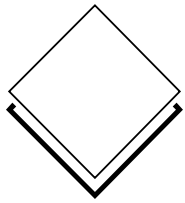


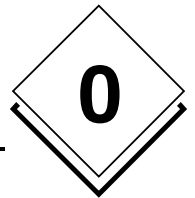
novaNet OPC Server

**OPC Server for Sauter
EY3600 System**

7001063003 T3

This description corresponds to the current program version 2.2.0.11 Changes may be made at any time without prior notice.



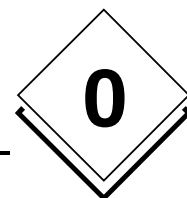


Inhaltsverzeichnis

Inhaltsverzeichnis	3
1 Purpose	7
2 Description	9
2.1 OPC Server	9
2.2 Time program editor component	9
3 Installation	11
3.1 List of installed files of the OPC server	13
3.2 List of installed OPC proxy files	14
4 Quick start	15
4.1 Install one or more modems	15
4.2 Connect the equipments	15
4.3 Declare the equipments	15
5 Usage	21
5.1 OPC server parameters	21
5.2 Trace utility for the visualisation of the trace messages	23
5.3 Client application: OPC server declaration	23
5.4 Client application: OPC items declaration	24
5.4.1 General Items	24
5.4.2 Items for communication line (modem)	25
5.4.3 Items for router	25
5.4.4 Items for automation station	26
5.4.5 Items for the addresses of the automation station (MFA)	26
5.4.6 Items to read from historical database	27
5.4.7 Items for direct memory access of the automation station	28
5.4.7.1 Access a column of DW	29
5.4.7.2 Access a row of DW	29
5.4.7.3 Access a DW in decimal format	29
5.4.7.4 Access a DW in hexadecimal format	29
5.4.7.5 Access a DW in measure format (real)	30
5.5 Usage of items for connection state	30
5.6 Usage of Remote OPC (DCOM)	31
5.7 Client application : Usage of the time program control	32
5.7.1 Usage of the control	33
5.7.1.1 First page	33
5.7.1.2 Dialog to edit a time program	34



5.7.1.3	Dialog to edit a analogue command	35
5.7.1.4	Dialog to edit a binary command.....	36
5.7.1.5	Operations on main page.....	37
5.7.1.6	Edit of the calendar.....	38
6	Operation of OPC Server.....	39
6.1	Read and write	39
6.2	Presence test of the automation station.....	40
6.3	Information with spontaneous messages.....	40
6.4	Information with polling requests	41
A1	List of all items of the OPC server.....	43
A2	History of changes	47
	Version 2.1.0.0 to 2.2.0.4.....	47
	Version 2.2.0.4 to 2.2.0.5.....	47
	Version 2.2.0.5 to 2.2.0.6.....	47
	Version 2.2.0.6 to 2.2.0.7.....	50
	Version 2.2.0.7 to 2.2.0.8.....	50
	Version 2.2.0.8 to 2.2.0.9.....	51
	Version 2.2.0.9 to 2.2.0.10.....	51
	Version 2.2.0.10 to 2.2.0.11.....	51
A3	Operation sequence	53
A3.1	Direct Connection: ROUTER mode	53
A3.1.1	Start of server	53
A3.1.2	Connection establishment	53
A3.1.2.1	Sequence of the connection in router mode	53
A3.1.3	Disconnection	54
A3.1.4	Connection error	54
A3.2	Remote operation: ROUTEL mode.....	55
A3.2.1	Start of server	55
A3.2.2	Outgoing call to the island manually activated.....	55
A3.2.2.1	Sequence of the connection with the routel.....	55
A3.2.2.2	Disconnection	56
A3.2.2.3	Connection error	56
A3.2.3	Outgoing call to the island automatically activated	57
A3.2.3.1	Sequence of the connection with the routel.....	57
A3.2.3.2	Disconnection	58
A3.2.3.3	Connection error	58
A3.2.4	Incoming call from the island	58
A3.2.4.1	Sequence of the connection with the routel.....	58
A3.2.4.2	Disconnection	59



A3.2.4.3 Connection error	59
A4 Registry of the OPC server.....	61
A5 Support of Windows XP SP 2.....	65
A5.1 Activating the Windows Firewall.....	65
A5.1.1 Adding exceptions	66
A5.1.2 Access rights for the network ports.....	67
A5.2 DCOM configuration	67
A5.2.1 Launch of DCOMCnfg.exe.....	67
A5.2.2 Adding anonymous user accounts.....	69
A5.2.3 Launch permission	71
A6 Recording of PC-291 telegrams	73
A6.1 Description of the recording function.....	73
A6.2 Example of a record.....	73
A7 Bibliography.....	75



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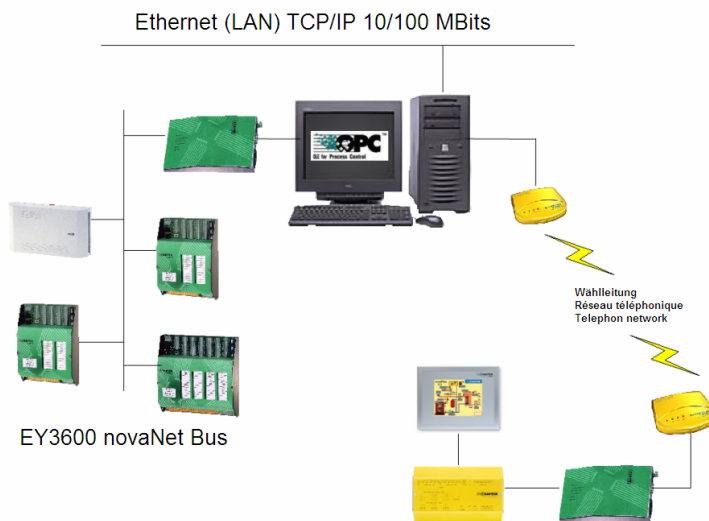
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1 Purpose

The OPCAsNovaNet server is a OPC Data Access version 2.0 compatible OPC server.

