Tools** option from the **Program** menu.

2. Double-click on the **Administrative Tools** icon, and then double-click on the **Computer Manager** icon.
3. In the *Computer Management* screen, click **System Information** → **Hardware Resources** → **IO**.

4. Then, if you find that the I/O port you chose is not free, go back to section 1.2.1 and change I/O port option.



Address	Device	Bus	Type
03B0 - 03BB	ati	1	Pci
03B0 - 03BB	VgaSave	0	Pci
03C0 - 03DF	ati	1	Pci
03C0 - 03DF	VgaSave	0	Pci
03C4 - 03C5	ati	1	Pci
03C5 - 03C5	ati	1	Pci
03CE - 03CF	ati	1	Pci
03CF - 03CF	ati	1	Pci
03F0 - 03F5	Floppy	0	Isa
03F6 - 03F6	atapi	0	Isa
03F7 - 03F7	Floppy	0	Isa
03F8 - 03FE	Serial	0	Isa
1000 - 107F	El90x	0	Pci
10B1 - 10B2	Au88NT	0	Pci
10B9 - 10BA	Au88NT	0	Pci
9000 - 90FF	ati	1	Pci

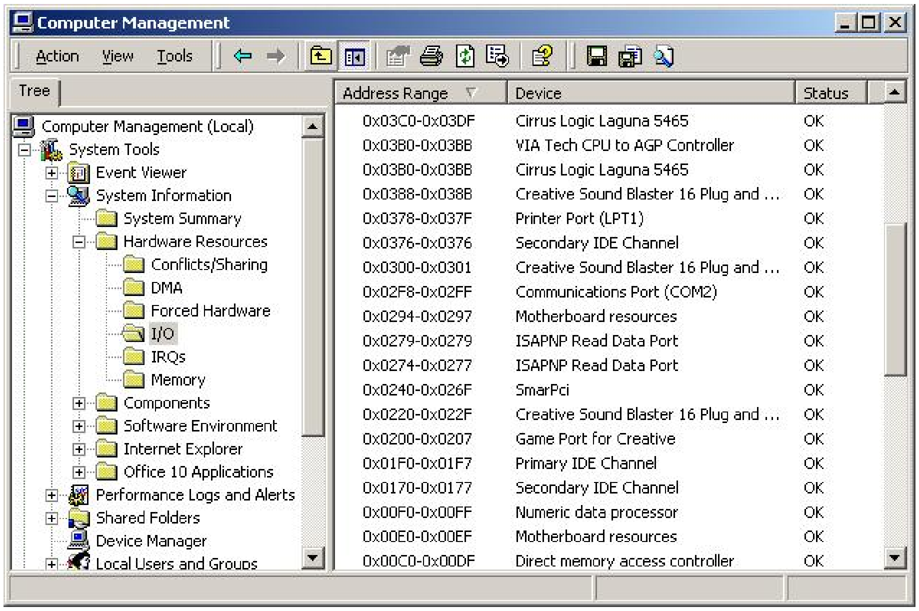
Windows 2000

1. Click **Start**, and select the **Control Panel** option from the **Settings** menu.

2. Double-click on the **Administrative Tools** icon, and then double-click on the **Computer Manager** icon.

3. In the *Computer Management* screen, click **System Information** → **Hardware Resources** → **IO**.

4. Then, if you find that the I/O port you chose is not free, go back to section 1.2.1 and change I/O port option.



Address Range	Device	Status
0x03C0-0x03DF	Cirrus Logic Laguna 5465	OK
0x03B0-0x03BB	VIA Tech CPU to AGP Controller	OK
0x03B0-0x03BB	Cirrus Logic Laguna 5465	OK
0x0388-0x038B	Creative Sound Blaster 16 Plug and ...	OK
0x0378-0x037F	Printer Port (LPT1)	OK
0x0376-0x0376	Secondary IDE Channel	OK
0x0300-0x0301	Creative Sound Blaster 16 Plug and ...	OK
0x02F8-0x02FF	Communications Port (COM2)	OK
0x0294-0x0297	Motherboard resources	OK
0x0279-0x0279	ISAPNP Read Data Port	OK
0x0274-0x0277	ISAPNP Read Data Port	OK
0x0240-0x026F	SmarPci	OK
0x0220-0x022F	Creative Sound Blaster 16 Plug and ...	OK
0x0200-0x0207	Game Port for Creative	OK
0x01F0-0x01F7	Primary IDE Channel	OK
0x0170-0x0177	Secondary IDE Channel	OK
0x00F0-0x00FF	Numeric data processor	OK
0x00E0-0x00EF	Motherboard resources	OK
0x00C0-0x00DF	Direct memory access controller	OK

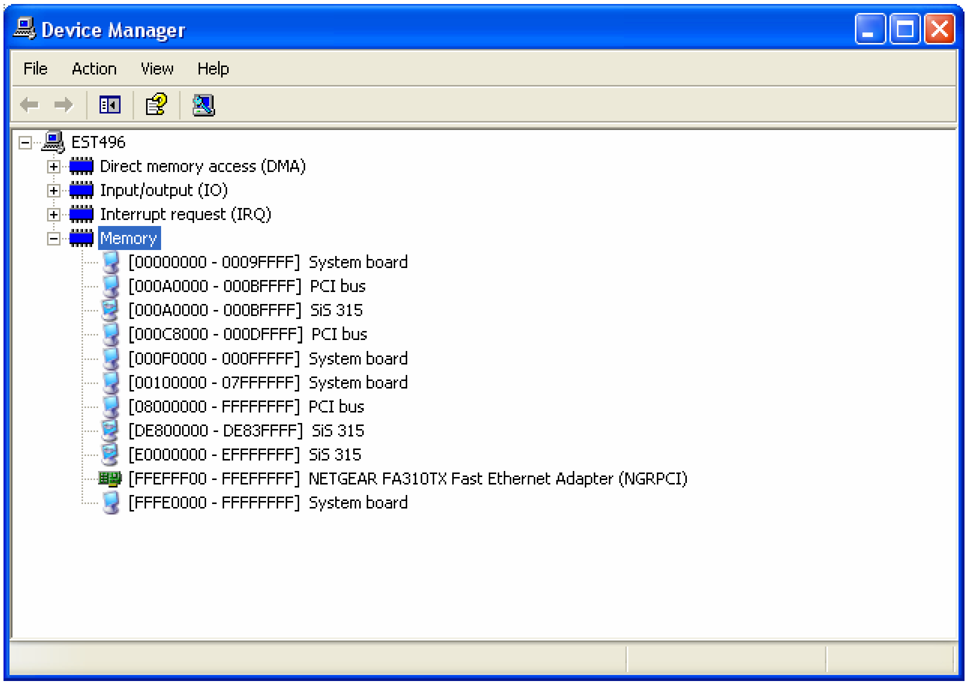
Windows XP

1. Click **Start** then click **Control Panel** → **Performance and Maintenance** → **System**.

2. Click in **Hardware t**ab and choose **Device Manager**.

3. Click in **View** menu → **Resources by Type** → **Interrupt Request (IRQ)**. The IRQs will be displayed on your screen.

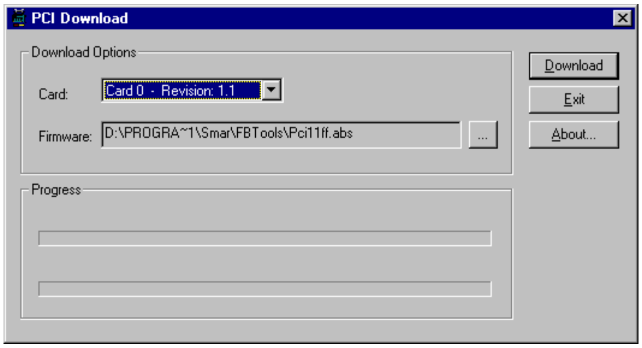
4. Then, if you find that the I/O port you chose is not free, go back to section 1.2.1 and change I/O port option.



```
[00000000 - 0009FFFF]  System board
[000A0000 - 000BFFFF]  PCI bus
[000A0000 - 000BFFFF]  SiS 315
[000C8000 - 000DFFFF]  PCI bus
[000F0000 - 000FFFFF]  System board
[00100000 - 07FFFFFF]  System board
[08000000 - FFFFFFFF]  PCI bus
[DE800000 - DE83FFFF]  SiS 315
[E0000000 - EFFFFFFF]  SiS 315
[FFEFFF00 - FFEFFFFF]  NETGEAR FA310TX Fast Ethernet Adapter (NGRPCI)
[FFFE0000 - FFFFFFFF]  System board
```

Step 4 – Firmware Download

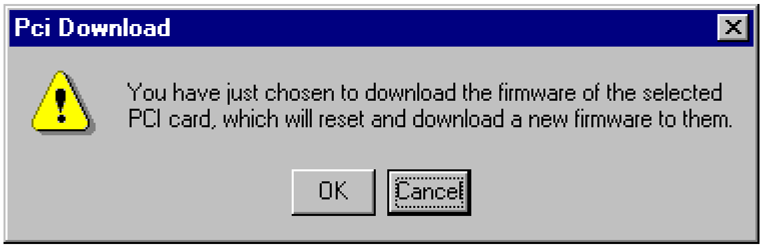
Choose the card which you want to download the firmware and hit the button **Download**. See the picture below:



Card: Card 0 - Revision: 1.1

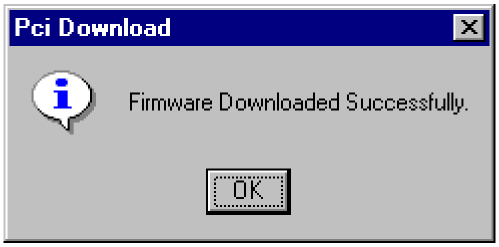
Firmware: D:\PROGRA~1\Smar\FBTools\Pci11ff.abs

The following window will appear. Just click **OK**:



You have just chosen to download the firmware of the selected PCI card, which will reset and download a new firmware to them.

When the download is successfully finished, the following window will appear:



Firmware Downloaded Successfully.

1.3.2 – DFI Firmware Download

For further information about the *DFI302* firmware download, open the ***DFI302 Manual*** and look for the chapter 3.

1.4 – DEVICE DESCRIPTIONS

In order to assure interoperability between devices of different vendors, a technology called *Device Description* (**DD**) is necessary.

A Device Description provides the necessary information to the control system or host understand the data sent by the field device. So, the DD can be thought as a “driver” for the device. There is a DD for each device type, and it consists of the files whose extensions are *“.ffo”* and *“.sym”*.

The *Capabilities File* is used to define the device capabilities – e.g., dynamic block instantiation capability - and the resources available for creating Function Block Applications, Resource Blocks, Transducer Blocks, and Function Blocks. The Capabilities File consists of the files whit the extension *“.cff”*, and they are placed together with the DD files. The Files are stored in manufacturer’s folder, as will be shown later.

1.4.1 – Getting a Device Descriptions

Device Descriptions are supplied by the device vendors or by Fieldbus Foundation if the supplier has already registered their **DD** there. Fieldbus Foundation makes available a CD-ROM with standard *Device Descriptions*.

The next topic shows how to install a *Device Description* of another vendor (in this case Yokogawa) on *System302*.

1.4.2 – Installing a new DD and Capability file on System302

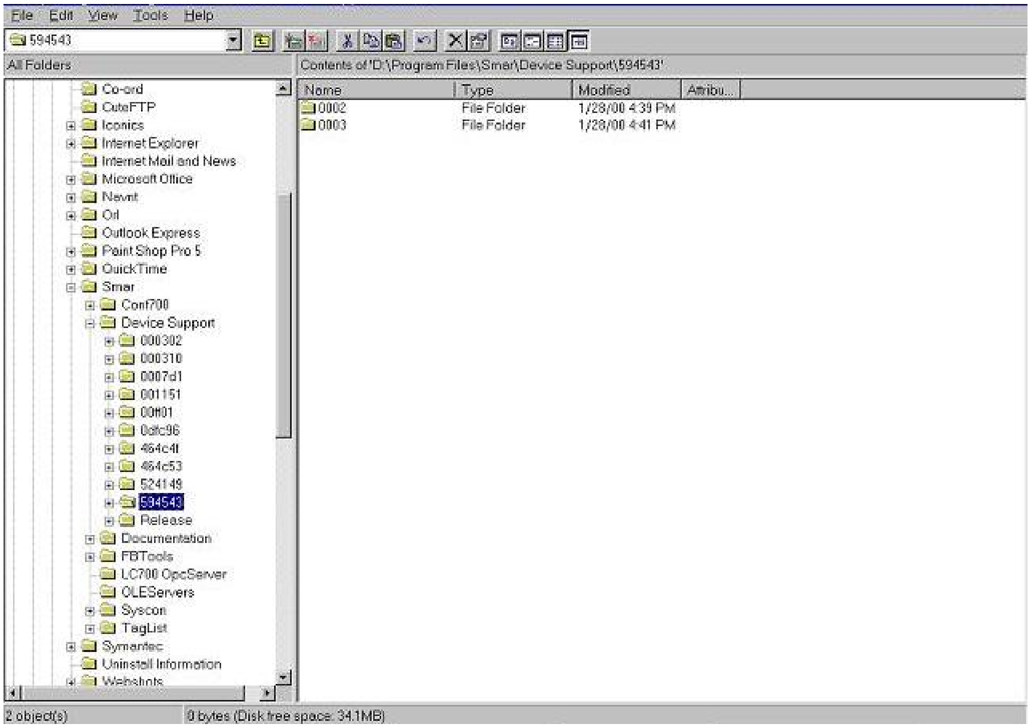
Each type of FOUNDATION fieldbus device has manufacturer's parameters that are described in DDs and capability files. See the example below that shows how to install these files to devices of others manufacturers.

Yokogawa Manufacturer ID			=	594543
YewFlow	–	Device Type	=	0002
EJA	–	Device Type	=	0003

Inside de folder **Program Files/Smar/Device Support**, create a new folder named with the number of the manufacturer ID. For instance, for Yokogawa the folder "594543" must be created.

Inside the manufacturer ID folder "594543", a new folder with the device type number must be created. For this example, we have two device types (YewFlow and EJA). So, two folders named with their corresponding numbers should be created: folder "0002" and folder "0003".

The next picture shows these new folders.

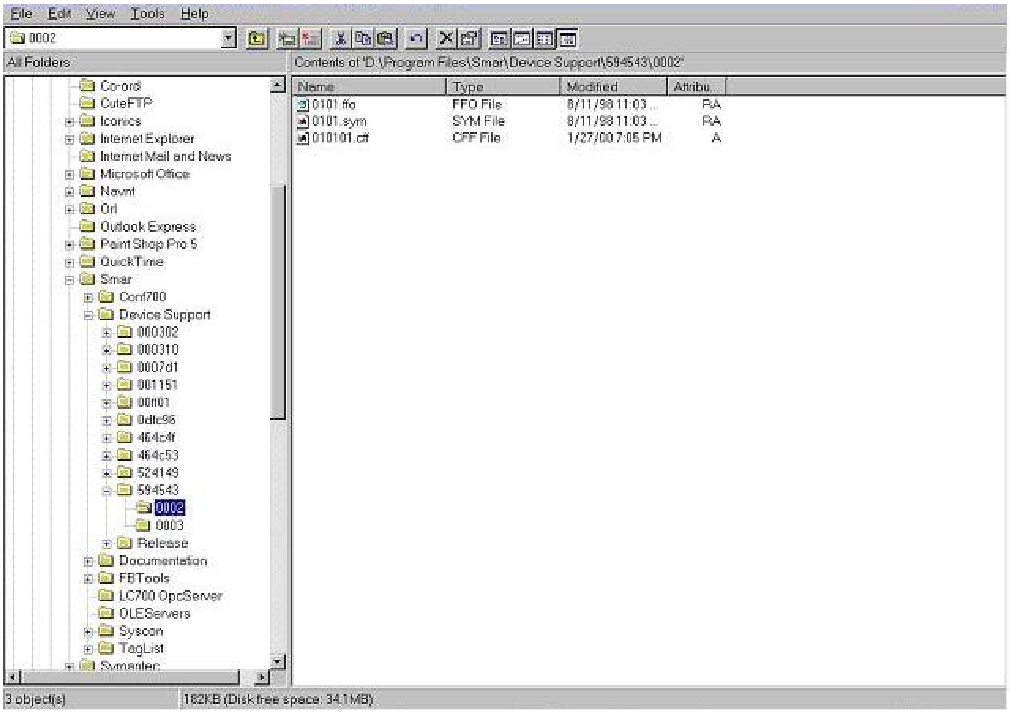


Contents of 'D:\Program Files\Smar\Device Support\594543'

Name	Type	Modified	Attribu...
0002	File Folder	1/28/00 4:39 PM	
0003	File Folder	1/28/00 4:41 PM	

2 object(s) 0 bytes (Disk free space: 34.1MB)

Inside each folder (0002 and 0003) copy the files with extensions "**.ff0**" , **".sym**" and **".cff**". The manufacturer supplies these files. See the next picture:

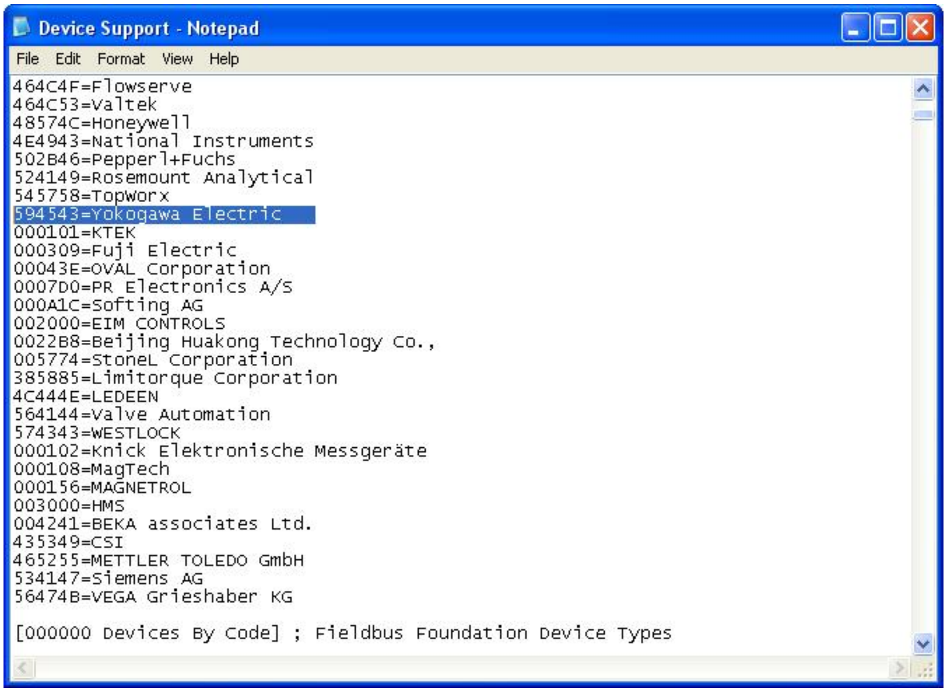


Contents of 'D:\Program Files\Smar\Device Support\594543\0002'

Name	Type	Modified	Attribu...
0101.ffo	FFO File	8/11/98 11:03 ...	RA
0101.sym	SYM File	8/11/98 11:03 ...	RA
010101.cff	CFF File	1/27/00 7:05 PM	A

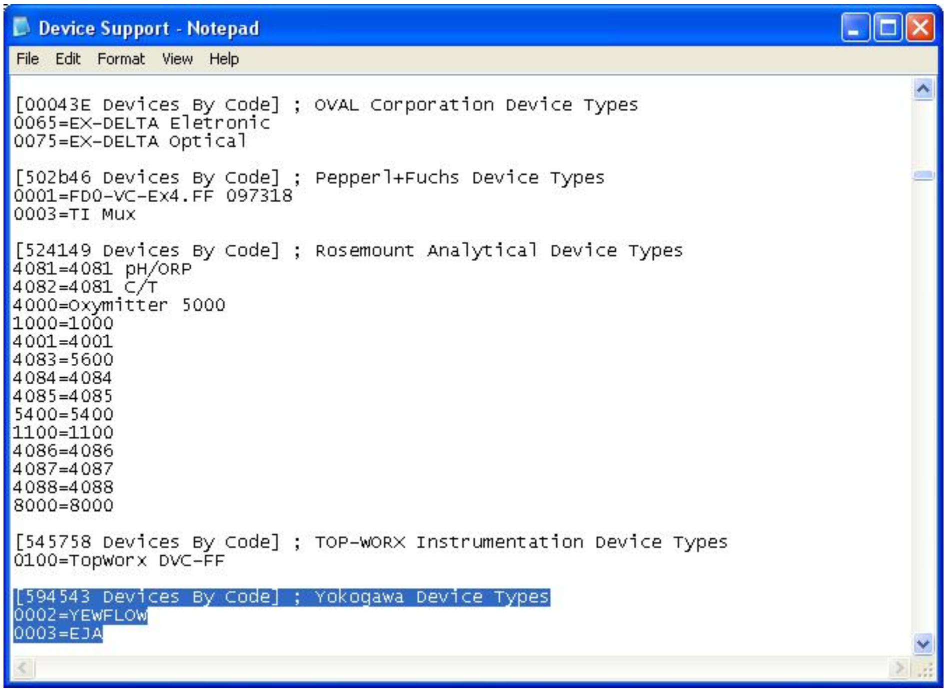
3 object(s) 182KB (Disk free space: 34.1MB)

In the “**DeviceSupport.ini**” file (located in “**Device Support**” Folder) you will have to add the Manufacturer ID and the manufacturer name. This is done in the section “Manufacturer by ID” as follows: “594543 = Yokogawa”. See the next picture:



```
464C4F=Flowserve
464C53=Valtek
48574C=Honeywell
4E4943=National Instruments
502B46=Pepperl+Fuchs
524149=Rosemount Analytical
545758=TopWorx
594543=Yokogawa Electric
000101=KTEK
000309=Fuji Electric
00043E=OVAL Corporation
0007D0=PR Electronics A/S
000A1C=Softing AG
002000=EIM CONTROLS
0022B8=Beijing Huakong Technology Co.,
005774=StoneL Corporation
385885=Limitorque Corporation
4C444E=LEDEEN
564144=Valve Automation
574343=WESTLOCK
000102=Knick Elektronische Messgeräte
000108=MagTech
000156=MAGNETROL
003000=HMS
004241=BEKA associates Ltd.
435349=CSI
465255=METTLER TOLEDO GmbH
534147=Siemens AG
56474B=VEGA Grieshaber KG

[000000 Devices By Code] ; Fieldbus Foundation Device Types
```

A section called “Device by code” for the manufacturer must also be created as follows: “[594543 Device by code]; Yokogawa”. Include the manufacturer device types in this section, “0002 = YewFlow” and “0003 = EJA” for this example. See the next picture:



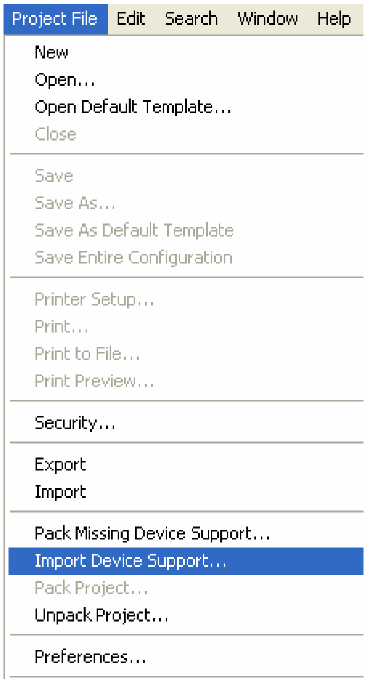
```
[00043E Devices By Code] ; OVAL Corporation Device Types
0065=EX-DELTA Eletronic
0075=EX-DELTA Optical

[502b46 Devices By Code] ; Pepperl+Fuchs Device Types
0001=FD0-VC-Ex4.FF 097318
0003=TI Mux

[524149 Devices By Code] ; Rosemount Analytical Device Types
4081=4081 pH/ORP
4082=4081 C/T
4000=Oxymitter 5000
1000=1000
4001=4001
4083=5600
4084=4084
4085=4085
5400=5400
1100=1100
4086=4086
4087=4087
4088=4088
8000=8000

[545758 Devices By Code] ; TOP-WORX Instrumentation Device Types
0100=TopWorx DVC-FF

[594543 Devices By Code] ; Yokogawa Device Types
0002=YEWFLOW
0003=EJA
```

1.4.3 – Importing Device Support Files

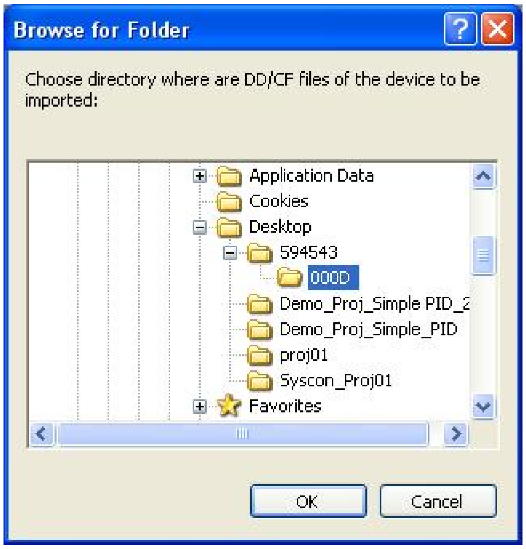
SYSCON automatically imports the DD and CF files of a device. Therefore it is not necessary follow the steps in section1.4.2.

> **Note:** The user must be logged on as an Administrator or a member of the Administrators group to import the DD and CF files.

Go to *Project File* menu, click **Import Device Support**:



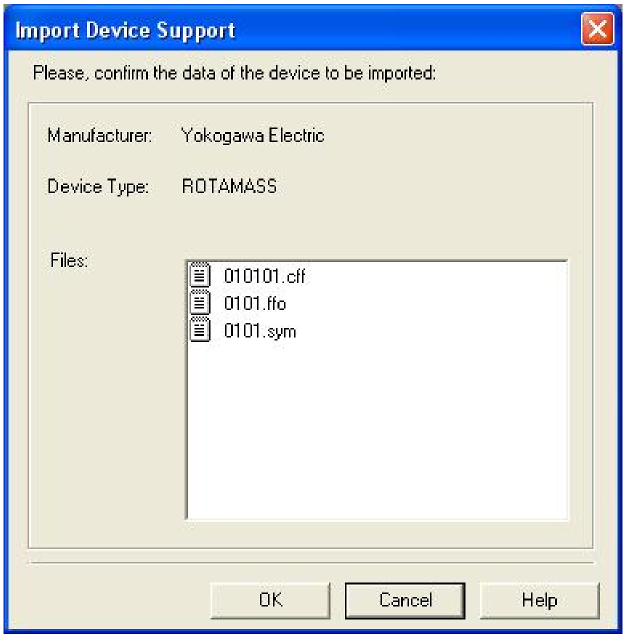
The *Browse* dialog box will open. Select the directory where the DDs and CFs of the device being imported are located and click Ok.



Browse for Folder

Choose directory where are DD/CF files of the device to be imported:

The Import *Device Support* dialog box will open showing the list of files that will be imported in the Device Support folder of the correspondent manufacturer:



Import Device Support

Please, confirm the data of the device to be imported:

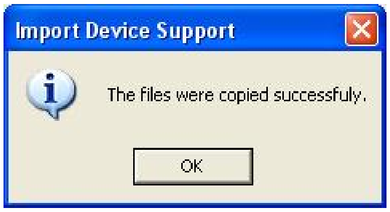
Manufacturer: Yokogawa Electric

Device Type: ROTAMASS

Files:

010101.cff
0101.ffo
0101.sym

Click **Ok** and a message box will appear informing the user that the operation was successful.



Import Device Support

The files were copied successfuly.

Click **Ok** to conclude.

1.5 – Creating a Syscon Configuration

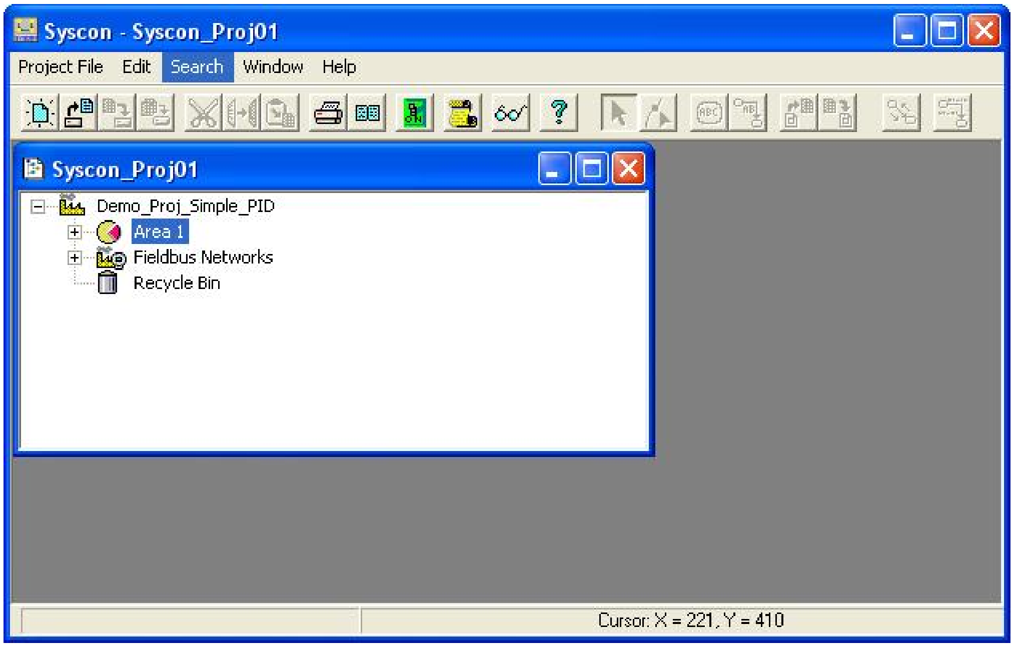
The first necessary thing to do is to make the configuration using *Syscon*.

Note: Users not familiarized with the software Syscon, consult the section “Step-by-Step Configuration” on the “Syscon 6.0 – Users’ Manual”.

The fieldbus configuration in *Syscon* is organized as per the ISA S88 model.

The project is initially divided in two major parts:

- The Logical Plant or “Area1”
- The Physical Plant or “Fieldbus Networks”.



The Area1 is where all the logic part will be kept, as the connection between function blocks, for instance.

On the other side, the Fieldbus Networks is where the physical installation is represented, i.e., it is where all the fieldbus segments or networks are configured, with all bridges (PCI/DFI302) and field devices distributed in the segments the same way they are installed in the field.

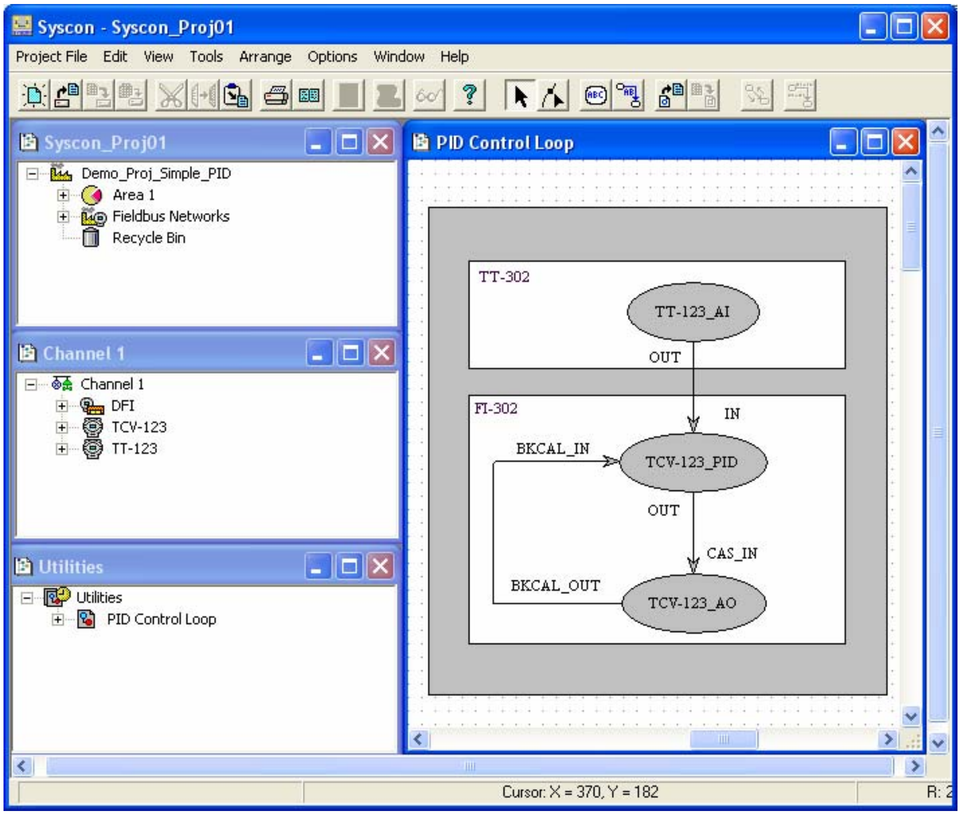
Naturally, these two parts are connected. The link between them is the function blocks and that is why they are present in both parts.

Syscon was designed so it is possible to make a configuration starting from different points and going through different ways.

It is possible, for example, to make first the Physical part, creating segments, devices and function blocks in them and after attaching these blocks to the Logical part.

Or one can first create the Logical Plant making all the control strategy and after this, create the physical plant and attach the function blocks (previously created in the logical part) to them.

Anyway, after all this is done, we will have a complete configuration, as in the next example:



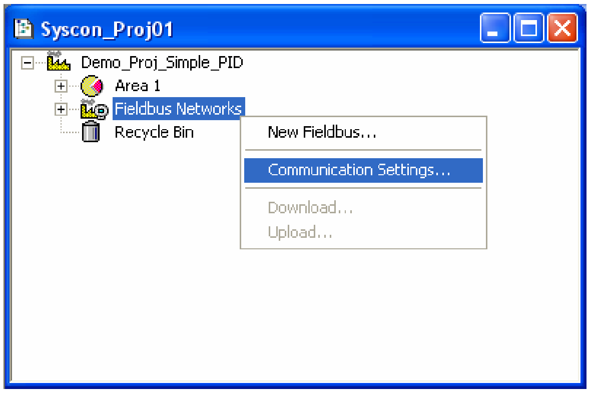
1.6 – Initializing Communication

This section is a step by step guide for communicating FOUNDATION fieldbus devices using **Smar** configuration tools, for the first time.

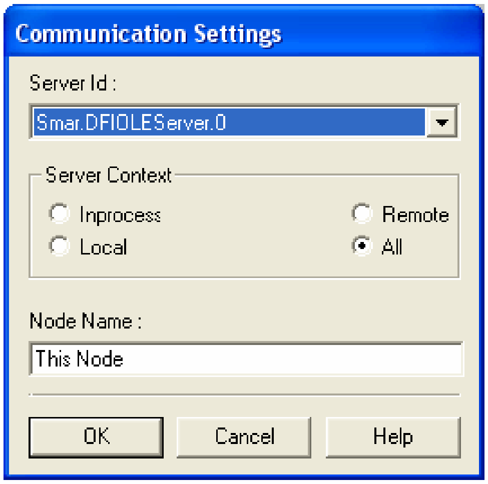
It will be used as example a Simple PID configuration using the Smar DF51 CPU. After a successful firmware download in *FBTools* and with the system configuration ready, it is time to initialize on line communication.

Step 1 – Communication Settings

Open the *Syscon* configuration file, click over the Fieldbus Networks icon, go to the **Communication** menu and click **Settings**. Or right-click Fieldbus Networks icon to activate the popup menu and select **Communication Settings**, as in the following figure:



The *Communication Settings* dialog box will appear. Make sure the server settings on this dialog are the same as set on the section 1.2, for the PCI or for the DFI302.


Communication Settings

Server Id : Smar.DFIOLEServer.0

Server Context

○ Inprocess ○ Remote

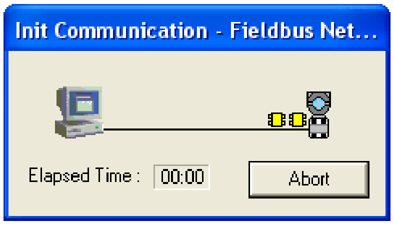
○ Local ● All

Node Name : This Node

Step 2 – Initializing Communication

To initialize the communication, click the **Operation Mode** button, , on the General Operation toolbar under the Menu bar.

The video clip below should appear for a couple of seconds. During this time, *Syscon* will identify and attach any bridges installed in the computers to the configuration.

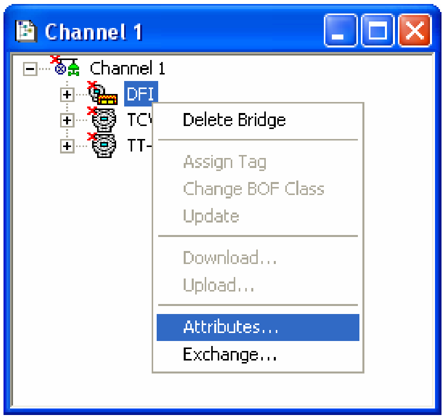

Init Communication - Fieldbus Net...

Elapsed Time : 00:00

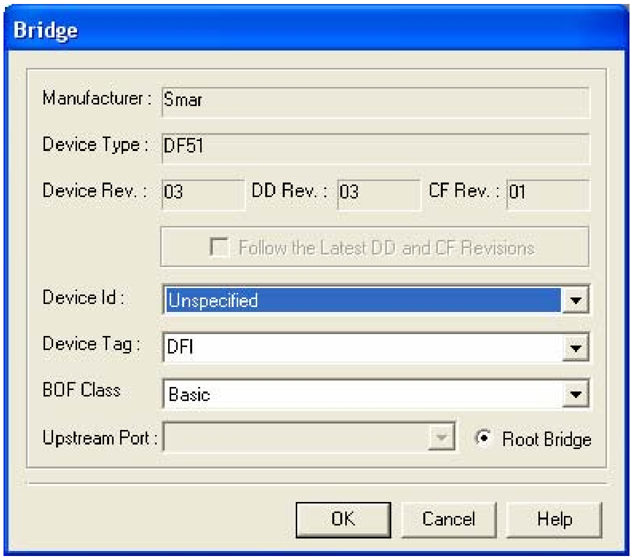
Step 3 – Assigning the bridges device identification (Device ID).

Note that at this point, if all the procedures were completed successfully, a red X will be prompt at the top-left part of each device and bridge icon. It means that no device ID was assigned to these yet.

Go to the Fieldbus window, right-click over the bridge icon to activate the popup menu and select **Attributes**, as seen in the next picture.



The following dialog will show up:



Bridge

Manufacturer : Smar

Device Type : DF51

Device Rev. : 03 DD Rev. : 03 CF Rev. : 01

☐ Follow the Latest DD and CF Revisions

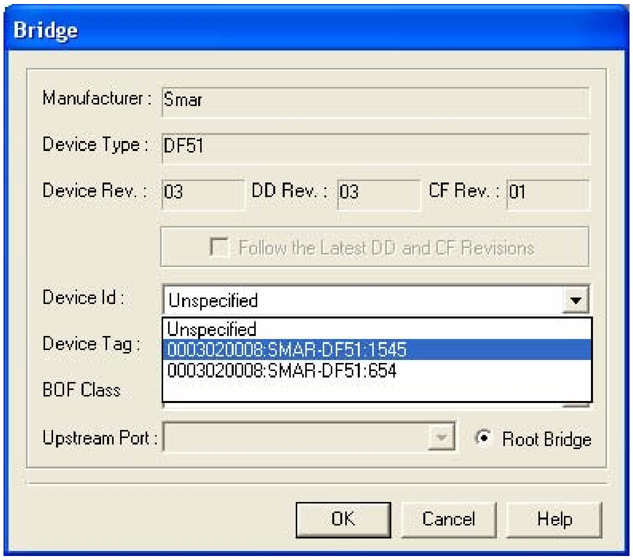
Device Id : Unspecified

Device Tag : DFI

BOF Class : Basic

Upstream Port : ● Root Bridge

Click the down arrow on the ***Device ID*** box and select the proper ID from the list. See next figure:



Bridge

Manufacturer : Smar

Device Type : DF51

Device Rev. : 03 DD Rev. : 03 CF Rev. : 01

☐ Follow the Latest DD and CF Revisions

Device Id : Unspecified

Unspecified
0003020008:SMAR-DF51:1545
0003020008:SMAR-DF51:654

Device Tag :

BOF Class

Upstream Port : ● Root Bridge

Note: If the bridge is not in the Device ID list, be sure that the computer and the bridge are connected in the same sub-net. Example: Case the equipments (computers and DFIs) are connected in a network with IP address 192.168.101.0, they must have IPs in the format 192.168.101.X (X identifies the number of the equipment in the network). If the equipments are in the same sub-net and the problem persists, verify if there are equipments with the same IP number. Example: Two DFIs with the IP address 192.168.101.100.

Hit the button ***Ok***. Now, the X should disappear from the bridge only.

The same procedure must be done for all bridges in the configuration.

Step 4 – Assigning the Device ID to the field devices.

Assign the device ID to each field device, the same way that it was done to the bridge (Step 2). Right-click over each device, select **Attributes** and choose the proper Device ID.

Note: It is necessary to associate the device ID to the fieldbus elements only for this first time. Then, it will be saved to the configuration file with the Save command, so if in the future one opens the Syscon file and starts the communication (initiate communication commands), it won't be necessary to do the device ID association again because it is already there. Only if one device is changed is that we have to go at one of those points and change also the device ID, which is unique for each fieldbus instrument.

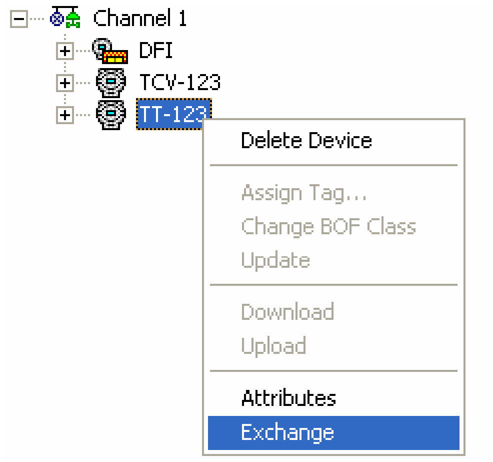
Finally, save your configuration, in order to get the IDs saved.

Step 5 – Device Exchange

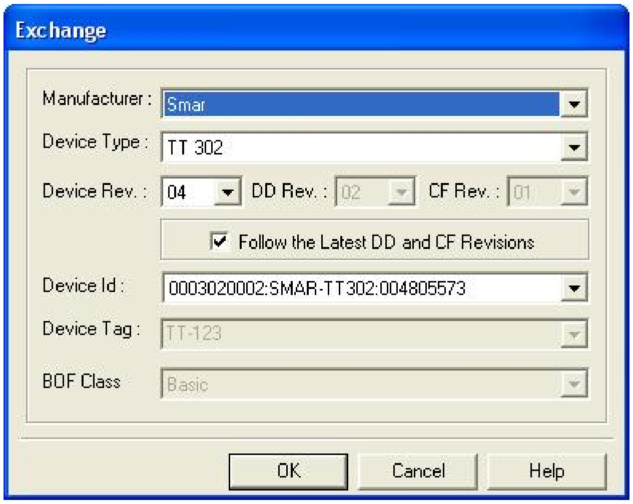
Note: This step will have to be executed in configurations with previous versions to the Syscon 6.0 or to change the device revision.

When a defective device must be replaced by a new device that has a newer or different *Device Revision*, it is possible to exchange these devices easily without modifying the existing configuration. Another scenario occurs when the user wants to change the Device Revision for a device.

To exchange a device, select its icon, go to the *Edit* menu and click *Exchange*. Or right-click the device icon and click the item **Exchange**.



The *Exchange* dialog box will open.


Exchange

Manufacturer : Smar

Device Type : TT 302

Device Rev. : 04 DD Rev. : 02 CF Rev. : 01

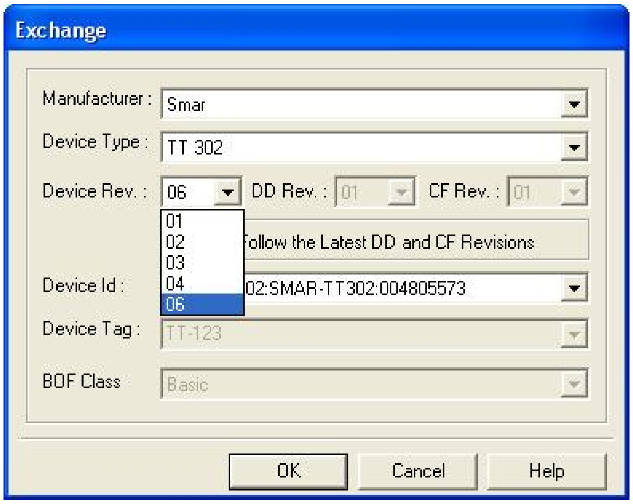
☑ Follow the Latest DD and CF Revisions

Device Id : 0003020002:SMAR-TT302:004805573

Device Tag : TT-123

BOF Class : Basic

The user can change the Manufacturer, the Device Type and the Device Revision. The following example, we change the device revision.



Exchange

Manufacturer : Smar

Device Type : TT 302

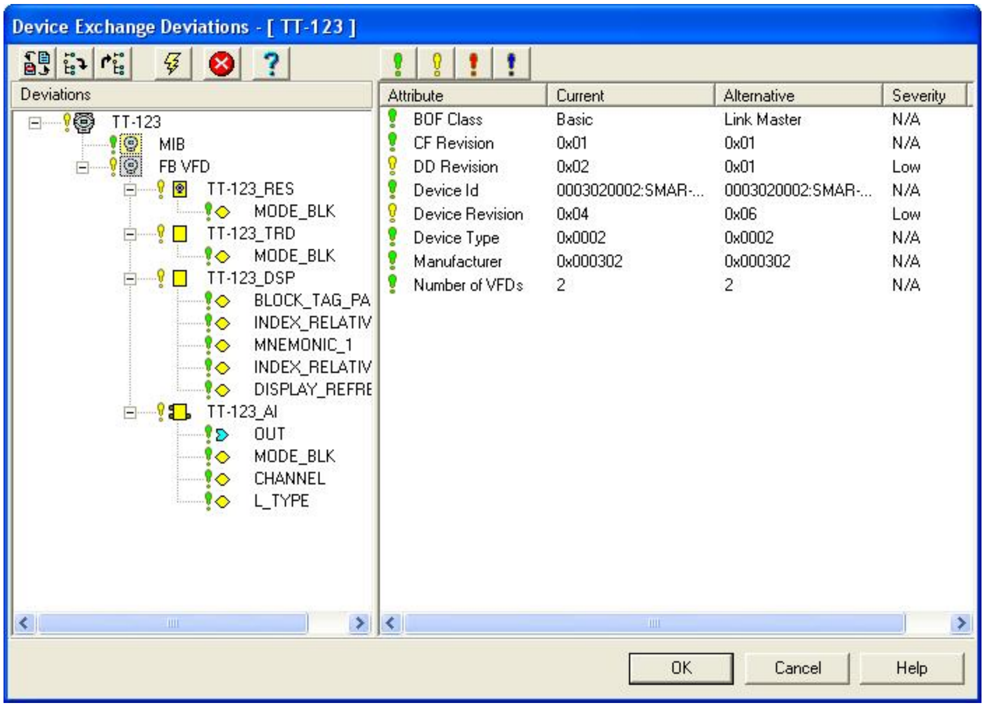
Device Rev. : 06 DD Rev. : 01 CF Rev. : 01

Device Id : 02:SMAR-TT302:004805573

Device Tag : TT-123

BOF Class Basic

The *Deviations* dialog box shows detailed information of the device, the blocks and parameters, indicating to the user the functionalities that can be lost when exchanging the device.



Device Exchange Deviations - [TT-123]

Deviations

- TT-123
  - MIB
  - FB VFD
    - TT-123_RES
      - MODE_BLK
    - TT-123_TRD
      - MODE_BLK
    - TT-123_DSP
      - BLOCK_TAG_PA
      - INDEX_RELATIV
      - MNEMONIC_1
      - INDEX_RELATIV
      - DISPLAY_REFRE
    - TT-123_AI
      - OUT
      - MODE_BLK
      - CHANNEL
      - L_TYPE

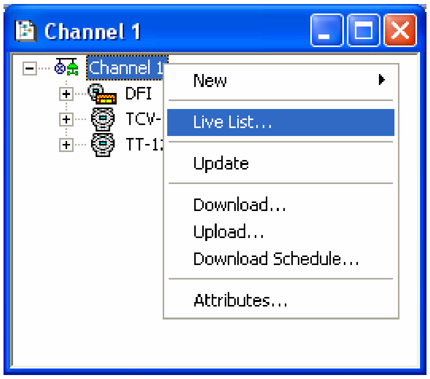
Attribute	Current	Alternative	Severity
BOF Class	Basic	Link Master	N/A
CF Revision	0x01	0x01	N/A
DD Revision	0x02	0x01	Low
Device Id	0003020002:SMAR-...	0003020002:SMAR-...	N/A
Device Revision	0x04	0x06	Low
Device Type	0x0002	0x0002	N/A
Manufacturer	0x000302	0x000302	N/A
Number of VFDs	2	2	N/A

Click **OK** to perform de exchange.

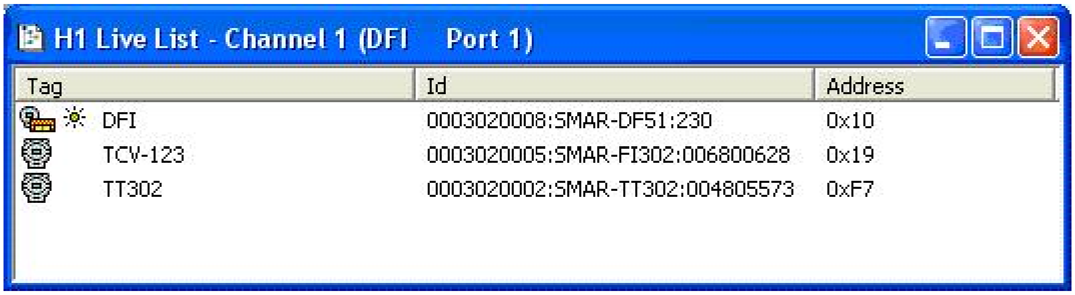
You can find more information in Syscon 6.0 manual, section 3.6.7.

Step 6 – Checking the Communication

For every channel (or segment), open the Fieldbus window, right-click over the Fieldbus icon and select **Live List** from the popup menu, as the figure below:



Another window will be displayed with all devices connected to the segment, as in the example:

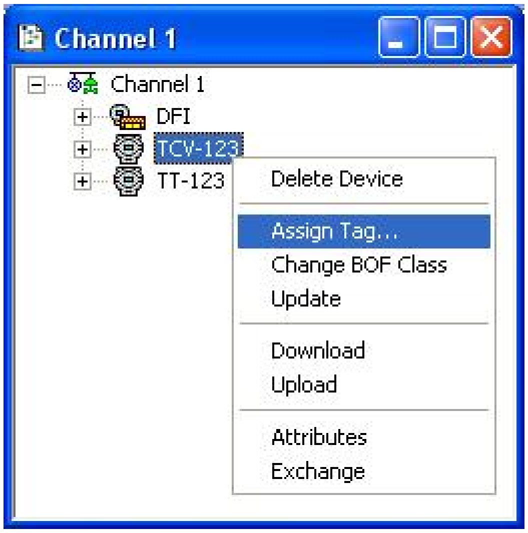


Tag	Id	Address
DFI	0003020008:SMAR-DF51:230	0x10
TCV-123	0003020005:SMAR-FI302:006800628	0x19
TT302	0003020002:SMAR-TT302:004805573	0xF7

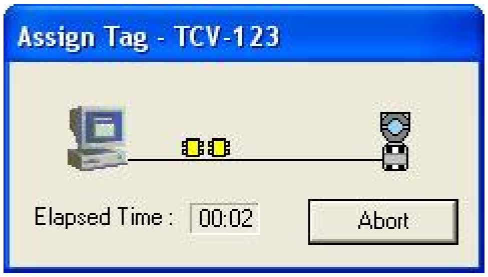
1.7 – Tags Assignment

In the previous section, one address was automatically assigned to each fieldbus device. Now, it is necessary to assign the tags to each one of these devices and interfaces.

Right-click over each bridge and device to activate their popup menu and select **Assign Tag**, as in the next example:



The tag written in the configuration will be sent to the devices, while you are seeing the following clip.



Assign Tag - TCV-123

Elapsed Time : 00:02

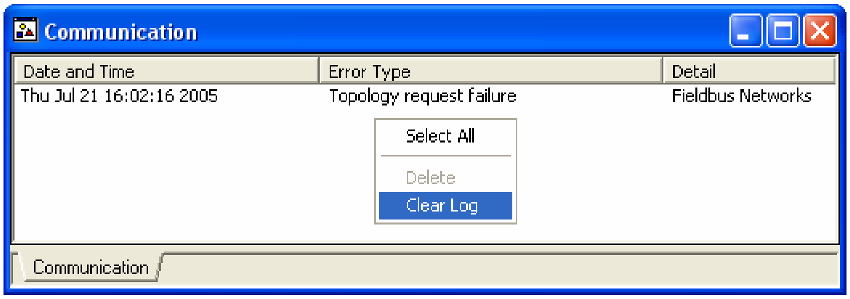
Notes:
1) In order to check if the tag assignment was successful, open the live list of the channel (or segment) and see if the tag from the device is the one you sent.
2) The tag assignment procedure needs to be done just once. It will only be necessary again in case a tag is changed or if a device is changed or has its memory erased

1.7 – Erasing the Error Log Registry

It is important to clear the Error Log Registry before downloading the configuration, because any eventual error that might occur during the download process will be easily detected as the Error Log window pops up automatically at the occurrence of its first error.

In *Syscon*, hit the button. It will open the Error Log window (this step will not be necessary in case this button is not enabled).

Right-click inside this window and select the option ***Clear Log***, as in the following example:



Communication

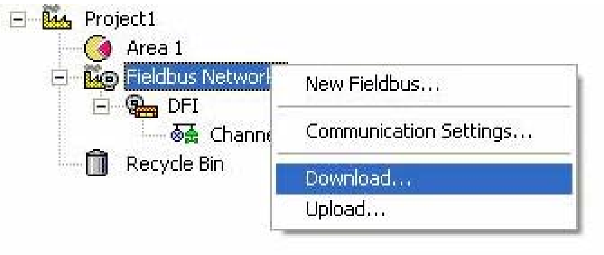
Date and Time	Error Type	Detail
Thu Jul 21 16:02:16 2005	Topology request failure	Fieldbus Networks

1.8 – Downloading the Configuration

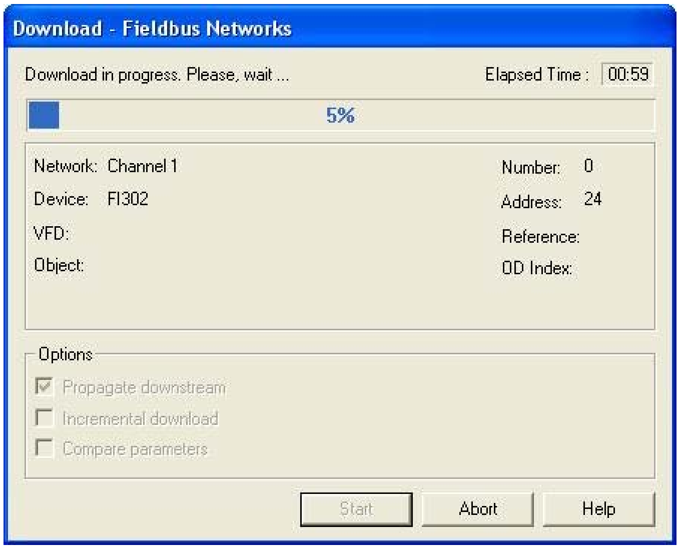
There are four ways to do the configuration download to the field devices: plant configuration download, channel download, device download and download incremental. See these forms in the topics below:

1.8.1 – Plant Configuration Download

In the Project window, click the icon *Fieldbus Networks*, go to the *Communication* menu and click in the item *Download*. Or right-click the icon Fieldbus **Networks** and select the item **Download**.



The *Download* dialog box will open. To download the entire configuration to the plant, do not select the option *Incremental download* and click in the **Start** button.



Download - Fieldbus Networks

Download in progress. Please, wait ... Elapsed Time : 00:59

5%

Network: Channel 1 Number: 0

Device: FI302 Address: 24

VFD: Reference:

Object: OD Index:

Options

☑ Propagate downstream

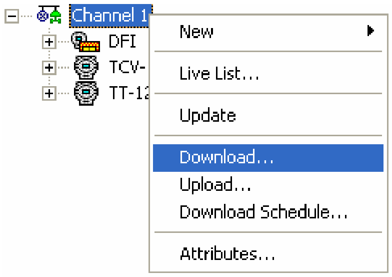
□ Incremental download

□ Compare parameters

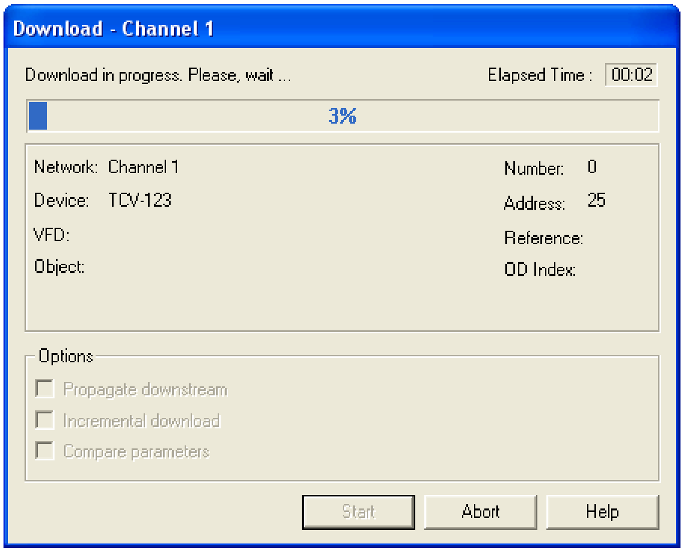
To execute the incremental download, check the option *Incremental Download* before start the download.

1.8.2 – Fieldbus Download

To execute the download for each fieldbus segment, click the Fieldbus window, go to the *Communication* menu and click the item *Download*. Or right-click over the *Fieldbus* icon to activate the popup menu and select **Download**, as in the next example:



The *Download* dialog box will open. Click **Start** to download fieldbus information. While the configuration is being downloaded to your plant, the following dialog will be prompted:



Download - Channel 1

Download in progress. Please, wait ... Elapsed Time : 00:02

3%

Network: Channel 1 Number: 0

Device: TCV-123 Address: 25

VFD: Reference:

Object: OD Index:

Options

□ Propagate downstream

□ Incremental download

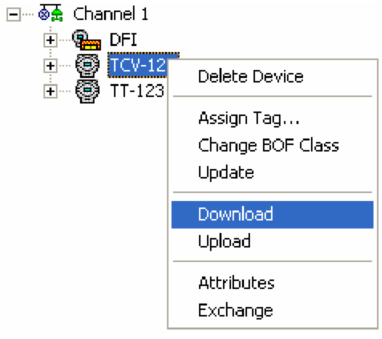
□ Compare parameters

To execute the incremental download, check the option *Incremental Download* before start the download.

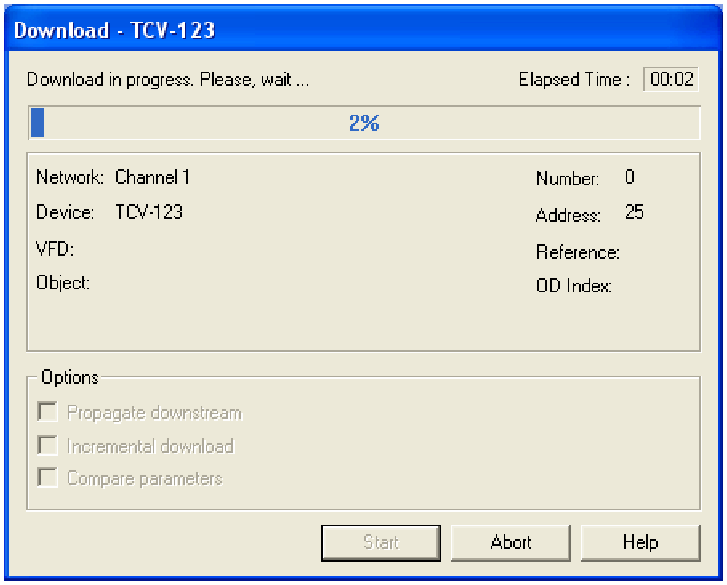
1.8.3 – Device Download

In case a device failed or after replacing a device, the user can run a partial download for this device, provided that it doesn't change the configuration. If you have already done the download of the entire configuration and the device configuration changes, it is recommended to do the device download too.

In the *Fieldbus* window, click the device icon, go to the *Communication* menu and click the item *Download*. Or right-click the device icon to activate its popup menu and select the item **Download**.



The dialog box *Download* will open. Click **Start** to download the device information.



Download in progress. Please, wait ...

Elapsed Time : 00:02

2%

Network: Channel 1

Device: TCV-123

VFD:

Object:

Number: 0

Address: 25

Reference:

OD Index:

Options

☐ Propagate downstream

☐ Incremental download

☐ Compare parameters

Note: In case a device failed or after replacing a device, it is necessary execute the **Assign Tag** in the equipment before executing the partial download.

To execute the incremental download, select the option *Incremental Download* before start the download.

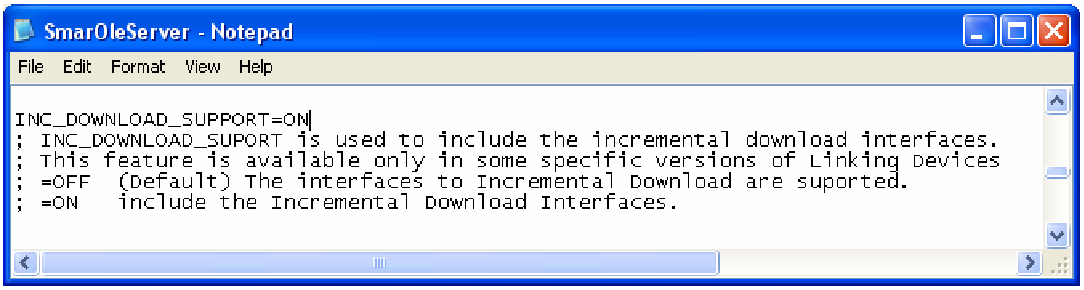
1.8.4 - Incremental Download

Syscon 6.0 can compare the project configuration with the plant configuration and then execute the download only for the discrepant information, without sending unnecessary information to the device.

Step 1 – Enabling the Incremental Download

To enable this option, open the file **SmarOleServer.ini,** located in the folder *C:\Program Files\Smar\OleServers*.

Set the parameter **INC_DOWNLOAD_SUPPORT=ON**. See picture below.

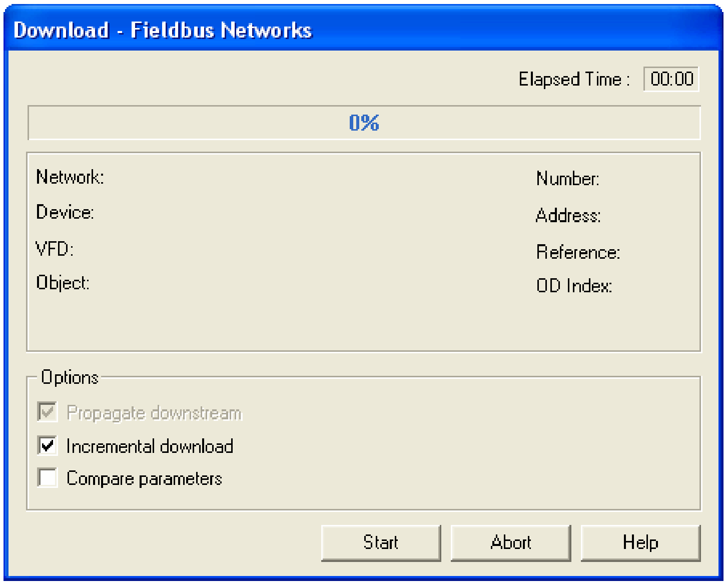


```
INC_DOWNLOAD_SUPPORT=ON
; INC_DOWNLOAD_SUPORT is used to include the incremental download interfaces.
; This feature is available only in some specific versions of Linking Devices
; =OFF  (Default) The interfaces to Incremental Download are suported.
; =ON   include the Incremental Download Interfaces.
```

Save the file and restart the Smar Ole Server.

Step 2 – Download

Back to Syscon configuration, in the *Download* dialog box, select the option **Incremental download** to compare the project configuration with the plant configuration.



Elapsed Time : 00:00

0%

Network:

Number:

Device:

Address:

VFD:

Reference:

Object:

OD Index:

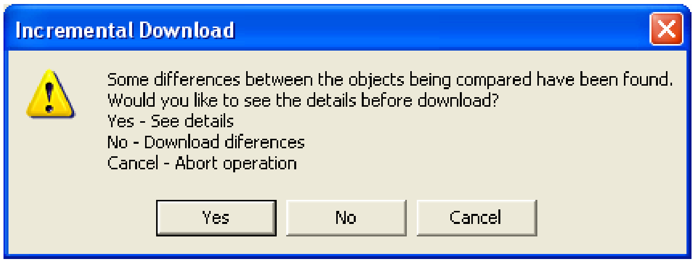
Options

☑ Propagate downstream

☑ Incremental download

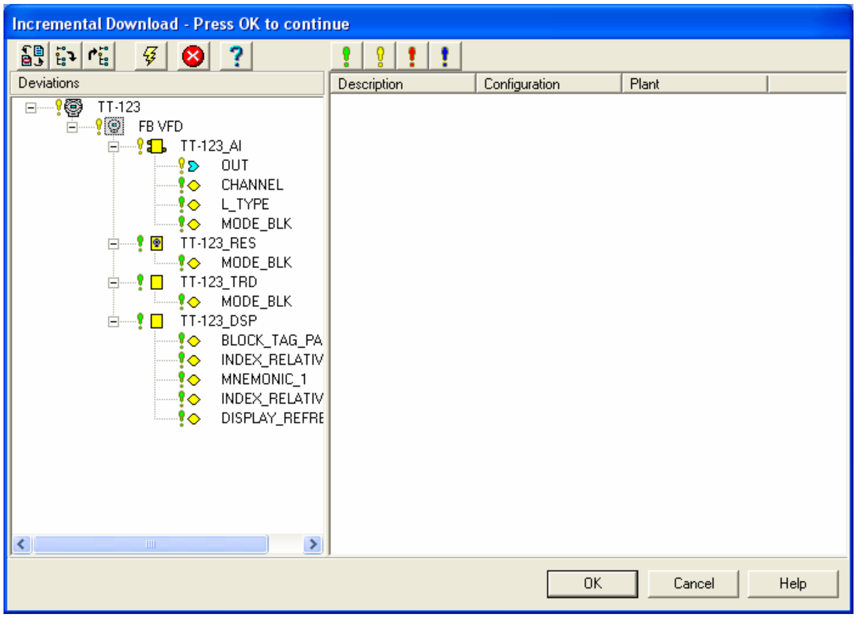
□ Compare parameters

The message box in the figure below will appear if SYSCON finds any difference in the configuration.



Some differences between the objects being compared have been found.
Would you like to see the details before download?
Yes - See details
No - Download diferences
Cancel - Abort operation

Click **Yes** to open the *Incremental Download* window and check the differences.



TT-123
- FB VFD
  - TT-123_AI
    - OUT
    - CHANNEL
    - L_TYPE
    - MODE_BLK
  - TT-123_RES
    - MODE_BLK
  - TT-123_TRD
    - MODE_BLK
  - TT-123_DSP
    - BLOCK_TAG_PA
    - INDEX_RELATIV
    - MNEMONIC_1
    - INDEX_RELATIV
    - DISPLAY_REFRE

Click **Ok** to start the configuration download.

You can find more information in Syscon 6.0 manual, section 6.7.

1.9 – Exporting Tags

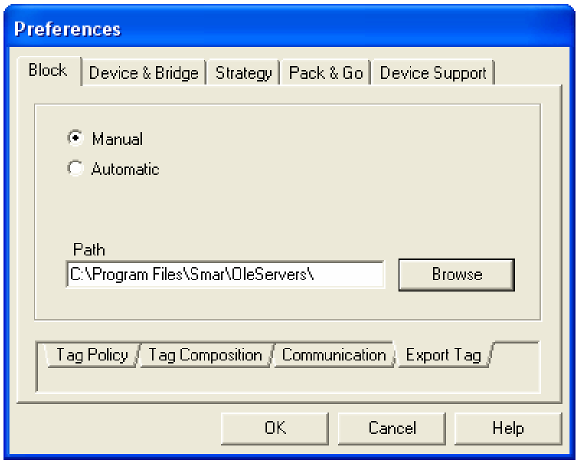
It is necessary to execute one further command in order to enable the on-line communication with the parameters of the function blocks. This command is called **Export Tags**. It basically generates a file (Taginfo.ini) containing all tags (devices and function blocks) present in the configuration. This file is used by the *OPC* (OLE for Process Control), for supervision purposes.

Note: The **Export Tags** command has to be executed just once, unless a tag change in the configuration is made. In this last case, this command should be executed again to update the file.

Step 1 – Preferences

Before execute the Export Tags, the user can select the mode for operation and the path for the Taginfo.ini file.

Go to **Project File** menu and click **Preferences**. The following window will appear. Select the **Export Tag** tab.



● Manual
○ Automatic

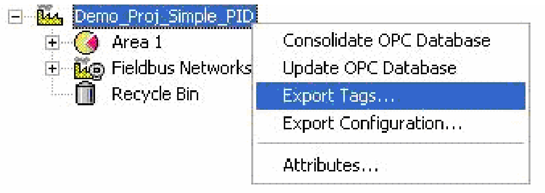
Path: C:\Program Files\Smar\OleServers\

You can choose between two modes:
Manual: The user has to execute the Export Tag command to update the Taginfo.ini file.

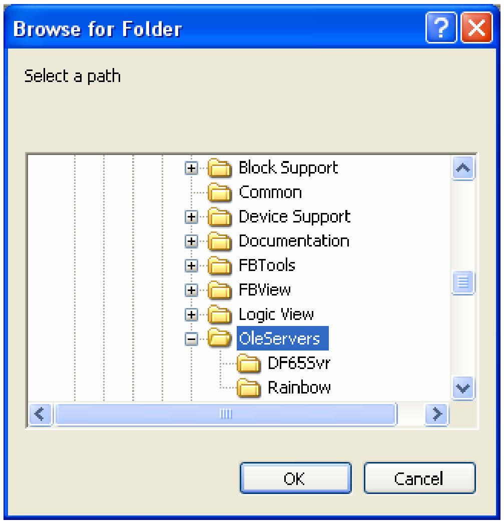
Automatic: The Export Tag will be executed every time a relevant on-line change occurs. In this case, a message will appear to confirm the export tags.

Step 2– Exporting Tags

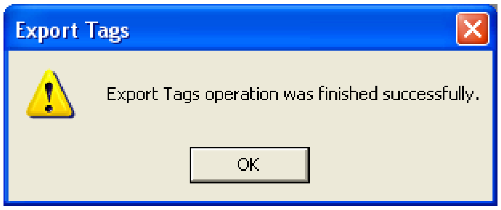
Go to the main window, right-click over the project icon and select **Export Tags,** as in the figure:



Then, a *Browse for Folder* dialog box will show up.



If the user executed the step 1, the dialog box will show the correct folder to save the *Taginfo.ini* file, otherwise, choose the folder **C:\Program Files\Smar\OleServers** and click **OK**.

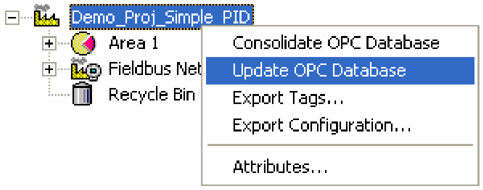


Export Tags operation was finished successfully.

Click **OK** to finish.

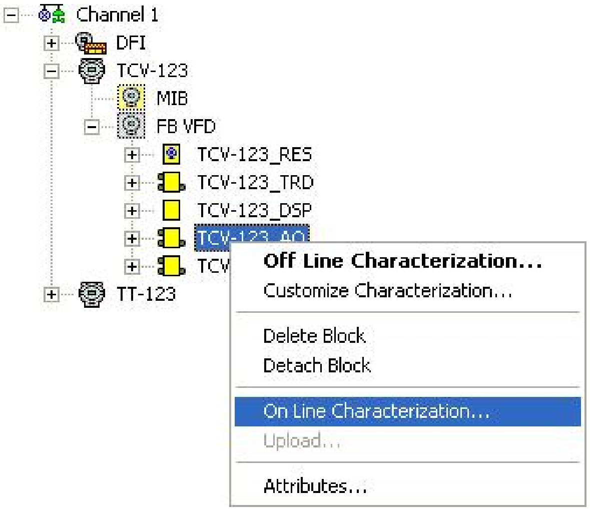
> **Note:** Every time you change any tag in the configuration, it is necessary to repeat the Export tag procedure, otherwise, the supervision of the new tag will not be allowed.

To update the *Taginfo.ini* file previously saved, you can use the command *Update OPC Database*. Selects the icon of the project, goes to the *Export* menu and click *Update OPC Database*. Or open the popup menu right-clicking the *Project* icon. Click in the item **Update OPC Database**.



Step 3– Checking the on-line supervision

Now, it is already possible to monitor the parameters using the on-line characterization tools. For that, right-click over a chosen function block and select **On Line Characterization**, as in the figure below:

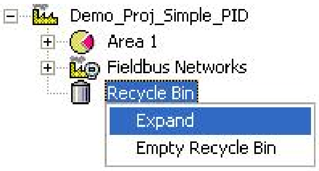


WARNING
In Syscon 6.0, the function block parameters can be changed in the **On-Line Characterization** mode. Any of these changes will be saved to the configuration file.
To previous version of Syscon, the function block parameters can be changed in the On-Line characterization mode. However, any of these changes will not be saved to the configuration file. They just change the parameter value in the function block in the memory of the field device. So, in order to get it saved into file, it is necessary to access also the **Off Line Characterization**, make the same changes and then save the configuration.

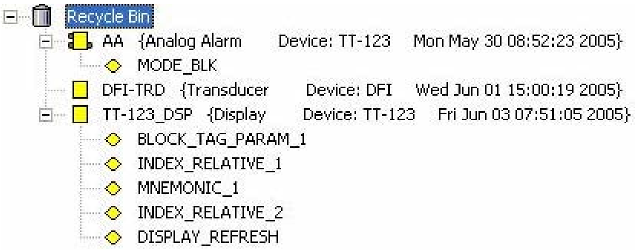
1.10 – Recycle Bin

The deleted items are sent to the *Recycle Bin*. They can be recovered any time, even if the configuration is closed and opened again.

To open it, right-click in the **Recycle Bin** icon located in the *Project* window and choose the option **Expand**.

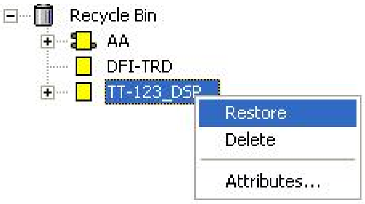


To display the detailed information about the items, click in the **Show/Hide Details** button, 👓, located in the *General Operation Toolbar*.



Recycle Bin
AA {Analog Alarm Device: TT-123 Mon May 30 08:52:23 2005}
MODE_BLK
DFI-TRD {Transducer Device: DFI Wed Jun 01 15:00:19 2005}
TT-123_DSP {Display Device: TT-123 Fri Jun 03 07:51:05 2005}
BLOCK_TAG_PARAM_1
INDEX_RELATIVE_1
MNEMONIC_1
INDEX_RELATIVE_2
DISPLAY_REFRESH

To restore blocks, bridges and devices to the configuration, right-click the item in *Recycle Bin* and choose the option **Restore**.

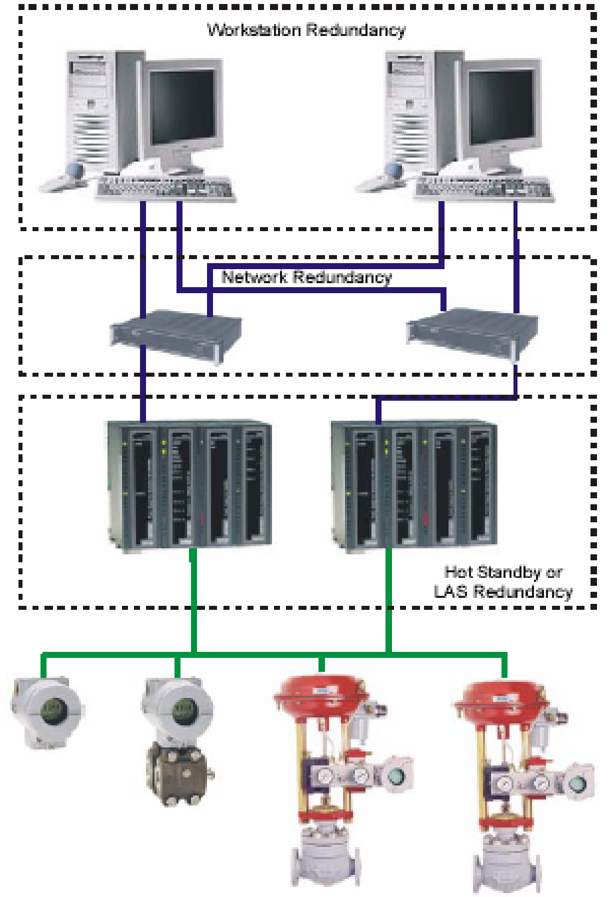


Note: It will not be possible to restore a block or device if the area (Fieldbus, Control Modulo or Device) where the item was attached is removed.

You can also delete and see the attributes of the item from Recycle Bin.

PROCEDURE TO INITIALIZE A REDUNDANT SYSTEM

In order to have a true redundant system, not just all the equipments must be redundant but also the entire system topology must be thought as redundant. The more elements with redundancy ability the system have, better reliability and availability can be achieved. A typical and simple redundant topology based on DFI302 can be seen in picture below.



What happens when we are dealing with this level of redundancy is that there are two computers, each one connected to one or more bridges and each bridge connected to the same segments (See figure above). Then, if there is any problem with the active station (LAS) or computer, the backup station will take over the communication schedule (will become the LAS) and, as soon as the active station is up again, it retakes the charges of LAS.

System302 is provided of two kinds of redundancy:

- ***Hot Standby***

Hot Standby is the redundancy strategy where the Standby module is powered and synchronized with the Active module, standing ready to assume if necessary".

This mode offers redundancy for all the DFI302 functionalities and databases:
- Gateway: 1 Ethernet port ↔ 4 H1 ports;
- Link Active Scheduler (LAS);
- Controller (running Function blocks);
- Modbus Gateway.

Link Active Scheduler is the entity in the network responsible for organizing the communication. It basically dictates when each device is allowed to publish/subscribe data to/from the network.

With the Hot Standby mode full redundancy is achieved, heavily improving the plant availability and safety. This mode suits specially the cases where the DFI302 has function blocks in its configuration.

Note:

- The 4TH FF H1 channel is used as the synchronization path between the modules. Thus, this channel will not be used as a usual FF H1 channel and should not have devices connected.
- DFI302 in Hot Standby mode uses the flat address “0x05” when it publishes. Because third-party devices do not support the flat address, they are not able to establish links with the DFI302 in Hot Standby redundancy.
- Hot Standby redundancy is available only for System302 Version 6.1.7 and above.

- ***LAS***

This is a legacy mode of redundancy suitable only for the case where DFI302 does not have function blocks in its configuration. That is, in such case the function blocks are on the field devices. This is a completely distributed control philosophy where DFI302 perform two main functions:
- Gateway: 1 Ethernet port ↔ 4 H1 ports;
- Link Active Scheduler.

For this scenario, with the LAS redundancy the control, operation, and supervision redundancies are also guaranteed.

The following procedures inform how to set up and running redundant system. It starts assuming that the Software is already installed in the computers and the bridges initial settings were already made. If you need some information on how to do that, please refer to chapter 1 of this manual.

2.1 - System Pre-requirements

The requirements listed here apply to both redundancy modes.

2.1.1 Firmware Download

Follow the steps described on section 1.3 and be careful to select the redundant firmware for the bridge.

The firmware's names for redundant systems have the termination "r". It indicates a firmware suitable for redundant applications. For example:

Bridge	Version	Firmware
PCI 1.2	3.7.2	PCI12FFV3.7.2r.abs
DF51	3.9.1	DF51V3.9.1r.abs

With the redundant firmware, the module initializes by default in Hot Standby mode, in a safety state called “Sync_Idle”. The user as will be seen forth can change the redundancy mode later, if necessary.

2.1.2 Configuring the Network Redundancy

For any of the redundancy modes it is necessary first of all to configure the network redundancy. The next section explains how to do it.

2.1.3 Creating the Syscon Configuration

The configuration that has to be created as it is usually done for a non-redundant system (In case of doubts, please refer to the section 1.5 of this document). The unique difference (now that redundancy is involved) is that it is necessary to add a transducer function block to each bridge in the configuration. This transducer will be set then to define how the bridge will work.

One of the bridges will be the Active LAS (Master Station) and the other will be the Backup LAS (Backup Station). So, whenever an active or backup station is mentioned, it is related to the bridge settings, which configuration will be shown in the next items of this document.

In the SYSCON configuration, the tag for the transducer block can be any, preferentially a meaningful tag concerned to the DFI302 tag or to the plant. Be careful to not use tags already in use in the same plant. Further information on *SYSCON* operation, can be found in its own manual.

For Syscon Version older than V.6.1.7, The transducer tag format has to have necessarily the following format:

PCI-TRD-“PCI serial number” or

DFI-TRD-“DFI serial number”

Example (for the bridge with serial number 488):

PCI-TRD-488 or

DFI-TRD-488

2.2 - Configuring the Network Redundancy

In order all the OPC-Client tools be able to deal with network redundancy it is necessary configure the workstation and the DFI OLE Server.

2.2.1 Configuring the Workstation

It is possible to have one or two workstation (redundancy of workstation). Here follows the steps for the configuration.

Step 1 – HMI

Each workstation must have an HMI installed.

Step 2 – Network Interface Card

Each workstation must have installed two NICs (Network Interface Card).

Step 3 – Configuring the NIC

Each NIC must be configured in a different subnet range (e.g. NIC1, IP=192.168.164.50 / Subnet Mask 255.255.255.0 and NIC2, IP=192.168.163.50 / Subnet Mask 255.255.255.0).

Step 4 – Gateway

Configure also the default gateway according to your specific needs.

Step 5 – Hubs/Switches

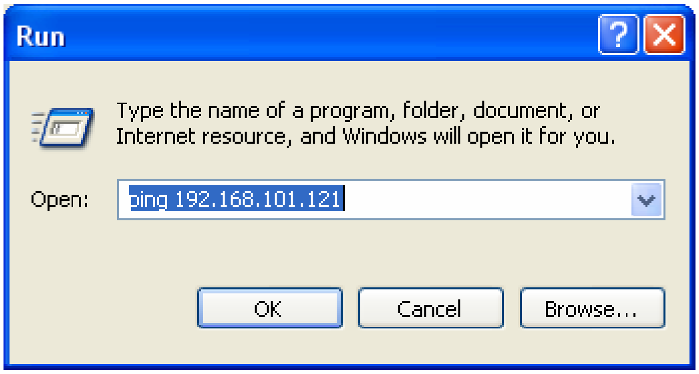
Install two HUBs or switches. Each NIC must be connected to one of them in such a way that two LAN are assembled isolated from each other.

That way, each one of the DF51 modules can be connected to one of the HUBs obeying the subnet ranges predefined (e.g. First DF51, IP=192.168.164.51 / Subnet Mask 255.255.255.0 and Second

DF51, IP=192.168.163.51 / Subnet Mask 255.255.255.0).

Step 6 – Testing the Network

To test the network configuration, use the ping command in the DOS prompt. Click in the **Start** button in the Windows toolbar. Choose the **Run** option. Type the IP of each DF51 module in the Run window to confirm the communication.


Run
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
Open:
OK
Cancel
Browse...

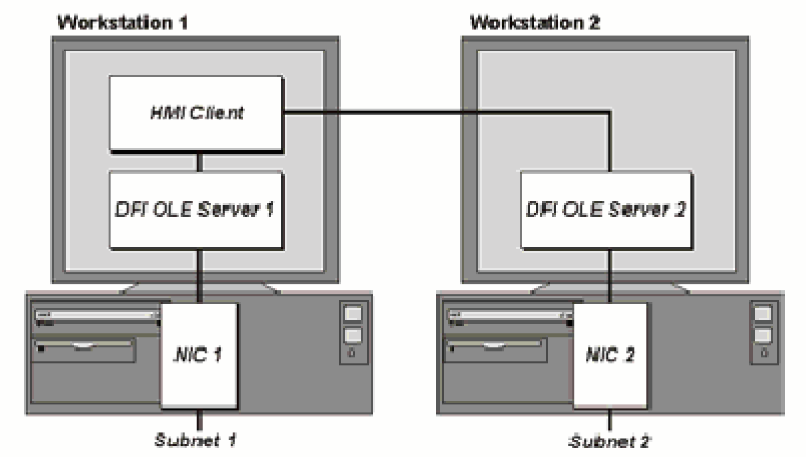
ping 192.168.101.121

2.2.2 Configuring the DFI OLE Server

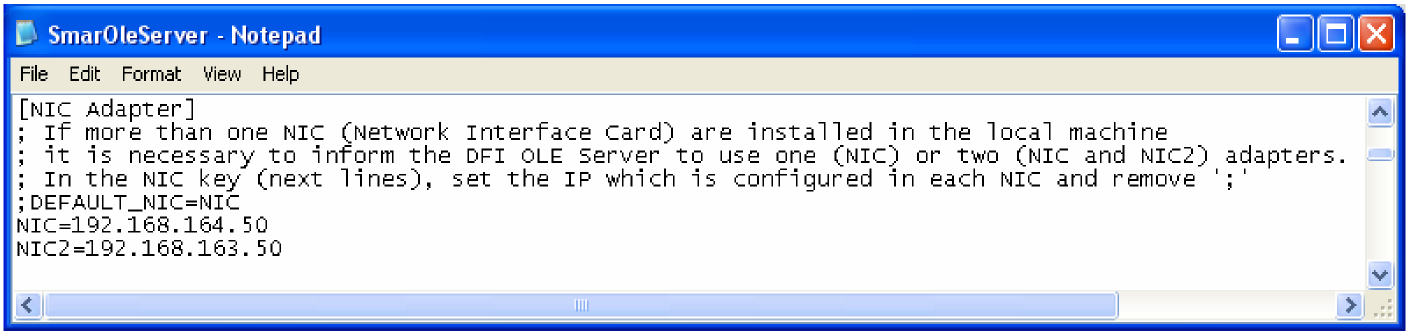
There are two ways to configure the OLE Server for network redundancy: Here follows the steps for the configuration in each case.

The HMI Client chooses the DFI OLE Server (local and remote).

In this case, the local Server has a specific NIC adapter and the Client chooses what server will be used, see figure below.



Configure in the file **SmarOleServer.ini**, the NIC adapter that will be used on each workstation ports (e.g. First workstation, NIC=192.168.164.50 and Second workstation, NIC=192.168.163.50). Do not forget to remove the ‘;’ at the beginning of the line. See figure below.



```
[NIC Adapter]
; If more than one NIC (Network Interface Card) are installed in the local machine
; it is necessary to inform the DFI OLE Server to use one (NIC) or two (NIC and NIC2) adapters.
; In the NIC key (next lines), set the IP which is configured in each NIC and remove ';'
;DEFAULT_NIC=NIC
NIC=192.168.164.50
NIC2=192.168.163.50
```

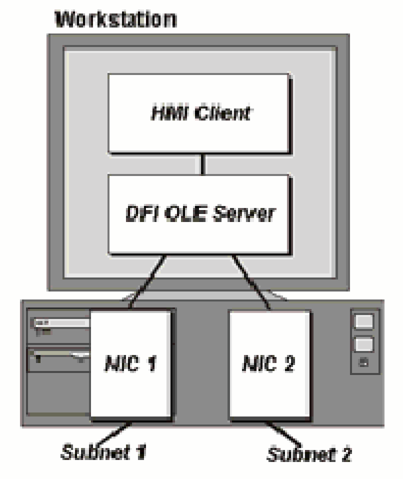
Doing so, each DFI OLE Server will choose the specified NIC adapter.

When configuring the HMI, configure each TAG to be monitored using two possible ways: First one, using Local DFI OLE Server, second option, using Remote DFI OLE Server (some HMI does not permit this kind of configuration and you will need to use an external software).

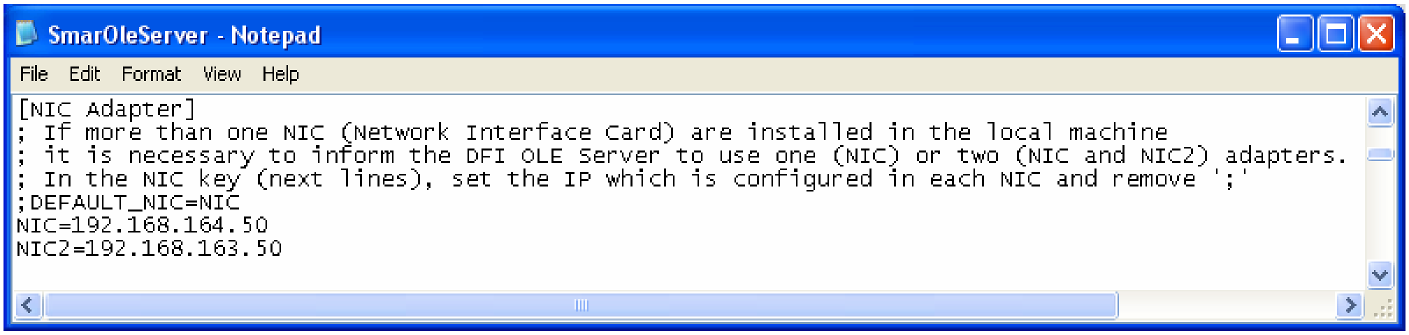
To validate the Remote connection between Client and Server, make sure to configure DCOM and NT Security. The steps are described in the Appendix A in the *DFI302* manual.

The DFI OLE Server is connected to both subnets where are located the redundant modules.

In this case, the client uses only one server that will choose which NIC adapter is to be used, see figure below.



Configure in the file SmarOleServer.ini the NIC adapters as intended. Example: NIC = 192.168.164.50, NIC2 = 192.168.163.50



```
[NIC Adapter]
; If more than one NIC (Network Interface Card) are installed in the local machine
; it is necessary to inform the DFI OLE Server to use one (NIC) or two (NIC and NIC2) adapters.
; In the NIC key (next lines), set the IP which is configured in each NIC and remove ';'
;DEFAULT_NIC=NIC
NIC=192.168.164.50
NIC2=192.168.163.50
```

Doing so, the DFI OLE Server will have information through both the NIC adapters.

The last updated good data will be chosen by the DFI OLE Server to be forwarded to the client. When the DFI302 is in Hot Standby mode, the DFI OLE Server will preferably choose the data that came from the Active module, to be forwarded to the client.

2.3 - Configuring the Hot-Standby Redundancy

2.3.1 First Time Configuration Procedure

This is the procedure to configure the system with Hot Standby Redundancy for the first time, at the plant start-up.

Step 1 – Factory Init

With the H1 connector disconnected, execute a *Factory Init* in both modules in order to grant the default state.

Step 2 – Activating the Bridge

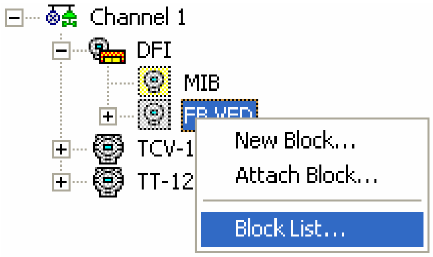
Connect both modules together, through the *FF H1* channels (1 to 4).

Step 3 – Initializing Communication with the Active Bridge

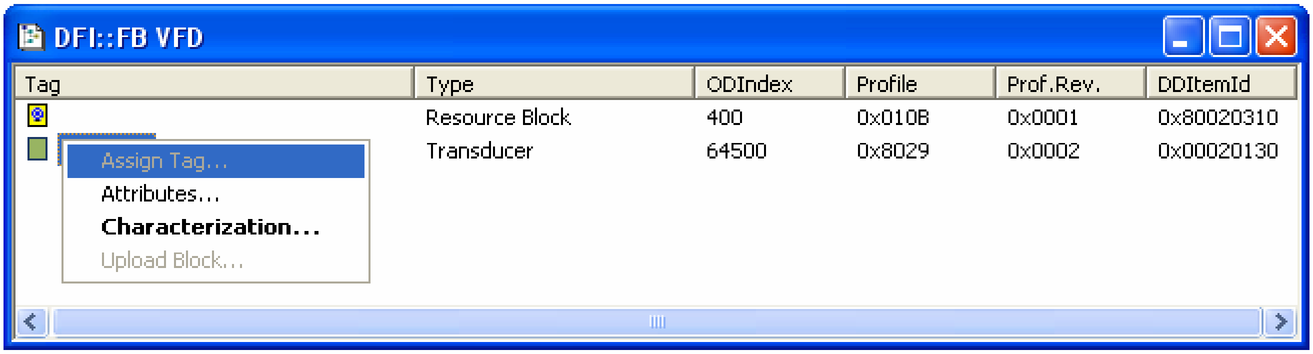
Open the desired configuration in the *SYSCON* and put it in **On-line** *mode*. Attribute the Device ID to the bridge. Proceed according section 1.6, steps 1 to 3 for the active station.

Step 4 – Adjusting the transducer tag

Even in the bridge icon, right-click the field **FB VFD** and then click **Block List**.



A new window will be opened showing all the blocks pre-instantiated in the module. Then, right-click the *transducer* performing an **Assign Tag** with the *tag* that is predicted in the configuration.

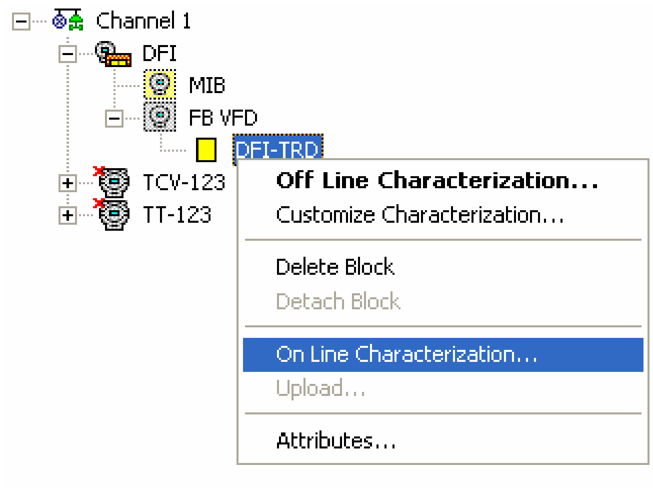


Tag	Type	ODIndex	Profile	Prof.Rev.	DDItemId
	Resource Block	400	0x010B	0x0001	0x80020310
	Transducer	64500	0x8029	0x0002	0x00020130

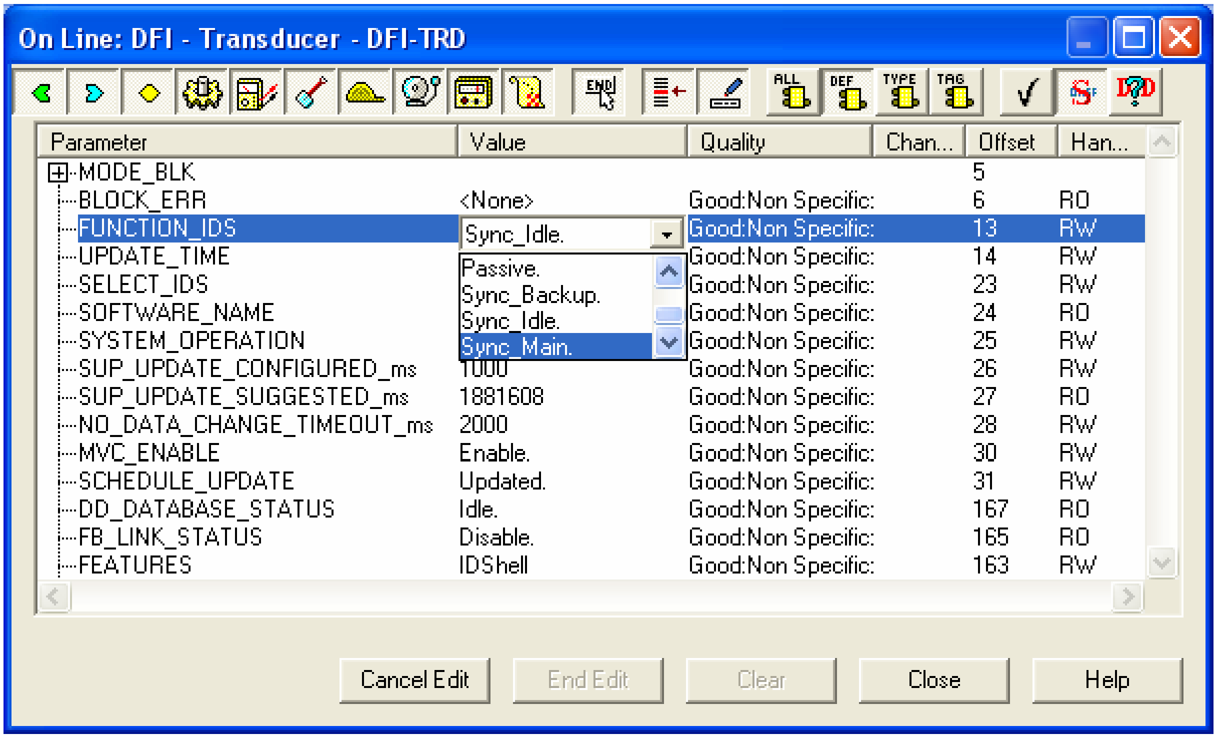
Close the *Block List* window.

Step 5 - Reading Profiles

Right-click the *transducer* icon in the *bridge* and choose **On Line Characterization**.