The server is designed for communicating with SAUTER automation stations of the EY3600 system via SAUTER novaNet291 (EYZ 291) router, using a serial connection RS232-C (direct connection), or via a modem for remote connection.



One OPC server can support up to 16 routers connected on 16 different communication ports in direct connection. In remote connection, via modem, there is no physical limitation.



Purpose



2 Description

OPCAsNovaNet comes in two components : an OPC server and a time program editor component.

2.1 OPC Server

The OPC server is with the standard OPC Data Access 2.0 compatible. It is supporting 'custom' interfaces, including the optional interfaces defined in the standard. Automation stations can be addressed using OPC items (refer to namespace definition below).

Since version 2.2.0.5, server is dealing with the modem communication lines, independently from the routers. In other words, list of usable communications lines are simply declared (for sure, one modem needs to be installed for each declared communication line). The server will then assign a communication line to a router, as needed. It is possible to reserve some communication lines for incoming calls only (response only modulus).

The server is composed of an executable file called OPCAsNovaNetTrace.exe and a configuration file called OPCAsNovaNet.ini.

The configuration file contains all functional parameters needed by the server.

2.2 Time program editor component

The time program editor component is delivered as an ActiveX component, therefore it can be integrated in any application supporting the OLE object. It is allowing the edition of the time programs and calendars of all automation stations controlled by the OPC server.

This component is delivered in two versions :

TimeProgramOcx.dll : English version
TimeProgramOcxFra.dll : French version



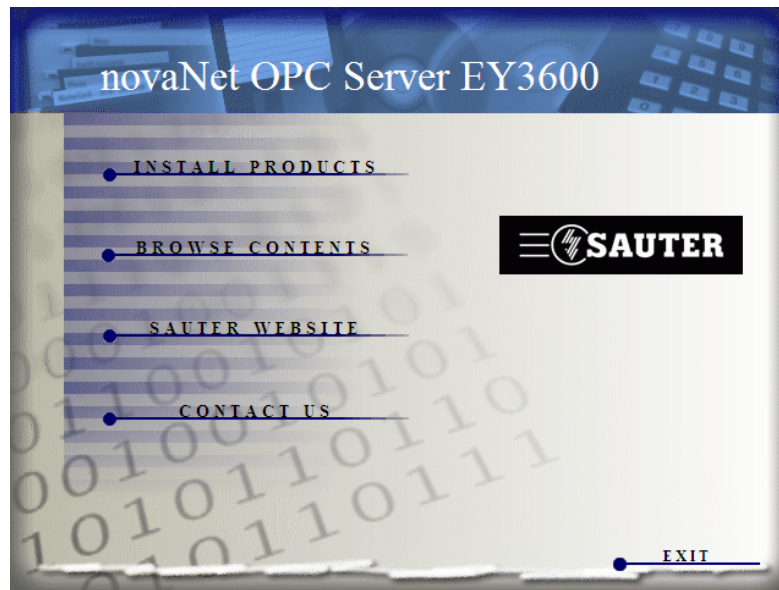
novaNet OPC Server



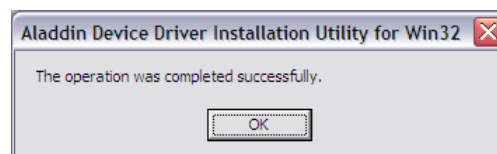
Description

3 Installation

The whole software package is delivered on a CD-ROM, and includes an automatic installation program for the OPC server and a driver installation program for the USB security key delivered with the product.



- 1) You can start the program **hinstall.exe** (USB key driver) manually from the zipped folder \Util\Hinstall.zip on the CD-ROM or use the following shown interface by choosing **INSTALL PRODUCTS** and then **INSTALL USB DRIVER**.



- 2) Following you start the program **setup.exe** from the folder \Bin\OPC Server\ from the CD-ROM or you can use the general installation surface by selecting **INSTALL PRODUCTS** and **INSTALL OPC SERVER**.

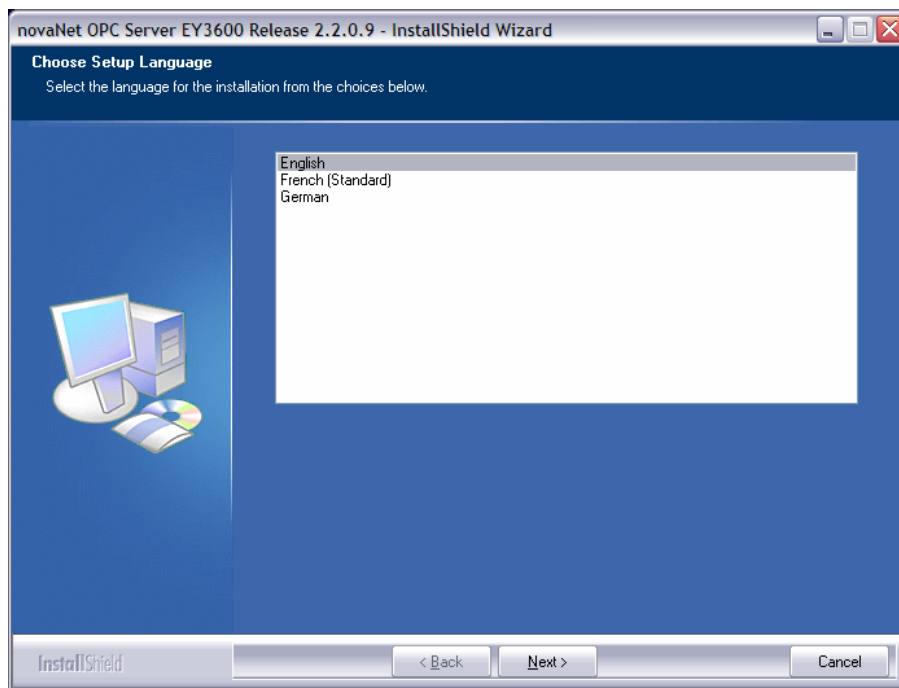
As soon as the program is started you can choose the desired language.