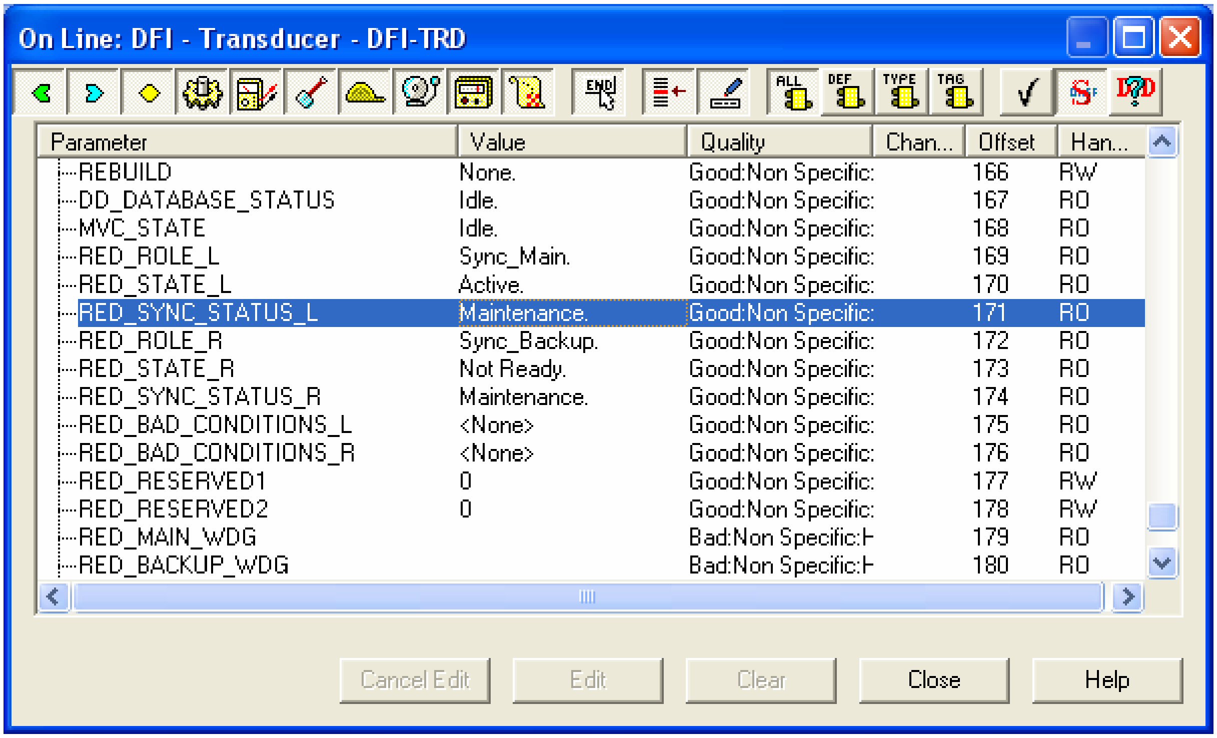


Set the parameter *FUNCTION_IDS* as **Sync_Main**.



Parameter	Value	Quality	Chan...	Offset	Han...
MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific:		6	RO
FUNCTION_IDS	Sync_Idle.	Good:Non Specific:		13	RW
UPDATE_TIME		Good:Non Specific:		14	RW
SELECT_IDS		Good:Non Specific:		23	RW
SOFTWARE_NAME		Good:Non Specific:		24	RO
SYSTEM_OPERATION		Good:Non Specific:		25	RW
SUP_UPDATE_CONFIGURED_ms	1000	Good:Non Specific:		26	RW
SUP_UPDATE_SUGGESTED_ms	1881608	Good:Non Specific:		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	2000	Good:Non Specific:		28	RW
MVC_ENABLE	Enable.	Good:Non Specific:		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific:		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific:		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific:		165	RO
FEATURES	IDShell	Good:Non Specific:		163	RW

Through the synchronism path, the other module automatically will be initialized as *Backup*. After that, both the parameters RED_SYNC_STATUS (*L* and *R*) will indicate *Maintenance*, which means that neither of the modules was configured yet;



Parameter	Value	Quality	Chan...	Offset	Han...
REBUILD	None.	Good:Non Specific:		166	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific:		167	RO
MVC_STATE	Idle.	Good:Non Specific:		168	RO
RED_ROLE_L	Sync_Main.	Good:Non Specific:		169	RO
RED_STATE_L	Active.	Good:Non Specific:		170	RO
RED_SYNC_STATUS_L	Maintenance.	Good:Non Specific:		171	RO
RED_ROLE_R	Sync_Backup.	Good:Non Specific:		172	RO
RED_STATE_R	Not Ready.	Good:Non Specific:		173	RO
RED_SYNC_STATUS_R	Maintenance.	Good:Non Specific:		174	RO
RED_BAD_CONDITIONS_L	<None>	Good:Non Specific:		175	RO
RED_BAD_CONDITIONS_R	<None>	Good:Non Specific:		176	RO
RED_RESERVED1	0	Good:Non Specific:		177	RW
RED_RESERVED2	0	Good:Non Specific:		178	RW
RED_MAIN_WDG		Bad:Non Specific:H		179	RO
RED_BACKUP_WDG		Bad:Non Specific:H		180	RO

Click in the **Close** button to close the window.

> **Note:** When closing the window **On Line Characterization** is recommended not to save the modified parameters.

Step 6 – Initializing communication with field devices

If necessary, perform Assign Tag for all the field devices. Wait until the Live Lists of all the channels are complete. Proceed as section 1.6 (step 4) and 1.7.

Step 7 – Configuration Download

Configure the system through the *Active* module executing all necessary downloads exactly the same way for a non-redundant DFI302 system (section 1.9 and 1.10).

As soon as the downloads are successfully completed, the transducer will show the following phases:

1. The Active will transfer the whole configuration to the other module (*RED_SYNC_STATUS_L* as *Updating Remote* and *RED_SYNC_STATUS_R* as *Maintenance*);
2. After the configuration is successfully transferred, the modules can take some time to synchronize (parameters *RED_SYNC_STATUS (L and R)* as *Synchronizing*). This is the time necessary to the modules to check the configuration with each other;
3. Finally, the modules will synchronize (parameters *RED_SYNC_STATUS (L and R)* as *Synchronized* and *RED_STATE_R* as *Standby*). Once the system is on these conditions, the Active will be constantly updating the Standby.

2.3.2 Changing the Configuration

Just follow the steps 6 and 7 of the section 2.3.1.

2.3.3 Adding redundancy to a system in operation

If a non redundant system is intended to be redundant in the future, at the plant startup, the following conditions must be obeyed:

Step 1 – Synchronism Channel

The 4th H1 port should be reserved as synchronization path. That is, this port should not have devices connected to it.

Step 2 – H1 Channel Cabling

Predict H1 channels cabling considering that a Backup module will be added in the future (the H1 channels of the Main module should be connected in parallel with the respective H1 channels of the Backup module).

Step 3 – Network Architecture

Predict that the LAN architecture can be expanded, in order to attend what is described in the Redundant System Architecture.

Step 4 – Initializing the Single Module

The single module should use a redundant firmware (a version terminated in R). The parameter *FUNCTION_IDS* should be set as *Sync_Main*. This way the module will work in Stand Alone state and will be ready to recognize a new module inserted at any time.

Obeying these conditions, redundancy can be added at a later time without process interruption. The procedure to add redundancy to the system is just follow the same steps described in the section8.1, *“Replacing a module with failure”.*

2.4 - Configuring the LAS Redundancy

Here follows the steps for the configuration and maintenance of this legacy mode. It is recommended that the steps are all read and understood before are executed.

2.4.1 - First Time Configuration Procedure

This is the procedure to configure the system with LAS Redundancy for the first time, at the plant start-up.

Active Module

Step 1 – Factory Init

With the H1 connector disconnected, execute a *Factory Init* in both modules to grant the default state.

Step 2 – Activating the System

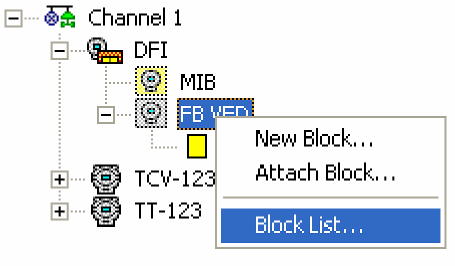
Connect the H1 connector to the Active module. Keep the Backup module with the H1 connector disconnected for a while.

Step 3 – Initializing Communication with Active Bridge

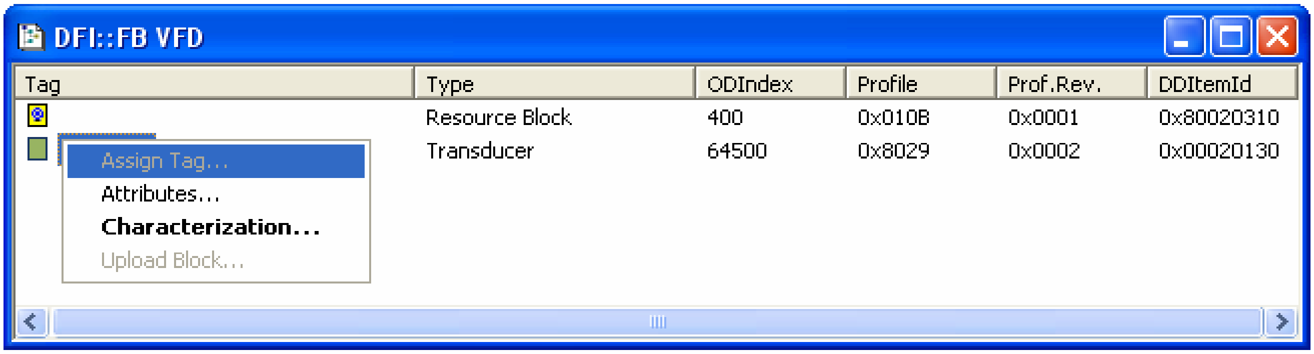
Open the desired configuration in the *SYSCON* and put it in *On-line mode* and attribute the *Device ID* to the bridge. Proceed according the section 1.6, steps 1 to 3 for the Active station.

Step 4 – Adjusting the Transducer Tag

Even in the bridge icon, right-click the field **FB VFD** and then click **Block List**.



A new window will be opened showing all the blocks pre-instantiated in the module. Then, in this window, right-click the transducer performing an **Assign Tag** with the tag that is predicted for the *Active* in the configuration.

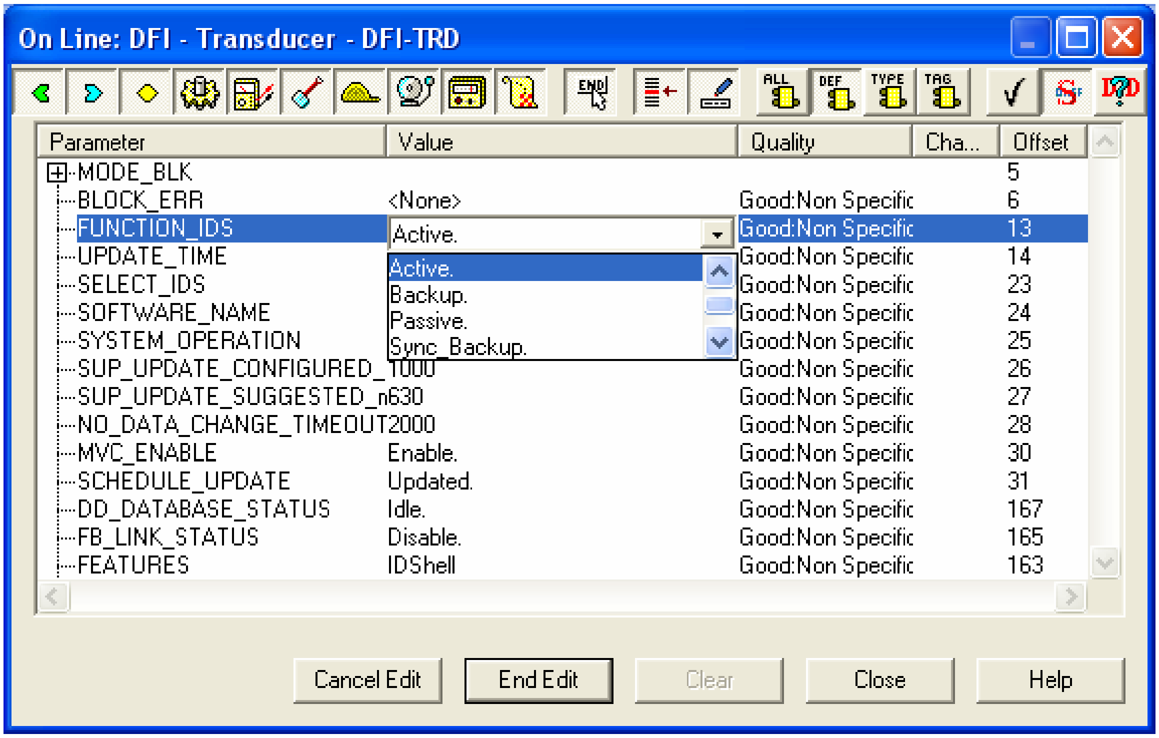


Tag	Type	ODIndex	Profile	Prof.Rev.	DDItemId
	Resource Block	400	0x010B	0x0001	0x80020310
	Transducer	64500	0x8029	0x0002	0x00020130

Close the *Block List* window. In the main menu of SYSCON, go to **Export Tags**.

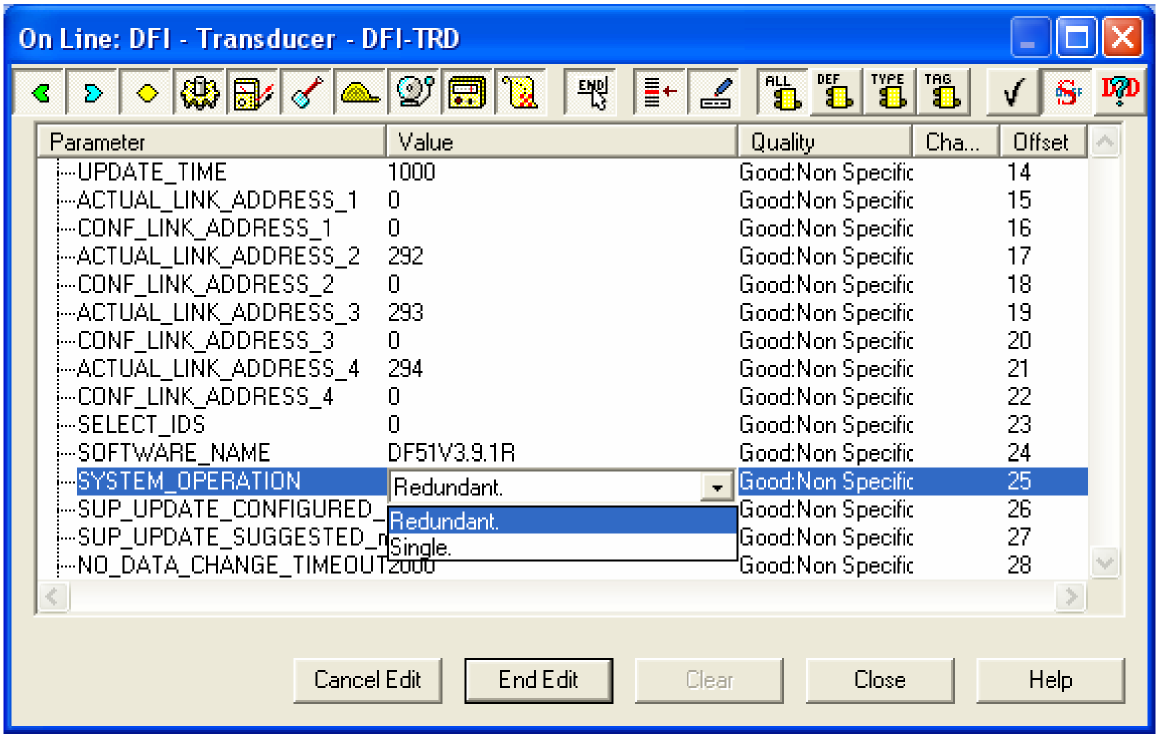
Step 5 - Reading Profiles

Right click in the transducer icon and choose the option **On Line Characterization**, Change the parameter **FUNCTION_IDS** to **Active** and press the **End Edit** button. See example below:



Parameter	Value	Quality	Cha...	Offset
MODE_BLK				5
BLOCK_ERR	<None>	Good:Non Specific		6
FUNCTION_IDS	Active.	Good:Non Specific		13
UPDATE_TIME		Good:Non Specific		14
SELECT_IDS		Good:Non Specific		23
SOFTWARE_NAME		Good:Non Specific		24
SYSTEM_OPERATION		Good:Non Specific		25
SUP_UPDATE_CONFIGURED_	1000	Good:Non Specific		26
SUP_UPDATE_SUGGESTED_n	630	Good:Non Specific		27
NO_DATA_CHANGE_TIMEOUT	2000	Good:Non Specific		28
MVC_ENABLE	Enable.	Good:Non Specific		30
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167
FB_LINK_STATUS	Disable.	Good:Non Specific		165
FEATURES	IDShell	Good:Non Specific		163

Even in the transducer block, set the parameter **SYSTEM OPERATION** as “**Redundant**” and close the window



Parameter	Value	Quality	Cha...	Offset
UPDATE_TIME	1000	Good:Non Specific		14
ACTUAL_LINK_ADDRESS_1	0	Good:Non Specific		15
CONF_LINK_ADDRESS_1	0	Good:Non Specific		16
ACTUAL_LINK_ADDRESS_2	292	Good:Non Specific		17
CONF_LINK_ADDRESS_2	0	Good:Non Specific		18
ACTUAL_LINK_ADDRESS_3	293	Good:Non Specific		19
CONF_LINK_ADDRESS_3	0	Good:Non Specific		20
ACTUAL_LINK_ADDRESS_4	294	Good:Non Specific		21
CONF_LINK_ADDRESS_4	0	Good:Non Specific		22
SELECT_IDS	0	Good:Non Specific		23
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24
SYSTEM_OPERATION	Redundant. Redundant. Single.	Good:Non Specific		25
SUP_UPDATE_CONFIGURED_		Good:Non Specific		26
SUP_UPDATE_SUGGESTED_r		Good:Non Specific		27
NO_DATA_CHANGE_TIMEOUT	2000	Good:Non Specific		28

Step 6 – Initializing the Communication with field devices

If necessary, perform Assign Tag for all the field devices. Wait until the Live Lists of all the channels are complete. Proceed according section 1.6 (step 4) and 1.7.

Step 7 – Configuration Download

So, configure the system through the Active module executing all necessary downloads exactly the same way for a non-redundant DFI302 system (section 1.9 and 1.10).

Backup Module

Before connecting the H1 connector to the Backup module, follow the steps below.

Step 1 – Initializing Communication with the Backup Bridge

In the *SYSCON* configuration, put in *On-line mode* and attribute the *Device ID* to the backup bridge. Proceed according the section 1.6, steps 1 to 3 for the Backup station.

Step 2 – Adjusting the Transducer Tag

In the configuration change temporarily the tag of the transducer (Backup must have it different from that one used for Active). In the main menu, go to **Export Tags**.

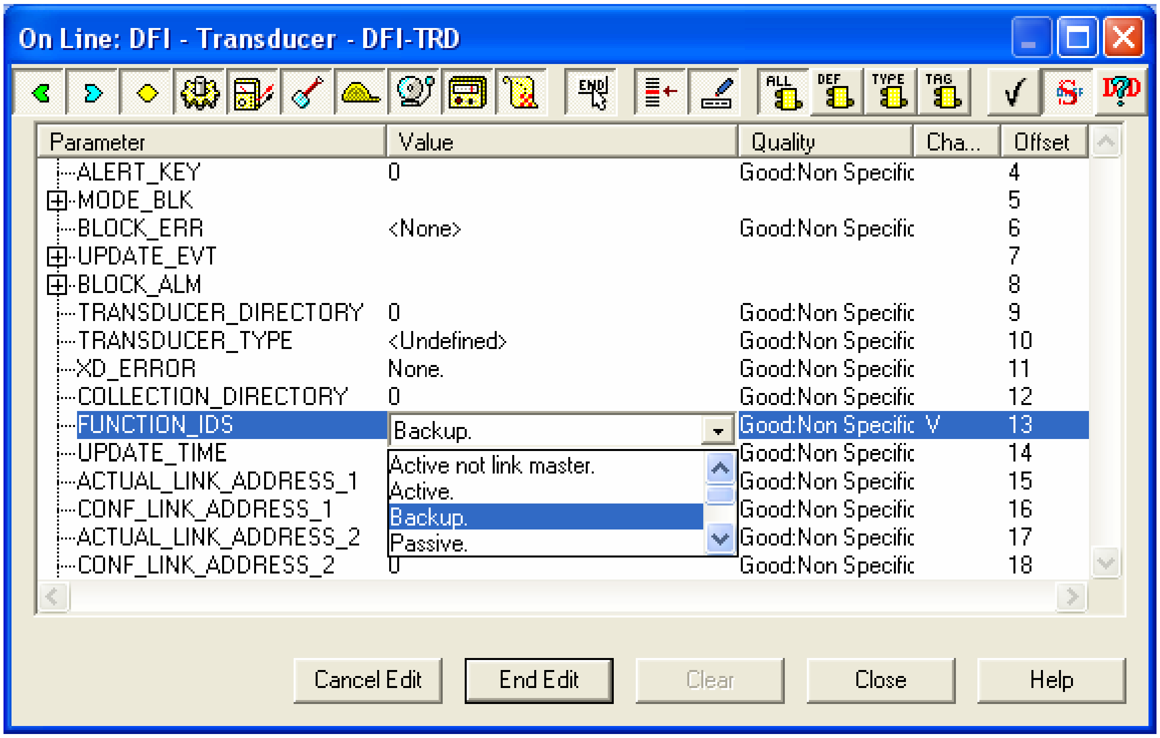
Even in the bridge icon, right-click the field **FB VFD** and then click **Block List**. A new window will be opened showing all the blocks pre-instantiated in the module. Then, in this window, right-click the transducer performing an **Assign Tag** with the tag that is predicted for the Backup in the configuration. Close the *Block List* window.

Step 3 – Reading Profiles

Right-click the *transducer* icon in the *bridge* and choose **On Line Characterization**. Set the parameter *FUNCTION_IDS* as **Passive**.

Step 4 – Connecting the Backup Bridge

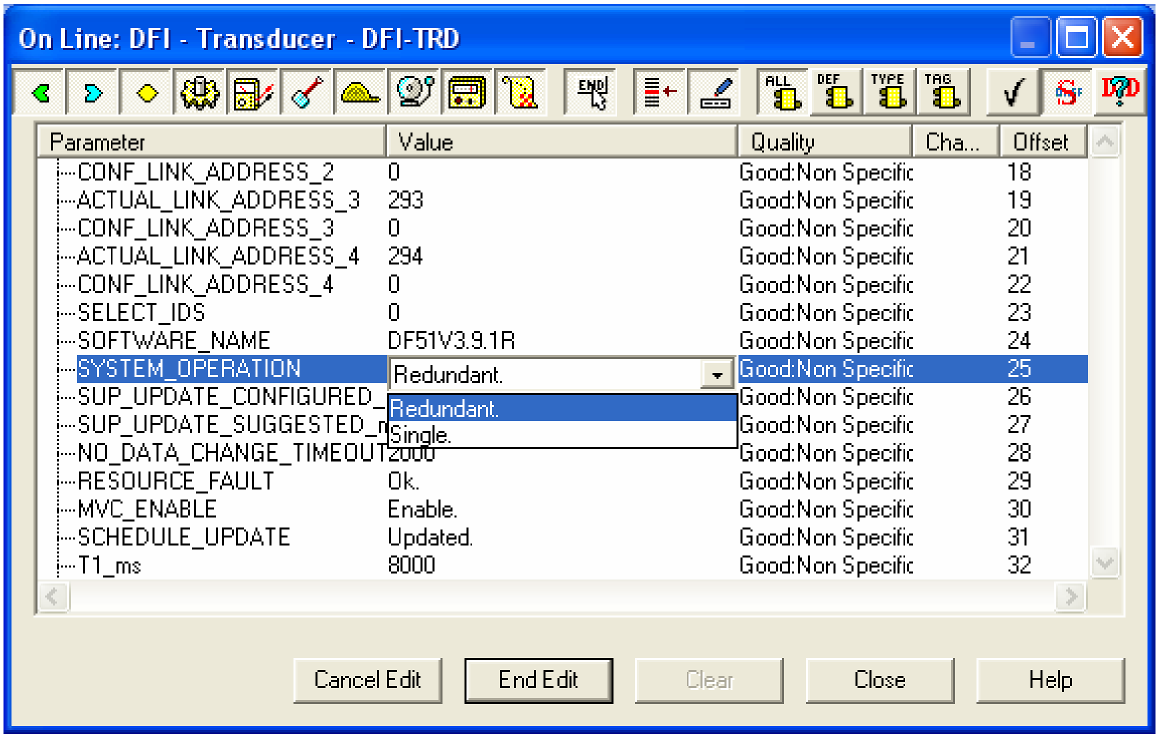
And then, connect the H1 connector to the new module, and after that set the parameter *FUNCTION_IDS* as **Backup**.



Parameter	Value	Quality	Cha...	Offset
ALERT_KEY	0	Good:Non Specific		4
⊞ MODE_BLK				5
BLOCK_ERR	<None>	Good:Non Specific		6
⊞ UPDATE_EVT				7
⊞ BLOCK_ALM				8
TRANSDUCER_DIRECTORY	0	Good:Non Specific		9
TRANSDUCER_TYPE	<Undefined>	Good:Non Specific		10
XD_ERROR	None.	Good:Non Specific		11
COLLECTION_DIRECTORY	0	Good:Non Specific		12
FUNCTION_IDS	Backup.	Good:Non Specific	V	13
UPDATE_TIME		Good:Non Specific		14
ACTUAL_LINK_ADDRESS_1		Good:Non Specific		15
CONF_LINK_ADDRESS_1		Good:Non Specific		16
ACTUAL_LINK_ADDRESS_2		Good:Non Specific		17
CONF_LINK_ADDRESS_2	0	Good:Non Specific		18

Step 5 – Setting System Redundancy

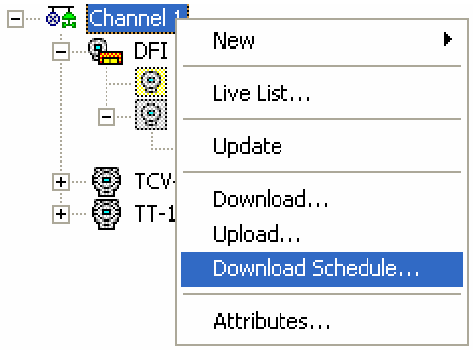
Even in the transducer block, set the parameter *SYSTEM OPERATION* as "**Redundant**" and close the window.



Parameter	Value	Quality	Cha...	Offset
CONF_LINK_ADDRESS_2	0	Good:Non Specific		18
ACTUAL_LINK_ADDRESS_3	293	Good:Non Specific		19
CONF_LINK_ADDRESS_3	0	Good:Non Specific		20
ACTUAL_LINK_ADDRESS_4	294	Good:Non Specific		21
CONF_LINK_ADDRESS_4	0	Good:Non Specific		22
SELECT_IDS	0	Good:Non Specific		23
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24
SYSTEM_OPERATION	Redundant.	Good:Non Specific		25
SUP_UPDATE_CONFIGURED_		Good:Non Specific		26
SUP_UPDATE_SUGGESTED_r		Good:Non Specific		27
NO_DATA_CHANGE_TIMEOUT	2000	Good:Non Specific		28
RESOURCE_FAULT	Ok.	Good:Non Specific		29
MVC_ENABLE	Enable.	Good:Non Specific		30
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31
T1_ms	8000	Good:Non Specific		32

Step 6 – Download Schedule

For each one of the channels used in the configuration right-click the Fieldbus icon and choose the option **Download Schedule**.



Note: The parameter SCHEDULE_UPDATE in the transducer should not be used anymore. Instead of it use the option Download Schedule as described in the step above.

Now, the backup will build your schedule automatically. The redundant system is ready.

PROCEDURE TO SET A DEVICE TO BE LINK MASTER

The field devices have also the capability to become the LAS (Link Active Scheduler) of a fieldbus network if the bridge (original LAS) fails or is disconnected from the networks. It is a very interesting feature because it enables the system to be totally independent from the bridge and, consequently, totally independent from the computer stations, where the bridges are connected.

Link Active Scheduler is the entity in the network responsible for organizing the communication, i.e., it basically dictates when each device is allowed to publish/subscribe data to/from the network.

However, this functionality needs to be set, i.e., by default, the devices are not set to work as link masters. Other important point is that a device can only be set as link master in a system that is already properly functioning, i.e., up and running.

The following steps show how to set a device in an operating system to be link master:

Step 1 – Initializing Syscon Communication

Unless the user already has the *Syscon* communicating with the device, open the *Syscon* configuration and proceed according the section 1.6 (Initializing Communication), steps 2, 4 and 6 only. (Note that the step 3 do not has to be repeated because it has to be executed just in the first time that a device is used in the network).

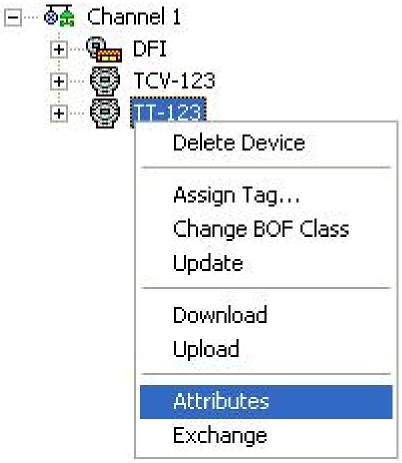
Step 2 – Selecting the right device

Select the device configured with less function blocks and less external links. This device is the one that originally performs fewer functions in the network, and so, it is the best choice for a new task assignment - the link master function.

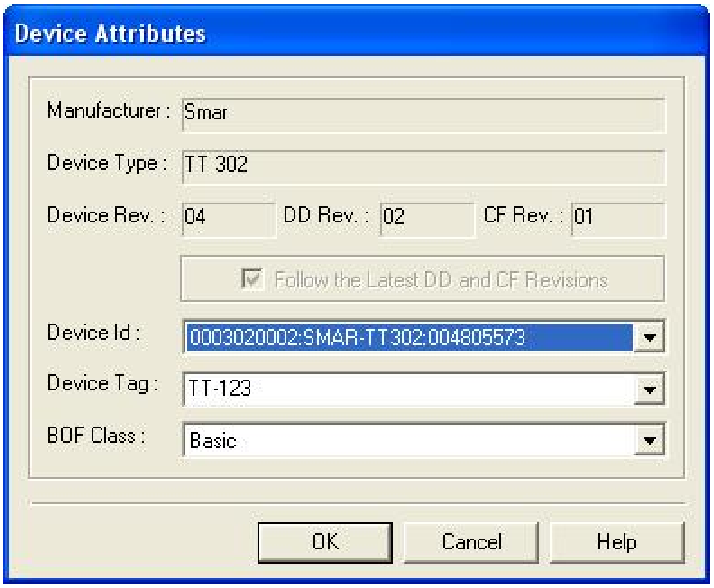
External Link is a link between function blocks of different devices.

Step 3 – Change the device BOF class

Inside the Fieldbus window, right-click over the device icon to activate the popup menu and select **Attributes**, as in the figure:



The following windows will be prompted:



Device Attributes

Manufacturer : Smar

Device Type : TT 302

Device Rev. : 04 DD Rev. : 02 CF Rev. : 01

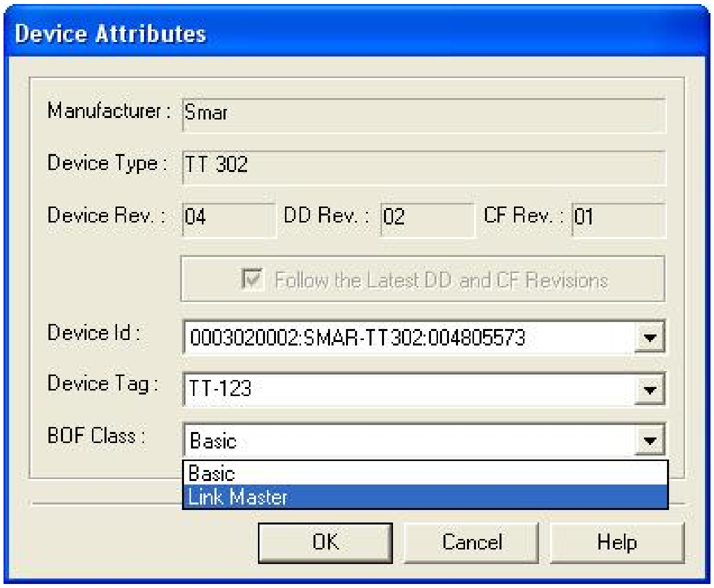
☑ Follow the Latest DD and CF Revisions

Device Id : 0003020002:SMAR-TT302:004805573

Device Tag : TT-123

BOF Class : Basic

Change the BOF class to Link Master, as in the figure:



Device Attributes

Manufacturer : Smar

Device Type : TT 302

Device Rev. : 04 DD Rev. : 02 CF Rev. : 01

☑ Follow the Latest DD and CF Revisions

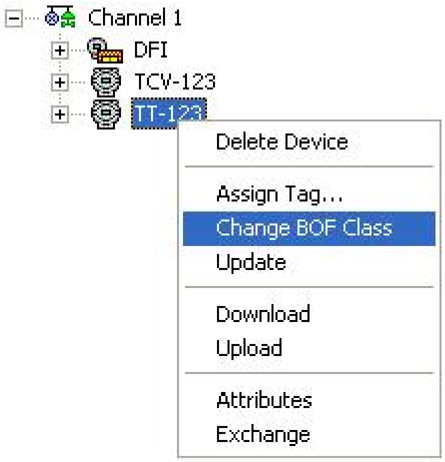
Device Id : 0003020002:SMAR-TT302:004805573

Device Tag : TT-123

BOF Class : Basic

Close the Attributes window.

Right-click over the device icon again and select **Change BOF Class**.



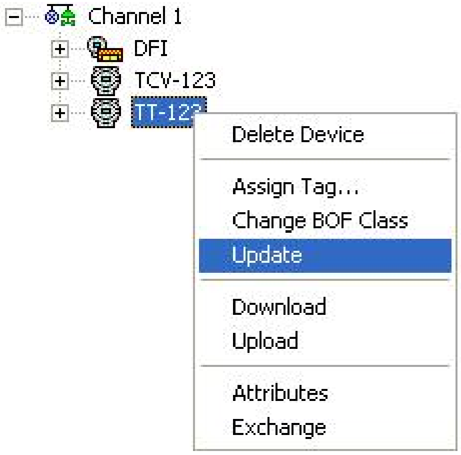
Step 4 – Turn the device off and back on

Wait 30 seconds until the device save the changes and turn off the device by disconnecting its wires, then wait ten seconds and turn the device back on.

Step 5 – Download

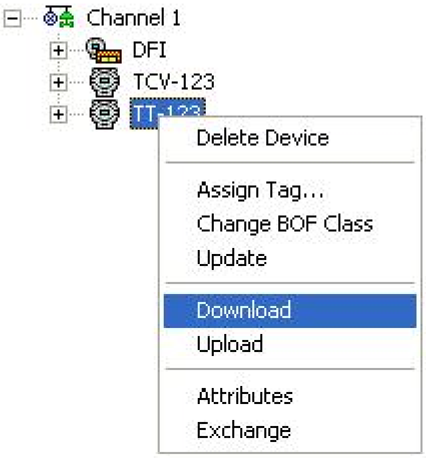
Proceed with an update on this device and wait until it finished.

Right-click over the device icon to activate the popup menu and select **Update**.



Then, proceed with a download on this device.

Right-click over the device icon to activate the popup menu and select **Download**.


Channel 1
DFI
TCV-123
TT-123
Delete Device
Assign Tag...
Change BOF Class
Update
Download
Upload
Attributes
Exchange

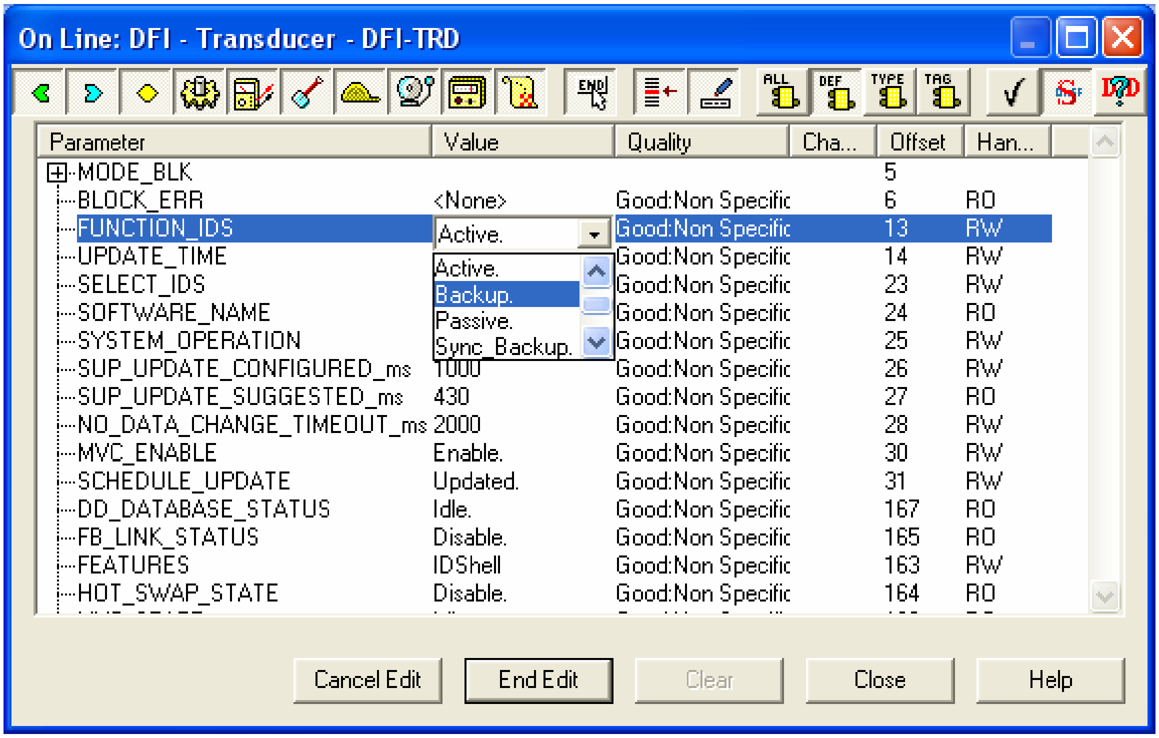
PROCEDURE TO SET THE BRIDGE TO ACTIVE, BACKUP OR PASSIVE

Step 1 – Initializing Communication

Proceed according section 1.6, steps 2 and 3 for the active or master station.

Step 2 – Changing the Parameter

Select **On Line Characterization** for the transducer block and change the parameter **FUNCTION_IDS** to **Passive, Backup**, **Active Not Link Master** or **Active**, and click **End Edit.** See the next picture as an example:



On Line: DFI - Transducer - DFI-TRD

Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Active.	Good:Non Specific		13	RW
UPDATE_TIME		Good:Non Specific		14	RW
SELECT_IDS		Good:Non Specific		23	RW
SOFTWARE_NAME		Good:Non Specific		24	RO
SYSTEM_OPERATION		Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	1000	Good:Non Specific		26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	2000	Good:Non Specific		28	RW
MVC_ENABLE	Enable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

Active.
Backup.
Passive.
Sync_Backup.

PROCEDURE TO BRING REDUNDANT STATIONS BACK

There is also a procedure to bring the stations back on after they have been turned off for some reason. If you turn them on at the same time, there will be many collisions on the network because both bridges (Active and Backup) will try to become the LAS at the same time. It will cause a delay for the perfect communication to be established. So, in order to avoid that problem proceed as follows.

Step 1 – Turning the First Station On

Turn the first station on. Wait until it is on-line.

Step 2 – Turning the Second Station On

Turn the second station on.

Chapter 6

PROCEDURE TO CONNECT A REDUNDANT WORKSTATION WHEN THE H1 CABLE BREAKS

If a fail occurs in a segment of H1 line such that it affects only one module, the redundancy will cover this fail. But, if the H1 cable is re-connected at once, the noise introduced in the line will cause communication problems for some time. In order to avoid that problem, follow the procedure below.

Step 1 – Deactivating the Bridge

Put the module affected by H1 cable fail in *Hold* using the *FBTools*.

Step 2 – Re-connecting the cable

Fix up the cable connection.

Step 3 – Activating the Bridge

Perform a *Reset* in the affected module in order it returns operating.

When using *Hot Standby Redundancy*, the module will be automatically recognized by the Active and both will stay in *Synchronizing* for some time. As soon the system get the *Synchronized* status and <none> in the parameters *Bad Conditions*, the redundancy will be fully available and failure simulations can be performed.

In *LAS Redundancy*, the system will be fully available and failure simulations can be performed.

Chapter 7

PROCEDURE TO UPDATE A BRIDGE FIRMWARE TO A REDUNDANT SYSTEM

This procedure describes how to update the firmware of both modules without process interruption.

7.1 - Hot Standby Redundancy

Step 1 – Firmware Download – Active Module

Be sure the system is in the *Synchronized* status and it has <none> in the parameters *Bad Conditions*. So, using *FBTools* update the firmware of the *Active* module. At this moment, the other module will take over.

Step 2 – Synchronizing the modules

After the firmware update was finished, the modules will start to synchronize with each other, with the Active transferring the entire configuration to the other one. Wait for the system get the *Synchronized* status and it has <*none*> in the parameters *Bad Conditions*.

Step 3 – Firmware Download – Backup Module

Using *FBTools* update the firmware of the Backup module. At this moment, the other module will take over.

Step 4 – Synchronizing the Modules

After the firmware update was finished, the modules will start to synchronize with each other, with the Active transferring the entire configuration to the other one. As soon the system get the S*ynchronized* status and has <*none*> in the parameters *Bad Conditions*, the redundancy is fully available again and failure simulations can be performed.

7.2 - LAS Redundancy

Step 1 – Firmware Download – Active Module

Using *FBTools* update the firmware of the *Active* module. At this moment, the other module will take over.

Step 2 – Synchronizing the Modules

After the firmware update had finished successfully, follow the steps 4 to 9 of section 8.1.1, *"Replacing an Active module with failure"*.

Wait around one minute in order the Active module become the LAS again (the Active is always the preferential in this mode of redundancy).

Step 3 – Firmware Download – Backup Module

Using FBTools update the firmware of the Backup module.

Step 4 – Configuring the Backup Module

After the firmware update had finished successfully, follow the steps 1 to 5 of the section 2.4.1, *"First time configuration procedure-Backup Module"*.

Chapter 8

REPLACING A MODULE WITH FAILURE

If the Active module fails, the Backup module takes over as LAS (Link Active Scheduler). Follow this procedure to replace the bridge from the Active Station.

8.1 -Hot Standby Redundancy

Step 1 - Deactivating the bridge

Disconnect the H1 connector from the Active module and insert the new module in the backplane.

Step 2 – Firmware Download

Update the firmware in the new module, if necessary. Follow the steps described in the section 2.1 to select the firmware file for download. Perform a Factory Init in the new module in order to grant the default state.

Step 3 – Reconnecting the Bridge

Reconnect the H1 connector to the new module.

Step 4 – Recognizing the Modules

The new module will be automatically recognized by the Active and both will stay in *Synchronizing* for some time. As soon the system get the *Synchronized* status and <*none*> in the parameters *Bad Conditions*, the redundancy will be fully available and failure simulations can be performed.

8.2 -LAS Redundancy

Replacing an Active module with failure

Step 1 - Deactivating the bridge

With the H1 connector disconnected, insert the new module in the backplane.

Step 2 – Firmware Download

Update the firmware in the new module, if necessary. Follow the steps describe in the section 2.1 to select the firmware file for download. Perform a Factory Init in the new module in order to grant the default state.

Note: Before connecting the H1 connector to the new module follow the steps bellow.

Step 3 – Initializing Communication

Proceed according section 1.6, steps 2 and 3, for the active or master station.

Step 4 – Adjusting the Transducer Tag

Even in the bridge icon, right-click the field *FB VFD* and then click *Block List*. A new window will be opened showing all the blocks pre-instantiated in the module. Then, in this window, right-click the transducer performing an *Assign Tag*, according to the serial number of the Active station Close the Block List window. In the main menu go to *Export Tags*.

Step 5 – Reading the Profiles

Right-click the transducer icon in the bridge and choose *On Line Characterization*. Set the parameter *FUNCTION_IDS* as *Passive*.

Step 6 - Reconnecting the Bridge

Now, connect the H1 connector to the new module, and after that set the *FUNCTION_IDS* as *Active Not Link Master*.

Step 7 – Setting System Redundancy

Even in the transducer, *On Line Characterization,* set the parameter *SYSTEM_OPERATION* as *Redundant*.

Step 8 – Download Schedule

For each one of the channels used in the configuration right-click the *Fieldbus* icon and choose the option *Download Schedule*.

Step 9 – Activating the Master Station

Change the parameter *FUNCTION_IDS* from *Active Not Link Master to Active*.

> **Note:** Option **Active not link master** is available only for PCI firmware version 3.3.5.20, DFI firmware version 3.0.8.9 and upper. For the PCI, it is also required to replace the DD files (.ffo and .sym) to files generated Tuesday, January 18, 2000 3:13 PM for all versions (0101, 0102 and 0103).

Replacing an Backup module with failure

Step 1 - Deactivating the bridge

With the H1 connector disconnected, insert the new module in the backplane.

Step 2 – Firmware Download

Update the firmware in the new module, if necessary. Perform a *Factory Init* in the new module in order to grant the default state.

> **Note:** Before connecting the H1 connector to the new module follow the steps bellow.

Step 3 – Configuring the Backup Module

Follow the steps 1 to 6 of the section 2.4.1, “*First time configuration procedure-Backup Module*”.

PROCEDURE TO REPLACE A FIELD DEVICE

Step 1 – Checking the device version

Make sure the new device has the same version as the old one.

To check the version turn the device off and on, the version will show up in the display. If you have a different version, please contact **Smar**, or upgrade the version using *FBTools*.

Step 2 – Replacing the device physically

Disconnect the old device and connect the new one.

Step 3 – Changing the configured device ID

On *Syscon*, initialize the communication and change the device ID of the device in the configuration to the one of the new device connected to the bus. (In case of doubts, please refer to the section 1.6, steps 2 through 6).

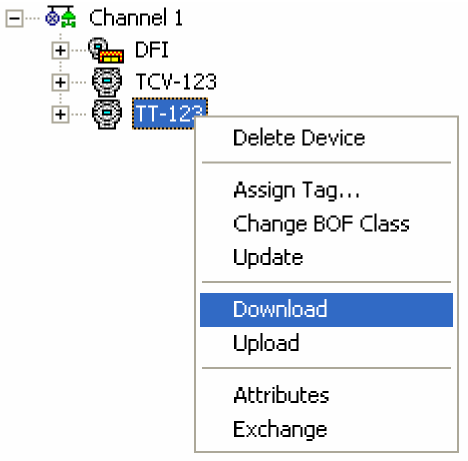
Step 4 – Assigning the Tag

Assign the configured tag to the field device. (In case of doubts, please refer to the section 1.7).

Step 5 – Download

Proceed with a download on this device.

Right-click over the device icon to activate the popup menu and select **Download**.



Chapter 10

PROCEDURE TO REPLACE THE PCI CARD

If you need to replace a PCI card for some reason, proceed as follow:

Step 1 – Replacing Physically the PCI

Turn the computer off.

Replace the PCI card in the ISA slot of the computer.

Step 2 – Setting the PCI Dip-Switches

Position the new PCI dip switches the same way they were for the old PCI (if you have doubts here, please refer to the section 1.2.1, step 2 of this document).

Step 3 – Setting the PCI IRQ

Turn the computer on.

Run the program **Interface Setup** to set the IRQ for the PCI card. In this program the I/O is set and also the IRQ. The I/O must be the same set in the dip switch configuration. (In case of doubts, please refer to the section 1.2.1, step 3 of this document).

Chapter 11

PROCEDURE TO CONFIGURE THE SUPERVISION TIME

The *Supervision Time* is the time required for the Interface card to acquire the entire field device's data destined for the supervision workstation. Remember that this data is sent through the background time part of the macro cycle part. During the *Supervision Time* the interface device completely refreshes its internal database. So, it only makes sense to be performed in a system that is already up and running, together with all HMI (Human Machine Interface) software involved.

The transducer block has four (4) parameters that are used to optimize the supervision in *System302*.

- Parameter 1: SUP_UPDATE_CONFIGURED_ms
- Parameter 2: SUP_UPDATE_SUGGESTED_ms

These two parameters define the time that the bridge has to poll the supervision data from the devices.

- Parameter 3: NO_DATA_CHANGE_TIMEOUT_ms

No data change is a mechanism to optimize the data transference between the bridge and the HMI software. With this mechanism the bridge will only send data that has changed.

The HMI has a time-out for the data, which means that if it does not receive a communication point after a certain period it will indicate lack of communication. That is where the **NO_DATA_CHANGE_TIMEOUT_ms** comes in. It will define a time-out to the bridge, if a certain value does not change over that period it will be sent to the HMI any way, avoiding the HMI time-out to expire.

Note: Good values for the parameter **NO_DATA_CHANGE_TIMEOUT_ms** are between the ranges 2500 to 6000, depending on the configuration load.

- Parameter 4: MVC_ENABLE

MVC - Multiple variable containers, is a data container that will have all the supervised points of a device. If it is disabled the supervised points are sent through block views. Each block has 4 views, which gives a lot of overhead to the communication.

The MVCs come to optimize this communication, send only one big packet per device instead of 4 small ones per block.

To enable it, just set the MVC_ENABLE parameter to "**Enable**".

11.1 – Defining the Update Time for Supervision

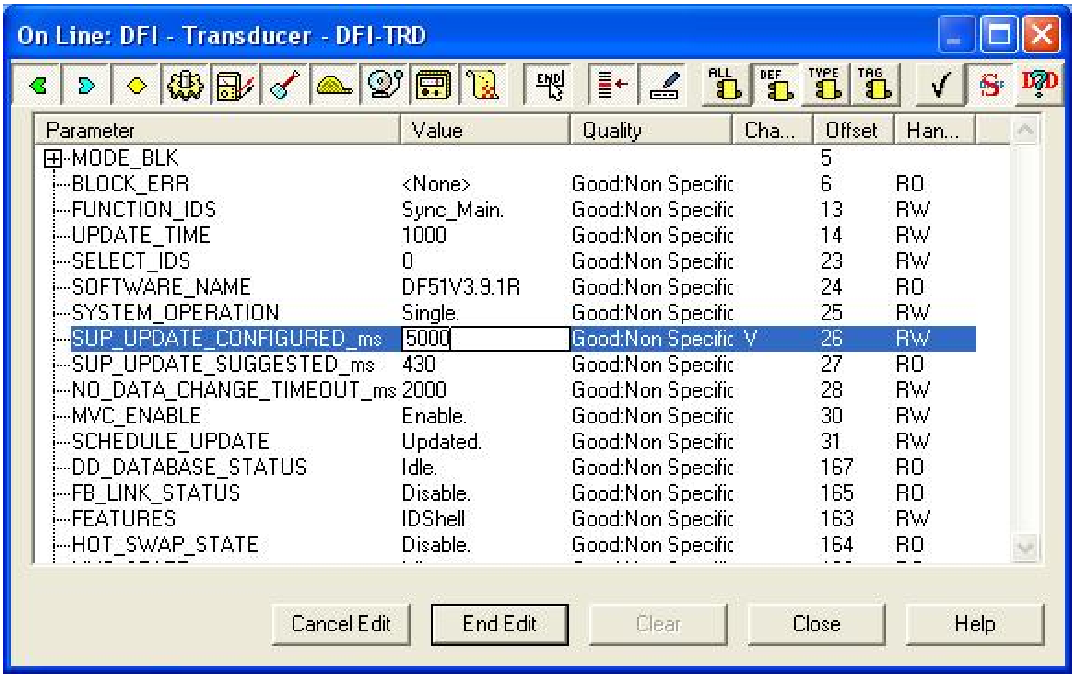
Update Time is the time that a data shown in the workstation screen takes to be refreshed. During the *Update Time* the HMI software reads the interface device database and updates its own database, using this one to refresh the values in the screen. The interface card can be configured to send all the values to the HMI or only the ones that have been changed, optimizing in this way the update time and reducing the load on the data highway.

Step 1 – Syscon communication Initialization

Open *Syscon* and initialize the communication, according the section 1.6, steps 2, 4 and 6 of this document.

Step 2 – Initial setting of the parameter SUP_UPDATE_CONFIGURED_ms

In *Syscon*, choose **On Line Characterization** for the transducer block and set **SUP_UPDATE_CONFIGURED_ms** to "**5000**", and click the button **End Edit.** See the next picture as an example:



Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Sync_Main.	Good:Non Specific		13	RW
UPDATE_TIME	1000	Good:Non Specific		14	RW
SELECT_IDS	0	Good:Non Specific		23	RW
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24	RO
SYSTEM_OPERATION	Single.	Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	5000	Good:Non Specific	V	26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	2000	Good:Non Specific		28	RW
MVC_ENABLE	Enable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

Step 3 – Closing Syscon

Close the *Syscon* Application.

Step 4 – Running the HMI

Run the HMI software and make sure it is the only OPC client (client of the *OLE Server*) available.

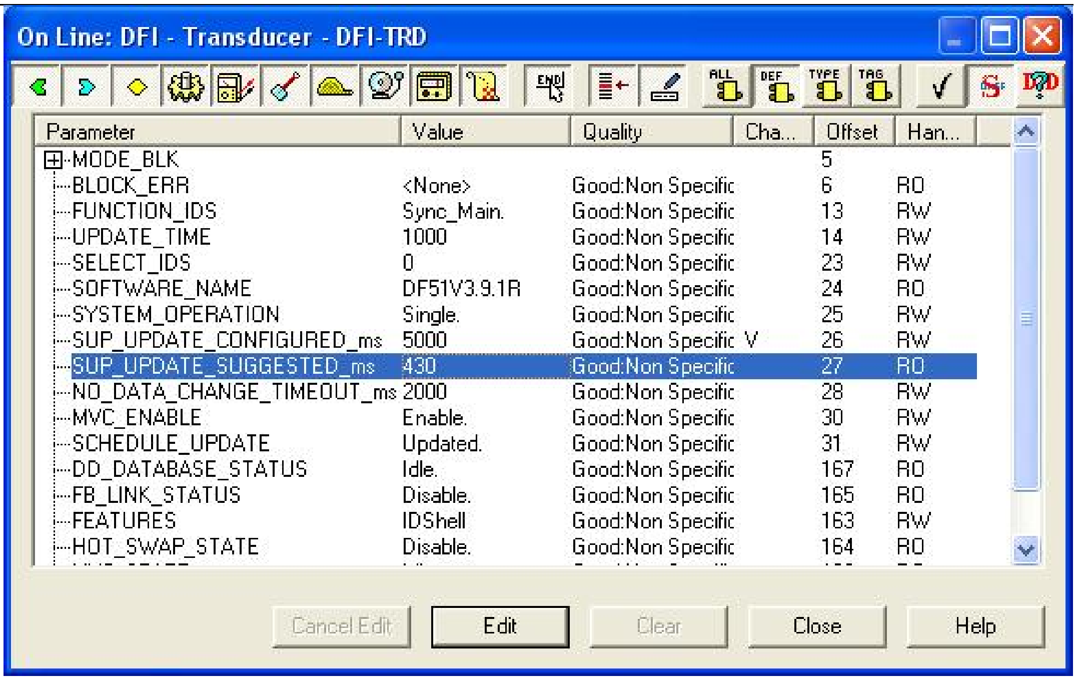
Leave the HMI software running alone for 10 minutes.

Step 5 – New Syscon Communication Initialization

Open *Syscon* and initialize the communication, according the section 1.6, steps 2, 4 and 6 of this document.

Step 6 – Check the value in SUP_UPDATE_SUGGESTED_ms

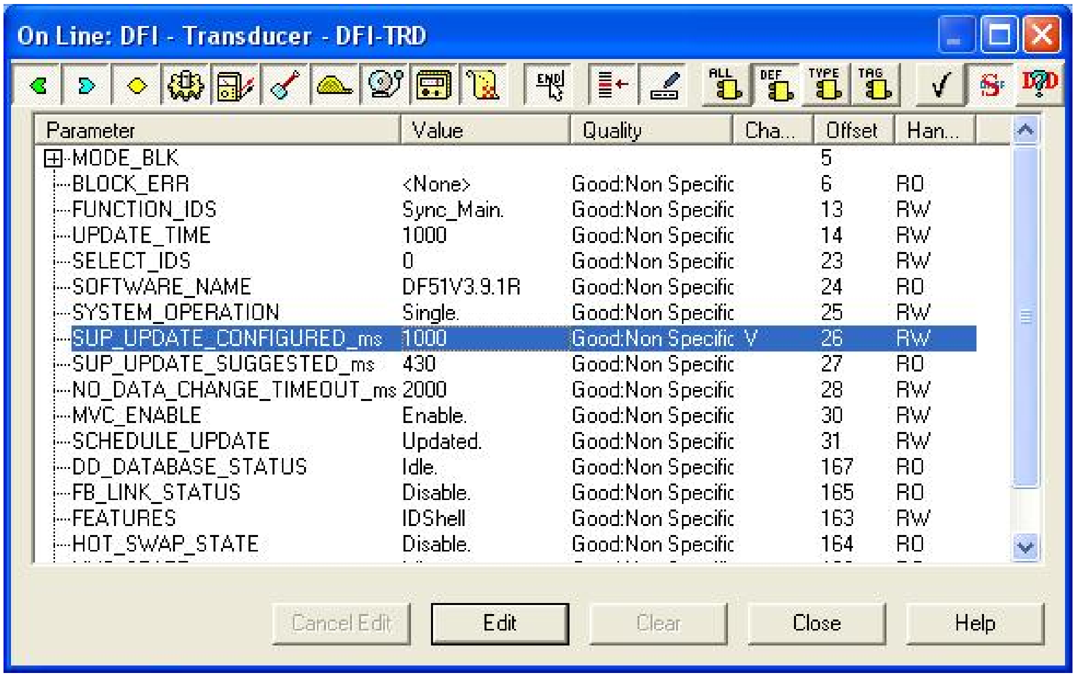
In *Syscon*, choose **On Line Characterization** for the transducer block and read the parameter **SUP_UPDATE_SUGGESTED_ms.** See the next picture as an example:



On Line: DFI - Transducer - DFI-TRD

Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Sync_Main.	Good:Non Specific		13	RW
UPDATE_TIME	1000	Good:Non Specific		14	RW
SELECT_IDS	0	Good:Non Specific		23	RW
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24	RO
SYSTEM_OPERATION	Single.	Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	5000	Good:Non Specific	V	26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	2000	Good:Non Specific		28	RW
MVC_ENABLE	Enable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

Still in this On Line Characterization window, set the parameter **SUP_UPDATE_CONFIGURED_ms** to the suggested value, plus 500 or more.



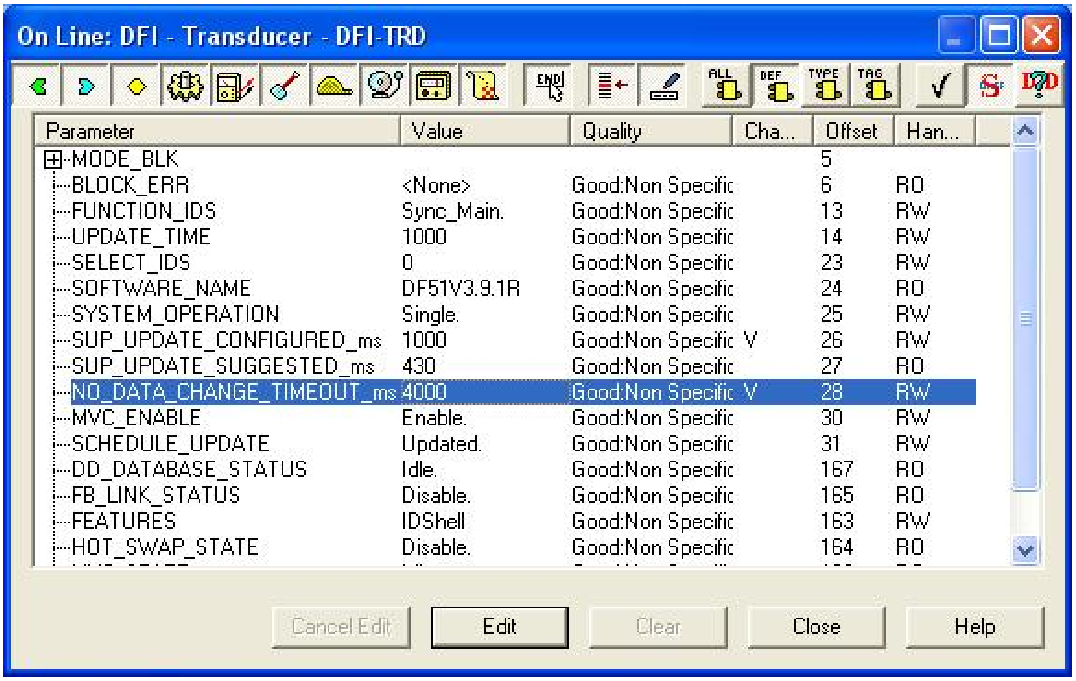
On Line: DFI - Transducer - DFI-TRD

Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Sync_Main.	Good:Non Specific		13	RW
UPDATE_TIME	1000	Good:Non Specific		14	RW
SELECT_IDS	0	Good:Non Specific		23	RW
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24	RO
SYSTEM_OPERATION	Single.	Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	1000	Good:Non Specific	V	26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	2000	Good:Non Specific		28	RW
MVC_ENABLE	Enable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

This configuration will define the time the bridge must poll all the supervisory data from the devices. The more time you allow to it, more time the system has to maintenance and administration, like assigning tags or recovering devices.

11.2 – Setting the No-Data Change Timeout

In *Syscon*, choose **On Line Characterization** for the transducer block and set **NO_DATA_CHANGE_TIMEOUT_ms** to a value up to 6000**.** See the next picture as an example:

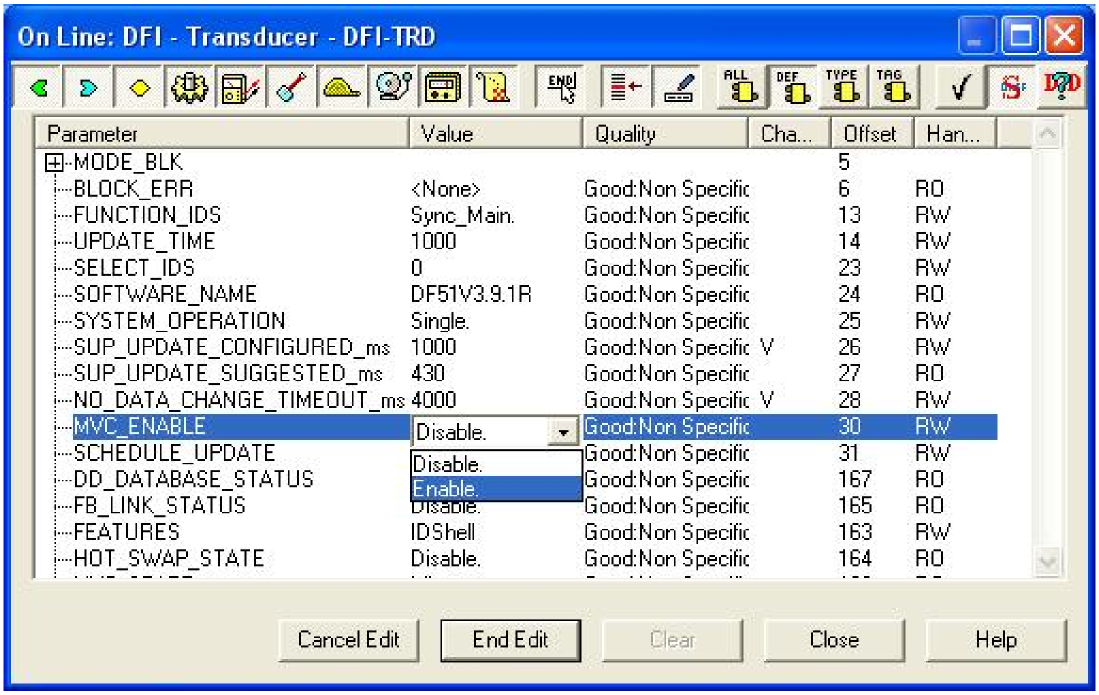


Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Sync_Main.	Good:Non Specific		13	RW
UPDATE_TIME	1000	Good:Non Specific		14	RW
SELECT_IDS	0	Good:Non Specific		23	RW
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24	RO
SYSTEM_OPERATION	Single.	Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	1000	Good:Non Specific	V	26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	4000	Good:Non Specific	V	28	RW
MVC_ENABLE	Enable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE	Updated.	Good:Non Specific		31	RW
DD_DATABASE_STATUS	Idle.	Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

After you set this parameter, check the HMI supervision. If you have communication problems, try increasing the value of this parameter.

11.3 – Enabling the MVC

In *Syscon*, choose **On Line Characterization** for the transducer block and set the parameter **MVC_ENABLE** to **Enable**. See the next picture as an example:



Parameter	Value	Quality	Cha...	Offset	Han...
⊞ MODE_BLK				5	
BLOCK_ERR	<None>	Good:Non Specific		6	RO
FUNCTION_IDS	Sync_Main.	Good:Non Specific		13	RW
UPDATE_TIME	1000	Good:Non Specific		14	RW
SELECT_IDS	0	Good:Non Specific		23	RW
SOFTWARE_NAME	DF51V3.9.1R	Good:Non Specific		24	RO
SYSTEM_OPERATION	Single.	Good:Non Specific		25	RW
SUP_UPDATE_CONFIGURED_ms	1000	Good:Non Specific	V	26	RW
SUP_UPDATE_SUGGESTED_ms	430	Good:Non Specific		27	RO
NO_DATA_CHANGE_TIMEOUT_ms	4000	Good:Non Specific	V	28	RW
MVC_ENABLE	Disable.	Good:Non Specific		30	RW
SCHEDULE_UPDATE		Good:Non Specific		31	RW
DD_DATABASE_STATUS		Good:Non Specific		167	RO
FB_LINK_STATUS	Disable.	Good:Non Specific		165	RO
FEATURES	IDShell	Good:Non Specific		163	RW
HOT_SWAP_STATE	Disable.	Good:Non Specific		164	RO

INTEGRATING VARIABLES BETWEEN FIELDBUS AND LC700

Introduction

The **Smar's** Programmable Controller, the LC700, is a unique programmable controller in the market because it has a special module, the fieldbus module or simply FB700.

This module is basically an electronic board that serves as an interface data between the Fieldbus networks and the programmable controller's CPU. This feature is very powerful because it gathers all the control strategies along the fieldbus to the Programmed Logic inside the programmable controller.

For example, a pressure value can be sent from a fieldbus segment to the programmable controller and being used as an interlock condition; Or, in other situation, a switch position can sent from the programmable controller to the fieldbus and determine a valve to be sent to a desired position. These are only two simple examples of the advantages of it.

In this scenario, this document informs the necessary configurations that are necessary to transfer digital and analog variables among Fieldbus networks and the LC700.

Knowledge on how to use the software *Syscon* and Conf700 is considered pre-requisites to understand the contents of this guideline. So, in case of doubts, consult the *Syscon* and Conf700 manual for reference.

1 – Overview

What exactly enables the transference of data between fieldbus and the PLC is that the FB700 module is connected to a fieldbus segment and also to a PLC set, and that the FB700 has related function blocks that are configured in both software, Conf700 and in *Syscon*. The following table shows how these function blocks are related.

Conf700 (PLC configuration)		**Syscon (Fieldbus configuration)**	
CODD	(Communication Output of Digital Data)	MDI	(Multiple Digital Input)
CIDD	(Communication Input of Digital Data)	MDO	(Multiple Digital Output)
COAD	(Communication Output of Analog Data)	MAI	(Multiple Analog Input)
CIAD	(Communication Input of Analog Data)	MAO	(Multiple Analog Output)

Note that what is an output function block for the PLC is an input function block for the fieldbus. This relative concept is important to be understood to avoid confusions later on.

So, what happens is that the FB700 automatically transfers what is configured in the output blocks in the Conf700 to their respective input function blocks in *Syscon* and vice-versa.

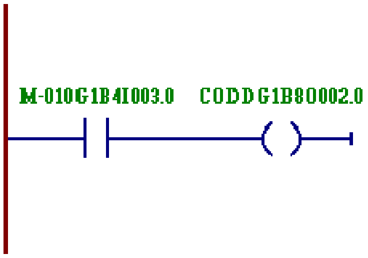
Each one of these function blocks have eight I/O (Inputs or Outputs) points.

Lets check now the next sections, which describes the necessary configuration for the four possible types of data transfer.

2 – Transferring a Digital value from the PLC to Fieldbus

It is necessary to have at least one Digital input module, such as the M-010, which has eight 120 VAC inputs, and a Fieldbus card (FB700) with at least one function block, the CODD (Communication Output of Digital Data) set in the LC700.

The necessary configuration in the PLC, which is made through the software Conf700, is as shown in the next figure where the first input of the module M-010 (in this example) is being passed to the first output of the function block CODD.

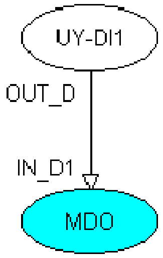


Note: The last digit of the default label shown in the figure (CODDG1B8O002.0) means the I/O number, which starts from 0 and goes till 7 (eight I/O). So, in the figure we have configured the first points of those groups (M-010 and the CODD) configured.

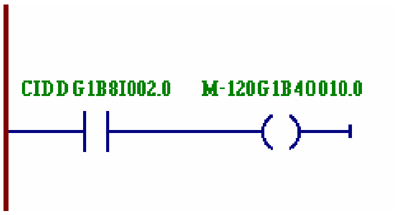
This way, the digital value is available to the fieldbus (now, using the software *Syscon*), in the first output of the fieldbus function block MDI (Multiple Digital Input) of that FB700, which is **OUT_D1**. This output parameter can be linked to any digital input parameter of the other blocks available on the bus. If the value is needed only for monitoring purposes, it is not necessary to make links.

3 – Transferring a Digital value from the Fieldbus line to the PLC

In *Syscon*, it is necessary to configure a link of any digital value to an input of the block MDO, as in the following picture.



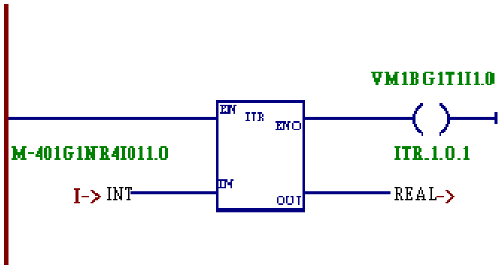
Them, the digital value will be available for the PLC logic in the FB block CIDD (Communication input of digital data) present in the FB700. Then, it is possible to use this value, for example, to activate an output of a digital output module, such as in the example below:



4 – Transferring an analog value from the PLC to the Fieldbus line

We could use, for instance, the analog module M-401 passing the value of one of its inputs to the FB700, through the block COAD (Communication Output of Analog Data).

So, it would look like this:



Note that it is necessary to use a built in function block to connect the M-401 point to the COAD point. The function block used is the ITR (Integer to Real converter), which converts an Integer value to Real, because the variables of the analog module M-401 are Integer while the variables of the COAD are Real.

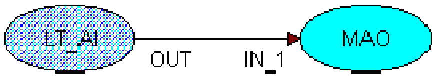
So, the first input of the M-401 was connected to the first input of the COAD, in this case with default label COADG1F8O002.0. This label is not shown in the ladder because more them one point can be linked to that same function block output.

That function has also the input EN that is set to true so the function is executed. Also, the other output, ENO, is required to be linked to something so the block will operate. In this case we just connected it to a not used virtual variable.

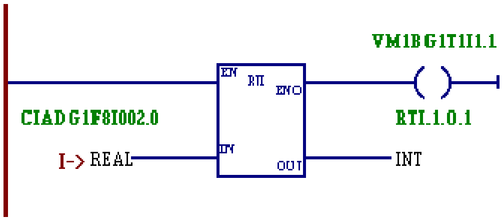
Now, this value is already available at the first output of the function block MAI of the FB700 in *Syscon* to be linked to any analog input of other fieldbus function blocks, or just to be monitored (in this last case, no links are necessary).

5 – Transferring an analog value from the Fieldbus to the PLC

In *Syscon*, links can be made connecting analog outputs of any function block to an input of the block MAO. See an example in the next figure:



In this situation, the analog value will be available at the first output of the FB block CIAD (Communication Input of Analog Data) present in the FB700 to be used in the Conf700. And this value can be used to be connected to an analog output module as the M-501 or used in one of the many functions available in the Conf700 (ADD, PID, and so on). So, for instance lets link it to an output of the M-501 (LC700 analog output module).



In this example, we used a function RTI (Real to Integer converter) to convert a Real data to an Integer data so the value can be passed to the module M-501, which deals with Integer type of variables. Note that the label for the point used in the M-501 is also not shown, which can only be viewed on the label dialog box of the Conf700.

Also the I/Os EN and ENO were linked as shown for the same reasons explained in section 4.

These were simple examples that cover all possibilities of data sharing between Fieldbus and LC700, If you need more details on that of if any additional information should be present, please e-mail your questions or comments to di@smar.com.br.

Appendix B

ICS / DF65 APPLICATION BULLETIN

Introduction

The Computer and the DF65 communicate between each other based on the Master-Slave MODBUS RTU protocol. This means that the host Computer always needs to have the initiative of the transaction sending a command to the DF65. The DF65 will receive the request and send a response after interpretation.

The DF65 has three non-independent serial ports. Only one can be used at a time!
The CPU Module carries a DB9 connector for RS-232C and regular terminals for the RS-485 physical connections. Communication with the CPU module can be established via the Serial Port RS-232C (EIA-232C) for local connection or RS-485 (EIA-485) for long distance connections in an industrial environment. The protocol in both of these channels is the same MODBUS RTU.

These channels can be used for configuration or monitoring. When the RS-232 channel is used, it automatically seals the other (RS-485) and maintains communication with the local computer until disconnected.
The RS-232C is oriented for local connection and is only a point-to-point transaction while the RS-485 provides multi-drop capability and better noise immunity performance for high speed and larger distance communication. It is a balanced kind of communication signal more oriented for industrial sector.

Throughout the RS-232C or RS-485 using Modbus protocol, we can access:

- All I/O signals from the Modules and Auxiliary variables created (Virtual Variables).

- All linked signals from the I/O blocks in the Fieldbus Module channel (Analog or Digital Variables).

Most Man Machine Interface packages in the market are able to interact with the DF65 for monitoring purposes.

For industrial and long distance connections it is recommended to use an RS-485 network. Considering the fact that most of host computers have their serial ports with RS-232C, the user will need to find a converter for his application in order to use an RS-485 network.

It is recommended to use an RS-232 to RS-485 interface/converter optically isolated for a better system protection.

SMAR ICS2.0PRS-232 to RS-485 interface/converter is a perfect fit for the DF65 once it is optically isolated and has been tested on industrial environments.

SMAR DF65 programmable controller has two Half duplex EIA485 (RS-485) communication channels. The ICS2.0Pneeds to be set to work without echo, and we will be able to connect up to 31 DF65's.

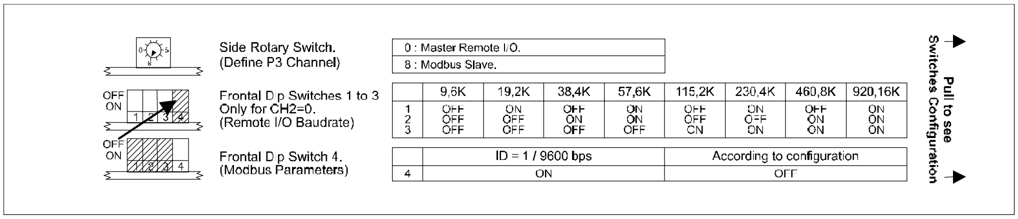
The following instructions must be observed to proceed a correct installation.

Serial Communication Settings

Device Communication Baud rate and Device Address

The CPU module has a key where user may select default communication parameters (DCP, Switch 4 ON) or programmed communication parameters (PCP, Switch 4 OFF). Default parameters are address 1 and baud rate 9600 bits/s.

In the PCP position user might select new address and/or baud rate, using LogicView. The new adjust of parameters will be accepted only after the key being moved to the PCP position. In the PCP position user also is able to change communication parameters. In this case they will be accepted immediately after they have been sent.



Side Rotary Switch.
(Define P3 Channel)

0 : Master Remote I/O.
8 : Modbus Slave.

Frontal Dip Switches 1 to 3
Only for CH2=0.
(Remote I/O Baudrate)

	9,6K	19,2K	38,4K	57,6K	115,2K	230,4K	460,8K	920,16K
1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
3	OFF	OFF	OFF	OFF	ON	ON	ON	ON

Frontal Dip Switch 4.
(Modbus Parameters)

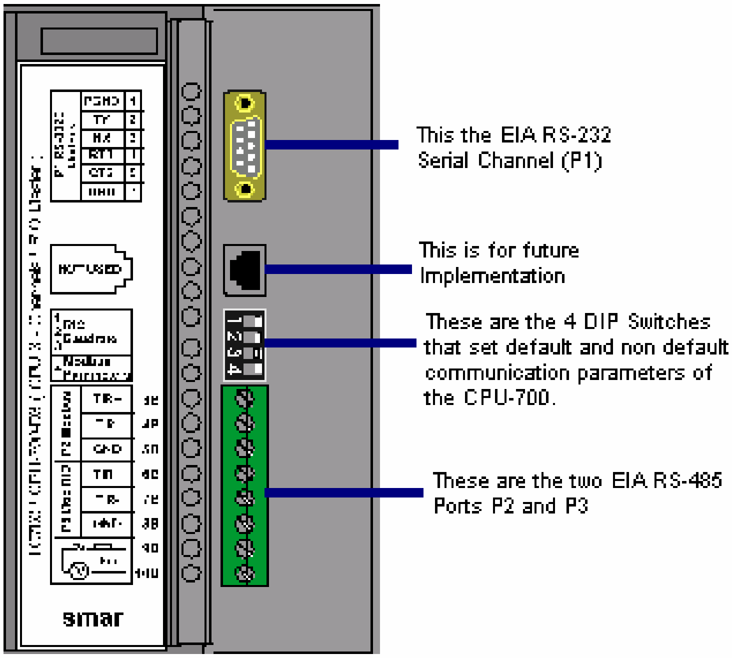
	ID = 1 / 9600 bps	According to configuration
4	ON	OFF

Setting the DIP Switches

Communication Switch

In the CPU module, between the communication ports, there is a group of 4 switches. Using a small screwdriver make sure that the lowest key is pointing to the left (user looking to the frontal of the module). In this position the CPU has default communication parameters: Device ID= 1, baud rate= 9600 bps and even parity.

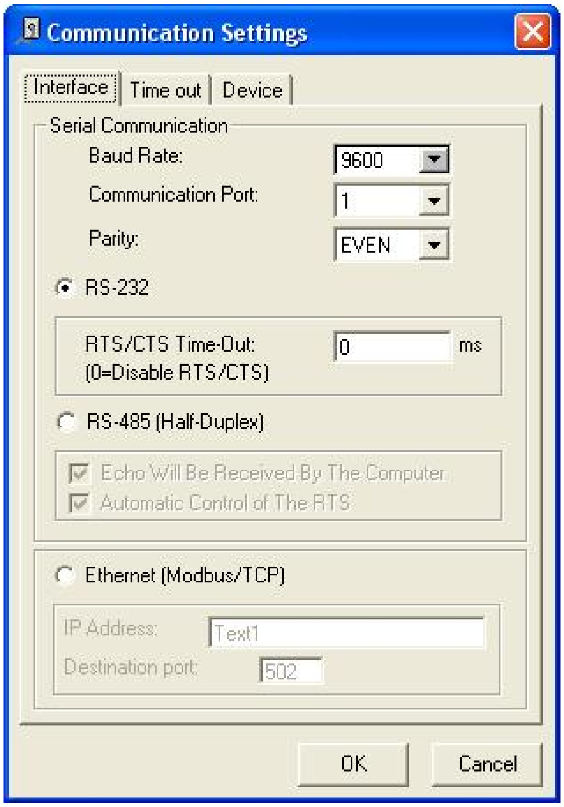
Later these parameters may be changed using LogicView but they will only have effect when the communication key is on the non-default position.



This the EIA RS-232 Serial Channel (P1)
This is for future Implementation
These are the 4 DIP Switches that set default and non default communication parameters of the CPU-700.
These are the two EIA RS-485 Ports P2 and P3
smar

Physical Layer and Time out

Now verify the communication settings to allow the LogicView to communicate with the DF65 CPU. Go to the menu *Tools/Comm. Settings*… and the following dialog box will open.
Set interface for RS-232 physical layer as show in the figure.



Communication Settings

Serial Communication

Baud Rate: 9600

Communication Port: 1

Parity: EVEN

● RS-232

RTS/CTS Time-Out: 0 ms
(0=Disable RTS/CTS)

○ RS-485 (Half-Duplex)

☑ Echo Will Be Received By The Computer

☑ Automatic Control of The RTS

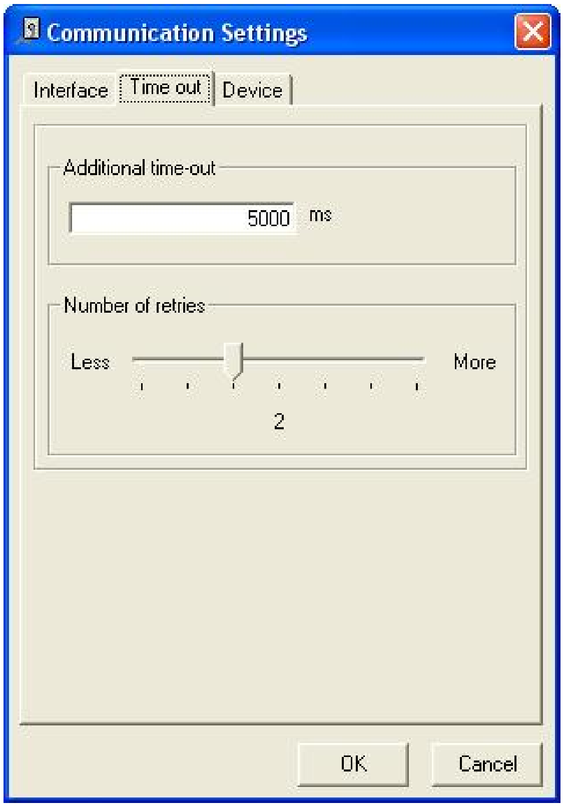
○ Ethernet (Modbus/TCP)

IP Address: Text1

Destination port: 502

PC communication parameters

Next click on the "Time out" tab and set your time out and the number of times the computer should try in case of a bad communication.



Communication Settings

Additional time-out

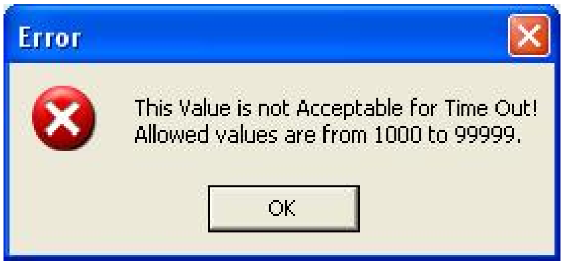
5000 ms

Number of retries

Less More

2

The *Time Out* parameter is limited in 1000ms. That is, inferior values are rejected. In the example above if the user configure 200ms, this value will not be accepted by LogicView and an alert message will be shown to the user.


Error

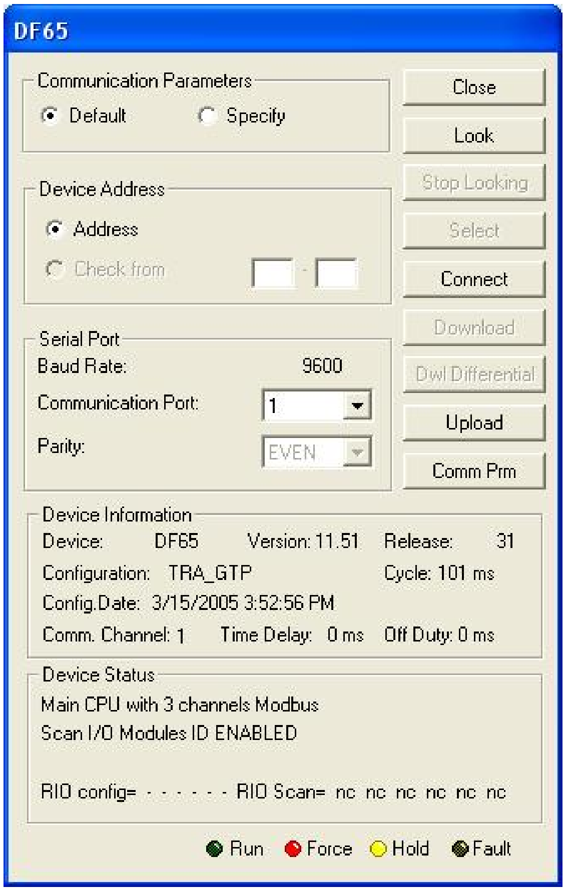
This Value is not Acceptable for Time Out!
Allowed values are from 1000 to 99999.

Changing the CPU Communication Settings

Consider that we have a serial RS-232 connection between the DF65 and the PC running the LogicView. Make sure the serial cable is installed, the LogicView is set for RS-232 and the Communication Switch is in the default position. Now open the DF65 ONLINE dialog box using the menu: Tools/Online or click on .

LogicView will try to connect with a DF65 CPU as soon as the online mode is called. If LogicView cannot detect the DF65 presence it will time out and wait with the DF65 ONLINE dialog box opened. This gives user a chance to modify some parameters to correctly set the communication.

In case LogicView finds a CPU that matches the communication parameters it was already configured, it will add information on the Device, Version, Release, Configuration Name and present Status. See dialog box bellow.


DF65

Communication Parameters
● Default ○ Specify

Device Address
● Address
○ Check from -

Serial Port
Baud Rate: 9600
Communication Port: 1
Parity: EVEN

Device Information
Device: DF65 Version: 11.51 Release: 31
Configuration: TRA_GTP Cycle: 101 ms
Config.Date: 3/15/2005 3:52:56 PM
Comm. Channel: 1 Time Delay: 0 ms Off Duty: 0 ms

Device Status
Main CPU with 3 channels Modbus
Scan I/O Modules ID ENABLED

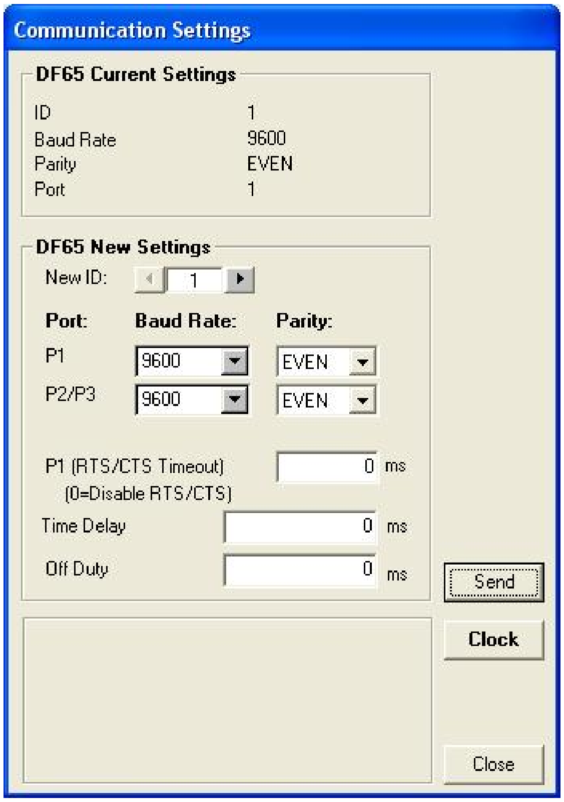
RIO config= - - - - - - RIO Scan= nc nc nc nc nc nc

The DF65 ONLINE dialog box

It is important to stress that the CPU module has 4 Dip Switches used to set the communication default parameters. In this case device address is 1 and baud rate is 9600 bps. The easiest way to meet these conditions is to select the “Default” option under “Communication Parameter” on the figure above. In this condition we can not make changes in the Serial Port frame.

Changing the DF65 Communication Parameters

To change the DF65 communication parameter go and click on the “Comm Prm” button and work on the following dialog box.



Communication Settings

DF65 Current Settings

ID	1
Baud Rate	9600
Parity	EVEN
Port	1

DF65 New Settings

New ID: 1

Port:	Baud Rate:	Parity:
P1	9600	EVEN
P2/P3	9600	EVEN

P1 (RTS/CTS Timeout) 0 ms
(0=Disable RTS/CTS)

Time Delay 0 ms

Off Duty 0 ms

DF65 communication parameters setting

After these parameters being changed the Send button will be enabled. The DF65 CPU will receive information and will inform that these modifications will only take place when user changes the communication DIP switch (see Chapter 4 Troubleshooting for more details about).

There are 3 serial ports available in DF65. A port P1 (EIA RS232) and two EIA RS485 ports (P2 and P3). User will be able to set each one of these ports: baud rate, parity and other specific parameters.

Port P1
Baud rate (9600 to 57600 bps)
Parity (Odd or Even)

RTS/CTS Timeout
CTS: Signal that indicates device ready to transmission.
RTS: Signal to request data transmission

The PC requests a connection with the CPU. The DF65 receives this request and process it. After the DF65 sends the RTS signal and waits for the CTS signal for the time interval set on RTS/CTS Timeout.

Off Duty
Available time for communication when the CPU is not running a ladder diagram. The bigger is the value set for Off Duty, the bigger is the available time for communication.

Time Delay
The PC sends a frame to the CPU, i.e., makes a communication request. The DF65 waits the amount of time set on Time Delay to process the frame request and send answer.

Note: For better performance of your system we recommend:

- OFF Duty must be se as 10 % of the Ladder cycle of execution.
- Time Delay depends of the Workstation's processor. If the processor is higher than a Pentium MMX 233 MHz we recommend that Time Delay is set for 5 ms. Otherwise we recommend that Time Delay is set with its default value.

Ports P2 and P3
Port P3 is the port used for communication with remote I/Os (RIOs). Its baud rate is fixed in 56.7 Kbps. Port P2 is the other serial EIA RS-485 channel and has two configurable parameters: baud rate (9600 to 115200 bps) and parity (odd or even).

TAGMONIT SOFTWARE APPLICATION BULLETIN

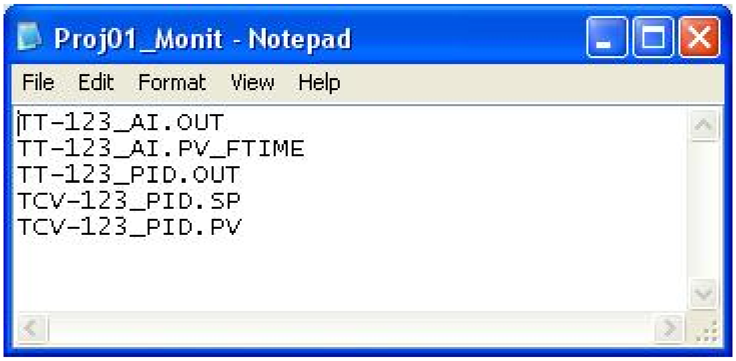
Introduction

The TagMonit is another software tool for monitoring Fieldbus Devices Variables. In order to use it proceed as follows:

1 – Creating Tag list file

The TagMonit software works from a text format file that contains the Tags of the parameters or variables to be monitored. The text file can be created with the Notepad software that comes with Windows operation system. You have to save this text file with the "LST" extension.

Create you tag list file, as in the following example:



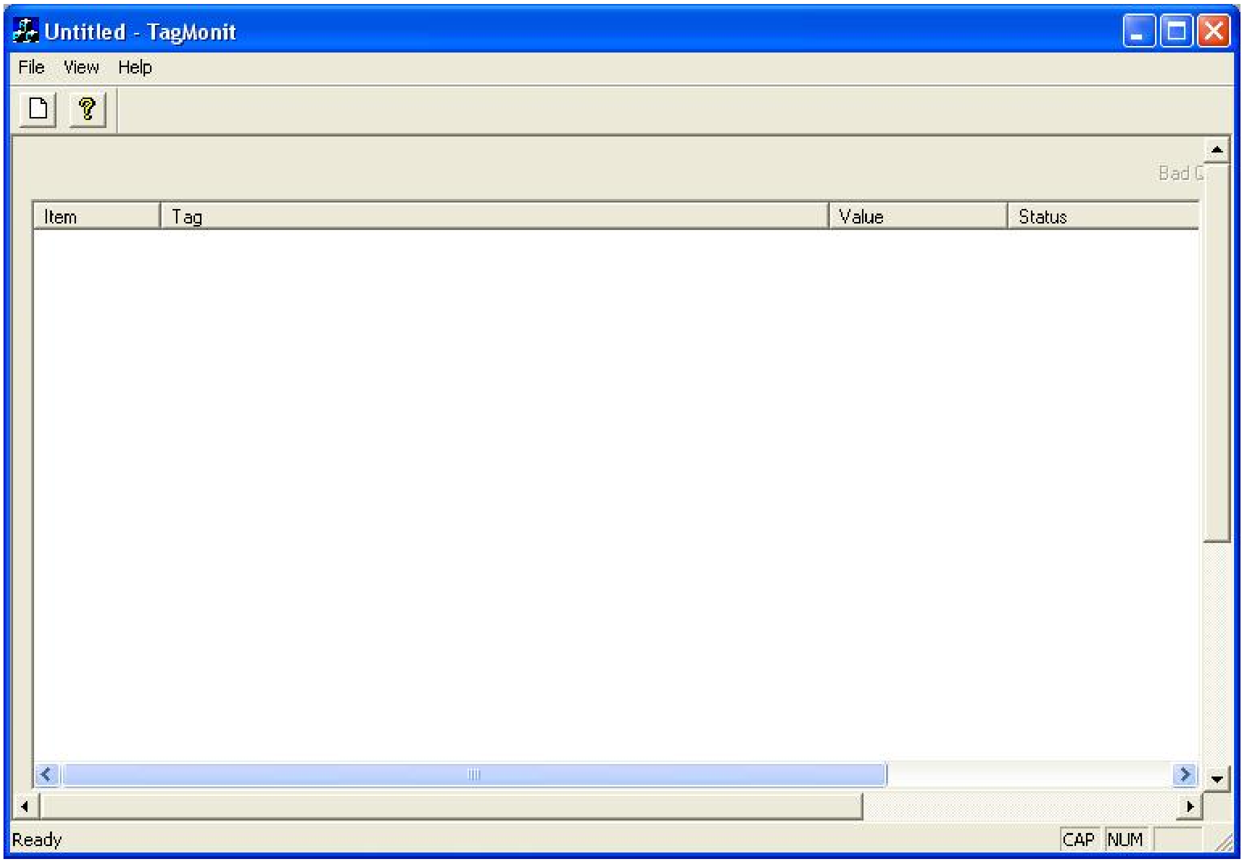
```
TT-123_AI.OUT
TT-123_AI.PV_FTIME
TT-123_PID.OUT
TCV-123_PID.SP
TCV-123_PID.PV
```

The format of each list item is: ***<tagname>.<parameter>***.

2 – Starting Up TagMonit

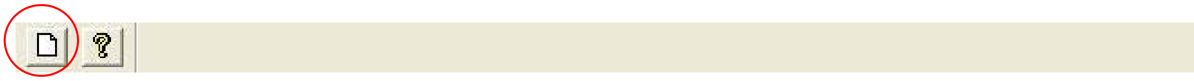
From the **Start** menu, select **Programs\System302\Tag List Monit View\TagMonit**.

The following window will open:

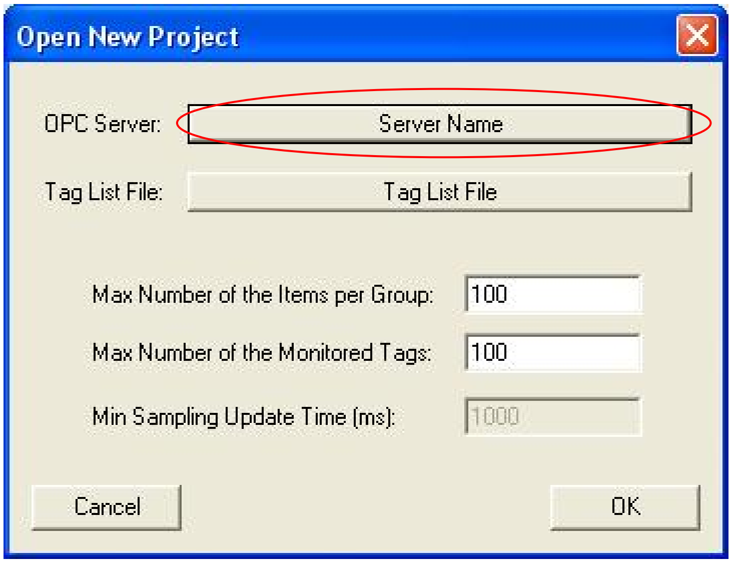


3 – Connecting to the OPC server

Click on the “New” button on the Tool bar to begin the **TagMonit** configuration, see next picture.



When the following window appears, click on OPC Server button.



OPC Server: Server Name

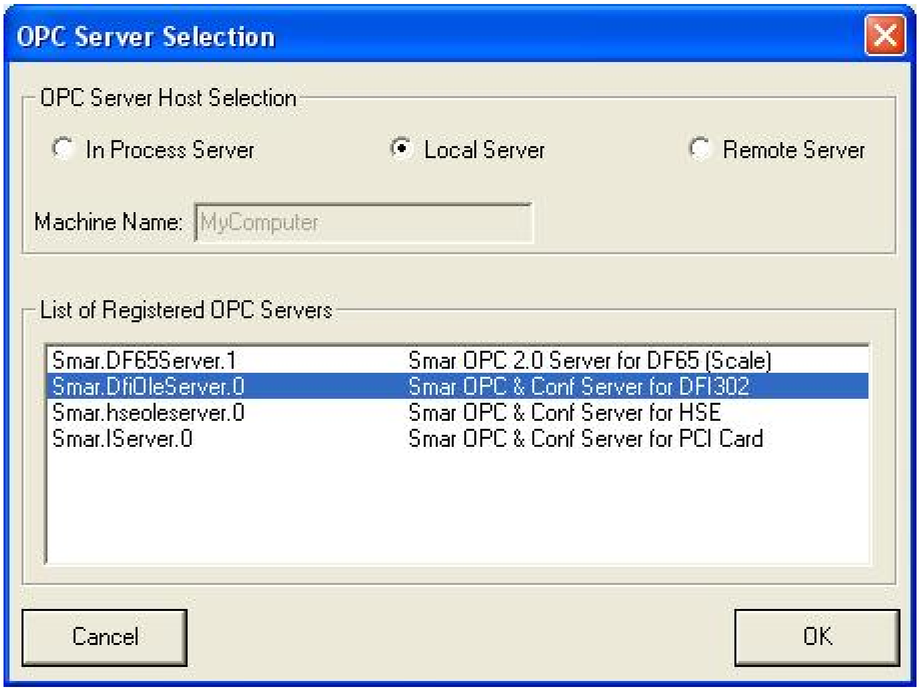
Tag List File: Tag List File

Max Number of the Items per Group: 100

Max Number of the Monitored Tags: 100

Min Sampling Update Time (ms): 1000

Select the Local Server in the OPC Server Selection and choose the **Smar** OPC server from the registered list, then click on the OK button (See below).