3

novaNet OPC Server



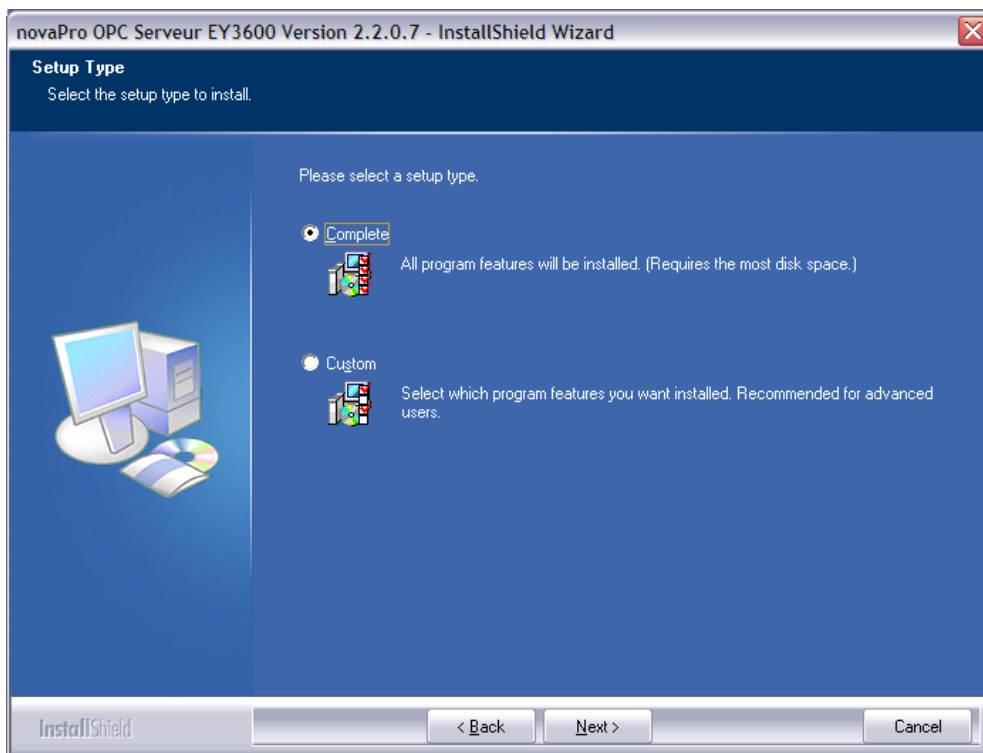
Installation



A dialog window shows you the version number of your OPC Server.



Click on 'Next'.



You have the choice of two setup types: the first will install the complete software on your system or the second will allow you to install the different available components customized.

At that moment the installation is finished you can parameterise the initialisation files.

3.1 List of installed files of the OPC server

OPCASNovaNetRemoteTrace.exe	: OPC server executable main program
OPCASENovaNet.ini	: example of OPC server configuration file
Net1.ini	: example of definition file for data points with spontaneous messaging
OCSTrace.exe	: trace display program
TimeProgramOcx.dll	: English time program editor component
TimeProgramOcxFra.dll	: French time program editor component
OPC Library	: OPC Core Components 2.00 Redistributable 2.20.msi Installation program for OPC common files

Note: Never move this files manually to another folder after installation. If it is requested to place them in another folder, uninstall the whole software (using install/uninstall programs icon in configuration panel), and then reinstall it in the new folder. Only one copy of this files can exist on a workstation (PC).



3.2 List of installed OPC proxy files

OPCEnum.exe	: Navigator for OPC Servers
OPCComn_ps.dll	: Proxy/Stub-DLL for the OPC Common interfaces
OPCProxy.dll	: Proxy/Stub-DLL for the OPC Data Access interfaces
opc_aeps.dll	: Proxy/Stub-DLL for the OPC Alarm and Event interfaces
opcbc_ps.dll	: Proxy/Stub-DLL for the OPC Batch interfaces
opchda_ps.dll	: Proxy/Stub-DLL for the OPC Historical Data Access interfaces
opcSec_ps.dll	: Proxy/Stub-DLL for the OPC Security and Marshalling interfaces
OpComnRcw.dll	: .NET interface as Runtime Callable Wrapper (RCW)

These files are installed in the `./Windows/System32` or `./WinNT/System32` folder. It is not allowed to move them. If problems occur you can install the program **OPC Core Components 2.00 Redistributable 2.20.msi** again.



4 Quick start

4.1 Install one or more modems

In the Windows configuration panel, use the 'Add new hardware' wizard to install your modem(s). Use the drivers delivered by the modem manufacturer.