OPC Server Selection

OPC Server Host Selection

○ In Process Server ● Local Server ○ Remote Server

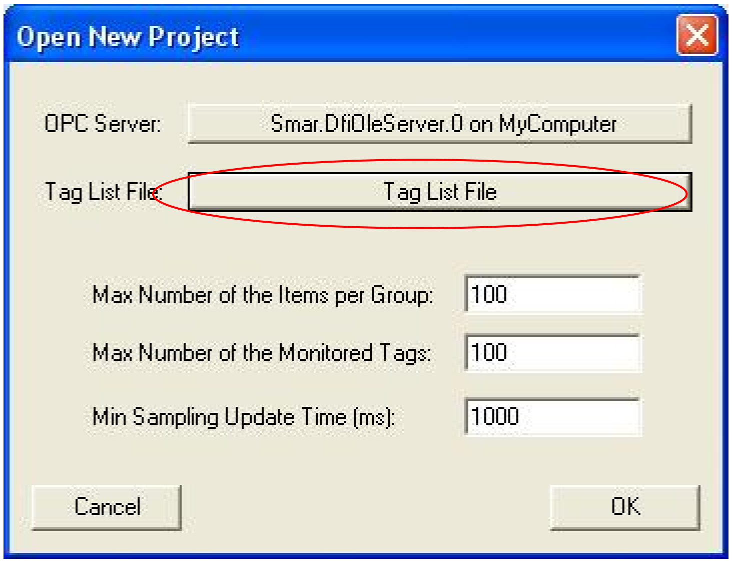
Machine Name: MyComputer

List of Registered OPC Servers

Smar.DF65Server.1	Smar OPC 2.0 Server for DF65 (Scale)
Smar.DfiOleServer.0	Smar OPC & Conf Server for DFI302
Smar.hseoleserver.0	Smar OPC & Conf Server for HSE
Smar.IServer.0	Smar OPC & Conf Server for PCI Card

4 – Adding the Tag List file

Click on the button **Tag List File**.



Open New Project

OPC Server: Smar.DfiOleServer.0 on MyComputer

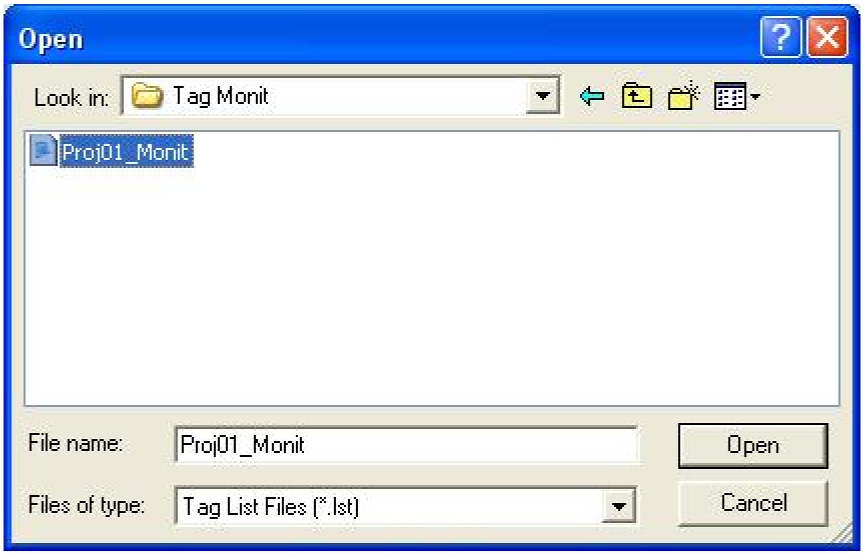
Tag List File: Tag List File

Max Number of the Items per Group: 100

Max Number of the Monitored Tags: 100

Min Sampling Update Time (ms): 1000

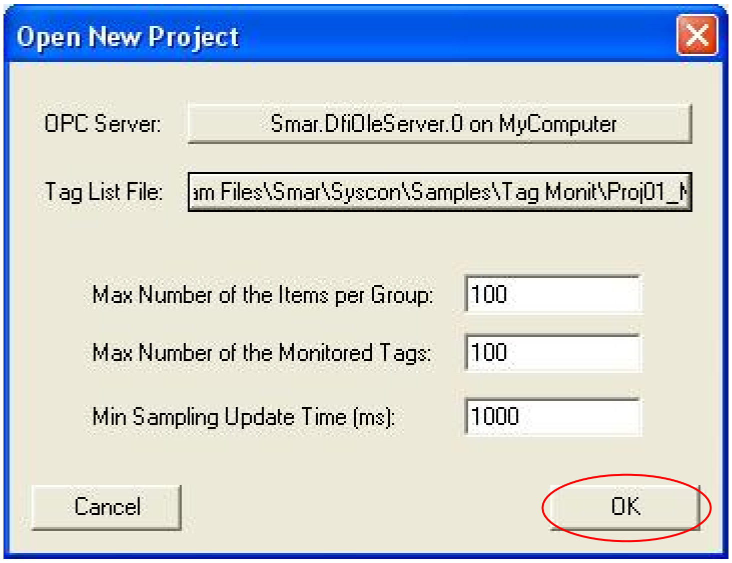
Select the file with “LST” extension that you have created in the item 1 and click on the button “**Open**”:



File name: Proj01_Monit

Files of type: Tag List Files (*.lst)

The following window will appear.



OPC Server: Smar.DfiOleServer.0 on MyComputer

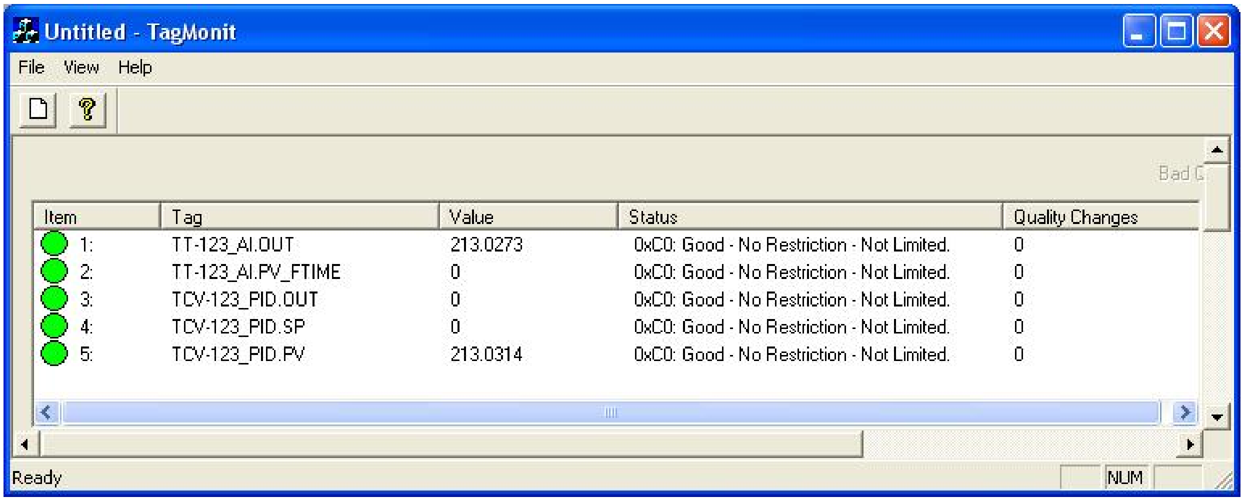
Tag List File: am Files\Smar\Syscon\Samples\Tag Monit\Proj01_M

Max Number of the Items per Group: 100

Max Number of the Monitored Tags: 100

Min Sampling Update Time (ms): 1000

Then, click “**OK**” on the above window and you will see the parameters being monitored, as in the next example.



Item	Tag	Value	Status	Quality Changes
● 1:	TT-123_AI.OUT	213.0273	0xC0: Good - No Restriction - Not Limited.	0
● 2:	TT-123_AI.PV_FTIME	0	0xC0: Good - No Restriction - Not Limited.	0
● 3:	TCV-123_PID.OUT	0	0xC0: Good - No Restriction - Not Limited.	0
● 4:	TCV-123_PID.SP	0	0xC0: Good - No Restriction - Not Limited.	0
● 5:	TCV-123_PID.PV	213.0314	0xC0: Good - No Restriction - Not Limited.	0

Appendix D

TAGVIEW SOFTWARE APPLICATION BULLETIN

Introduction

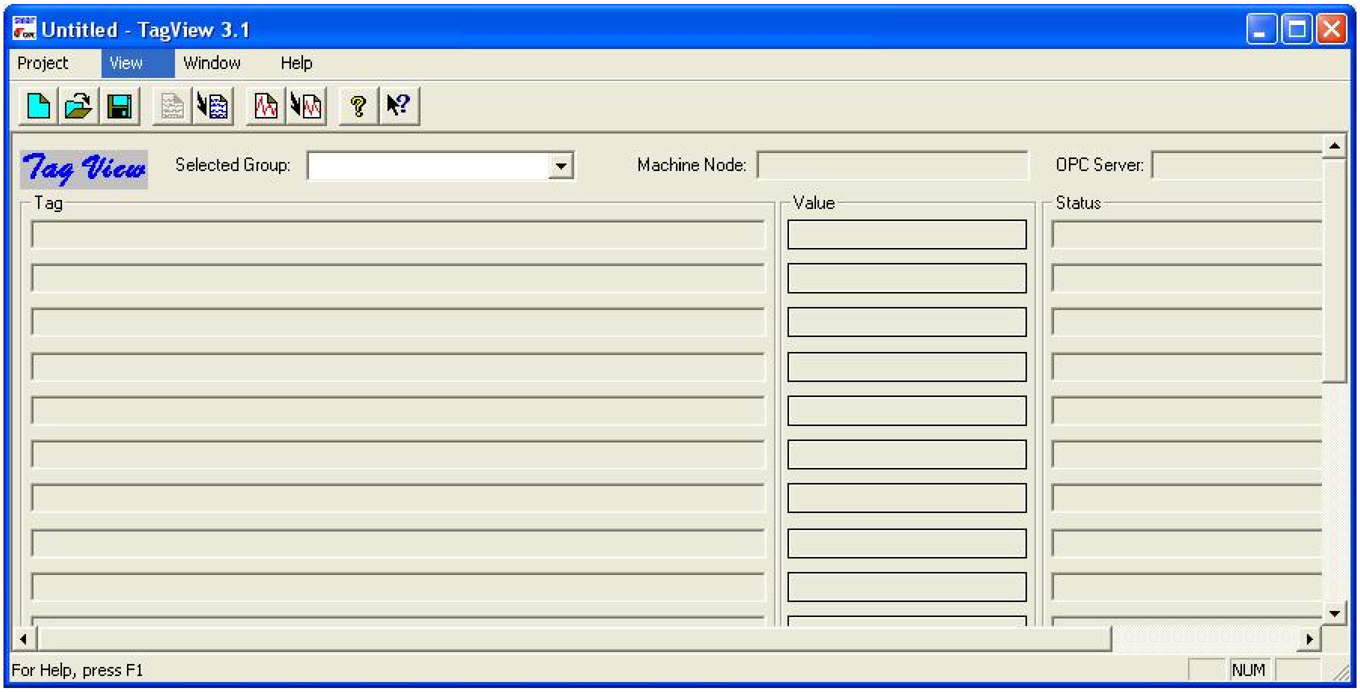
The Tag View is a software tool for monitoring and actuation on Fieldbus Devices Variables. It is basically an OPC client of the *OLE Server*. The following section will guide you on the procedure to connect to the server, select monitoring variables and viewing them.

1 – Starting Up TagView

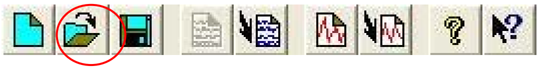
From the **Start** menu, select **Programs/System302/System302 Application** and select **TagView**.

You can also activate it from the **Start** menu, selecting **Program\System302\Tag List Monit View\TagView**.

The following application window will be prompted:

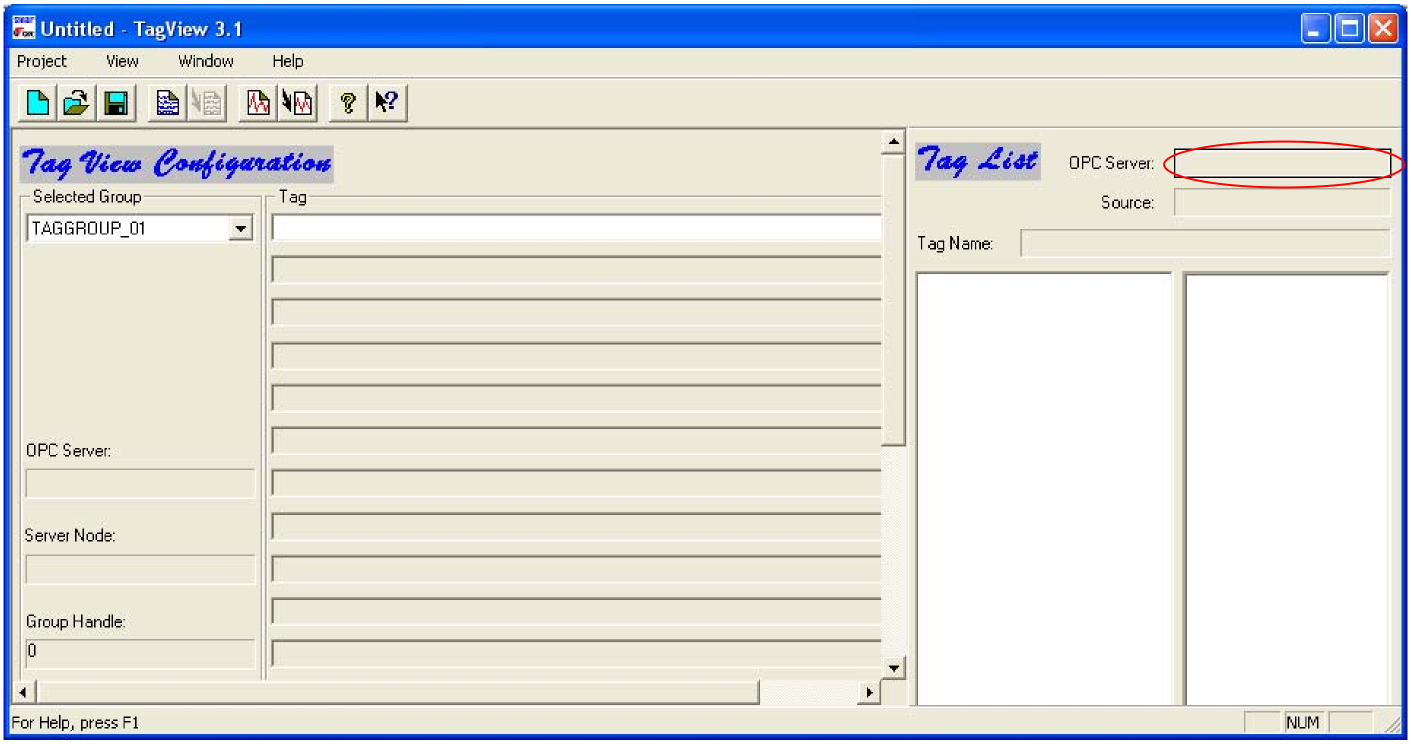


2 – Adding the OPC Server



To begin with, click on the button **TagConf** on the Tool bar (See below).

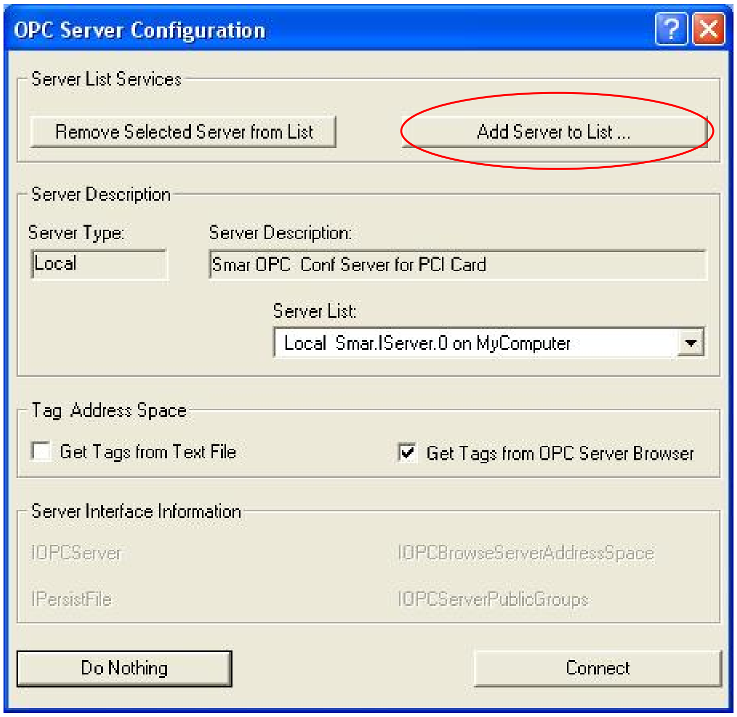
When the following window appears, click on *OPC Server* field, as indicated.



Selected Group: TAGGROUP_01

Group Handle: 0

Then, add the server to the list, by clicking on the respective adding button as indicated below:



Server Type: Local

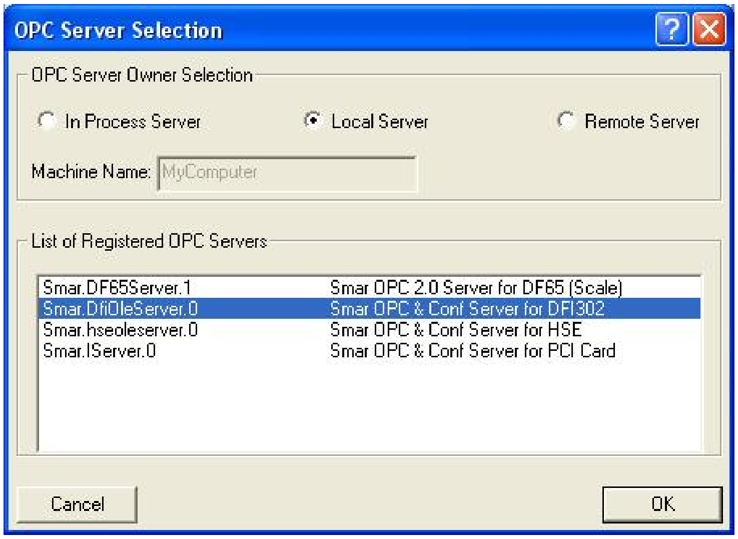
Server Description: Smar OPC Conf Server for PCI Card

Server List: Local Smar.IServer.0 on MyComputer

□ Get Tags from Text File

☑ Get Tags from OPC Server Browser

Select the **Local Server** in the OPC Server Selection and choose the **Smar OPC server** from the registered list, then click on the button **OK** (See below).



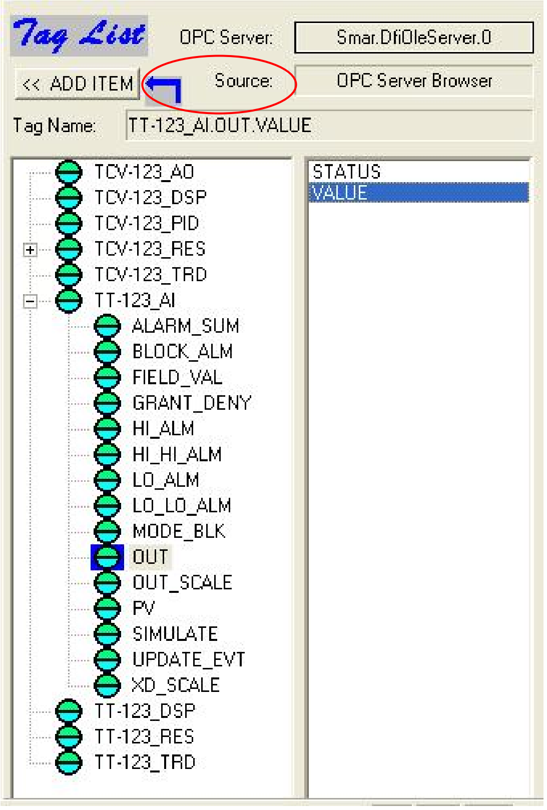
OPC Server Selection
OPC Server Owner Selection
○ In Process Server
● Local Server
○ Remote Server
Machine Name: MyComputer
List of Registered OPC Servers
Smar.DF65Server.1 Smar OPC 2.0 Server for DF65 (Scale)
Smar.DfiOleServer.0 Smar OPC & Conf Server for DFI302
Smar.hseoleserver.0 Smar OPC & Conf Server for HSE
Smar.IServer.0 Smar OPC & Conf Server for PCI Card
Cancel
OK

On the OPC Server Configuration window, click on the button **Connect**:

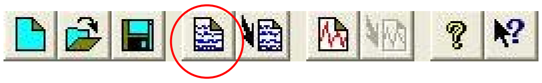
3 – Choosing the Tag Monitoring Objects

After the OPC Server is connected, the next step is to choose the objects to be monitored from the Tags in your configuration.

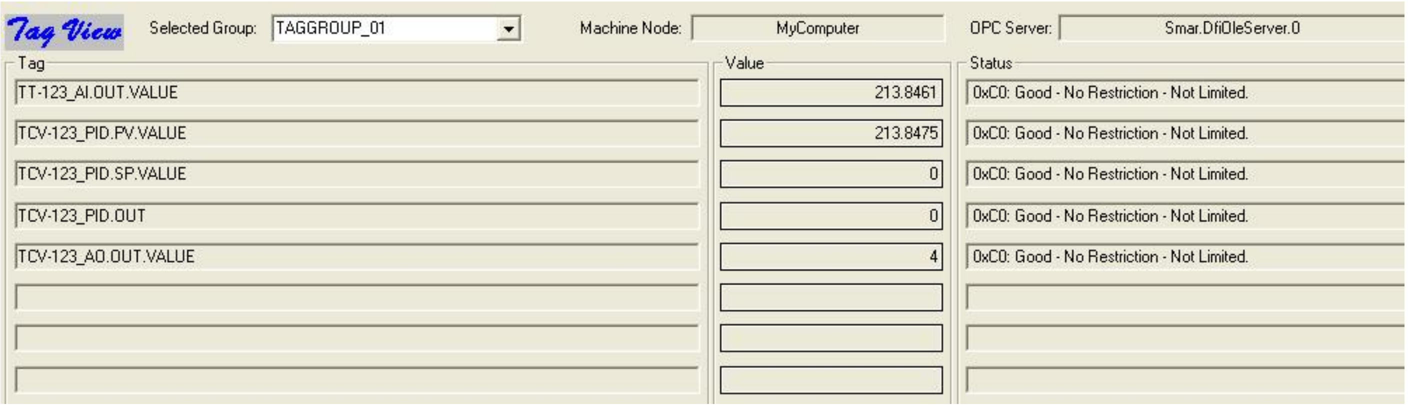
Double click the Tag name and choose the parameter from the list. The user can select 20 items for each group and have 16 groups in a TagView project.



Finally, click on the TagView button to start monitoring.



The following window will appear.



Selected Group: TAGGROUP_01

Machine Node: MyComputer

OPC Server: Smar.DfiOleServer.0

Tag	Value	Status
TT-123_AI.OUT.VALUE	213.8461	0xC0: Good - No Restriction - Not Limited.
TCV-123_PID.PV.VALUE	213.8475	0xC0: Good - No Restriction - Not Limited.
TCV-123_PID.SP.VALUE	0	0xC0: Good - No Restriction - Not Limited.
TCV-123_PID.OUT	0	0xC0: Good - No Restriction - Not Limited.
TCV-123_AO.OUT.VALUE	4	0xC0: Good - No Restriction - Not Limited.

Appendix E

PROCEDURE FOR FIRMWARE DOWNLOADING TO DEVICES THROUGH FDI302 (FIELD DEVICES INTERFACE)

Introduction

The device firmware download is also made by *FBTools* software, same as PCI firmware, but it is done via computer serial port and not via ISA bus as in PCI. Because of that the device firmware download requires interfaces to be done. For the field devices, as LD302, TT302, FY302, an interface called FDI-302 (field download interface) is used. For FB700 module of LC700, the LC700 configuration cable (C232-700) is used.

This procedure stops the normal operation of the device.

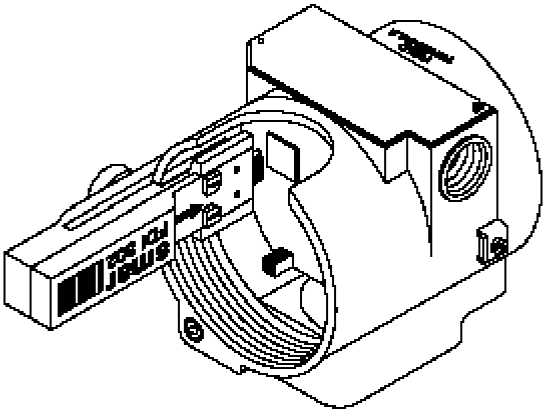
This kind of firmware download is helpful to keep the device with the most updated firmware revision, what guarantees always the most powerful and best devices.

1 – Procedure for Firmware Downloading to Devices

1.1 – Field Devices

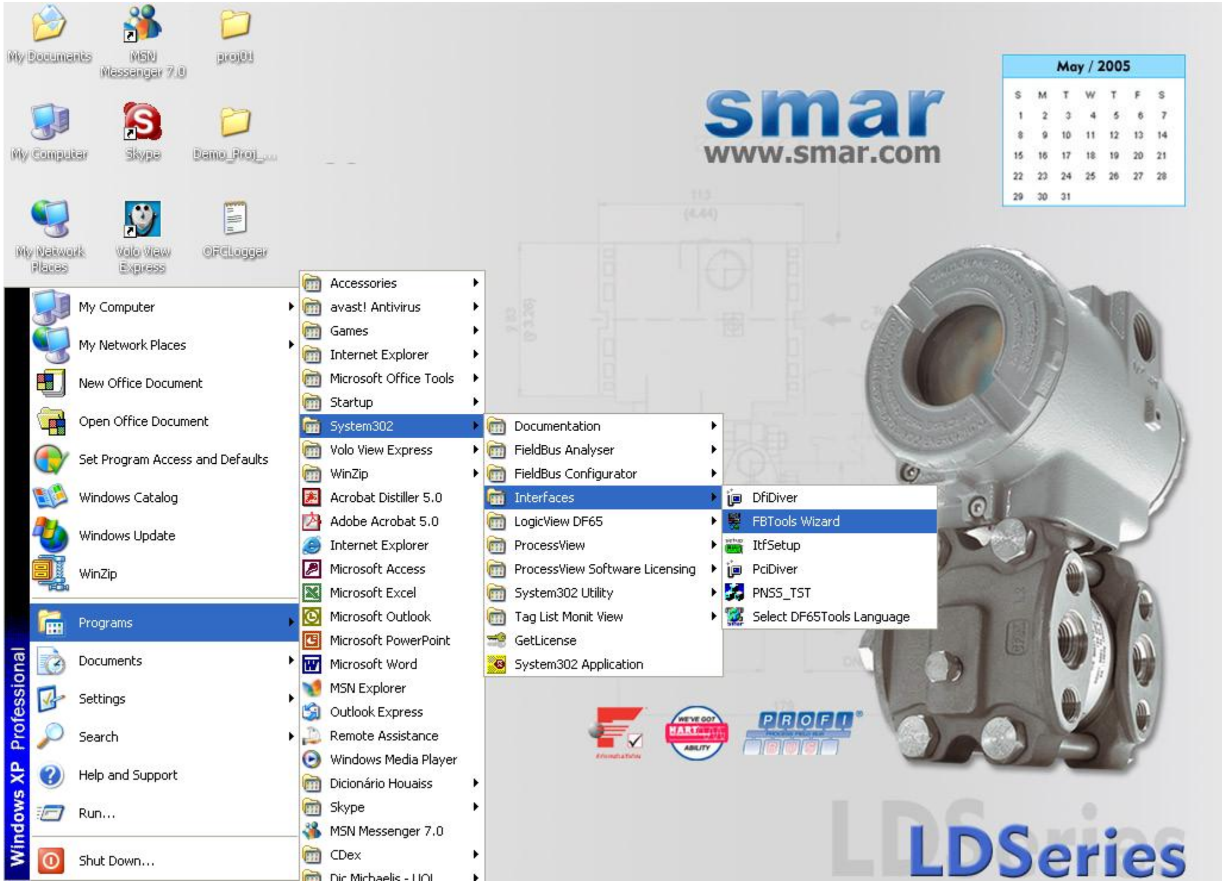
Step 1 – Connect the device to the computer

Power the device with 24VDC (it is not necessary to be in a fieldbus line).
Connect FDI-302 to the computer and to the device – this will freeze the device display.



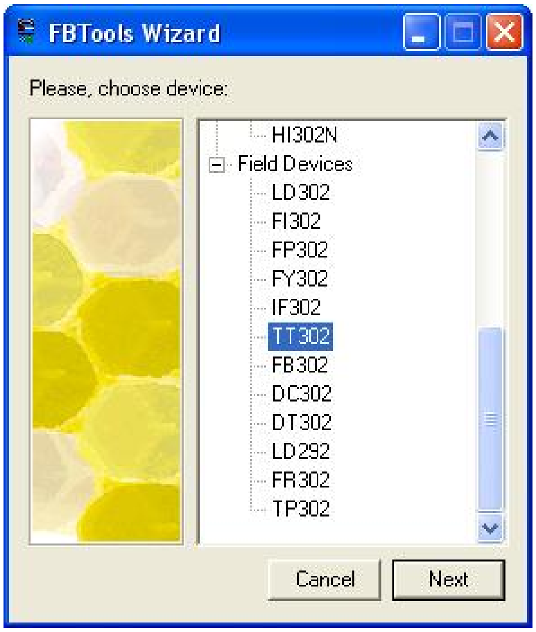
Step 2 – Run *FBTools* software

From **Start** menu or from desktop area start the *FBTools* program.

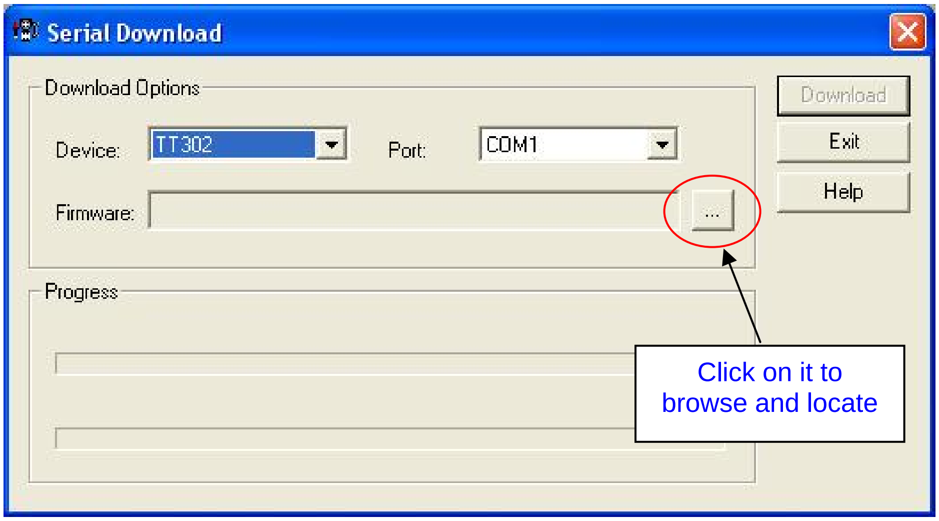


Step 3 – Select the device firmware

In the list of devices select the desired device and then click on the button **Finish**.



When the Serial Download appears, click on the button **Download** if the correct firmware file path is showed. If you need to locate the firmware file, click on the button showed below.



Device: TT302

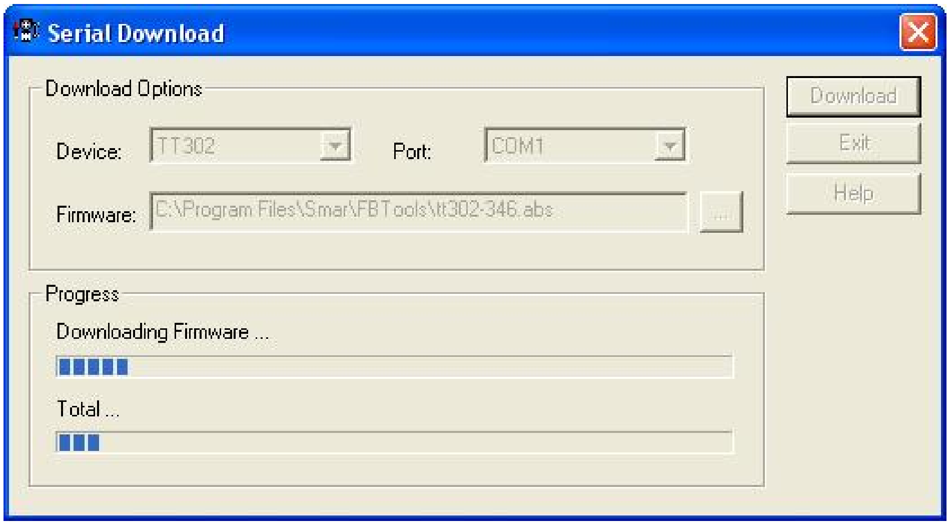
Port: COM1

Firmware:

Click on it to browse and locate

Step 4 – Download the firmware

After clicking the button **Download**, the firmware transferring process starts.



Device: TT302

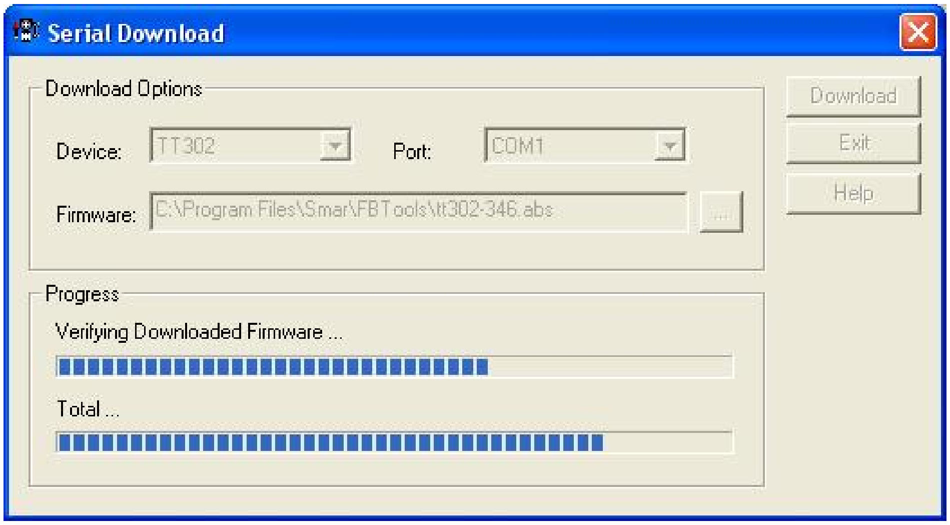
Port: COM1

Firmware: C:\Program Files\Smar\FBTools\tt302-346.abs

Downloading Firmware ...

Total ...

Then the software performs the downloaded firmware verification.



Device: TT302

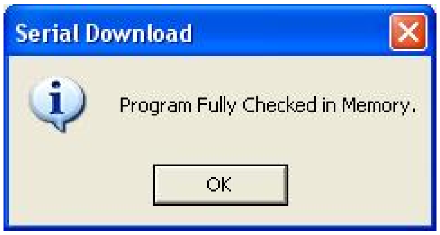
Port: COM1

Firmware: C:\Program Files\Smar\FBTools\tt302-346.abs

Verifying Downloaded Firmware ...

Total ...

The following screen will appear after finish the download.

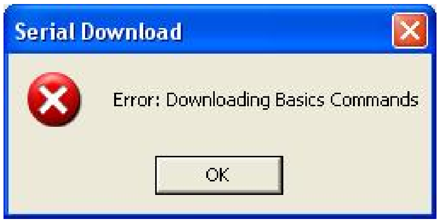


Serial Download

Program Fully Checked in Memory.

Download Errors

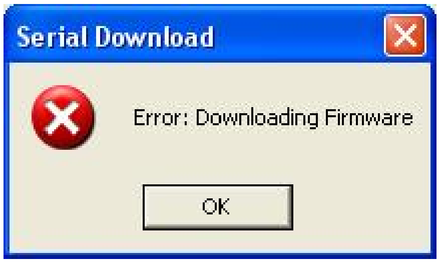
During the download process, some errors may occur. When any error happens, the download process should be restarted. See following the causes of these errors:



Serial Download

Error: Downloading Basics Commands

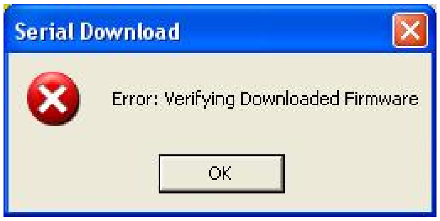
Causes: the FDI interface may be not connected correctly or the device may be powered off.



Serial Download

Error: Downloading Firmware

Causes: the communication may be lost during the firmware download or the download process was not well performed.



Serial Download

Error: Verifying Downloaded Firmware

Causes: the communication may be lost during the firmware download verification or the download process was not well performed.

Note: If an error occurs during the download process the display can turn off. In this case restart the download procedure and complete the process. The equipment will restart to work properly.

Step 5 – Restart the device

The device must be powered off, disconnected from the FDI302 and then restarted again.

For more information consult the FDI302 manual.

1.2 – FB700

Step 1 – Connect the device to the computer

Connect FB700 to the computer using the C232-700 that is the LC700 configuration cable.

Now, look at the topside of the FB700 Module. You will see two push buttons through the ventilation openings. The one closer to the module front is used to enable the RS-232 port that is used for the firmware download.

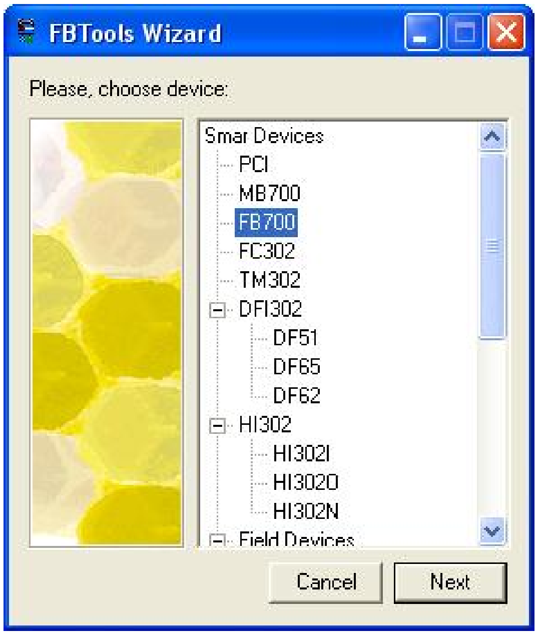
Push this button once and check if the 232 green LED is lighted. If it is, the module is ready to receive the firmware.

Step 2 – Run *FBTools* software

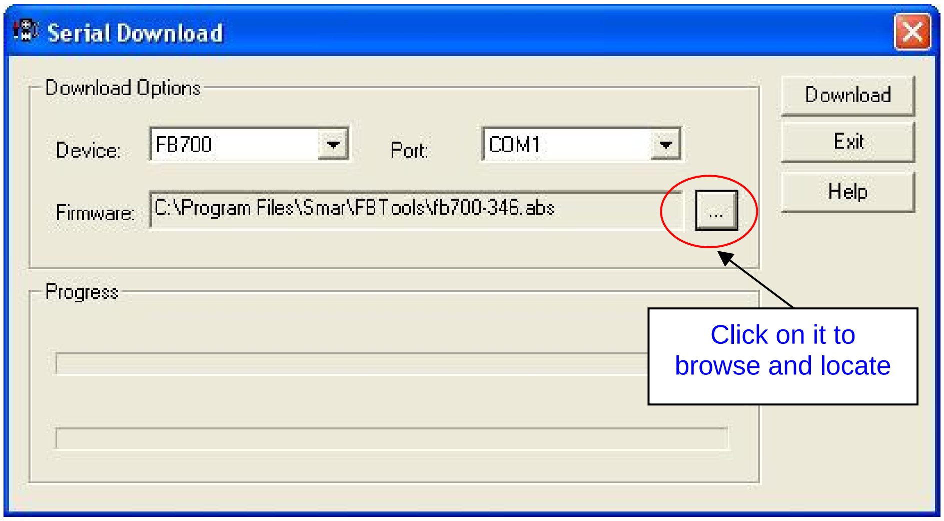
From **Start** menu open the *FBTools* program.

Step 3 – Select the device firmware

In the list of devices select the desired device and then click on the button **Finish**.



When the Serial Download appears, click on the button **Download** if the correct firmware file path is showed. If you need to locate the firmware file, click on the button showed below.



Device: FB700

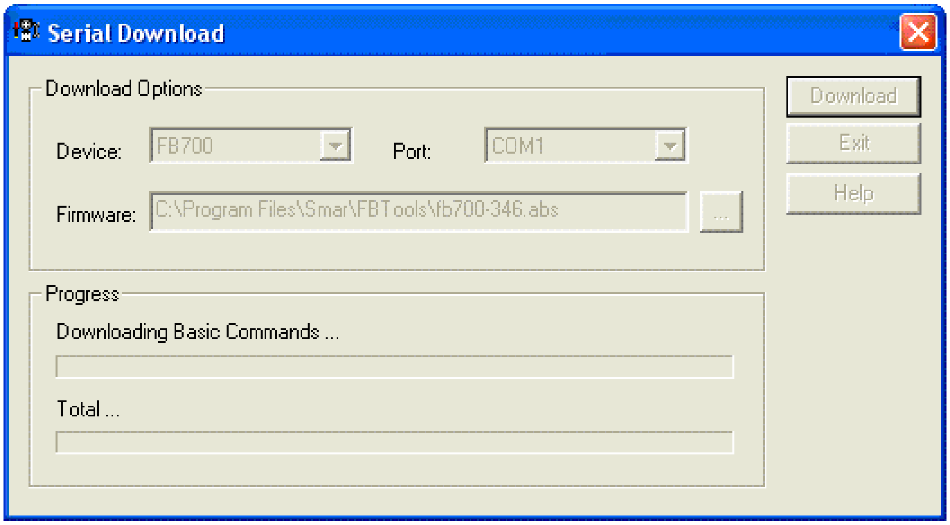
Port: COM1

Firmware: C:\Program Files\Smar\FBTools\fb700-346.abs

Click on it to browse and locate

Step 4 – Download the firmware

After clicking the button **Download**, the process of transference and verification of the firmware will start.



Device: FB700

Port: COM1

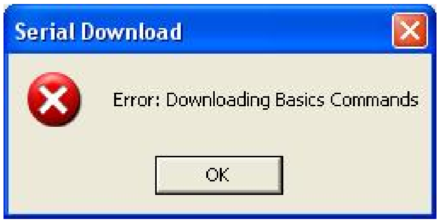
Firmware: C:\Program Files\Smar\FBTools\fb700-346.abs

Downloading Basic Commands ...

Total ...

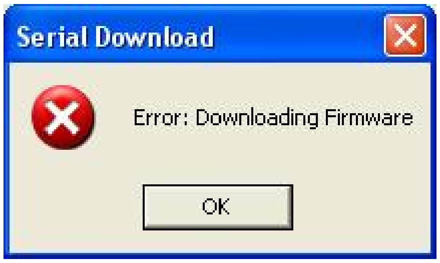
Download Errors

During the download process, some errors may occur. When any error happens, the download process should be restarted. See following the causes of these errors:



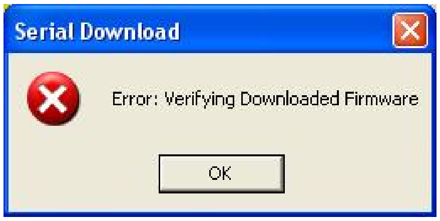
Error: Downloading Basics Commands

Causes: the C232-700 interface may be not connected correctly or the FB700 module may be powered off.



Error: Downloading Firmware

Causes: the communication may be lost during the firmware download or the download process was not well performed.



Error: Verifying Downloaded Firmware

Causes: the communication may be lost during the firmware download verification or the download process was not well performed.

Step 5 – Restart the device

FB700 module must have the serial port disabled.

Appendix F

PROCEDURE FOR MONITORING CRC ERRORS, THROUGH BRIDGE TRANSDUCER AND FBVIEW SOFTWARE

Introduction

Measuring the CRC (Cyclical Redundancy Check) errors is a good and efficient way to check and monitor the performance of the fieldbus line. Monitoring this value it is possible to know if the line is running properly and if the communication among the devices and the bridges is well done. An acceptable value for this measurement is equal or lower than 1%.

The acquisition of this measure can be done in two ways:

a) Via bridge transducer block: using the bridge already installed in the workstation and monitoring some parameters of its transducer block is possible to get the measure of the performance of the Fieldbus channels.

b) Via *FBView* software: in this case is necessary another workstation running the tool software. The software collects the line signals and measures the efficiency of the fieldbus line.

Using the *FBView* the user has the advantage of not to stop the supervision of the process in the workstation while monitoring the CRC errors measurement.

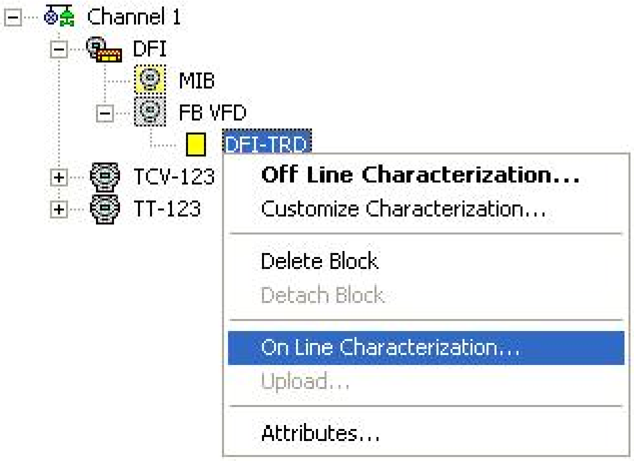
1 – Procedure to monitor CRC Errors

1.1 – Via Bridge Transducer Block

The following steps must be followed when the communication between the process and the *SYSCON* configuration is running.

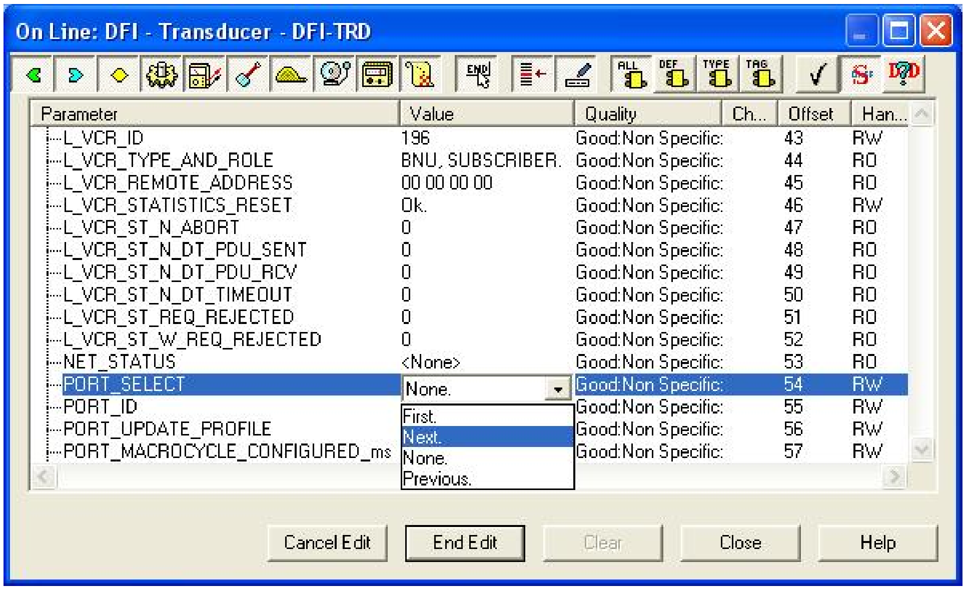
Step 1 – Locate and open transducer block

Open the Fieldbus channel window that the desired bridge belongs to. Right-click in the DFI transducer block and choose the option *On Line Characterization*.



Step 2 – Select the desired H1 Port

In the open “on-line Characterization” windows find the parameter **PORT_SELECT** and set the number of the H1 port that you desire to monitor. The number of the chosen channel is shown in the parameter **PORT_ID**.



Parameter	Value	Quality	Ch...	Offset	Han...
L_VCR_ID	196	Good:Non Specific:		43	RW
L_VCR_TYPE_AND_ROLE	BNU, SUBSCRIBER.	Good:Non Specific:		44	RO
L_VCR_REMOTE_ADDRESS	00 00 00 00	Good:Non Specific:		45	RO
L_VCR_STATISTICS_RESET	Ok.	Good:Non Specific:		46	RW
L_VCR_ST_N_ABORT	0	Good:Non Specific:		47	RO
L_VCR_ST_N_DT_PDU_SENT	0	Good:Non Specific:		48	RO
L_VCR_ST_N_DT_PDU_RCV	0	Good:Non Specific:		49	RO
L_VCR_ST_N_DT_TIMEOUT	0	Good:Non Specific:		50	RO
L_VCR_ST_REQ_REJECTED	0	Good:Non Specific:		51	RO
L_VCR_ST_W_REQ_REJECTED	0	Good:Non Specific:		52	RO
NET_STATUS	<None>	Good:Non Specific:		53	RO
PORT_SELECT	None.	Good:Non Specific:		54	RW
PORT_ID		Good:Non Specific:		55	RW
PORT_UPDATE_PROFILE		Good:Non Specific:		56	RW
PORT_MACROCYCLE_CONFIGURED_ms		Good:Non Specific:		57	RW

First.
Next.
None.
Previous.