For each modem, write down the windows identification name. This name has to be listed as designation of the modem in the configuration file of the server.

Set up the modem parameters as follow, for every installed modem :

```
Communication rate: 19200 bauds or higher
Number of bits: 8
Number of stops: 1
Parity: none
Stream control: hardware
```

Attention: make sure this setup is correctly done, since the server will use the windows settings. It is possible to change the communication rate if the router is setup in the same manner.

4.2 Connect the equipments

Connect a 291 router to the PC via a serial interface or install a modem using the windows configuration panel.

4.3 Declare the equipments

Open file OPCASNOVANET.INI in NotePad or any other text editor.

In section *[ComLines]* insert a line for each phone line to be supported. In order to work with the example application, this name needs to be *'Line1'*.

Example:

```
[ComLines]
Line1
```

Add a section to describe the modem communication line. Section needs to be named with the same label as the communication line.



Quick start

Insert line parameters in this section:

<i>Parameter</i>	<i>Description</i>
<i>Device = U.S. Robotics 56K FAX EXT PnP</i>	The device name is the modem name as it appears in the windows configuration panel. If it is omitted, the server will use the first available modem.
<i>InboundReserved = 0</i>	Put value 1 here, if you want to reserve this line for incoming calls only. In this case this line is not used for outgoing calls.
<i>Autoanswer = 1</i>	1 if the modem should answer incoming calls. In this case the server answers automatically to all incoming calls on this line.

Example:

```
[Line1]
Device = U.S. Robotics 56K FAX EXT PnP
InboundReserved = 0
Autoanswer = 1
```

In the *[Routers]* section, insert a line containing the name of the router. In order to work with the example application , this needs to be set to 'Net1'.

Example:

```
[Routers]
Net1
```

Add another section to describe the router. The section needs to be named as the router.

In this section , insert the router parameters:

<i>Parameter</i>	<i>Description</i>
<i>PCAddress = aaaaa</i>	<i>aaaa</i> corresponds to the PC address seen from the server.
<i>ComPort = p</i>	<i>p</i> is the port number used to communicate with the router.
<i>ComSpeed = sssss</i>	<i>ssss</i> is the communication rate in bauds.

Is *p* 0, the server is using a modem for the communication with the router. Each other value is generating a direct local connection with the corresponding serial port (COM1, COM2, etc.). A modem communication is not possible if *p* is bigger than 0. The allocation of the phone calls is managed dynamically by the OPC server.

Note: It is not possible to specify for a island explicitly a modem for outgoing calls if the hardware configuration of the clients have multiple outgoing modems (administration by modem pool).



In order to communicate via modem, the port number has to be set to 0. Furthermore the following parameters needs to be set:

<i>Parameter</i>	<i>Description</i>
<i>NetworkID = xxx</i>	<i>xxx</i> is the Routel ID which has been setup in the router with the configuration program (RoutelPara, HWC).
<i>PhoneNumber = ppp</i>	<i>ppp</i> is the phone number to dial to connect to the modem connected on the router.

Note: the variable PCAddress needs to contain a value compatible with the Routel function, this means 32512 for the first Routel in the network. For a configuration as direct bus the value needs to be 31744.

Add a line to list the automation stations connected to the current router.

<i>Parameter</i>	<i>Description</i>
<i>ASList = xxxx</i>	<i>xxxx</i> is the name chosen for the automation station.

Note: For the application example the name has to be 'AS128'.

For each automation station add a line to describe his address on the ASNovaNet bus.

Example:

```
[Net1]
PCAddress = 31945
ComPort = 1
ComSpeed = 38400
ASList = AS128
AS128 = 1
```

For each declared router, create a text file describing the list for all data points with spontaneous messaging for each automation station. This file needs to be named like the router, and have the '.INI' extension.

Example: Net1.ini

This file needs to have a section for each declared automation station on the router (just copy the names from the 'ASList' in file opcasnovanet.ini).

In each section, the number of the data points (MFA) which should be spontaneous is listed. A value is linked to the number specifying the desired parameterisation:



Quick start

```
; in router mode and routel mode with disconnected link (calling activation)
= x0 : no spontaneous messaging
= x1 : spontaneous messaging of analogue value + counter
= x2 : spontaneous messaging of binary value + counter
= x3 : spontaneous messaging of analogue value + binary + counter
= x4 : NovaLink: no spontaneous messaging
= x5 : NovaLink: spontaneous messaging of analogue value + counter
= x6 : NovaLink: spontaneous messaging of binary value + counter
= x7 : NovaLink: spontaneous messaging of analogue value + binary + counter

; in routel mode during connection
= 1y : spontaneous messaging of analogue value + counter
= 2y : spontaneous messaging of binary value + counter
= 3y : spontaneous messaging of analogue value + binary + counter
= 4y : NovaLink: no spontaneous messaging
= 5y : NovaLink: spontaneous messaging of analogue value + counter
= 6y : NovaLink: spontaneous messaging of binary value + counter
= 7y : NovaLink: spontaneous messaging of analogue value + binary + counter
```

The code for spontaneous messaging is a two-digit value (X, Y). Is the value 0 it is a indication there is no spontaneous messaging.

- The ones (Y) declare the type for programmed spontaneous messages in the automation stations in router mode (direct connection) and in routel mode (modem connection) with disconnected line; it allows specification which MFA with a value change activate a call (dialling).
- The tens (X) declare the type for the programmed spontaneous messages in the automation stations during connection in routel mode; it allows specification which MFAs are dynamically actualised during connection.

Example of contents:

```
[AS128]
0 = 1
52 = 20
53 = 22
54 = 2
20 = 0
21 = 0
```

Explanation:

For the automation station AS128:

- In routel mode MFA 0 is dialling with disconnected link. During connection it will not be actualised.
In router mode it is in 'spontaneous messaging' mode.
- In routel mode MFA 52 is not dialling during disconnected link. Only during connection it is in 'spontaneous messaging' mode.
In router mode it is not in 'spontaneous messaging' mode.



- In routel mode MFA 53 is dialling with disconnected link. During connection it will be actualised in 'spontaneous messaging' mode.
In router mode it is in 'spontaneous messaging' mode.
- In routel mode MFA 54 is dialling with disconnected link. During connection it will not be actualised.
In router mode it is in 'spontaneous messaging' mode.
- In routel mode MFA 20 is not dialling during disconnected link. Only during connection it is in 'spontaneous messaging' mode.
In router mode it is not in 'spontaneous messaging' mode. It is connected with a novaLink module.
- For MFA 21 the spontaneous messages are all deactivated.
In routel mode it is not dialling and during connection it is not actualised.
In router mode it is not in 'spontaneous messaging' mode.

Note :

- The content of this file is interpreted at each connection to the router. It is therefore possible to change it while the server is up and running. A manual action to disconnect/reconnect will allow to reprogram the automation stations.
- With the usage of novaLink modules (code=5) the information 'SetpointFeedback.Local' is not transmitted spontaneously. It is necessary to read manually or to wait on the automatic refresh cycle.
- Code 6 and 7 are not used at this time. They are reserved for future development.



5 Usage

Before the OPC server can be used, it is mandatory to define all the functional parameters and declare the list of routers and automation stations to be supported. This is done by editing file `OpcAsNovaNet.ini`.

5.1 OPC server parameters

Below an example of the delivered configuration file with the default values, with some comments:

Note: The values indicated below are those taken into account by the OPC server in the case where the initialisation file does not carry an explicit declaration of these parameters.

<i>Designation</i>	<i>Description</i>
[Server]	This section describes the server parameters
ReadDelay = 2000	Asynchronous reading delay (in ms). The server will collect all reading requests during this period of time, and then start a group request on the network.
WriteDelay = 1000	Asynchronous writing delay (in ms). The server will collect all writing requests during this period of time, and then execute a group request on the network.
StatusPolling = 30000	Polling interval (in ms) for checking the presence of the automation stations. A polling of the online automation stations are just done if the revision of the router/routel firmware is older than version 'F'.
ReadPolling = 20000	Periodic polling interval (in ms) for the reading items. The periodic polling to read the items that are not configured to be in spontaneous messaging mode is just done in router mode. In routel mode the actualisation is just done in spontaneous message mode or with the manual request through the item 'Refresh'.
ReadMaskDelay = 3000	Update masking time (in ms) for writing operations
ContractTimeout = 5000	Waiting time when executing a request (in ms)
HDBContractTimeout = 15000	Waiting time when executing a historical reading request (in ms)
IgnoreRead = 0	Value 1 means reading request are ignored. Needs to be set to 1 for clients doing a polling in order to not overload the communication.
AsyncRead = 1	Value 1 means, reading is asynchronous, otherwise reading is synchronous
AsyncWrite = 1	Value 1 means, writing is asynchronous, otherwise writing is synchronous
InactivityTime = 30000	In case of modem connection, time in ms before the line is shut down in case of inactivity. Note : an integrated scheduler is forcing the shut down after 15 minutes of inactivity.
PCAddress = 31744	Router address, for incoming calls. PC address that is assigned to the routel with an incoming call if the EPROM is not programmed with a valid PC address. This value is used as well for the default value if there is no specification for each the section [Router]. If the OPC server is configured to be on a direct bus the PC address is 31744.
KeepValid = 1	Value 1, the variables will still be valid in supervision when connection with the automation stations is shut down. With value 0 all items regarding the automation stations become invalid with a missing connection. However, the last value stays.
AutoConnect = 1	Value 1, the network is automatically connected on start up, when there is a request for reading or writing. If value is 0, a manual action for connection is required (only in routel mode).
TraceLevel = 3	Level of detail for the trace messages. The default value is 3 (shows the service and error messages). With the value 11 it is possible to show additionally the debugging messages. The value 15 shows in addition the sent content of the frames.
InboundInactivityTime = 15000	Wait time before hang up during inactivity (expressed in milliseconds) in case of modem connection for incoming calls.
ManuallInactivityTime = 180000	Wait time before hung up during inactivity (expressed in milliseconds) in case of a modem connection through a call by the user (Item Connect triggered)
NumRetries = 5	Count of dial retries if dial error occurs in routel mode. In router mode the retry to dial is done as long as the connection request is active.
RetryDelay = 180000	Time interval between two dial retries of the modems (expressed in milliseconds)
ConnectionTimeout = 45000	Wait time of the dial connection of the router with a modem connection (expressed in