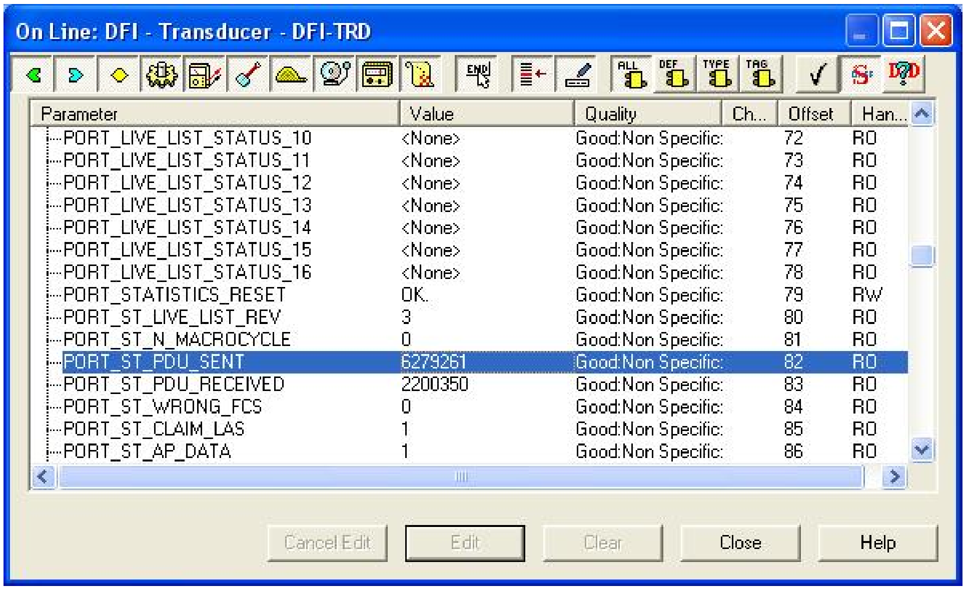
Step 3 – Analyze the parameter values

After the selection of the H1 port check the values of the following parameters:

PORT_ST_PDU_SENT: This parameter presents the numbers of frames sent by the bridge to the fieldbus line.

PORT_ST_PDU_RECEIVED: This parameter presents the number of frames received by the bridge from the fieldbus line.

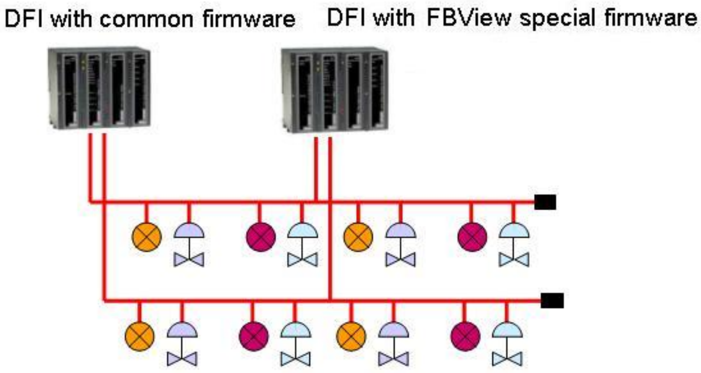
PORT_ST_WRONG_FCS: This parameter presents the number of wrong frames among the received ones.



Parameter	Value	Quality	Ch...	Offset	Han...
PORT_LIVE_LIST_STATUS_10	<None>	Good:Non Specific:		72	RO
PORT_LIVE_LIST_STATUS_11	<None>	Good:Non Specific:		73	RO
PORT_LIVE_LIST_STATUS_12	<None>	Good:Non Specific:		74	RO
PORT_LIVE_LIST_STATUS_13	<None>	Good:Non Specific:		75	RO
PORT_LIVE_LIST_STATUS_14	<None>	Good:Non Specific:		76	RO
PORT_LIVE_LIST_STATUS_15	<None>	Good:Non Specific:		77	RO
PORT_LIVE_LIST_STATUS_16	<None>	Good:Non Specific:		78	RO
PORT_STATISTICS_RESET	OK.	Good:Non Specific:		79	RW
PORT_ST_LIVE_LIST_REV	3	Good:Non Specific:		80	RO
PORT_ST_N_MACROCYCLE	0	Good:Non Specific:		81	RO
PORT_ST_PDU_SENT	6279261	Good:Non Specific:		82	RO
PORT_ST_PDU_RECEIVED	2200350	Good:Non Specific:		83	RO
PORT_ST_WRONG_FCS	0	Good:Non Specific:		84	RO
PORT_ST_CLAIM_LAS	1	Good:Non Specific:		85	RO
PORT_ST_AP_DATA	1	Good:Non Specific:		86	RO

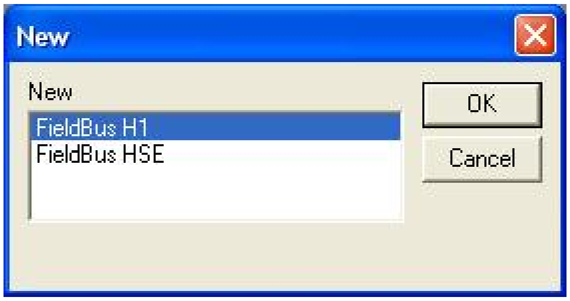
1.2 – Via *FBView* Software

FBView is easy to use and runs on Windows platform. **FBView** needs an interface that captures the messages from the bus and sends it to the computer. The interface available is the DFI with an FBView firmware . DFI with FBView firmware is connected in parallel in the bus as a common device.



Step 1 – New File

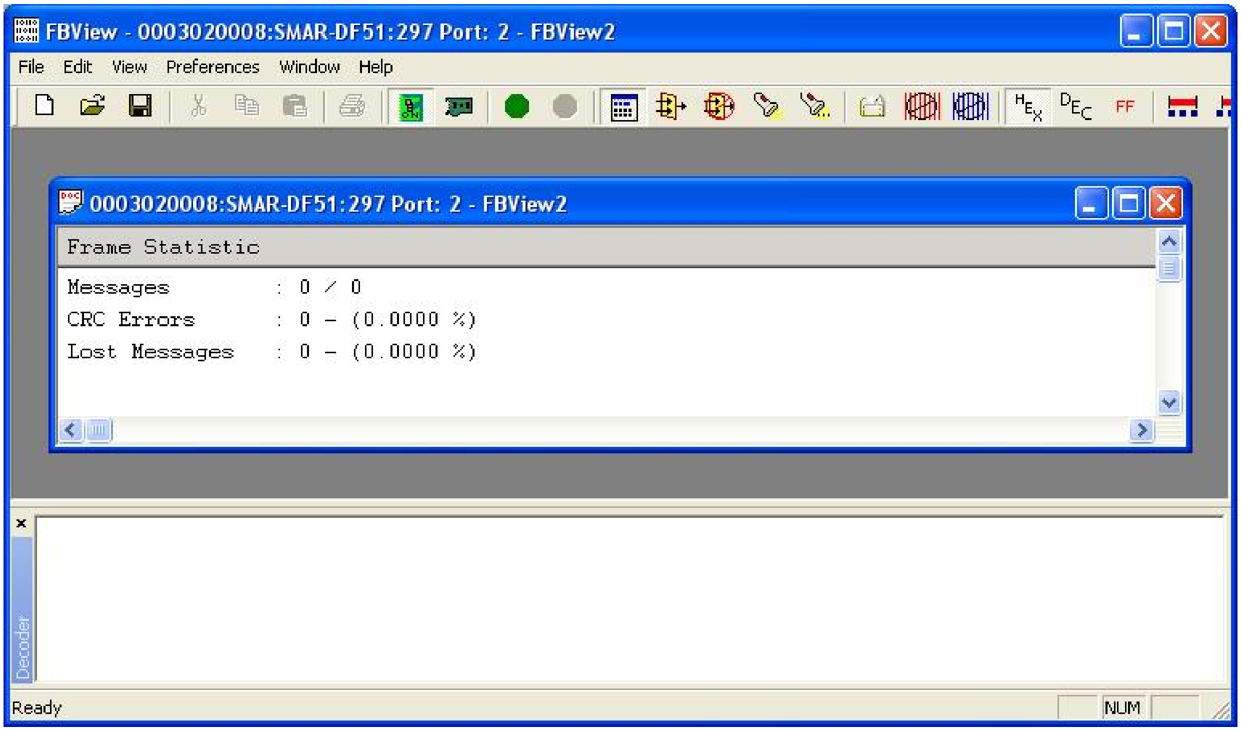
After start the FBView software select the **New File** Button. A new popup window will appear. Select the communication network used to collect the data from the Fieldbus line to FBView software. Click **OK**.


New

New

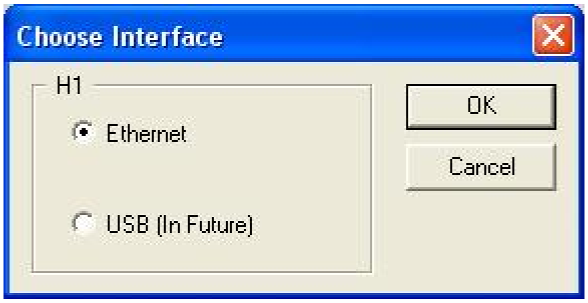
FieldBus H1
FieldBus HSE

A new FBView Window will open.


FBView - 0003020008:SMAR-DF51:297 Port: 2 - FBView2
File Edit View Preferences Window Help
HEX DEC FF
0003020008:SMAR-DF51:297 Port: 2 - FBView2
Decoder
Ready
NUM

```
Frame Statistic

Messages        :  0 / 0
CRC Errors      :  0 - (0.0000 %)
Lost Messages   :  0 - (0.0000 %)
```

Click on the Online Icon. *Choose Interface* Window will pop up. Select **Ethernet**. Click **OK**.



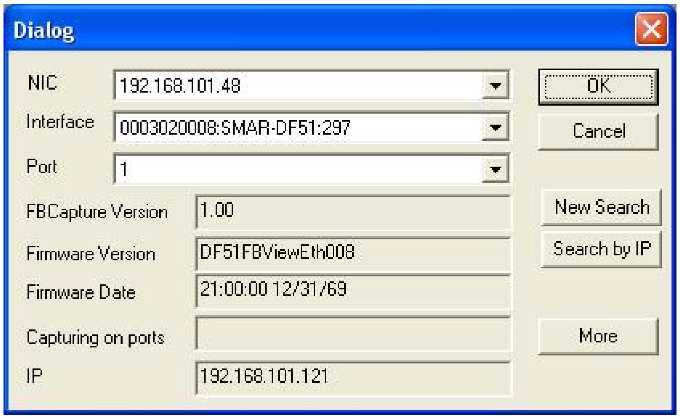
H1

● Ethernet

○ USB (In Future)

Click on the **Interface Icon**.

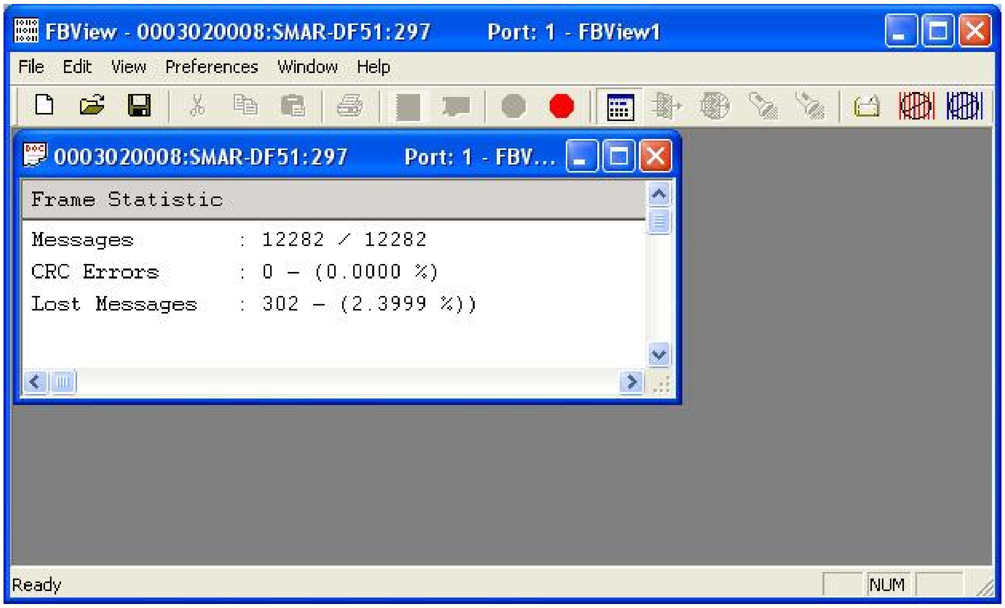
FBView will detect the DFIs connected in the network. In the field *Interface* ,select the DFI that has the special firmware to FBTools. Click **OK**.



NIC	192.168.101.48
Interface	0003020008:SMAR-DF51:297
Port	1
FBCapture Version	1.00
Firmware Version	DF51FBViewEth008
Firmware Date	21:00:00 12/31/69
Capturing on ports	
IP	192.168.101.121

Step 2 – Capturing Frames

Click on **Capture** button to start capturing frames. ● *Frame Statistic* will run


FBView - 0003020008:SMAR-DF51:297 Port: 1 - FBView1
File Edit View Preferences Window Help
0003020008:SMAR-DF51:297 Port: 1 - FBV...
Ready
NUM

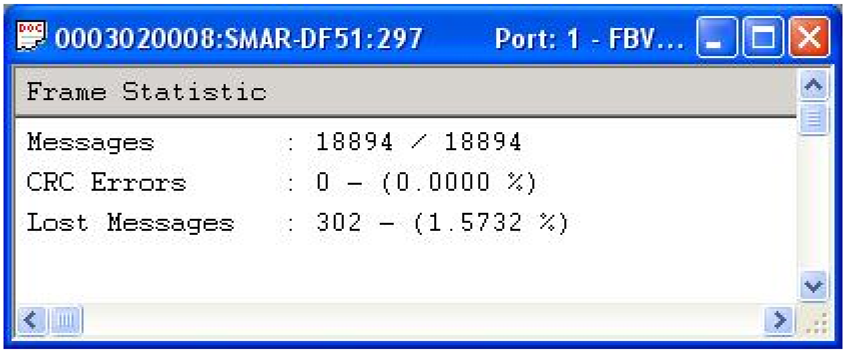
```
Frame Statistic

Messages        :  12282 / 12282
CRC Errors      :  0 - (0.0000 %)
Lost Messages   :  302 - (2.3999 %))
```

Click on “Stop” button. ●

Step 3 – Frame Statistics

After capturing, the following window will appear to show the errors.

For additional information consult the *FBView* manual.



```
Frame Statistic

Messages        :  18894 / 18894
CRC Errors      :  0 - (0.0000 %)
Lost Messages   :  302 - (1.5732 %)
```

DFI DIVER / PCI DIVER QUICK REFERENCE

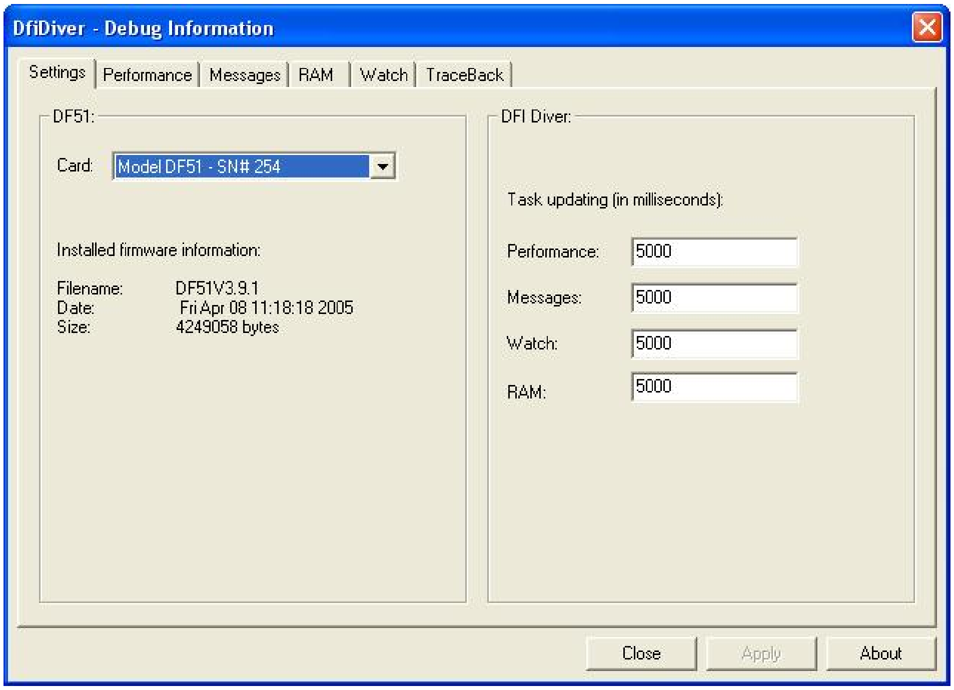
Introduction

Diagnosis of DFI/PCI is an advanced and very powerful feature of *System302*. DFI/PCI is the main LAS (Link Active Scheduler) in the system and is the interface between the control that is performed in the field and the supervisory software that runs on the workstations, in which the DFI/PCI cards are installed.

The DFI Diver/PCI Diver software allows the user to get some data stored in the DFI/PCI cards that can be very useful. Information such as the firmware version that is running on the hardware, how much time the DFI/PCI is running without resets, how much memory is still available for use and so on.

This software is part of *System302* package and is found in the same folder than *FBTools*.

1 – DFI Diver/PCI Diver – Settings Screen



DF51:

Card: Model DF51 - SN# 254

Installed firmware information:

Filename: DF51V3.9.1
Date: Fri Apr 08 11:18:18 2005
Size: 4249058 bytes

DFI Diver:

Task updating (in milliseconds):

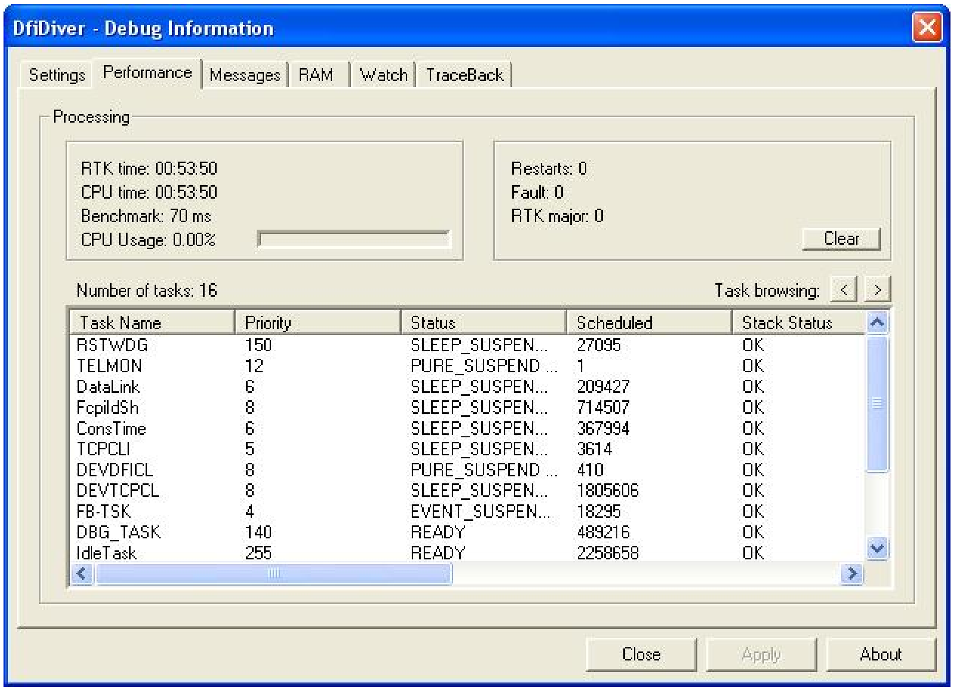
Performance: 5000
Messages: 5000
Watch: 5000
RAM: 5000

This screen is divided in two sections: DFI/PCI settings and DFI Diver/PCI Diver settings.

In the DFI/PCI settings section, it is chosen the DFI/PCI that will be analyzed and it is also presented the main settings of the card, such as firmware version and date, the size of the firmware program and the revision of the firmware.

Still in this section, the user sets time intervals, in milliseconds, in which the task update will be executed. Here, the user sets the interval between the readings of performance values, messages and watches the commands on the fieldbus line and on DFI/PCI RAM.

2 – DFI Diver/PCI Diver – Performance Screen



RTK time: 00:53:50
CPU time: 00:53:50
Benchmark: 70 ms
CPU Usage: 0.00%

Restarts: 0
Fault: 0
RTK major: 0

Number of tasks: 16

Task Name	Priority	Status	Scheduled	Stack Status
RSTWDG	150	SLEEP_SUSPEN...	27095	OK
TELMON	12	PURE_SUSPEND ...	1	OK
DataLink	6	SLEEP_SUSPEN...	209427	OK
FcpildSh	8	SLEEP_SUSPEN...	714507	OK
ConsTime	6	SLEEP_SUSPEN...	367994	OK
TCPCLI	5	SLEEP_SUSPEN...	3614	OK
DEVDFICL	8	PURE_SUSPEND ...	410	OK
DEVTCPCL	8	SLEEP_SUSPEN...	1805606	OK
FB-TSK	4	EVENT_SUSPEN...	18295	OK
DBG_TASK	140	READY	489216	OK
IdleTask	255	READY	2258658	OK

In this screen, it is presented the following performance values:

RTK time: the time of operation of RTK (real time kernel) – the operational system of the DFI/PCI – without any restart.

CPU time: the time of operation of the DFI/PCI CPU without any RESTART.

Benchmark: the time of operation of a subroutine by the processor.

CPU Usage: percentage of the CPU memory used to execute the tasks.

Restarts: numbers of restarts that DFI/PCI passed under. If this number is high can be a signal of problems in DFI/PCI and/or line.

Fault: counter of faulty commands and operations in DFI/PCI CPU.

RTK major: counter of faulty commands and operations detected by RTK.

In the bottom of the screen is presented a table with information about the tasks that the DFI/PCI is running.

Task Name: the name of each current task.

Priority: the importance of each task assigned by RTK. Lower value is more important.

Status: status of the task. “Ready” status means that the task is currently running and “Waiting for Timer” means that the task is waiting for a timing command to be run.

Scheduled: is the counter of how many times the task was run.

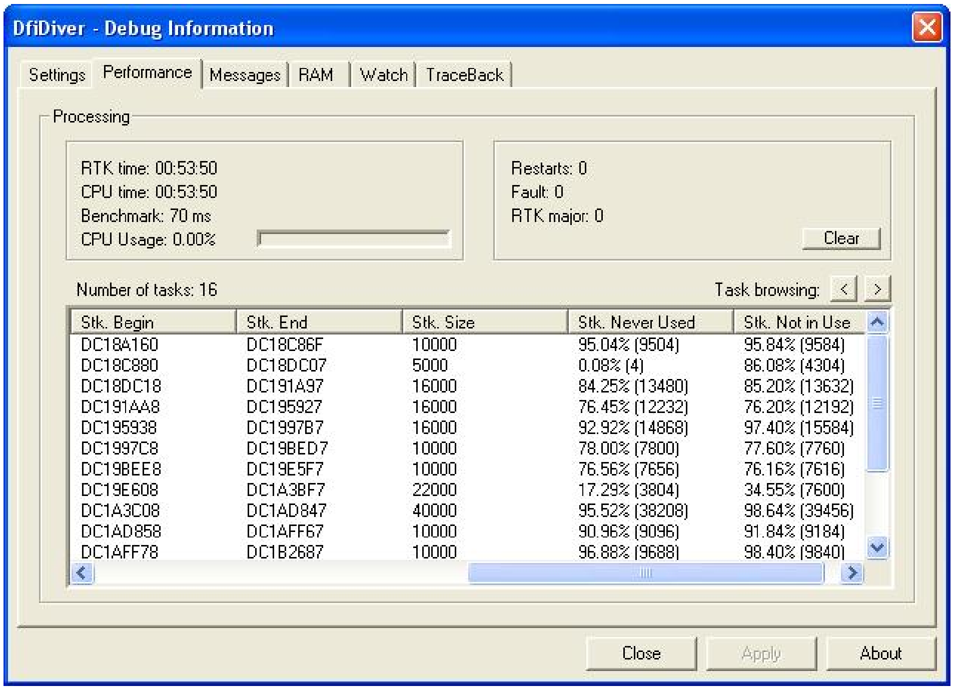
Stack Status: indicates the status of the stack dedicated to the task.

Stack Beginning: indicates the beginning address in memory of the stack dedicated to the task.

Stack End: indicates the end address in memory of the stack dedicated to the task.
Stack Size: indicates the size in memory of the stack dedicated to the task.

Stack Never Used: indicates how much of the memory was never used for the task.

Stack not in use: indicates how much of the already used memory is not being used.



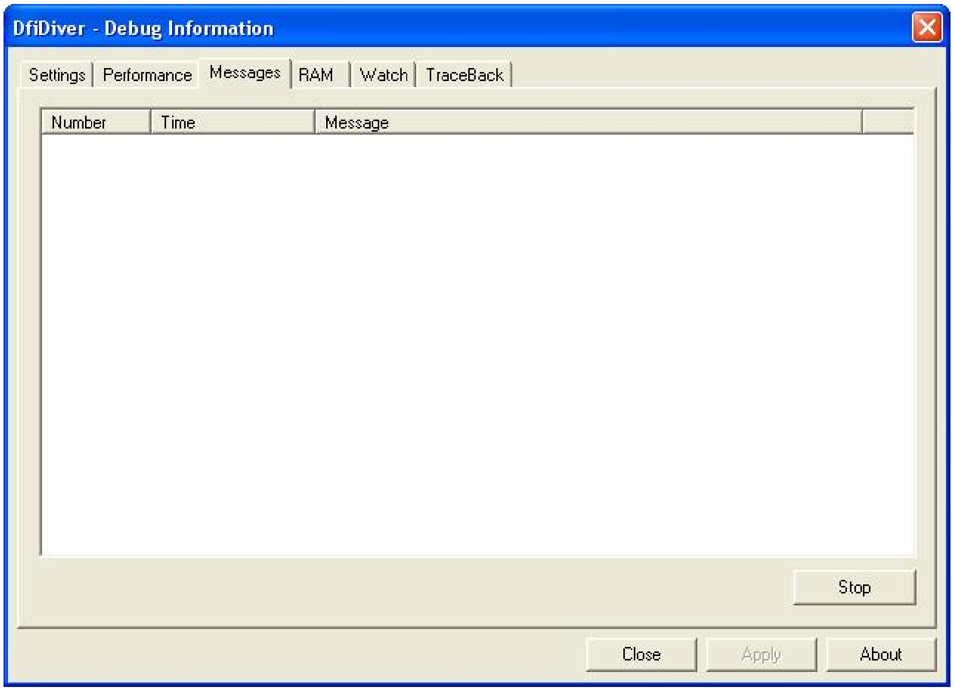
RTK time: 00:53:50
CPU time: 00:53:50
Benchmark: 70 ms
CPU Usage: 0.00%

Restarts: 0
Fault: 0
RTK major: 0

Number of tasks: 16

Stk. Begin	Stk. End	Stk. Size	Stk. Never Used	Stk. Not in Use
DC18A160	DC18C86F	10000	95.04% (9504)	95.84% (9584)
DC18C880	DC18DC07	5000	0.08% (4)	86.08% (4304)
DC18DC18	DC191A97	16000	84.25% (13480)	85.20% (13632)
DC191AA8	DC195927	16000	76.45% (12232)	76.20% (12192)
DC195938	DC1997B7	16000	92.92% (14868)	97.40% (15584)
DC1997C8	DC19BED7	10000	78.00% (7800)	77.60% (7760)
DC19BEE8	DC19E5F7	10000	76.56% (7656)	76.16% (7616)
DC19E608	DC1A3BF7	22000	17.29% (3804)	34.55% (7600)
DC1A3C08	DC1AD847	40000	95.52% (38208)	98.64% (39456)
DC1AD858	DC1AFF67	10000	90.96% (9096)	91.84% (9184)
DC1AFF78	DC1B2687	10000	96.88% (9688)	98.40% (9840)

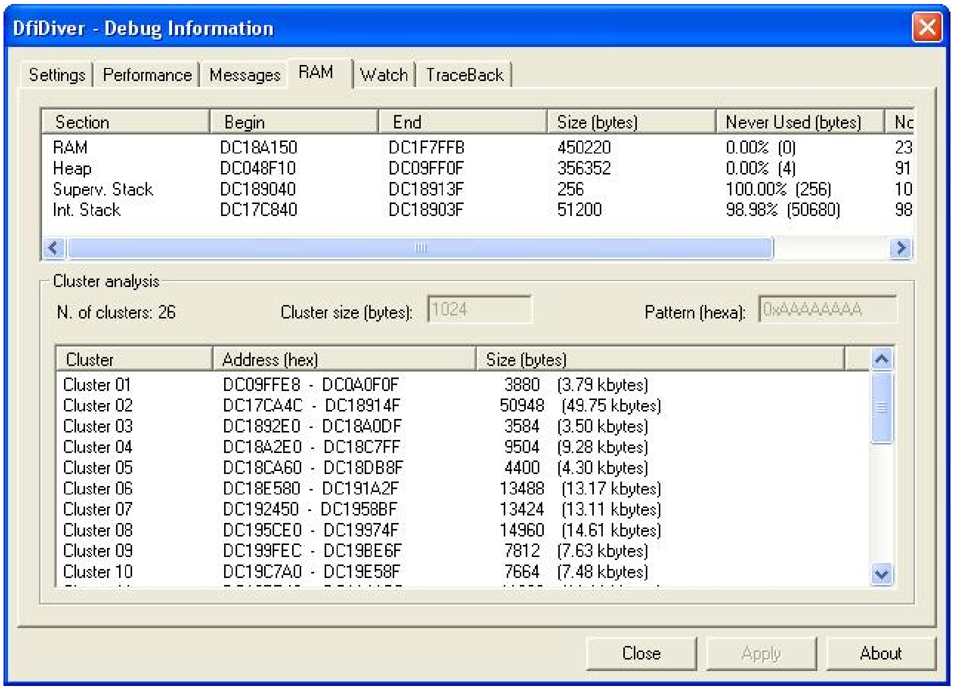
3 – DFI Diver/PCI Diver – Message Screen



Number	Time	Message

This screen is used for debug information. This screen is used for routine messages readings to help on debug tasks.

4 –DFI Diver/PCI Diver – RAM Information Screen



Section	Begin	End	Size (bytes)	Never Used (bytes)	Nc
RAM	DC18A150	DC1F7FFB	450220	0.00% (0)	23
Heap	DC048F10	DC09FF0F	356352	0.00% (4)	91
Superv. Stack	DC189040	DC18913F	256	100.00% (256)	10
Int. Stack	DC17C840	DC18903F	51200	98.98% (50680)	98

Cluster analysis

N. of clusters: 26

Cluster size (bytes): 1024

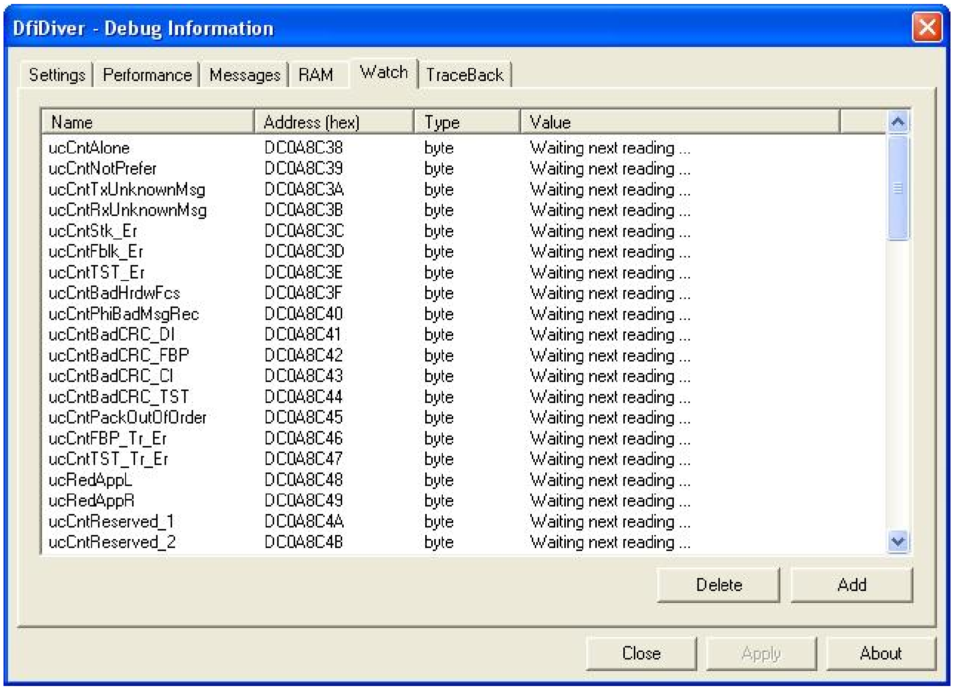
Pattern (hexa): 0xAAAAAAAA

Cluster	Address (hex)	Size (bytes)
Cluster 01	DC09FFE8 - DC0A0F0F	3880 (3.79 kbytes)
Cluster 02	DC17CA4C - DC18914F	50948 (49.75 kbytes)
Cluster 03	DC1892E0 - DC18A0DF	3584 (3.50 kbytes)
Cluster 04	DC18A2E0 - DC18C7FF	9504 (9.28 kbytes)
Cluster 05	DC18CA60 - DC18DB8F	4400 (4.30 kbytes)
Cluster 06	DC18E580 - DC191A2F	13488 (13.17 kbytes)
Cluster 07	DC192450 - DC1958BF	13424 (13.11 kbytes)
Cluster 08	DC195CE0 - DC19974F	14960 (14.61 kbytes)
Cluster 09	DC199FEC - DC19BE6F	7812 (7.63 kbytes)
Cluster 10	DC19C7A0 - DC19E58F	7664 (7.48 kbytes)

On this screen it is found information about the RAM memory of DFI/PCI card and of its subdivisions as Heap part (responsible for dynamic allocation), Supervision Stack (stack for main processor supervision) and Interruption Stack (stack for interruption for main processor).

In the cluster analysis part of the screen, the user can obtain an analysis of determined clusters of the memory. The user who sets the size and the pattern to be searched in the memory in the Cluster Size and Pattern fields determines those clusters.

5 – DFI Diver/PCI Diver - Watch Screen

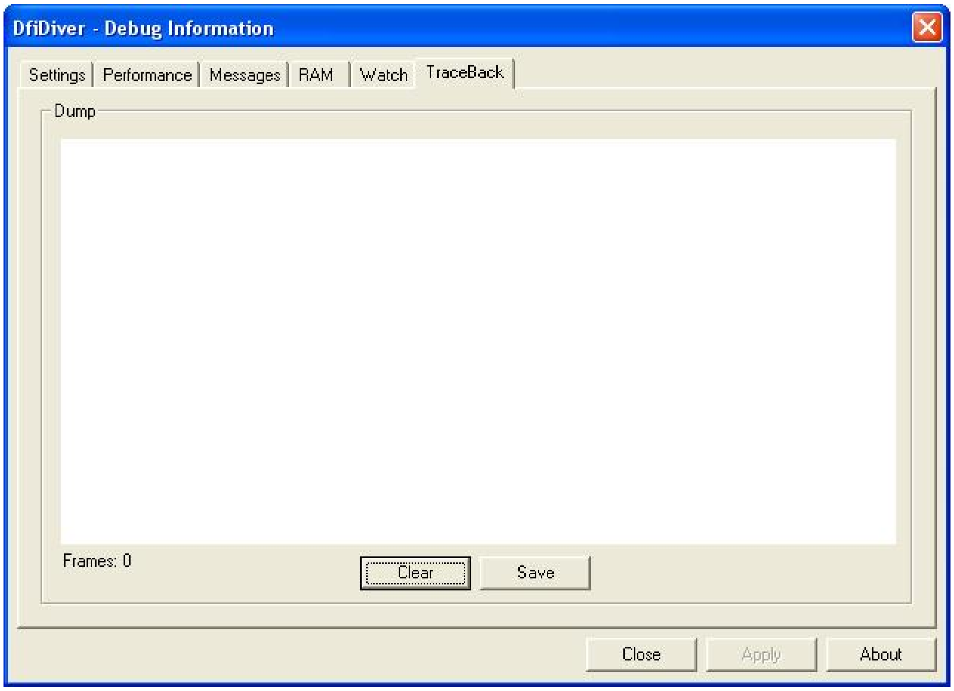


Name	Address (hex)	Type	Value
ucCntAlone	DC0A8C38	byte	Waiting next reading ...
ucCntNotPrefer	DC0A8C39	byte	Waiting next reading ...
ucCntTxUnknownMsg	DC0A8C3A	byte	Waiting next reading ...
ucCntRxUnknownMsg	DC0A8C3B	byte	Waiting next reading ...
ucCntStk_Er	DC0A8C3C	byte	Waiting next reading ...
ucCntFblk_Er	DC0A8C3D	byte	Waiting next reading ...
ucCntTST_Er	DC0A8C3E	byte	Waiting next reading ...
ucCntBadHrdwFcs	DC0A8C3F	byte	Waiting next reading ...
ucCntPhiBadMsgRec	DC0A8C40	byte	Waiting next reading ...
ucCntBadCRC_DI	DC0A8C41	byte	Waiting next reading ...
ucCntBadCRC_FBP	DC0A8C42	byte	Waiting next reading ...
ucCntBadCRC_CI	DC0A8C43	byte	Waiting next reading ...
ucCntBadCRC_TST	DC0A8C44	byte	Waiting next reading ...
ucCntPackOutOfOrder	DC0A8C45	byte	Waiting next reading ...
ucCntFBP_Tr_Er	DC0A8C46	byte	Waiting next reading ...
ucCntTST_Tr_Er	DC0A8C47	byte	Waiting next reading ...
ucRedAppL	DC0A8C48	byte	Waiting next reading ...
ucRedAppR	DC0A8C49	byte	Waiting next reading ...
ucCntReserved_1	DC0A8C4A	byte	Waiting next reading ...
ucCntReserved_2	DC0A8C4B	byte	Waiting next reading ...

On this screen, the user reads the values in memory directly. The user is able to read what is written in memory dynamically.

To do that, it is necessary to know the memory position of the desired value and its variable type. This information must be entered and the value can be monitored in the watch screen, as in the example.

6 – DFI Diver/PCI Diver - Trace Back Screen



Frames: 0

This screen displays the last actions of the processor until an error occurs. These information are in low-level language. Pressing the *Save* button you can save these information in a file. This file can be sent to Smar to analysis.

Appendix H

TAGLIST SOFTWARE APPLICATION BULLETIN

Introduction

The software Tag List Generator for the DF65 OPC Server is developed to generate an information Table to the DF65 OPC Server telling which are the Tags for each Modbus Address.

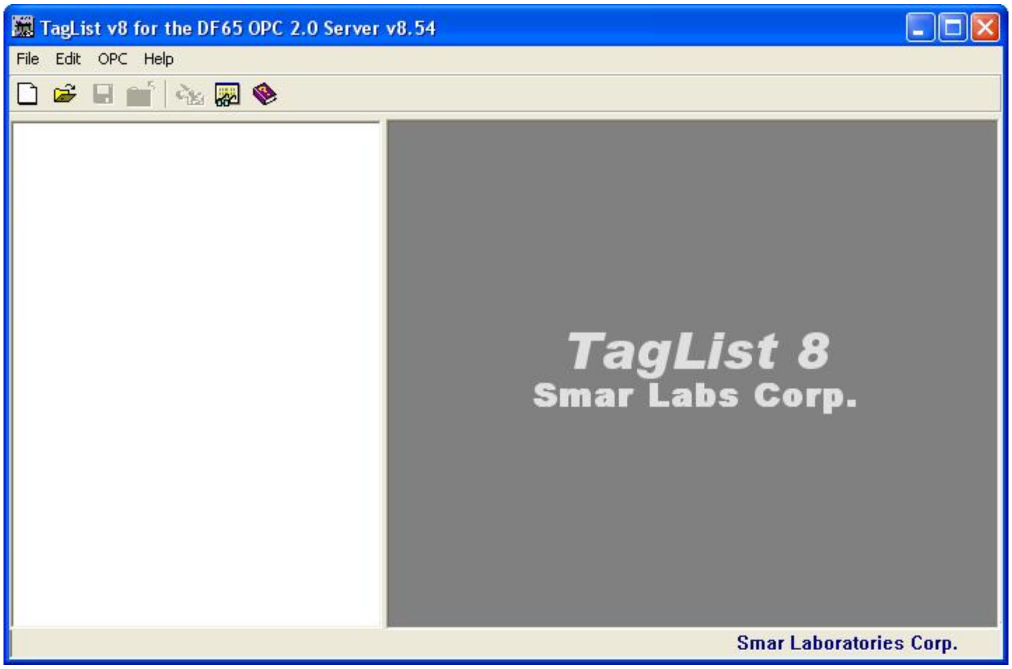
The advantage to configure using links to Tags is that if the user changes the DF65 configuration the Modbus address will change, but the Tags will not. The OPC Server will be able to read the new Tag List generated after the changes made with the LogicView.

1 – Starting Up TagList DF65

From the **Start** menu, select **Programs/System302/System302 Application** and choose **TagList**.

You can also activate it from the **Start** menu, selecting **Program\System302\Tag List Monit View\TagList**.

The following window will open.

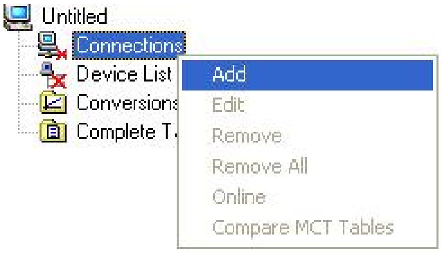


2 – Creating a New Project

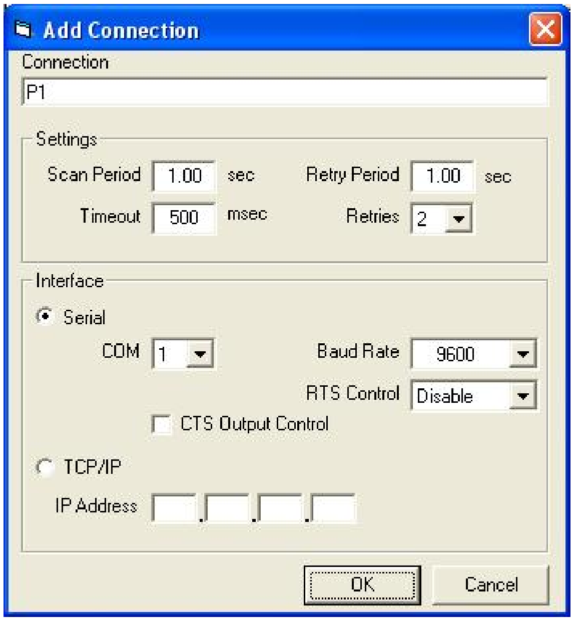
To create a New Project, click on the *File* menu, then click *New*, or click on **New** button, 🗋,on the toolbar.

3 – Adding Ports

Right-click on the **Connections** Icon and **Add** a connection.



The *Add Connection* window will open. Fulfill the fields and click **OK**.


Add Connection

Connection: P1

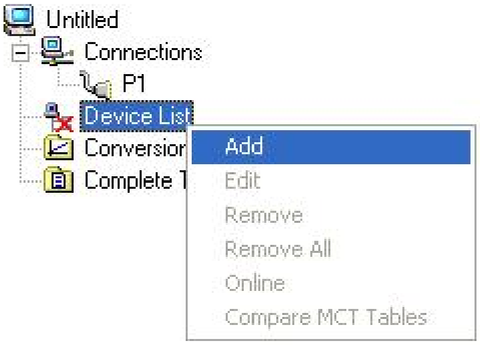
Settings
Scan Period: 1.00 sec
Retry Period: 1.00 sec
Timeout: 500 msec
Retries: 2

Interface
● Serial
COM: 1
Baud Rate: 9600
RTS Control: Disable
□ CTS Output Control
○ TCP/IP
IP Address: . . .

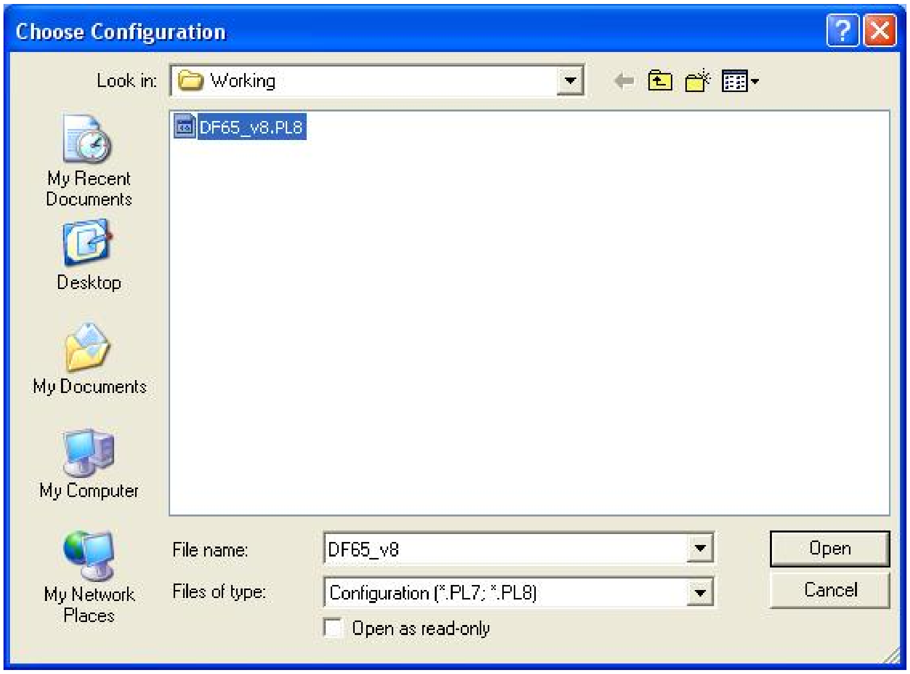
OK
Cancel

4 – Adding a Configuration

Right-click on the **Device List** icon, choose **Add**.



The TagList will open a window. Select the DF65 configuration file which contains the desired configuration.



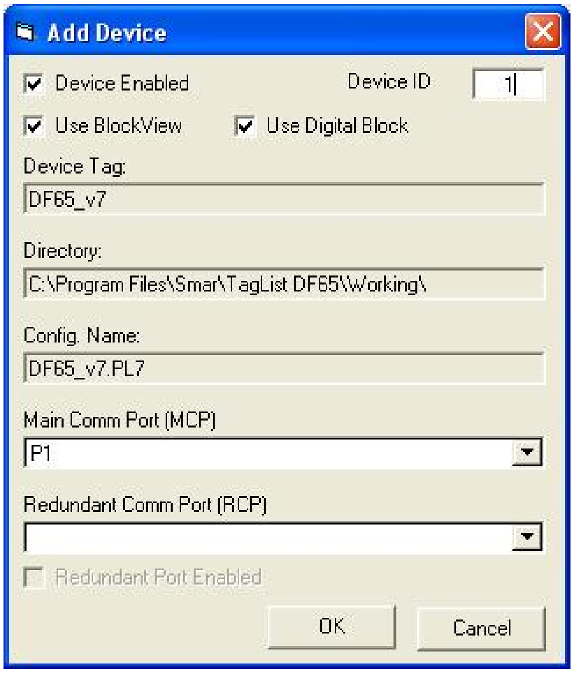
Look in: Working

File name: DF65_v8

Files of type: Configuration (*.PL7; *.PL8)

□ Open as read-only

The *Add Device* window will open. Select the Main Connection Port and provide the DF65 correct *Device ID*.



☑ Device Enabled

Device ID: 1

☑ Use BlockView

☑ Use Digital Block

Device Tag: DF65_v7

Directory: C:\Program Files\Smar\TagList DF65\Working\

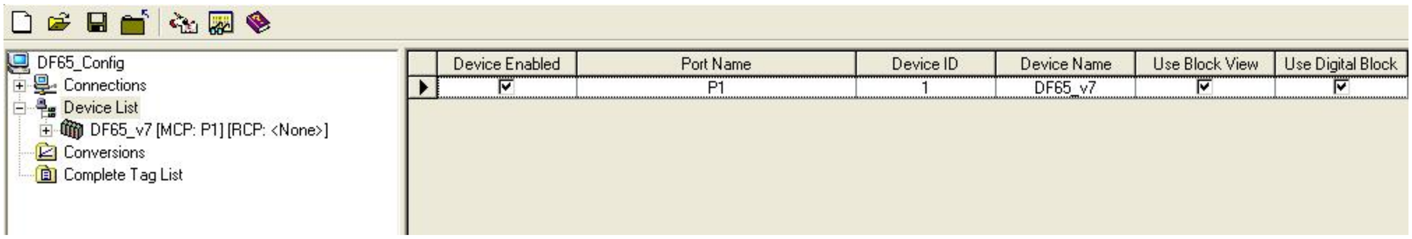
Config. Name: DF65_v7.PL7

Main Comm Port (MCP): P1

Redundant Comm Port (RCP):

□ Redundant Port Enabled

After add the ports and devices, the configuration will seem like the following window.

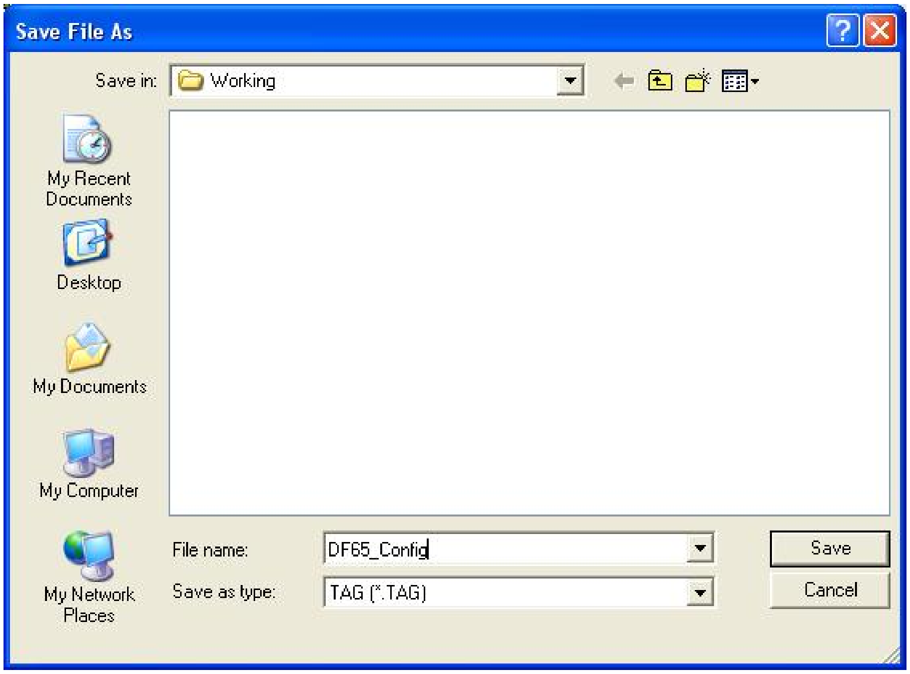


DF65_Config
- Connections
- Device List
  - DF65_v7 [MCP: P1] [RCP: <None>]
- Conversions
- Complete Tag List

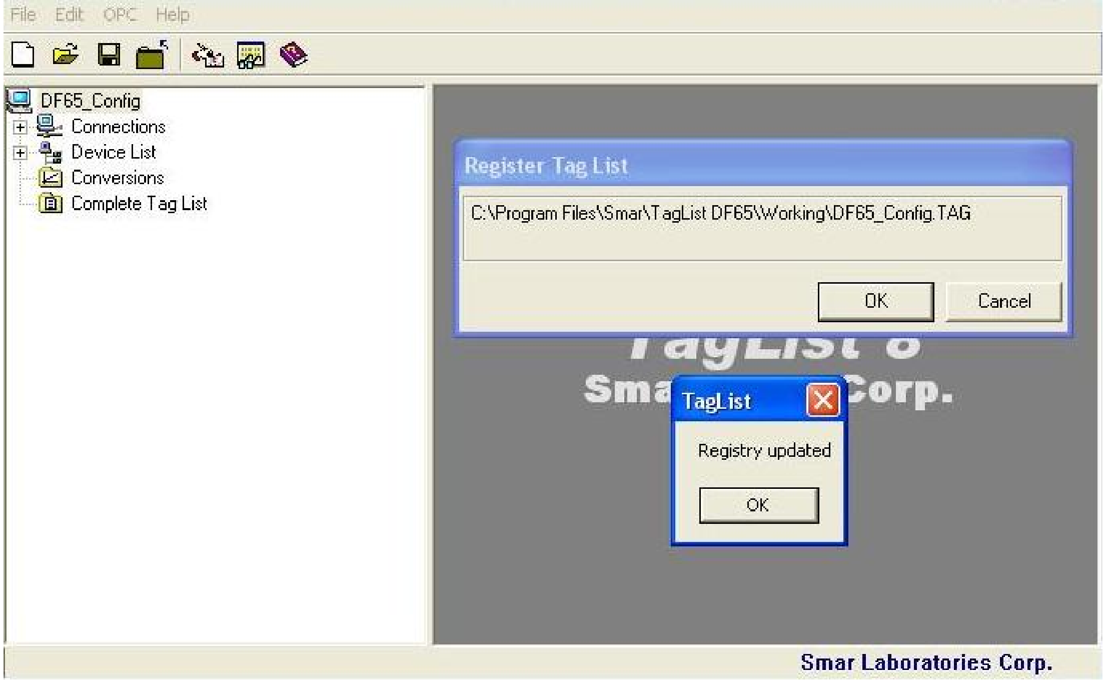
Device Enabled	Port Name	Device ID	Device Name	Use Block View	Use Digital Block
☑	P1	1	DF65_v7	☑	☑

5 –Registering the Project

In order to compile the project (to generate the Tag List) it is necessary to first save the current project. Click on the **Save** icon, 💾, on the toolbar.



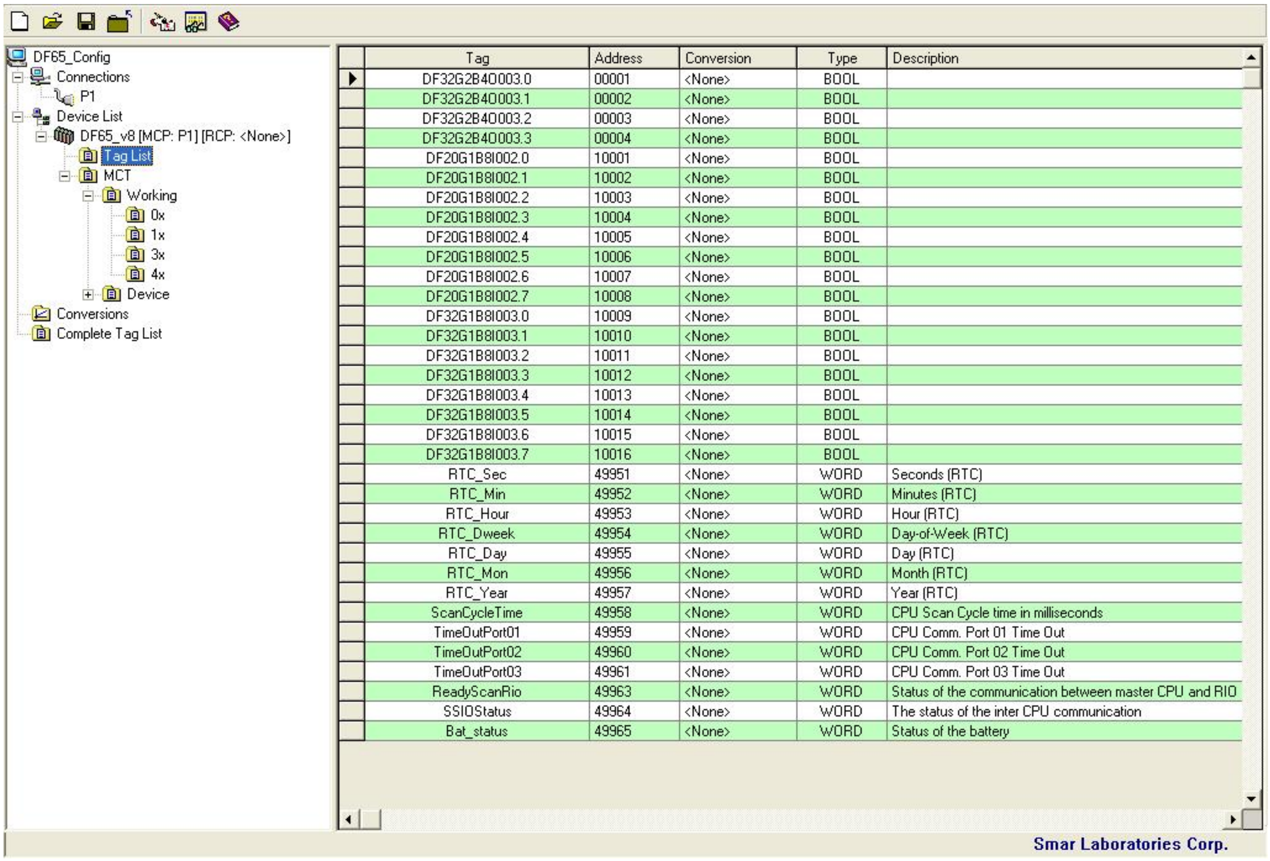
To register a project, just click on the *OPC* menu, then click on *Register Tag List*, or click on **Register Configuration**. Button, , on the Toolbar. The following window will appear.



C:\Program Files\Smar\TagList DF65\Working\DF65_Config.TAG

Registry updated

Click on the **Tag List** folder and check the Tag List Table generated for the current configuration.



Tag	Address	Conversion	Type	Description
DF32G2B4O003.0	00001	<None>	BOOL	
DF32G2B4O003.1	00002	<None>	BOOL	
DF32G2B4O003.2	00003	<None>	BOOL	
DF32G2B4O003.3	00004	<None>	BOOL	
DF20G1B8I002.0	10001	<None>	BOOL	
DF20G1B8I002.1	10002	<None>	BOOL	
DF20G1B8I002.2	10003	<None>	BOOL	
DF20G1B8I002.3	10004	<None>	BOOL	
DF20G1B8I002.4	10005	<None>	BOOL	
DF20G1B8I002.5	10006	<None>	BOOL	
DF20G1B8I002.6	10007	<None>	BOOL	
DF20G1B8I002.7	10008	<None>	BOOL	
DF32G1B8I003.0	10009	<None>	BOOL	
DF32G1B8I003.1	10010	<None>	BOOL	
DF32G1B8I003.2	10011	<None>	BOOL	
DF32G1B8I003.3	10012	<None>	BOOL	
DF32G1B8I003.4	10013	<None>	BOOL	
DF32G1B8I003.5	10014	<None>	BOOL	
DF32G1B8I003.6	10015	<None>	BOOL	
DF32G1B8I003.7	10016	<None>	BOOL	
RTC_Sec	49951	<None>	WORD	Seconds (RTC)
RTC_Min	49952	<None>	WORD	Minutes (RTC)
RTC_Hour	49953	<None>	WORD	Hour (RTC)
RTC_Dweek	49954	<None>	WORD	Day-of-Week (RTC)
RTC_Day	49955	<None>	WORD	Day (RTC)
RTC_Mon	49956	<None>	WORD	Month (RTC)
RTC_Year	49957	<None>	WORD	Year (RTC)
ScanCycleTime	49958	<None>	WORD	CPU Scan Cycle time in milliseconds
TimeOutPort01	49959	<None>	WORD	CPU Comm. Port 01 Time Out
TimeOutPort02	49960	<None>	WORD	CPU Comm. Port 02 Time Out
TimeOutPort03	49961	<None>	WORD	CPU Comm. Port 03 Time Out
ReadyScanRio	49963	<None>	WORD	Status of the communication between master CPU and RIO
SSIOStatus	49964	<None>	WORD	The status of the inter CPU communication
Bat_status	49965	<None>	WORD	Status of the battery

6 – Using MCT (Modbus Cross Table)

In this option, the user can choose which points will be monitored by the device that uses the Modbus protocol. The goal is create a Modbus sequential table in the CPU in order to get a better HMI register monitoring performance.

NOTE: TagList V8.54 allows a Modbus Cross Table configuration valid for E3 CPU, only.

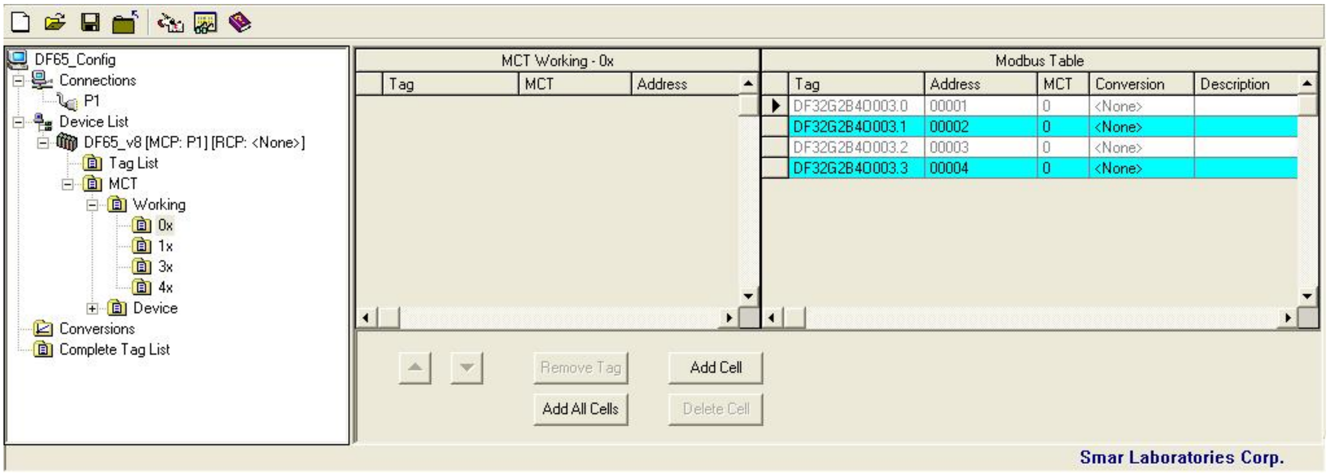
Step 1 - Configuring MCT

In this option, the user can choose which points will be monitored by the device that uses the Modbus protocol.

To configure the MCT table, select the address range required on the **Working** folder. The address Table will appear at left.

Four Address Ranges will become available to visualize the configuration points:

0x: Digital Outputs and Virtual Points.
1x: Digital Inputs.
3x: Analog Inputs.
4x: Analog Outputs, Function Blocks and Special Registers.



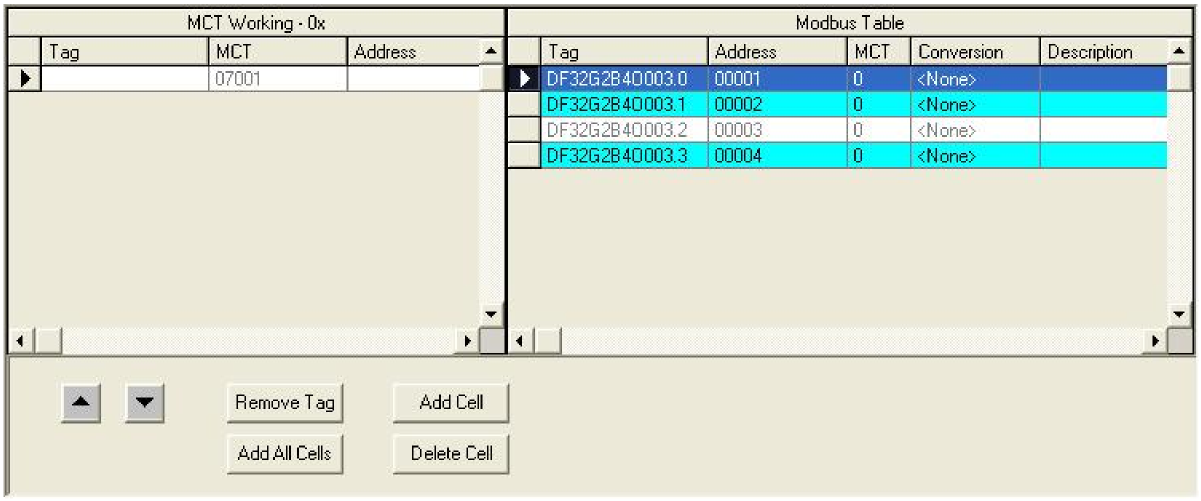
MCT Working - 0x

Tag	MCT	Address

Modbus Table

Tag	Address	MCT	Conversion	Description
DF32G2B4O003.0	00001	0	<None>	
DF32G2B4O003.1	00002	0	<None>	
DF32G2B4O003.2	00003	0	<None>	
DF32G2B4O003.3	00004	0	<None>	

In order to configure the MCT table, click on the **Add Cell** button. One line will be added in the table.



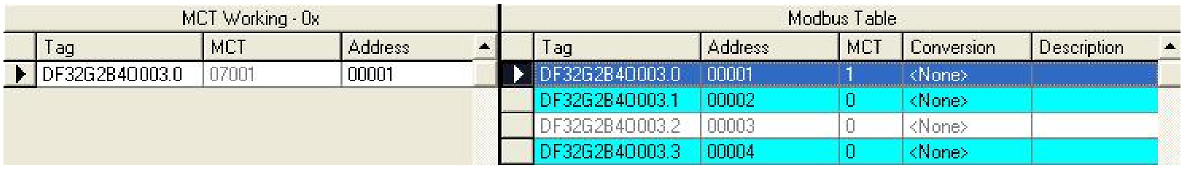
MCT Working - 0x

Tag	MCT	Address
	07001	

Modbus Table

Tag	Address	MCT	Conversion	Description
DF32G2B4O003.0	00001	0	<None>	
DF32G2B4O003.1	00002	0	<None>	
DF32G2B4O003.2	00003	0	<None>	
DF32G2B4O003.3	00004	0	<None>	

Click with the left button on the Tag in Modbus Table and drag it to the added cell in MCT Table.


MCT Working - 0x

Tag	MCT	Address
DF32G2B4O003.0	07001	00001

Modbus Table

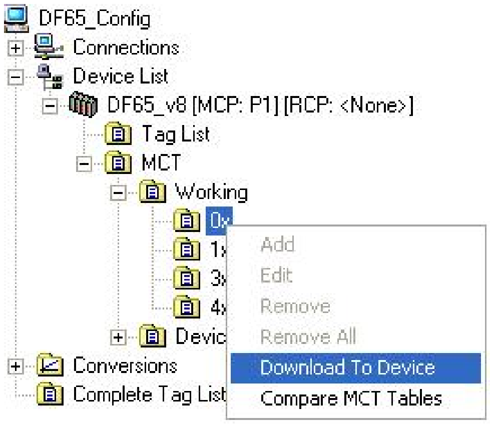
Tag	Address	MCT	Conversion	Description
DF32G2B4O003.0	00001	1	<None>	
DF32G2B4O003.1	00002	0	<None>	
DF32G2B4O003.2	00003	0	<None>	
DF32G2B4O003.3	00004	0	<None>	

Repeat the step above to add all points which must to be monitored.

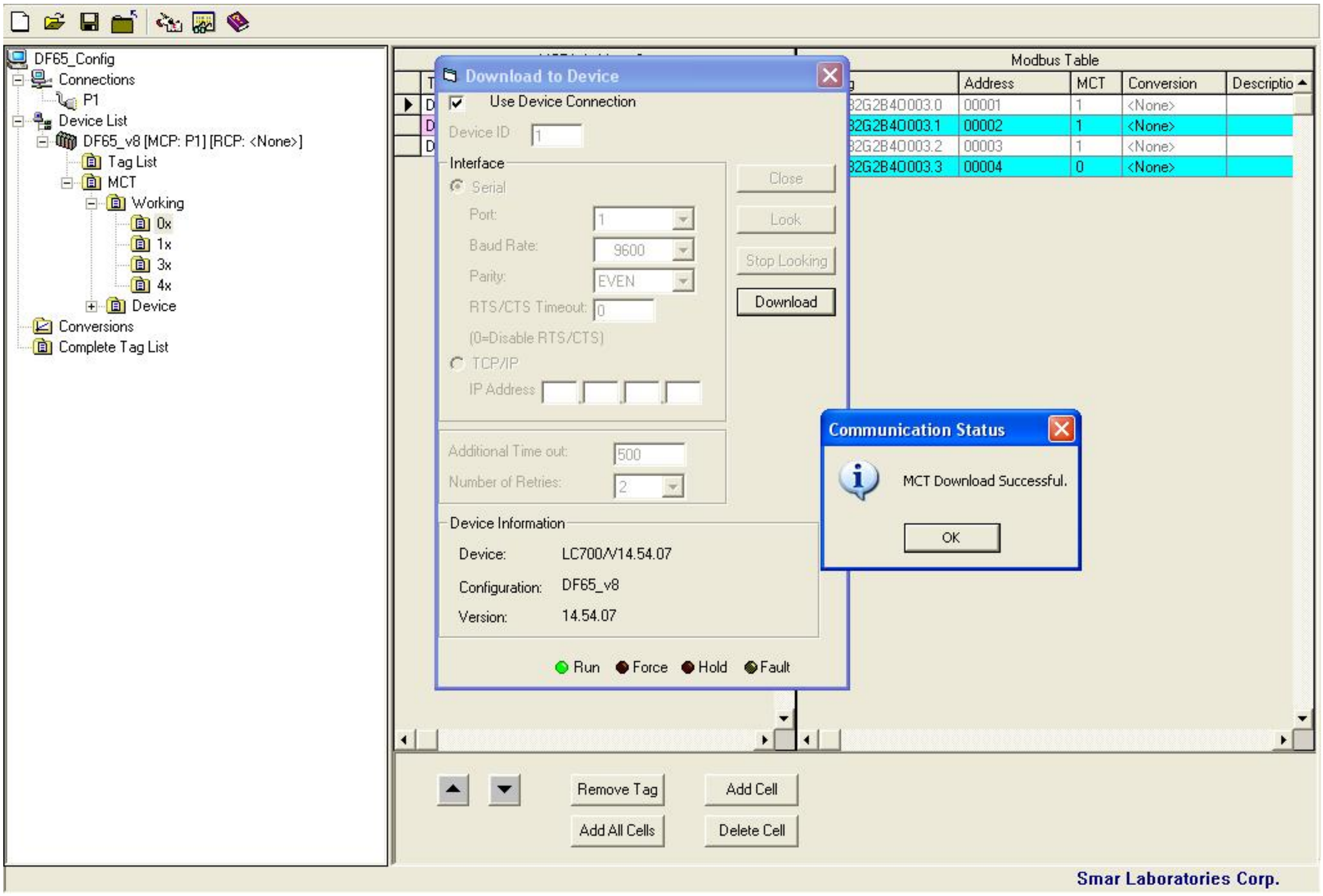
Step 2 - Download to Device

To configure the MCT Table, it is necessary to do the download of the added points.

Right-click on each one of the address ranges in the *Working* folder. A popup menu will be opened, select the **Download to Device** option or click on *Edit* menu and choose the *Download to Device* option. See the following picture:



After doing the download of all points the following message will be shown.



☑ Use Device Connection

Device ID: 1

Interface

● Serial

Port: 1

Baud Rate: 9600

Parity: EVEN

RTS/CTS Timeout: 0

(0=Disable RTS/CTS)

○ TCP/IP

IP Address

Additional Time out: 500

Number of Retries: 2

Device Information

Device: LC700/V14.54.07

Configuration: DF65_v8

Version: 14.54.07

Modbus Table

g	Address	MCT	Conversion	Descriptio
2G2B40003.0	00001	1	<None>	
2G2B40003.1	00002	1	<None>	
2G2B40003.2	00003	1	<None>	
2G2B40003.3	00004	0	<None>	

Communication Status

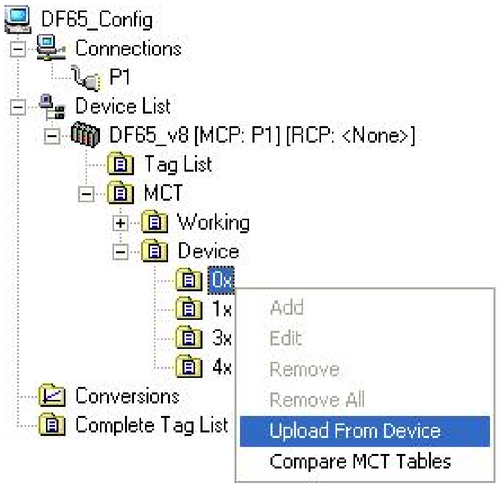
MCT Download Successful.

OK

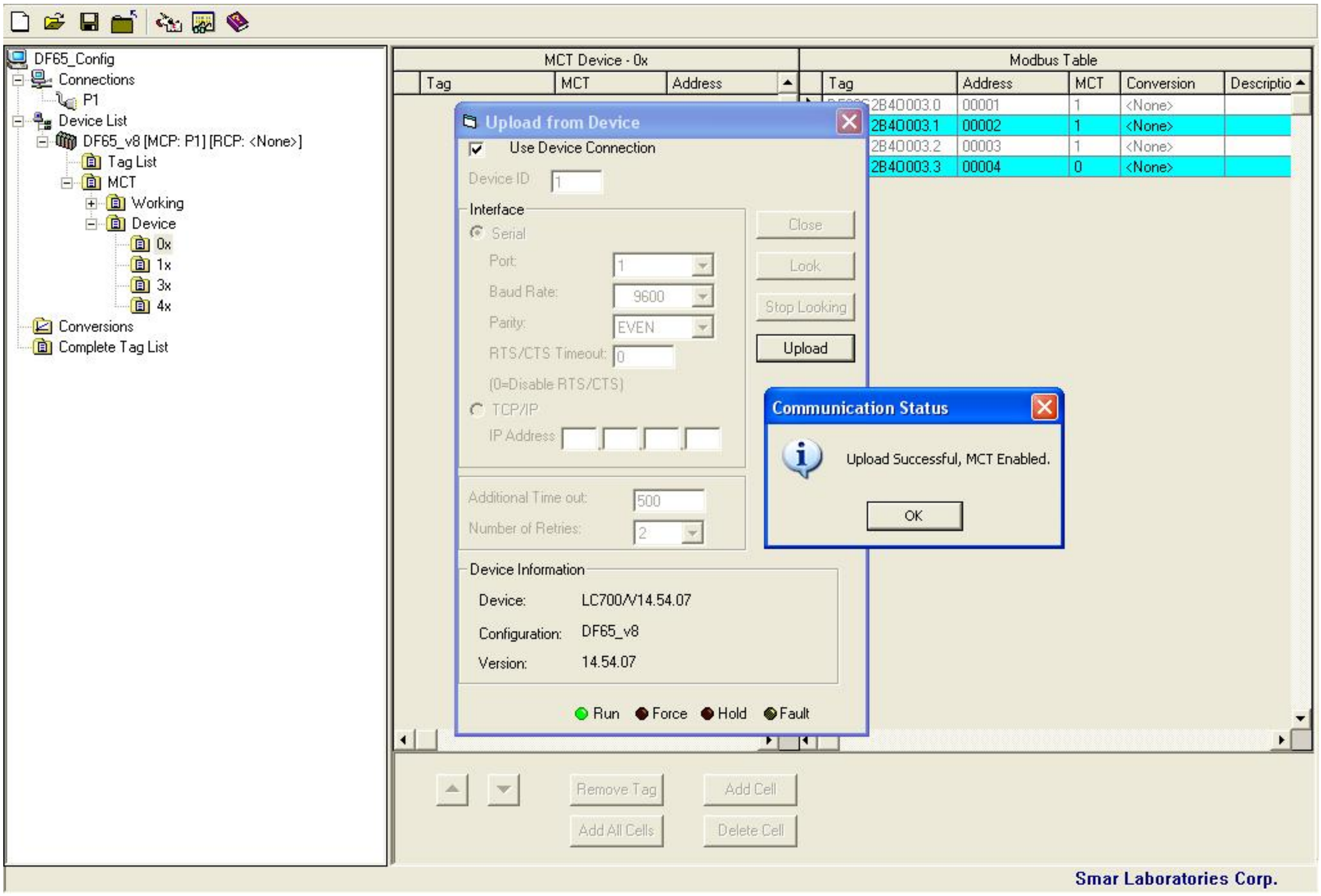
Step 3 - Upload from Device

After all points of the MCT Table had been sent to device, the upload of these points must be done in order to compare them.

Right-click on the Address ranges in the *Device* folder, a popup menu will be opened. Choose **Upload from Device** or click on the *Edit* menu and select the *Upload from Device* option.



After doing the upload of all points the following message will be shown.



Tag	Address	MCT	Conversion	Descriptio
2B40003.0	00001	1	<None>	
2B40003.1	00002	1	<None>	
2B40003.2	00003	1	<None>	
2B40003.3	00004	0	<None>	

Upload from Device

☑ Use Device Connection

Device ID: 1

Interface

● Serial

Port: 1

Baud Rate: 9600

Parity: EVEN

RTS/CTS Timeout: 0

(0=Disable RTS/CTS)

○ TCP/IP

IP Address:

Additional Time out: 500

Number of Retries: 2

Device Information

Device: LC700/V14.54.07

Configuration: DF65_v8

Version: 14.54.07

Communication Status

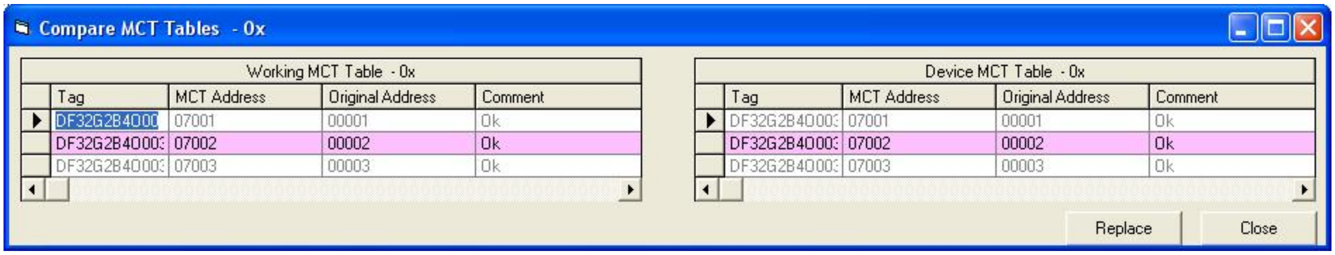
Upload Successful, MCT Enabled.

OK

Step 4 - Comparing the Tag Tables

It is possible to do the comparison of the Working and Device Tables.

Click with the right button on one of the address ranges in the *Working* or *Device* folder. A popup menu will appear, choose the **Compare MCT Tables** option, or click on *Edit* menu and select *Compare MCT* option.



Compare MCT Tables - 0x

Working MCT Table - 0x

Tag	MCT Address	Original Address	Comment
DF32G2B400(	07001	00001	Ok
DF32G2B4000:	07002	00002	Ok
DF32G2B4000:	07003	00003	Ok

Device MCT Table - 0x

Tag	MCT Address	Original Address	Comment
DF32G2B4000:	07001	00001	Ok
DF32G2B4000:	07002	00002	Ok
DF32G2B4000:	07003	00003	Ok

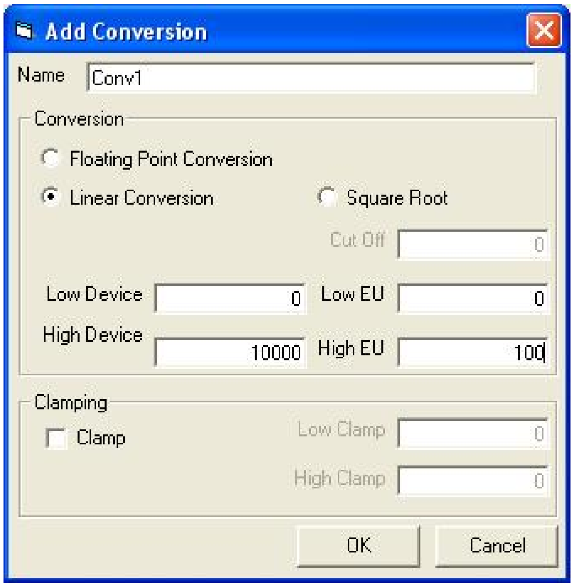
We can observe the status of the points in the Compare MCT Tables:0
- OK: the Device and Working original addresses are the same.
- Tag Mismatch: the Device and Working original addresses are different.
- Not found in Device: the original address was in Working was not found in Device.

The *Replace* button replaces the Device Table points to Working Table.
The *Close* button closes the window.

7 – Using Conversions

For each Tag, the user can choose if this Tag Value will have conversion from device scale (Device Range) to client scale (Engineering Units), or not.

Click with the right button on **Conversion** folder, a popup menu will be opened, choose **Add** option. The following window will appear.



Add Conversion

Name: Conv1

Conversion

○ Floating Point Conversion

● Linear Conversion ○ Square Root

Cut Off: 0

Low Device: 0 Low EU: 0

High Device: 10000 High EU: 100

Clamping

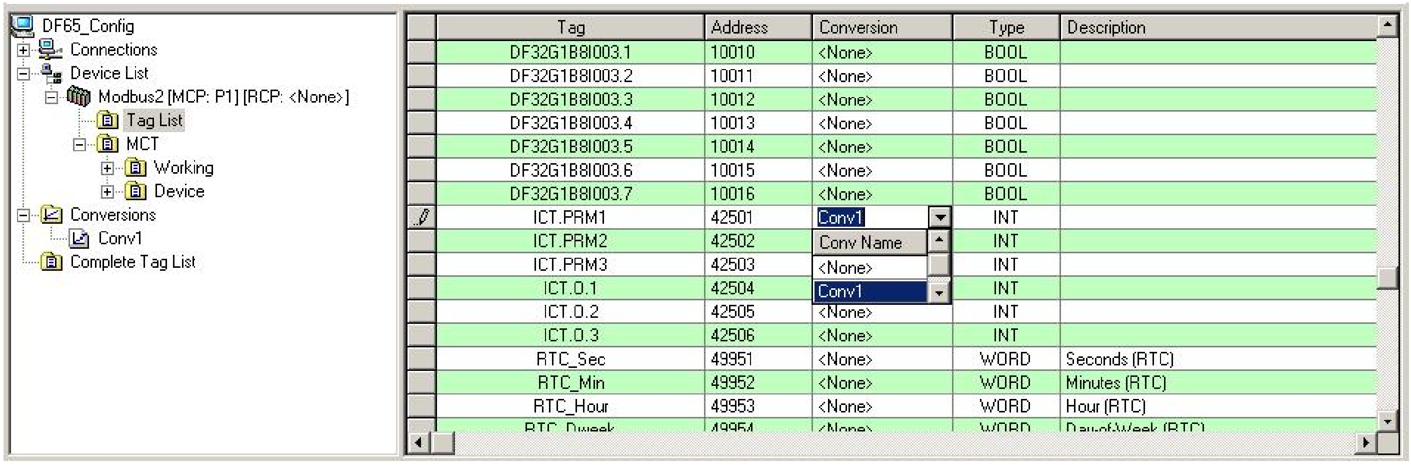
□ Clamp

Low Clamp: 0

High Clamp: 0

After having created a Conversion Rule, the user needs to assign this Conversion to a Tag.

Select the **Tag List** folder. Click on the C*onversion* field, a popup menu will open to assign the Conversion to the Tag.



DF65_Config
Connections
Device List
Modbus2 [MCP: P1] [RCP: <None>]
Tag List
MCT
Working
Device
Conversions
Conv1
Complete Tag List

Tag	Address	Conversion	Type	Description
DF32G1B8I003.1	10010	<None>	BOOL	
DF32G1B8I003.2	10011	<None>	BOOL	
DF32G1B8I003.3	10012	<None>	BOOL	
DF32G1B8I003.4	10013	<None>	BOOL	
DF32G1B8I003.5	10014	<None>	BOOL	
DF32G1B8I003.6	10015	<None>	BOOL	
DF32G1B8I003.7	10016	<None>	BOOL	
ICT.PRM1	42501	Conv1	INT	
ICT.PRM2	42502	Conv Name	INT	
ICT.PRM3	42503	<None>	INT	
ICT.O.1	42504	Conv1	INT	
ICT.O.2	42505	<None>	INT	
ICT.O.3	42506	<None>	INT	
RTC_Sec	49951	<None>	WORD	Seconds (RTC)
RTC_Min	49952	<None>	WORD	Minutes (RTC)
RTC_Hour	49953	<None>	WORD	Hour (RTC)
RTC_Dweek	49954	<None>	WORD	Day-of-Week (RTC)

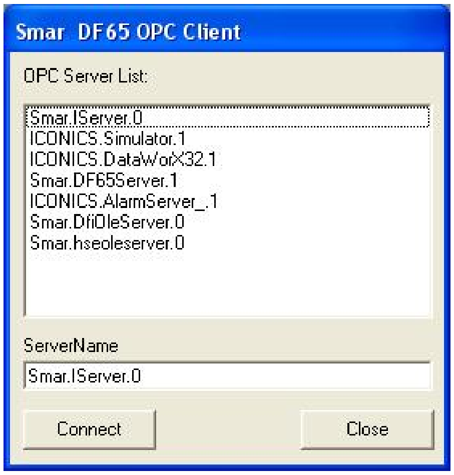
NOTE:
• Only Tags that can be represented in Eng. Units (EU) can be converted.
Tags with DATA TYPES: WORD, DWORD, INT and REAL are allowed to have conversion.
•Tags with DATA TYPES: BOOL, and BYTE are Tags that has no conversion to EU.

8 – OPC Monitor

The TagList has a tool that can monitor points using the DF65 OPC Server.

Click on *Edit* menu, select *Compare MCT* option or click in the *OPC Monitor* button, .

A dialog box will appear. Choose the **DF65 Server** and click on the **Connect** button.



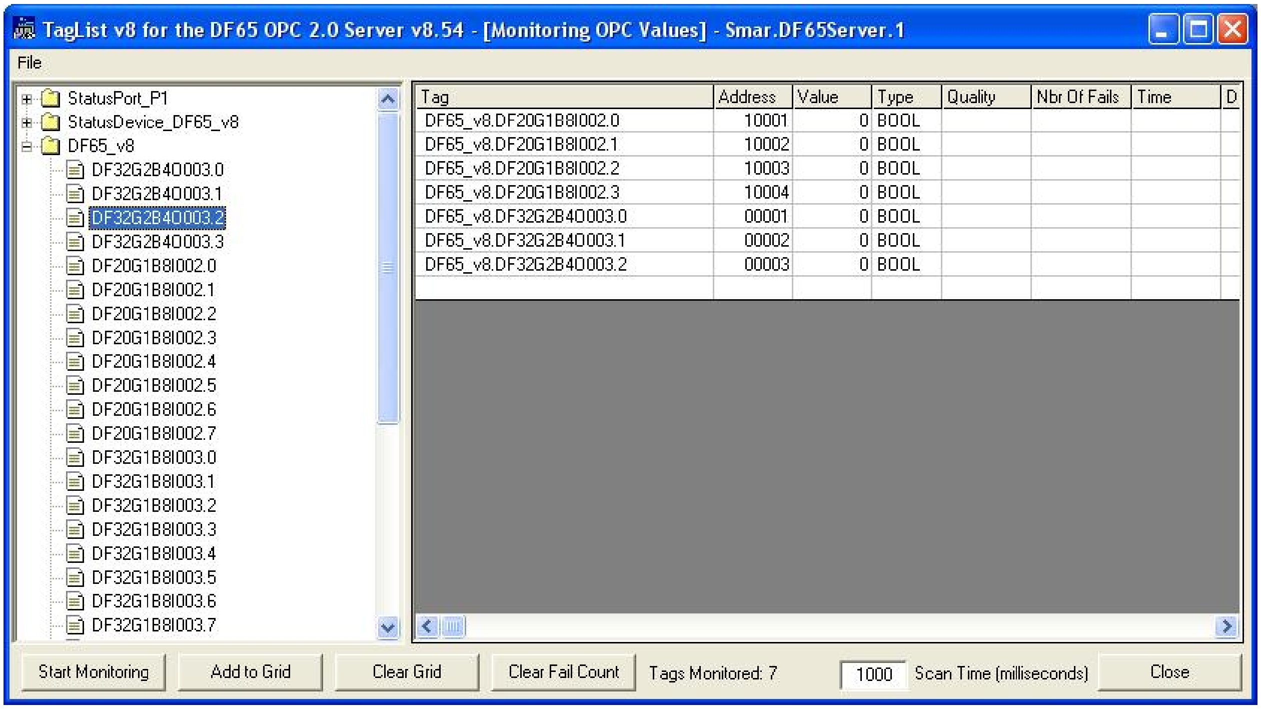
Smar DF65 OPC Client

OPC Server List:

Smar.IServer.0
ICONICS.Simulator.1
ICONICS.DataWorX32.1
Smar.DF65Server.1
ICONICS.AlarmServer_.1
Smar.DfiOleServer.0
Smar.hseoleserver.0

ServerName: Smar.IServer.0

The *OPC Monitor* screen will open. Double-click to add/delete variables

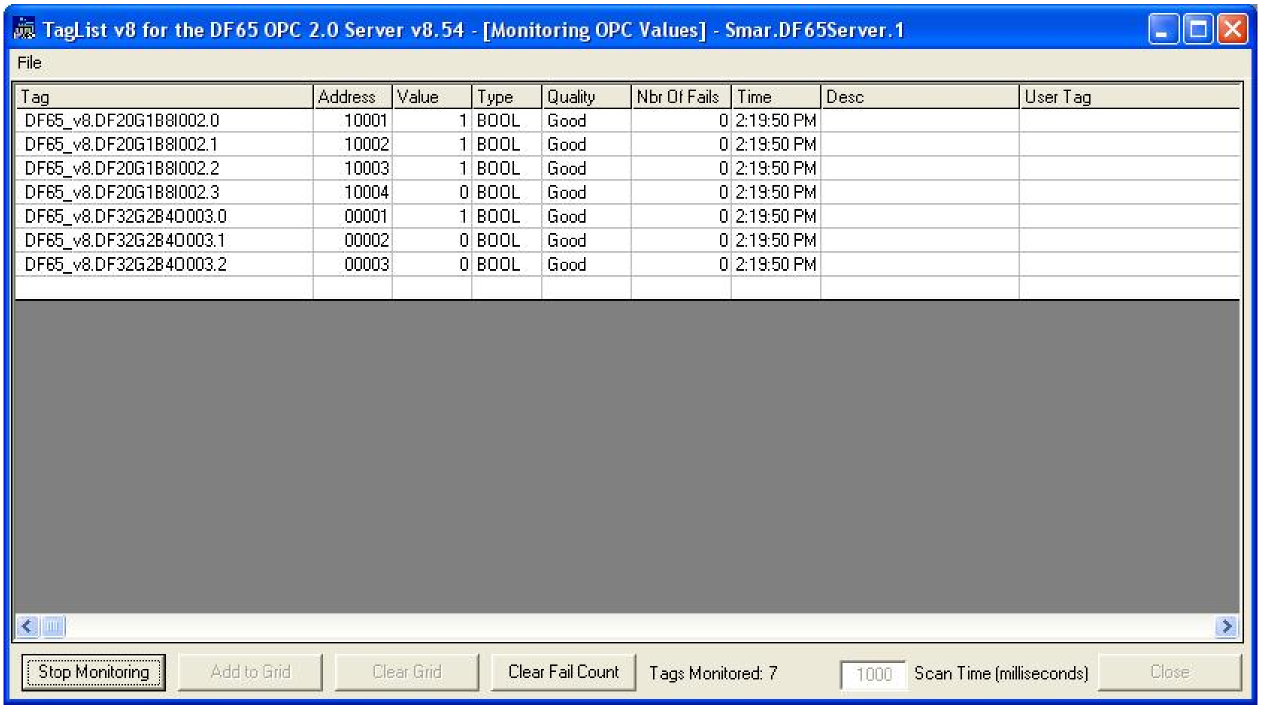


Tag	Address	Value	Type	Quality	Nbr Of Fails	Time	D
DF65_v8.DF20G1B8I002.0	10001	0	BOOL				
DF65_v8.DF20G1B8I002.1	10002	0	BOOL				
DF65_v8.DF20G1B8I002.2	10003	0	BOOL				
DF65_v8.DF20G1B8I002.3	10004	0	BOOL				
DF65_v8.DF32G2B4O003.0	00001	0	BOOL				
DF65_v8.DF32G2B4O003.1	00002	0	BOOL				
DF65_v8.DF32G2B4O003.2	00003	0	BOOL				

Tags Monitored: 7

Scan Time (milliseconds): 1000

To start monitoring, click on **Start Monitoring** button. To end monitoring, click on **Stop Monitoring** button.


TagList v8 for the DF65 OPC 2.0 Server v8.54 - [Monitoring OPC Values] - Smar.DF65Server.1
File
Stop Monitoring
Add to Grid
Clear Grid
Clear Fail Count
Close

Tag	Address	Value	Type	Quality	Nbr Of Fails	Time	Desc	User Tag
DF65_v8.DF20G1B8I002.0	10001	1	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF20G1B8I002.1	10002	1	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF20G1B8I002.2	10003	1	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF20G1B8I002.3	10004	0	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF32G2B4O003.0	00001	1	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF32G2B4O003.1	00002	0	BOOL	Good	0	2:19:50 PM		
DF65_v8.DF32G2B4O003.2	00003	0	BOOL	Good	0	2:19:50 PM		

Tags Monitored: 7

Scan Time (milliseconds): 1000

For additional information consult the *TagList Generator* manual.

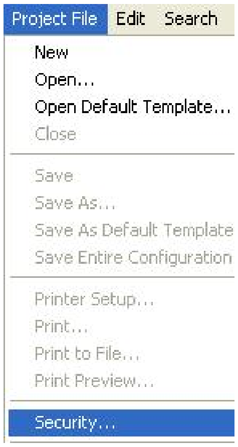
SYSCON SECURITY MANAGER

Introduction

Security Manager is a tool in Syscon 6.0 that avoids unauthorized users to open the configuration file. This appendix will show how do use and configure this.

1 – Opening Security Manager for the First Time

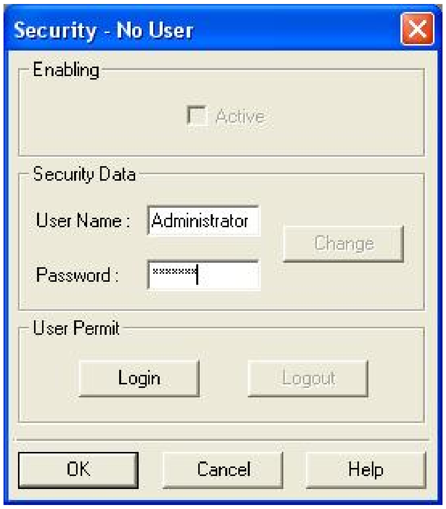
In the *Syscon* window, open the **Project File** menu and choose **Security**.



The *Security* window will open.

> **Note:** Only the Administrator can change and configure the users Database. When you use the security manager for the first time the default administrator user will be **Administrator** and the password will be **Unit XVI**.

Type the *User Name*, *Password* and click the **Login** button.

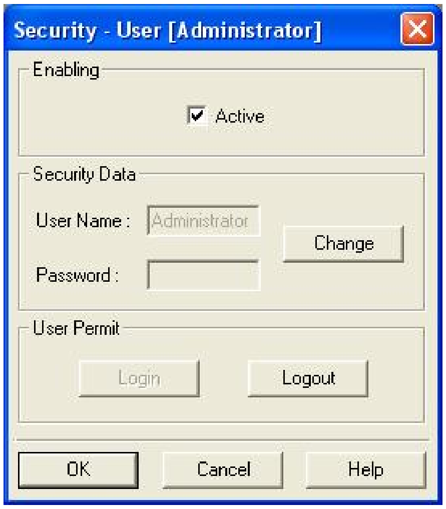


Security - No User

User Name : Administrator

Password : *******

Now the user is logged in.



Security - User [Administrator]

Enabling

☑ Active

Security Data

User Name : Administrator

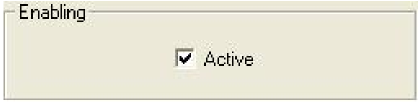
Password :

User Permit

2 – Enabling Security

Only the administrator can activate and deactivate the *Security Manager*.

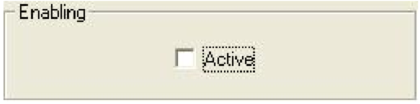
After Login, select the option **Activate**. When the *Security Manager* is *activated*, it will be necessary that the user logs to Syscon before opening the application.



Enabling

☑ Active

To deactivate the Security Manager, clear the option *Activate*. Now, any user can run the Syscon and open the configuration file.



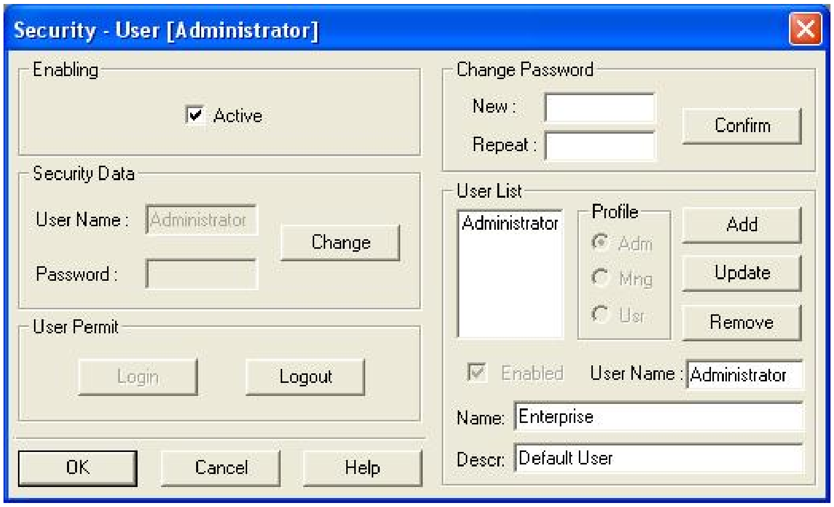
Enabling

□ Active

3 – User Management

To manage the users in the database, click the **Change** Button.

The dialog box will expand.