Usage

	milliseconds). Is the router not recognised after this time the connection is ended.
RouterPollingDelay = 15	Wait time between two request cycles of the router/routel in milliseconds. Increment this value to slow down the reading flow. In the most cases the default value is enough.
AutoConnectOnStart = 0	If 1, the server is trying to connect to all remote islands on start up (exclusively in routel mode). In the router mode the connection is done always automatically on start up.
HDBRetrieveTimeout = 180000	Maximal wait time for the transmission of the historical database values to the OPC clients. At the end of this time if not all clients have read the HDB values the process to read the HDB will be reactivated and the HDB is available to be read again.
RoutelCommTimeout = 5000	Timeout of the connection in routel mode. This time can be increased if latency in the modems exists.
CheckAliveDelay = 3000	Wait time for the feedback of the automation station with the execution of the 'check-alive'-process (collecting all the automation station available on the bus). The whole wait time is calculated by this value multiplied with the amount of available automation stations on the bus at time of the request.
ReadQueueSize = 4000	Size of the internal read queue file (per controller). Represents the maximum number of read requests in the queue file. This value must be increased if the error "Read failed: Queue size limit exceeded" appears. This value is identical for all controllers in the island.
WriteQueueSize = 16000	Size of the internal write queue file (for all controllers in the island). Represents the maximum number of values in the write queue file. This value must be increased if the error, "Write failed: Queue size limit exceeded" appears.
WatchdogPeriod = 10000	Defines the watchdog period for monitoring internal server tasks in milliseconds. The minimum value is 2000 milliseconds.
LogTAPIOEvents = 0	Allows generation of a log file tracing TAPI events linked to activity of modems for diagnostics (if value = 1).
ChekTAPIPeriod = 180000	Defines the task period for monitoring modems in milliseconds. This task monitors all free modems and periodically verifies their state.
NovaNetLogFiles = N,1,1	Can enable the debugging recording for the communication between the OPC Server and the novaNet291 router. With = Y,24,60 the recording is switched on. It will create 24 files each has data for 60 minutes.
[Routers]	This section is listing the names of the connected routers.
Net1	First router name.
;Net2	Second router name (invalid in this example because of the semicolon at front)
...	
[Net1]	First router parameters.
PCAddress = 31744	PC address for this router (default value); is the server configured in routel mode this value is 32512.
ComPort = 1	Communication port number (1 to 16)
ComSpeed = 38400	Communication rate
IdleDetectionCount = 3	Count of consecutive request cycles of the router while no information is reported during no-load of the network (no data traffic). This parameter is used for acquisition of the feedback messages in the state for the 'checkalive'-Process.
AutoConnectOnStart = 0	If 1, the connection to the island is established automatically at start-up of the server (in routel or router). If this value is absent, the AutoconnectOnStart parameter of the SERVER section is taken into account for routel mode and an island on direct bus (router) is automatically connected.
CheckAliveMaskDelay = 10000	Defines a masking time before router data is taken into account, indicating that the number of controllers present on the bus has changed. This mask prevents the launching of CheckAlive procedures when the router returns error data due to a high volume of transmission on the bus. A zero value disables masking, and status change data is taken into account immediately.
ASList = AS128,AS200,AS300	List of the names of the automation stations (comma separated) to those the router has access.
AS128 = 128	Address of the first automation station
AS200 = 200	Address of the second automation station
AS300 = 300	Address of the third automation station
...	
[Net2]	Second router parameters
PCAddress = 32512	PC address for this router
ComPort = 2	Communication port number (1 to 16)
ComSpeed = 38400	Communication rate
IdleDetectionCount = 3	Count of consecutive request cycles of the router while no information is reported during no-load of the network (no data traffic). This parameter is used for acquisition of the feedback messages in the state for the 'checkalive'-Process.
NetworkID = ILOT1	(Only for Routel) ID of the island how it is coded in Routel (String of up to 16 characters).
PhoneNumber = 0123456789	(Only for Routel) to dial this number for a connection with the routel for this island.



ASList = AS128,AS200,AS300	List of the names of the automation stations (comma separated) to those the router has access.
AS128 = 128	Address of the first automation station
AS200 = 200	Address of the second automation station
AS300 = 300	Address of the third automation station
...	

Note : The configuration file needs to be located in the folder where the OPC server is installed.

Up to 16 routers can be declared in direct connection, if so many communication ports are available. In modem connection there is no physical limitation. The server parameters are valid for most of the applications. It could be necessary to adapt them in some specific situations (lot of network traffic for example) or to solve compatibility issues. Only one configuration file can exist on one PC. If different configurations needs to be used, it will be necessary to use a configuration file library in a different folder.

The list of the names for the automation stations under 'ASList' does not allow to have spaces. The only allowed separator is the comma.

5.2 Trace utility for the visualisation of the trace messages

Before starting a client application, start the OCSTRACE.EXE program. It will allow the display of trace and diagnostic messages from the OPC server.

This utility is optional, it will be of help in setup phase as well as for fixing issues. This utility can be started at any time to display the trace messages from the server.

5.3 Client application: OPC server declaration

In the client application, create an OPC server instance. The OPCAsNovaNet server is called:

SAUTER ASNovaNetRemote OPC Server V1.0

The ProgID of the server is: *SAUTER.ASNovaNetRemote.1*

5.4.2 Items for communication line (modem)

We suppose THE line is called '*Line1*'

<i>Designation</i>	<i>Description</i>
Line1.Name	This item's value will contain the logical name of the line (in the example it will be 'Line1')
Line1.State	Value is indicating line status as text (in English)
Line1.OnLine	Value is indicating if line is connected or not.
Line1.PhoneNumber	Value contains the dialled number.
Line1.DeviceName	Value contains the modem name associated with this line.