Security - User [Administrator]

Enabling: ☑ Active

Security Data: User Name : Administrator; Password :

User List: Administrator

Profile: ● Adm ○ Mng ○ Usr

☑ Enabled User Name : Administrator

Name: Enterprise

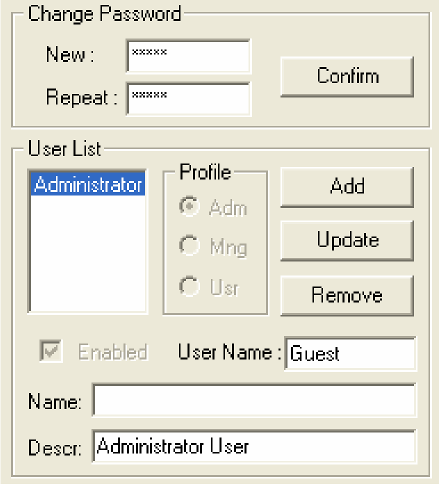
Descr: Default User

3.1 – Creating Users

Adding Users

Only an a*dministrator* user can add new users to the user list.

1. Type the *User Name* of the new user
2. Type the full name of the user in the *Name* field.
3. Type the description of the user in the *Descr.* field.
4. Type the user password in the *New* and *Repeat* fields.
5. Click **Add** to include the new user



Change Password: New : *****; Repeat : *****

User List: Administrator

Profile: ● Adm ○ Mng ○ Usr

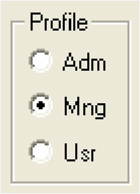
☑ Enabled User Name : Guest

Name:

Descr: Administrator User

Changing Profile

The *Profile* option determines the type of access for the user.



Profile
○ Adm
● Mng
○ Usr

The *Adm* profile allows the user to create, update and remove users from database. It is not possible to change the information about the *Administrator*.

The *Mng* profile allows the user to modify password and verify information about other users.

The *Usr* profile allows the user just to log and run the Syscon application. These kinds of user do not have access to the information about other users, as a result the *Change* button will be disabled.

3.2 – Updating Attributes for the User

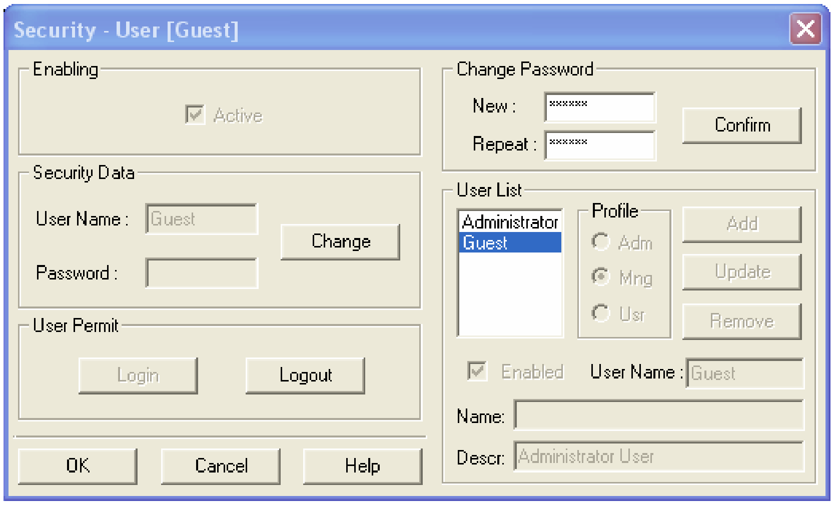
Changing Passwords

To change the password, the user has to be logged.

> **Note:** This procedure is done just to change the user own password. In case of a user with Administrator profile wants to change the password of other user, see the next topic **"Changing Users Information"**.

See in the example below, the user *Guest* will change his own password.

Type the new password in the *New* and *Repeat* fields.



Security - User [Guest]

Enabling
☑ Active

Change Password
New : ******
Repeat : ******

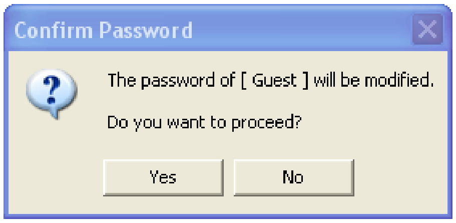
Security Data
User Name : Guest
Password :

User List
Administrator
Guest

Profile
○ Adm
● Mng
○ Usr

☑ Enabled
User Name : Guest
Name:
Descr: Administrator User

Click **Confirm**. A message box will appear to confirm the operation. Click **Yes** to apply changes or **No** to cancel the operation.



Confirm Password

The password of [Guest] will be modified.

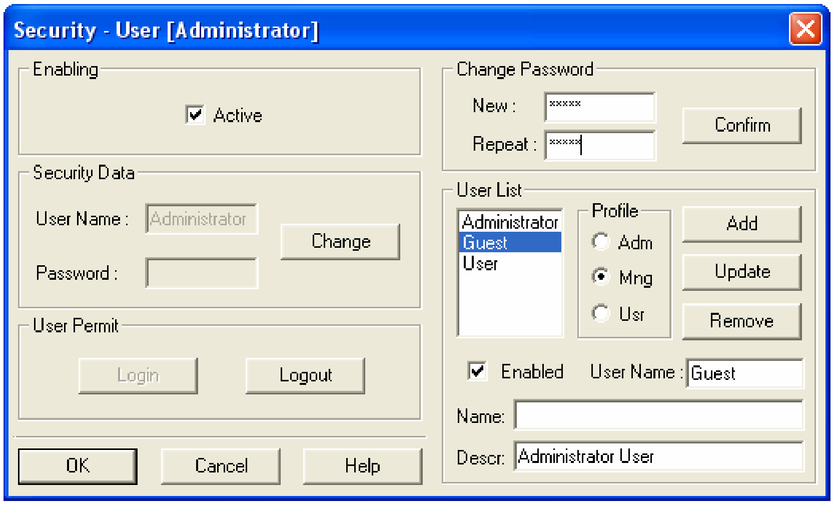
Do you want to proceed?

Changing Users Information

To update the user information, select the name of the user from the *User List*. The password, profile, name, description and also the user name can change.

Enter the new information about the user and click the button **Update** to save the values.

See example below, the *Administrator* user will change the password of the *Guest* user



Security - User [Administrator]

Enabling: ☑ Active

Security Data: User Name: Administrator; Password:

Change Password: New: *****; Repeat: *****

User List: Administrator, Guest, User

Profile: ○ Adm ● Mng ○ Usr

☑ Enabled; User Name: Guest; Name: ; Descr: Administrator User

3.3 – Enabling Users

The option *Enable* is used for enable/disable the user account. When the user account is disabled, the account still exists but the user will not have the access of Syscon application.

To enable/disable a user, you have to activate/deactivate the *Enabled* check box.

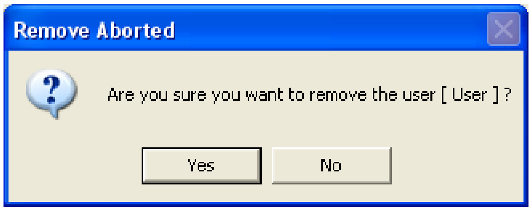
☑ Enabled

3.4 – Removing Users

Only a user with administrator profile can remove users from the Security Manager.

To remove a user, select the user name in the *User List* and click the button **Remove**.

A message box will appear to confirm the operation. Click **Yes** to finish or **No** to cancel the operation.

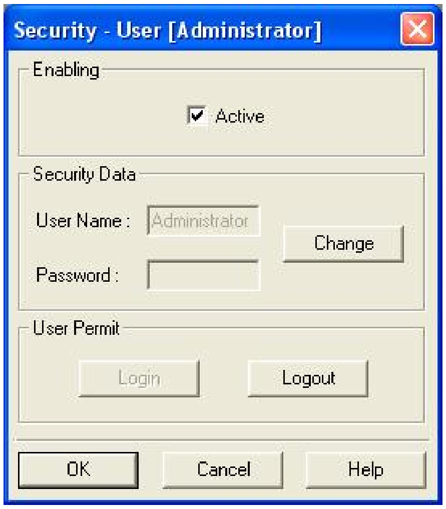


Remove Aborted

Are you sure you want to remove the user [User] ?

4 – User Logout

To logout from the Security Manager, go to **Project File** menu and select the option **Security**. The following window will appear.



Security - User [Administrator]

Enabling

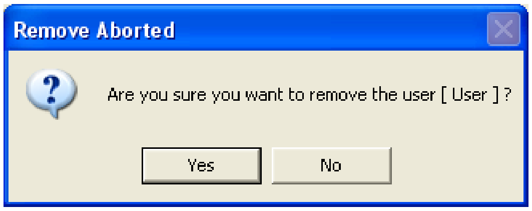
☑ Active

Security Data

User Name : Administrator

Password :

Click the **Logout** button. A message box will open to confirm the operation.



Remove Aborted

Are you sure you want to remove the user [User] ?

Appendix J

MODBUS COMMUNICATION IN SMAR SYSTEM 302

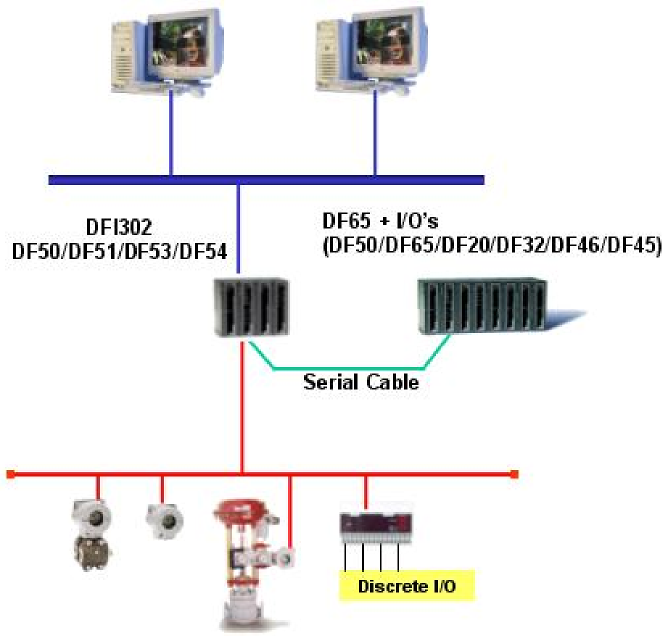
Introduction

This section will show the necessary configurations to implement Modbus in Smar System 302.

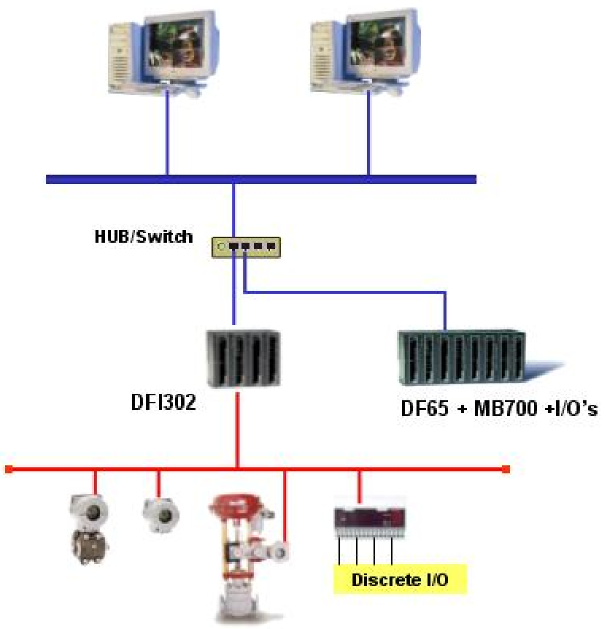
For this section, the knowledge on how to use the Syscon and Logic View software is considered pre-requisites to understand this informative. In case of doubts please consult the Function Block, Syscon, Logic View and DF65 manuals for reference.

1 – Architecture

The architectures used can be the Modbus Serial Communication Mode or the Modbus TCP/IP Communication Mode. As follows:



Mode 1: Modbus Serial Communication



Mode 2: Modbus TCP/IP Communication

Both architectures use the serial communication but in mode 1, the communication between the foundation fieldbus processor and the PLC is made through a serial cable that connects the two CPUs. In mode 2, it is used a modbus gateway (MB700) to make the communication between the two CPUs.

2 – Modbus Blocks

DFI302 has function blocks that allow the Modbus communication, it means that using these blocks the Fieldbus equipment is able to exchange data with the Modbus equipment. These blocks are:

- MBCF - ModBus Configuration;
- MBCS - ModBus Control Slave;
- MBSS - ModBus Supervision Slave;
- MBCM - ModBus Control Master;
- MBSM - ModBus Supervision Master.

This appendix will present a guideline with the minimum configuration necessary to make a modbus communication. Detailed information about modbus blocks and its parameters can be find in the *Function Blocks Manual*, section *Modbus Function Blocks*.

3 – Configuration

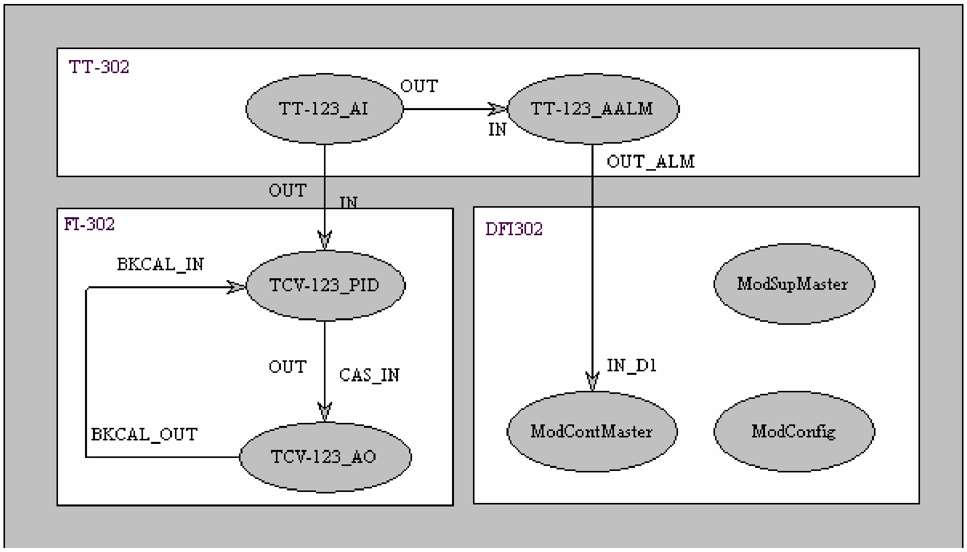
In this topic will be described the necessary configuration for the integration between DFI302 and DF65. In this case we are considering the DFI302 as a Modbus Master to DF65. The system architecture can be represented through the figures above. See the following steps:

3.1 – Mode 1: Modbus Serial Communication

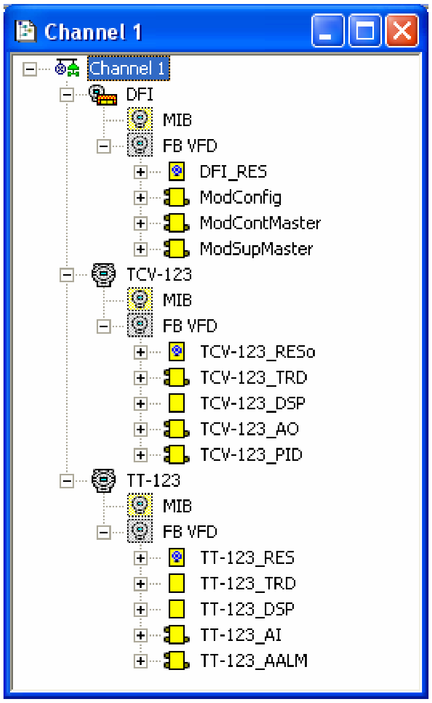
Step 1 – Implementing the Strategy

Using the Simple PID configuration done in the chapter 1, it will be implemented an analog alarm in the temperature transmitter. The alarm signal will be sent to the read/write modbus block *ModContMaster*.

See the control strategy in the picture below:

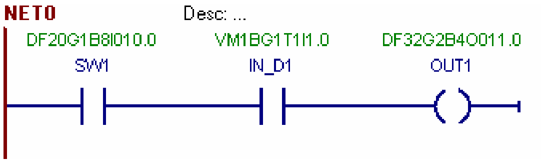


The user has to insert the additional function blocks MBCF (ModConfig), MBCM (ModContMaster), MBSM (ModSupMaster), Analog Alarm (TT-123_AALM) as shown in the picture below:



```
Channel 1
  DFI
    MIB
    FB VFD
      DFI_RES
      ModConfig
      ModContMaster
      ModSupMaster
  TCV-123
    MIB
    FB VFD
      TCV-123_RESo
      TCV-123_TRD
      TCV-123_DSP
      TCV-123_AO
      TCV-123_PID
  TT-123
    MIB
    FB VFD
      TT-123_RES
      TT-123_TRD
      TT-123_DSP
      TT-123_AI
      TT-123_AALM
```

The alarm signal from TT302 will be sent to DF65 logic configuration and it will be represented by the NA virtual relay IN_D1.



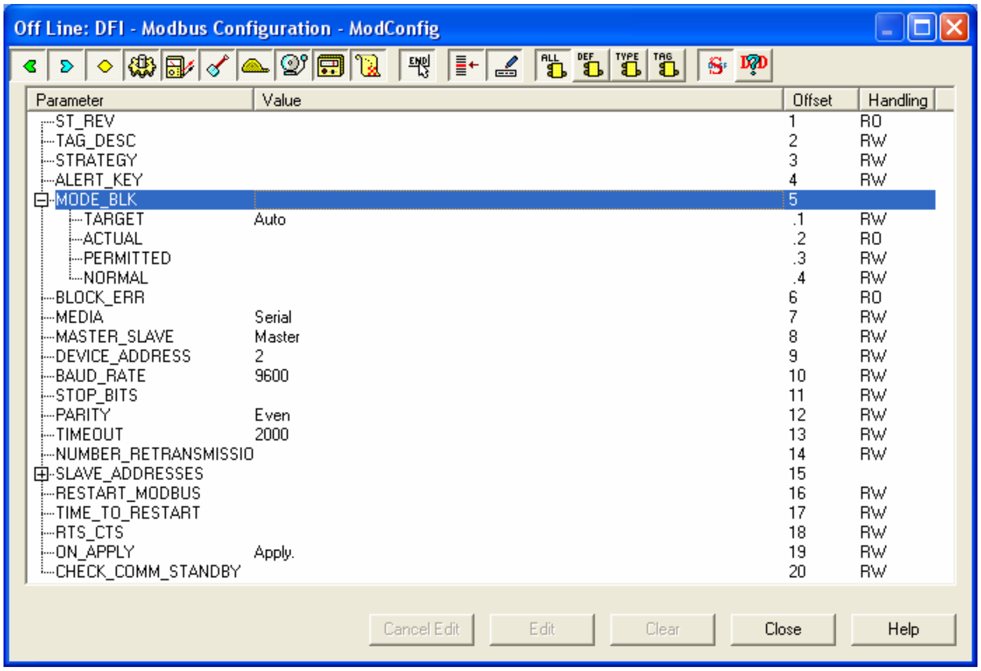
Moreover, it will be monitored the DF65 signals through the Foundation Fieldbus blocks in DFI302.

Step 2 - ModBus Configuration

The MBCF block is used to configure several communication parameters of the modbus protocol. It allows setting the communication parameter between DFI302 and a modbus slave/master device. In this example the DF65 is slave and DFI302 is master.

The user can configure the communication media (Serial or TCP/IP), device address, rate of transference, parity, timeout and number of retransmissions.

In the figure bellow, see the parameters that have to be configured to the Modbus Serial Communication Mode.



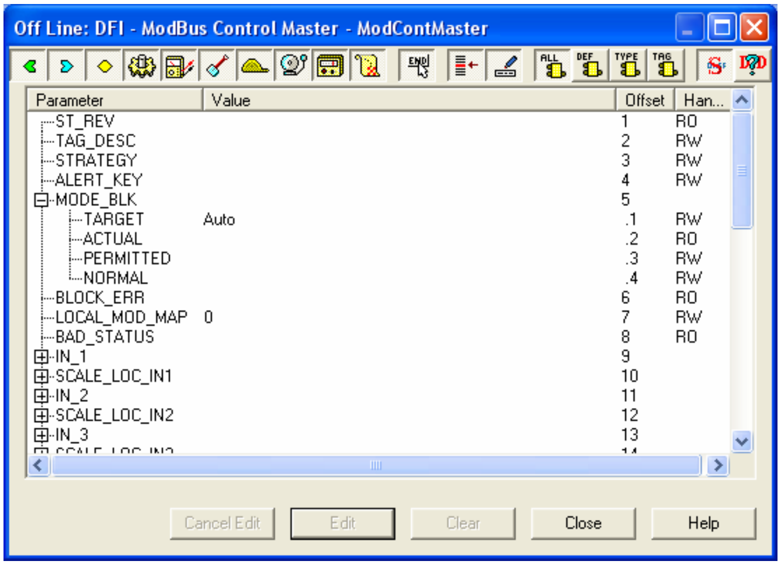
Parameter	Value	Offset	Handling
ST_REV		1	RO
TAG_DESC		2	RW
STRATEGY		3	RW
ALERT_KEY		4	RW
MODE_BLK		5	
TARGET	Auto	.1	RW
ACTUAL		.2	RO
PERMITTED		.3	RW
NORMAL		.4	RW
BLOCK_ERR		6	RO
MEDIA	Serial	7	RW
MASTER_SLAVE	Master	8	RW
DEVICE_ADDRESS	2	9	RW
BAUD_RATE	9600	10	RW
STOP_BITS		11	RW
PARITY	Even	12	RW
TIMEOUT	2000	13	RW
NUMBER_RETRANSMISSIO		14	RW
SLAVE_ADDRESSES		15	
RESTART_MODBUS		16	RW
TIME_TO_RESTART		17	RW
RTS_CTS		18	RW
ON_APPLY	Apply.	19	RW
CHECK_COMM_STANDBY		20	RW

Step 3 - ModBus Control Master

The MBCM block is used in strategies that the DFI and the modbus device have to exchange information. In this case the DFI will be able to read and write modbus variables, exchange data and interact with the FOUNDATION Fieldbus control strategy.

See in the control strategy above that the Modbus Control Block (ModContMaster) is being used to write data in the PLC. It is represented for the link OUT_ALM → IN_D1, which alarm output of TT302 is sent to a modbus writing parameter.

In the example bellow see the parameters that have to be configured in MBCM.



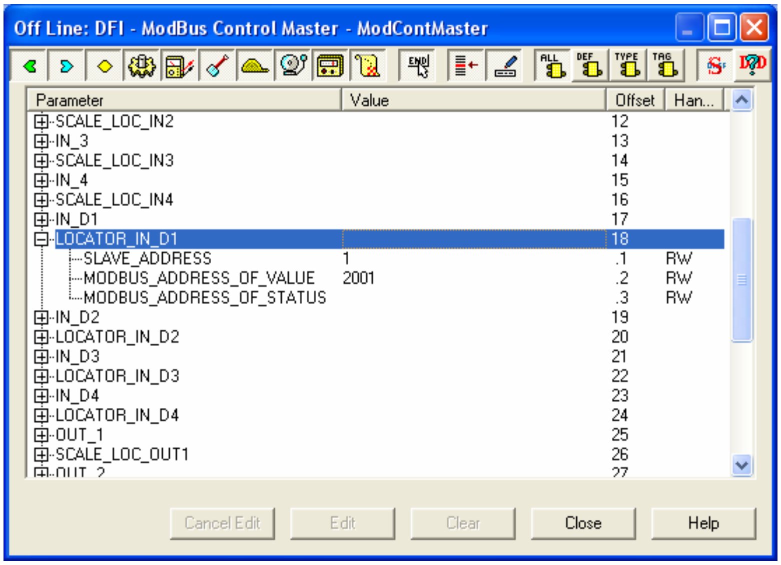
Parameter	Value	Offset	Han...
ST_REV		1	RO
TAG_DESC		2	RW
STRATEGY		3	RW
ALERT_KEY		4	RW
MODE_BLK		5	
TARGET	Auto	.1	RW
ACTUAL		.2	RO
PERMITTED		.3	RW
NORMAL		.4	RW
BLOCK_ERR		6	RO
LOCAL_MOD_MAP	0	7	RW
BAD_STATUS		8	RO
IN_1		9	
SCALE_LOC_IN1		10	
IN_2		11	
SCALE_LOC_IN2		12	
IN_3		13	
SCALE_LOC_IN3		14	

Every MBCM block added to the configuration must have different values of LOCAL_MOD_MAP parameter.

This block has four digital inputs and outputs and four analog inputs and outputs. See in the table below the description of how is made the communication of the inputs and outputs for each block.

Parameter	Description
IN_Dn	The Fieldbus discrete signal connected to this port will be written in the Modbus address specified by the parameter LOCATOR_IN_Dn.
OUT_Dn	The Fieldbus signal connected to this port will read the Modbus discrete signal from the modbus address specified by the parameter LOCATOR_OUT_Dn.
INn	The Fieldbus analog signal connected to this port will be written in the Modbus address specified by the parameter SCALE_LOC_INn.
OUTn	The Fieldbus signal connected to this port will read the Modbus analog signal from the modbus address specified by the parameter LOCATOR_OUT_Dn.

As example let's configure a digital input that will be sent to a virtual variable in the DF65 logic configuration. In the figure below the LOCATOR_IN_D1 configures the address of the digital input 1 in slave device.

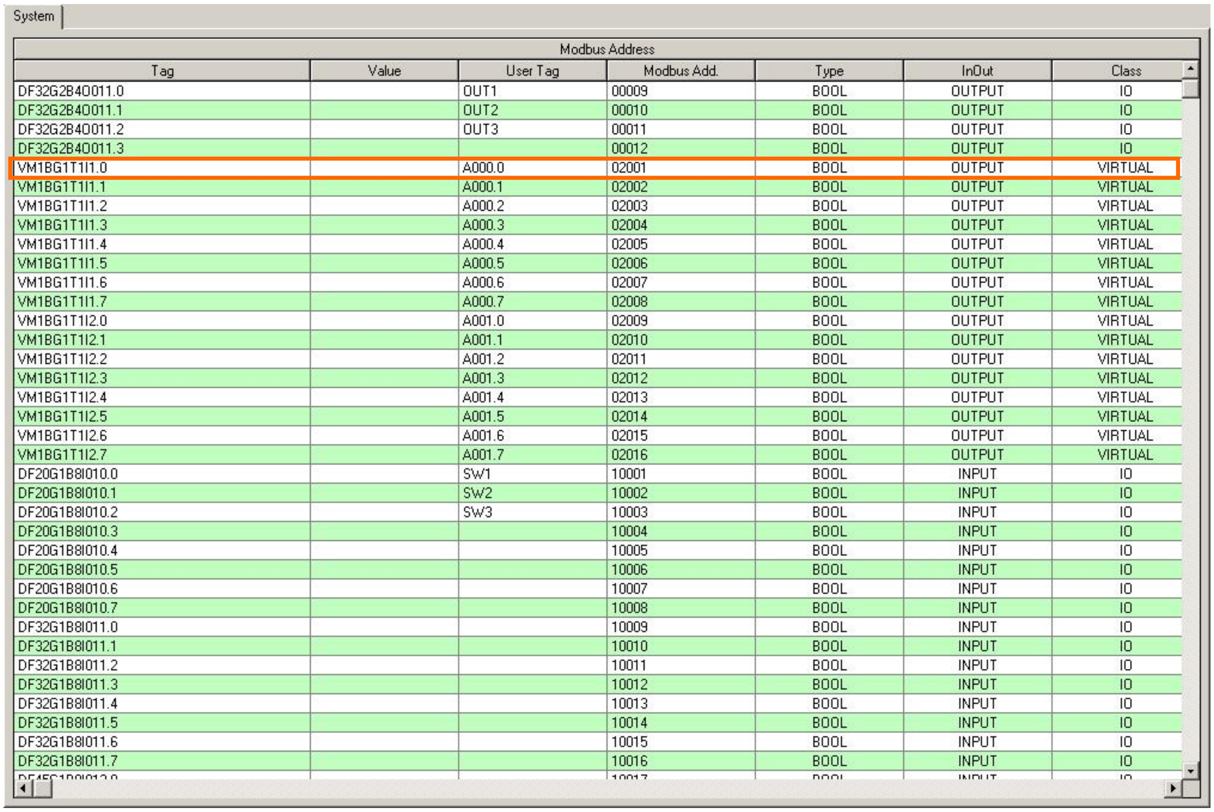


Off Line: DFI - ModBus Control Master - ModContMaster

Parameter	Value	Offset	Han...
⊞-SCALE_LOC_IN2		12	
⊞-IN_3		13	
⊞-SCALE_LOC_IN3		14	
⊞-IN_4		15	
⊞-SCALE_LOC_IN4		16	
⊞-IN_D1		17	
⊟-LOCATOR_IN_D1		18	
SLAVE_ADDRESS	1	.1	RW
MODBUS_ADDRESS_OF_VALUE	2001	.2	RW
MODBUS_ADDRESS_OF_STATUS		.3	RW
⊞-IN_D2		19	
⊞-LOCATOR_IN_D2		20	
⊞-IN_D3		21	
⊞-LOCATOR_IN_D3		22	
⊞-IN_D4		23	
⊞-LOCATOR_IN_D4		24	
⊞-OUT_1		25	
⊞-SCALE_LOC_OUT1		26	
⊞-OUT_2		27	

The SLAVE_ADRESS has the address of the slave modbus device that is the DF65 module, with address 1.

The MODBUS_ADRESS_OF_VALUE has the modbus address of the discrete variable. This value can be found in the LogicView Modbus Address Table. As follows.



Modbus Address						
Tag	Value	User Tag	Modbus Add.	Type	InOut	Class
DF32G2B4O011.0		OUT1	00009	BOOL	OUTPUT	IO
DF32G2B4O011.1		OUT2	00010	BOOL	OUTPUT	IO
DF32G2B4O011.2		OUT3	00011	BOOL	OUTPUT	IO
DF32G2B4O011.3			00012	BOOL	OUTPUT	IO
VM1BG1T1I1.0		A000.0	02001	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.1		A000.1	02002	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.2		A000.2	02003	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.3		A000.3	02004	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.4		A000.4	02005	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.5		A000.5	02006	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.6		A000.6	02007	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I1.7		A000.7	02008	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.0		A001.0	02009	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.1		A001.1	02010	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.2		A001.2	02011	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.3		A001.3	02012	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.4		A001.4	02013	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.5		A001.5	02014	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.6		A001.6	02015	BOOL	OUTPUT	VIRTUAL
VM1BG1T1I2.7		A001.7	02016	BOOL	OUTPUT	VIRTUAL
DF20G1B8I010.0		SW1	10001	BOOL	INPUT	IO
DF20G1B8I010.1		SW2	10002	BOOL	INPUT	IO
DF20G1B8I010.2		SW3	10003	BOOL	INPUT	IO
DF20G1B8I010.3			10004	BOOL	INPUT	IO
DF20G1B8I010.4			10005	BOOL	INPUT	IO
DF20G1B8I010.5			10006	BOOL	INPUT	IO
DF20G1B8I010.6			10007	BOOL	INPUT	IO
DF20G1B8I010.7			10008	BOOL	INPUT	IO
DF32G1B8I011.0			10009	BOOL	INPUT	IO
DF32G1B8I011.1			10010	BOOL	INPUT	IO
DF32G1B8I011.2			10011	BOOL	INPUT	IO
DF32G1B8I011.3			10012	BOOL	INPUT	IO
DF32G1B8I011.4			10013	BOOL	INPUT	IO
DF32G1B8I011.5			10014	BOOL	INPUT	IO
DF32G1B8I011.6			10015	BOOL	INPUT	IO
DF32G1B8I011.7			10016	BOOL	INPUT	IO
DF45G1B8I012.0			10017	BOOL	INPUT	IO

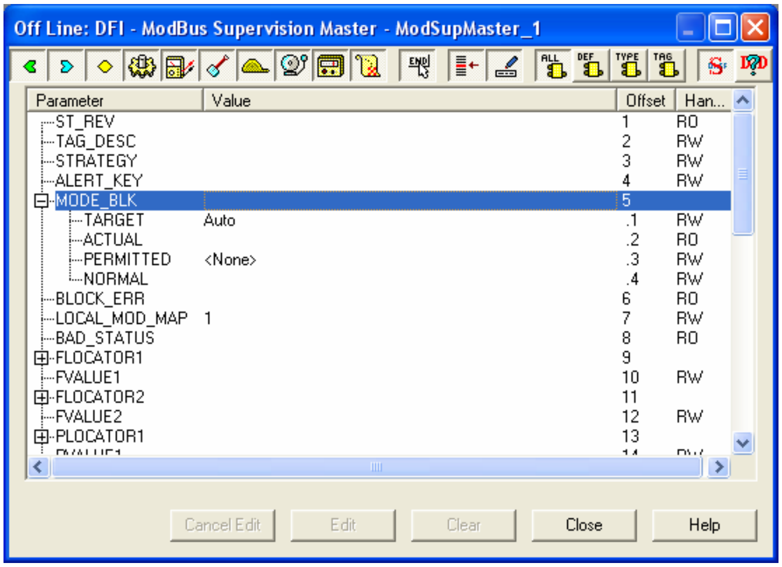
The same steps must be done to configure analog input/output and digital output.

Step 4 - ModBus Supervision Master

The MBSM block enables the DFI302 to monitor Modbus variables.

See in the control strategy that the Modbus Supervision Block (ModSupMaster) is used only for data supervision from modbus, so that it is not possible to do links with this block.

In the example below see the parameters that have to be configured in MBSM.

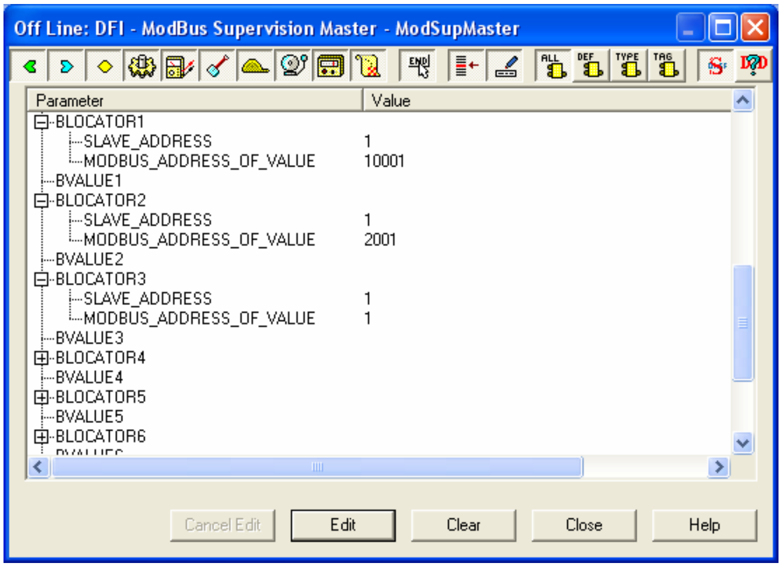


Parameter	Value	Offset	Han...
ST_REV		1	RO
TAG_DESC		2	RW
STRATEGY		3	RW
ALERT_KEY		4	RW
MODE_BLK		5	
TARGET	Auto	.1	RW
ACTUAL		.2	RO
PERMITTED	<None>	.3	RW
NORMAL		.4	RW
BLOCK_ERR		6	RO
LOCAL_MOD_MAP	1	7	RW
BAD_STATUS		8	RO
FLOCATOR1		9	
FVALUE1		10	RW
FLOCATOR2		11	
FVALUE2		12	RW
PLOCATOR1		13	
PVALUE1		14	RW

Every MBSM block added to the configuration must have different values of LOCAL_MOD_MAP parameter.

The user can configure different parameters to monitor float (FVALUE), percentage (PVALUE), integer (IVALUE) and boolean (BVALUE) variables from modbus device.

The same way as in the MBCM, each one of this parameters have to be associated to a modbus device address. See the example below that configures a boolean variable in the BLOCATOR parameter.


Off Line: DFI - ModBus Supervision Master - ModSupMaster

Parameter	Value
⊟BLOCATOR1	
SLAVE_ADDRESS	1
MODBUS_ADDRESS_OF_VALUE	10001
BVALUE1	
⊟BLOCATOR2	
SLAVE_ADDRESS	1
MODBUS_ADDRESS_OF_VALUE	2001
BVALUE2	
⊟BLOCATOR3	
SLAVE_ADDRESS	1
MODBUS_ADDRESS_OF_VALUE	1
BVALUE3	
⊞BLOCATOR4	
BVALUE4	
⊞BLOCATOR5	
BVALUE5	
⊞BLOCATOR6	

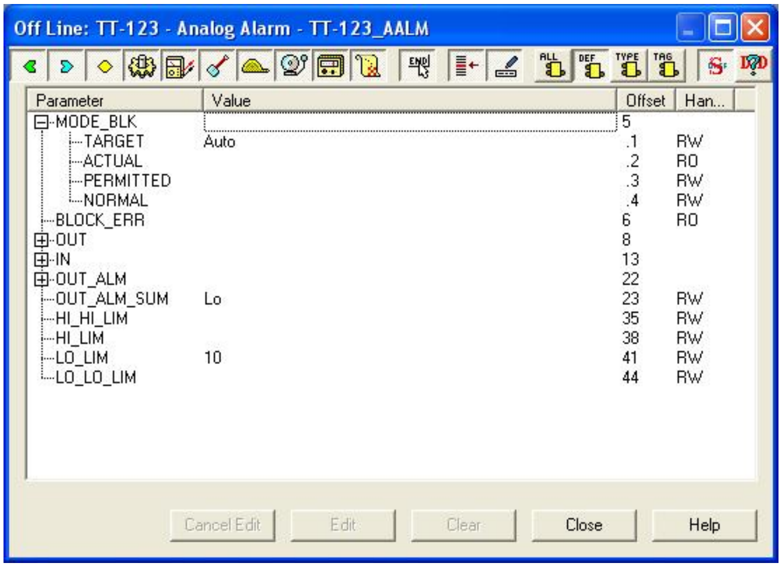
In this example will be supervised the signals SW1, In_D1 and OUT 1 from DF65 logic configuration.

The parameter SLAVE_ADRESS has the address of the slave modbus device that is the DF65 module. The parameter MODBUS_ADRESS_OF_VALUE has the modbus address of the discrete variable. This value can be found in the LogicView Modbus Address Table. As follows.

The same step has to be followed to configure float (FLOCATOR), percentage (PLOCATOR) and integer (ILOCATOR) variables.

Step 5 – Analog Alarm

Configure the Analog Alarm block from TT302 as following:


Off Line: TT-123 - Analog Alarm - TT-123_AALM

Parameter	Value	Offset	Han...
⊟MODE_BLK		5	
TARGET	Auto	.1	RW
ACTUAL		.2	RO
PERMITTED		.3	RW
NORMAL		.4	RW
BLOCK_ERR		6	RO
⊞OUT		8	
⊞IN		13	
⊞OUT_ALM		22	
OUT_ALM_SUM	Lo	23	RW
HI_HI_LIM		35	RW
HI_LIM		38	RW
LO_LIM	10	41	RW
LO_LO_LIM		44	RW

With this configuration every time that the temperature measured by TT302 is lower than 10, the block will generate an alarm, that can be noticed by the discrete state “1” in the parameter

OUT_ALARM.

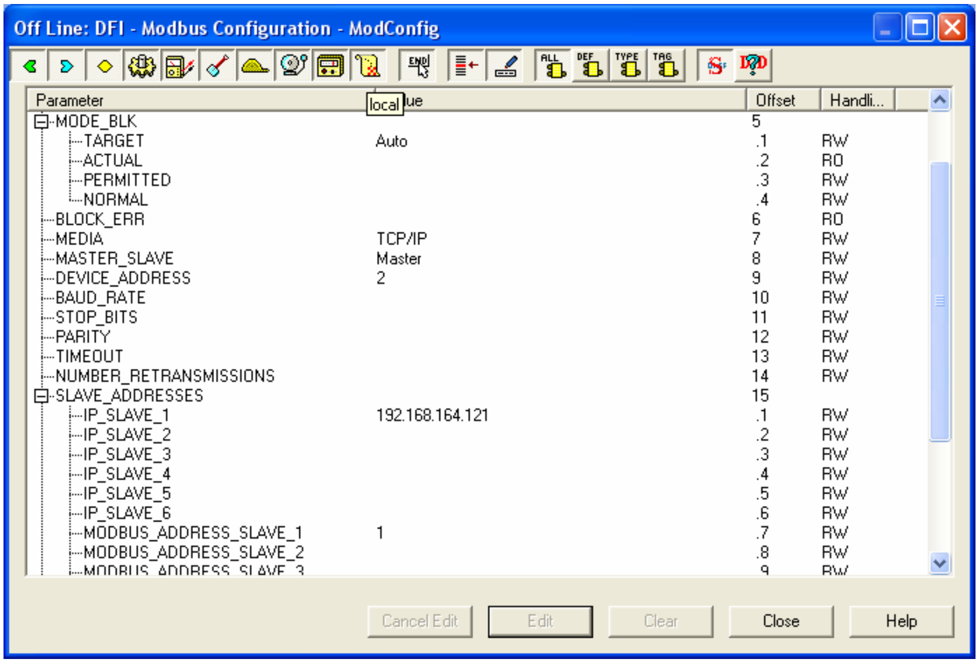
3.2 – Mode 2: Modbus TCP/IP Communication

Step 1 – Implementing the Strategy

See Appendix J, item 3.1, step 1.

Step 2 – Modbus Configuration

See an example of Modbus TCP/IP Communication Mode.



Off Line: DFI - Modbus Configuration - ModConfig

Parameter	local ue	Offset	Handli...
MODE_BLK		5	
TARGET	Auto	.1	RW
ACTUAL		.2	RO
PERMITTED		.3	RW
NORMAL		.4	RW
BLOCK_ERR		6	RO
MEDIA	TCP/IP	7	RW
MASTER_SLAVE	Master	8	RW
DEVICE_ADDRESS	2	9	RW
BAUD_RATE		10	RW
STOP_BITS		11	RW
PARITY		12	RW
TIMEOUT		13	RW
NUMBER_RETRANSMISSIONS		14	RW
SLAVE_ADDRESSES		15	
IP_SLAVE_1	192.168.164.121	.1	RW
IP_SLAVE_2		.2	RW
IP_SLAVE_3		.3	RW
IP_SLAVE_4		.4	RW
IP_SLAVE_5		.5	RW
IP_SLAVE_6		.6	RW
MODBUS_ADDRESS_SLAVE_1	1	.7	RW
MODBUS_ADDRESS_SLAVE_2		.8	RW
MODBUS_ADDRESS_SLAVE_3		.9	RW

Step 3 – Modbus Control Master

See Appendix J, item 3.1, step 3.

Step 4 – Modbus Supervision Master

See Appendix J, item 3.1, step 4.

Step 5 – Analog Alarm

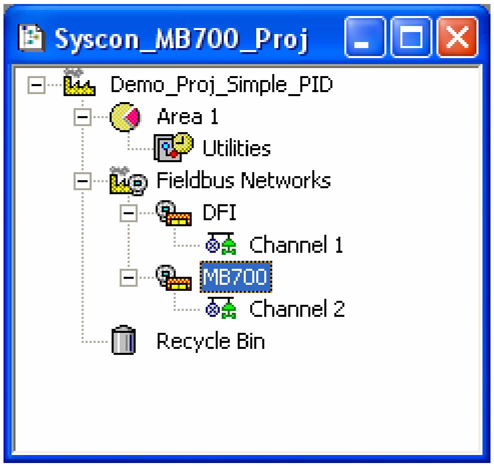
See Appendix J, item 3.1, step 5.

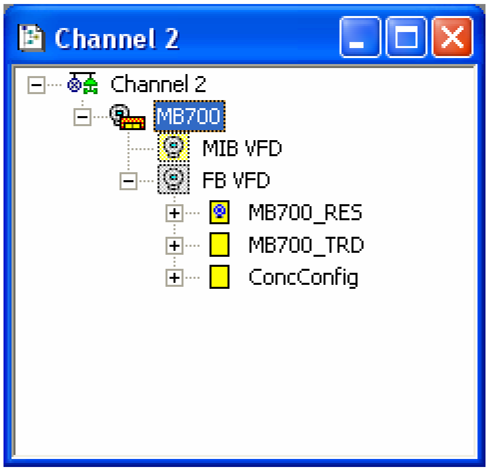
Step 6 – Configuring MB700

> **Note:** If the user uses the default communication parameters to DF65 and MB700, it is not necessary to execute this step. See below the default communication parameters:
> - BAUD_RATE = 9600 bps
> - STOP_BITS=1
> - PARITY=EVEN
> - TIME_OUT= 1000

To change some communication parameters the user has to follow the instruction below.

Create a MB700 in the configuration according the following pictures:





Parameterize the blocks according table below:

Tag	Block Type	Parameter
MB700_RES	Resource	MODE_BLK.TARGET=AUTO
MB700_TRD	Transducer	MODE_BLK.TARGET=AUTO

ConcConfig	Concentrate Configuration	MODE_BLK.TARGET=AUTO
		BAUD_RATE=9600
		PARITY=Odd
		TIMEOUT=2000

> **Note:** Every time that the user modifies the CCCF block from MB700, it is necessary to set the ON_APPLY parameter to **Apply**, otherwise the alterations will not be effective. This adjustment must be done with the block in **Online** Mode.

In this example we use a baud rate of 9600bps, odd parity and timeout of 2000 ms.

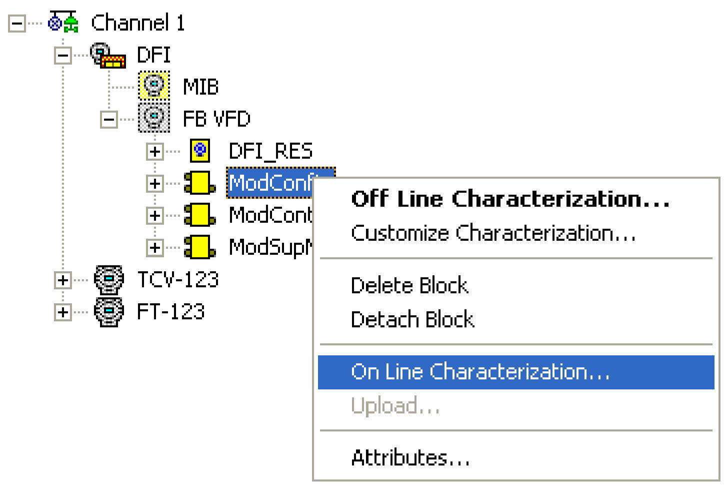
For more information please consult the MB700 manual, CCCF Function Block.

4 – Init Communication

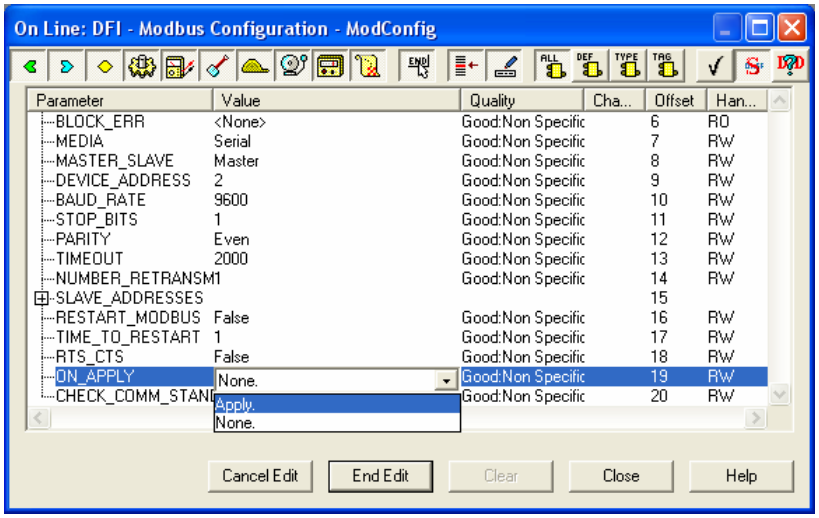
Its necessary to init communication, attribute devices IDs, check the Live List, assign tags, download the configuration and export tags, as shown in the sections 1.6 to 1.10 from this manual.

> Note: Every time that the user modifies a Modbus parameter, it is necessary to set the ON_APPLY parameter of de MBCF block to Apply, otherwise the alterations will not be effective. The same procedure must be done in the ON_APPLY parameter from MB700 CCCF block. The parameter ON_APPLY must be adjusted in the online configuration, but never must be saved in the offline configuration.

Right-click in the ModConfig block and choose the On Line Characterization.



In the parameter *ON_APPLY* change the status to Apply.


On Line: DFI - Modbus Configuration - ModConfig

Parameter	Value	Quality	Cha...	Offset	Han...
BLOCK_ERR	<None>	Good:Non Specific		6	RO
MEDIA	Serial	Good:Non Specific		7	RW
MASTER_SLAVE	Master	Good:Non Specific		8	RW
DEVICE_ADDRESS	2	Good:Non Specific		9	RW
BAUD_RATE	9600	Good:Non Specific		10	RW
STOP_BITS	1	Good:Non Specific		11	RW
PARITY	Even	Good:Non Specific		12	RW
TIMEOUT	2000	Good:Non Specific		13	RW
NUMBER_RETRANSM	1	Good:Non Specific		14	RW
SLAVE_ADDRESSES				15	
RESTART_MODBUS	False	Good:Non Specific		16	RW
TIME_TO_RESTART	1	Good:Non Specific		17	RW
RTS_CTS	False	Good:Non Specific		18	RW
ON_APPLY	None.	Good:Non Specific		19	RW
CHECK_COMM_STAND		Good:Non Specific		20	RW

Do the same procedure described above in the ConcConfig block. When close the window above. the change made in the parameter ON_APPLY must not be saved.

With these basic steps the user will able to do a configuration that allows the communication between FOUNDATION Fieldbus and Modbus equipments using the Smar System 302.