5.4.3 Items for router

WE suppose THE router IS called '*Router1*'

<i>Designation</i>	<i>Description</i>
Router1.ComPort	Value indicates the communication port number which is used.
Router1.ComSpeed	Value indicates communication rate (in bauds).
Router1.Address	Value contains the PC address (novaNet) as seen from the router.
Router1.Connect	Allows to start or stop the communication with the router.
Router1.ConnectDate	Value indicates the date of the last connection with the router.
Router1.OnLine	Value indicates if communication with router is ok.
Router1.OffLine	This value changes the status 'True' as soon as the connection with the router is disconnected or if the connection cannot be established.
Router1.NetworkError	Value contains last error code occurred in the network.
Router1.Id	Value indicates type of connected router.
Router1.SetDate	Is enabling the transfer of the PC date to all connected automation stations.
Router1.NetworkID	Value contains the AS network number (ID), configured in the router.
Router1.ComLine.Name	Value contains the logical name of the communication line associated with this router, in case of modem connection.
Router1.ComLine.PhoneNumber	Value contains the phone number to be dialled to connect to the router.
Router1.ComLine.State	Value contains a text string indicating the status of the communication line.
Router1.ComLine.Incoming	Value indicates whether is in calling or answer mode.
Router1.ComLine.NumIncomming	Value indicates the number of incoming calls for this router since the start of the server.
Router1.ComLine.NumOutgoing	Value indicates the number of outgoing calls for this router since the start of the server.
Router1.Routel.PhoneChannel1	Value contains dial number programmed on router to call on channel 1
Router1.Routel.PhoneChannel2	Value contains dial number programmed on router to call on channel 2
Router1.Routel.PhoneChannel3	Value contains dial number programmed on router to call on channel 3
Router1.ClientID	Value indicates the application associated text, stored in router (16 characters).
Router1.Violation	Routel indication: Indicates a call occurred by local violation.
Router1.PowerReturn	Routel indication: Indicates a call occurred by return of power.
Router1.ASmutation	Routel indication: Indicates a call occurred with appearance or disappearance of an AS in the network.
Router1.TLFailure	Routel indication: Indicates a call occurred with the recognition of a novaNet network interruption. This indication exists also in router mode.
Router1.State	Value indicates the state of the connection in a text string (English): <i>Disconnected:</i> Connection not established <i>Connecting:</i> In state to be connected with the router

	<p><i>On Refresh:</i> Connection established; first actualisation of the actual values and programming of the spontaneous messages. The time for this phase depends on the amount of items to be actualised.</p> <p><i>Connected:</i> Connection established and actualisation finished.</p> <p><i>Parameter Setting:</i> Programming of the spontaneous messages in 'Offline' mode during disconnection (only in routel mode).</p>
Router1.NumASOnBus	This value indicates the number of controllers present on the bus as reported by the router (for diagnostics).
Router1.NumTelegramsToRead	This value indicates the number of telegrams waiting to be read in the router. It allows an indication of the load on the network.
Router1.CheckAlive	This command allows manual activation of a CheckAlive procedure.

5.4.4 Items for automation station

We suppose the router will be called '*Router1*'.

We suppose the automation station will be called '*AS1*'.

<i>Designation</i>	<i>Description</i>
Router1.AS1.OnLine	Value indicates whether communication with router is up and running.
Router1.AS1.OffLine	This bit changes to the state "True" if the connection with the automation station is disconnected
Router1.AS1.Address	Value contains the novaNet address of the automation station
Router1.AS1.PowerFail	Value indicates whether automation station is on battery supplied power.
Router1.AS1.Date	Value contains current date and time of the automation station
Router1.AS1.Id	Value contains automation station type
Router1.AS1.Refresh	Forced request to read all items associated with this automation station

5.4.5 Items for the addresses of the automation station (MFA)

We suppose the router is called '*Router1*'

We suppose the automation station is called '*AS1*'

We suppose we address the MFA 1 (value possible between 0 and 255, i.e. MFA0 to MFA255).

<i>Designation</i>	<i>Description</i>
Router1.AS1.MFA1.DWnn	Is addressing DW nn for reading or writing in decimal numeric format. (nn can take any value from 0 to 127).
Router1.AS1.MFA1.DWHexnn	Is addressing DW nn for reading or writing in hexadecimal text format. (nn can take any value from 0 to 127).
Router1.AS1.MFA1.DWMeasurenn	Is addressing DW nn for reading or writing in measure format (floating numeric). (nn can take any value from 0 to 127).
Router1.AS1.MFA1.Measure	Allows reading of DW3 value in measure format.
Router1.AS1.MFA1.SetPoint	Allows writing a analogue command in measure format.
Router1.AS1.MFA1.SetPointAuto	Is positioning the 'automatic bit' of the analogue command.
Router1.AS1.MFA1.SetPointFeedback	This item is the feedback of analogue command (DW3) sent to the automation station.
Router1.AS1.MFA1.SetPointFeedbackAuto	This item is the feedback of the operation mode (automatic/manual) of the analogue command sent to the automation station.
Router1.AS1.MFA1.SetPointFeedbackLocal	This item is the feedback of the operation mode (Local override) of the automatic command sent to the automation station.

Router1.AS1.MFA1.Counter	Allows reading DW6 value in measure format
Router1.AS1.MFA1.Command	Allows writing a binary command. The value is combination of the bits: 1: bit of command 1 2: bit of command 2 4: bit of command 3 8: bit of command 4 16: bit of command 5 32: bit of command 6 64: bit "automatic"
Router1.AS1.MFA1.Command.Cmd1	Allows writing command 1
Router1.AS1.MFA1.Command.Cmd2	Allows writing command 2
Router1.AS1.MFA1.Command.Cmd3	Allows writing command 3
Router1.AS1.MFA1.Command.Cmd4	Allows writing command 4
Router1.AS1.MFA1.Command.Cmd5	Allows writing command 5
Router1.AS1.MFA1.Command.Cmd6	Allows writing command 6
Router1.AS1.MFA1.Command.Auto	Allows writing bit "automatic"
Router1.AS1.MFA1.BinaryFeedback	Allows reading of DW2 value. The value is a combination of the bits: 1: bit 24 of DW2 2: bit 25 of DW2 4: bit 26 of DW2 8: bit 27 of DW2 16: bit 28 of DW2 32: bit 29 of DW2 64: bit 30 of DW2 128: bit 31 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit24	Allows reading bit 24 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit25	Allows reading bit 25 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit26	Allows reading bit 26 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit27	Allows reading bit 27 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit28	Allows reading bit 28 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit29	Allows reading bit 29 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit30	Allows reading bit 30 of DW2
Router1.AS1.MFA1.BinaryFeedback.Bit31	Allows reading bit 31 of DW2

5.4.6 Items to read from historical database

We suppose the router is called '*Router1*'

We suppose the automation station is called '*AS1*'

We suppose we address the MFA 1 (value possible between 0 and 255, i.e. MFA0 to MFA255)

<i>Designation</i>	<i>Description</i>
Router1.AS1.History.StartDate	Specifies the global starting point of the time period for the readings.
Router1.AS1.History.EndDate	Specifies the global ending point of the time period for the readings.
<i>Note : this two items are specifying the starting and ending dates globally, for all MFA of an automation station. This items are optional and can be replaced by StartDate and EndDate from MFAnnn branch to organize the time period individually.</i>	
Router1.AS1.History.MFA1.StartDate	Specifies the starting point of the time period for the readings of this MFA.
Router1.AS1.History.MFA1.EndDate	Specifies the ending point of the time period for the readings of this MFA.
Router1.AS1.History.MFA1.Read	Activates the reading of the historical database. (set to 1)
Router1.AS1.History.MFA1.CurrentDate	Indicates current date during retrieval procedure.
Router1.AS1.History.MFA1.CurrentCount	Indicates the sample number during retrieval procedure.
Router1.AS1.History.MFA1.Status	Indicates the state of the retrieval procedure of the HDB and possible errors: 0 : no readings occurred 1 : reading from automation station in progress 2 : reading finished; transmission of the values to the OPC Clients 3 : transmission finished

	-1 : reading error -2 : error with the transmission to the clients. Is occurring if the clients do not get all the values within the specified parameter HDBRetrieveTimeout. -10 : StartDate not valid -11 : EndDate not valid or StartDate>=EndDate
<i>The following items are allowing another read of the historical database. Only one of the items has to be declared (choice is driven by the information which needs to be retrieved).</i>	
Router1.AS1.History.MFA1.Measure	This items will successively contain the measured value from the historical database.
Router1.AS1.History.MFA1.Counter	This items will successively contain the counter value from the historical database.
Router1.AS1.History.MFA1.BinaryFeedback	This items will successively contain the binary value of the entry from the historical database. This item can be decomposed into bits with items Bit24 till Bit31.

Notes : When starting the reading process, the values are transferred into the corresponding items successively and in chronological order, the maximum speed is specified by the customer at OPC group creation. As long as the complete retrieval sequence and the transmission of the values is not finished (status = 1 or 2) it is not possible to activate a new retrieval.

If the reading process is successful, the starting and ending date items are both set to the end value of the date range plus one second, this is done to facilitate the next reading operation.

If the item EndDate is not declared the end date will be the system date at the time of the reading (Read=1).

If multiple OPC clients are subscribed to the same items of historical values, they will get the same set of values and each with the maximum rate as specified with the creation of the OPC group. For each client is only one subscription for an item of historical data allowed (only one OPC group). The items CurrentCount, CurrentDate and as well the items of the historical values are exceptions: each client gets his own values depending on the specified rate of the retrieval.

If multiple clients are subscribed to the same items, it is required to be sure that only one client is the 'master' of the retrieval operation (Setting StartDate, EndDate and Read).

5.4.7 Items for direct memory access of the automation station

We suppose the router is called 'Router1'
We suppose the automation station is called 'AS1'

This set of items allows a dynamic addressing of memory. The addressing parameters (MFA and DW) are not set during declaration, but are dynamically filled during execution. This enables realisation of maintenance lists or diagnosis of equipments.

5.4.7.1 Access a column of DW

The 5 following items are linked together and can not be taken individually. It is possible to create several column reading sets; distinction is done by adding a two digit number suffix (nn) to the 'Column' identifier.

<i>Designation</i>	<i>Description</i>
Router1.AS1.Diag.Columnnn.MFA	Specifies the address of the MFA that will be address.
Router1.AS1.Diag.Columnnn.DW	Specifies the first DW that will be addressed.
Router1.AS1.Diag.Columnnn.Count	Specifies number of DW to be accessed.
Router1.AS1.Diag.Columnnn.Read	Starts the reading of the column of the DW.
Router1.AS1.Diag.Columnnn.Data	This items allows the exchange of the table of values.

5.4.7.2 Access a row of DW

The 5 following items are linked together and can not be taken individually. It is possible to create several row (line) reading sets; distinction is done by adding a two digit number suffix (nn) to the 'Line' identifier.

<i>Designation</i>	<i>Description</i>
Router1.AS1.Diag.Linenn.MFA	Specifies the first address of the MFA that will be address.
Router1.AS1.Diag.Linenn.DW	Specifies the DW that will be addressed.
Router1.AS1.Diag.Linenn.Count	Specifies number of MFA to be accessed.
Router1.AS1.Diag.Linenn.Read	Starts the reading of the line of the DW.
Router1.AS1.Diag.Linenn.Data	This items allows the exchange of the table of values.

5.4.7.3 Access a DW in decimal format

The 4 following items are linked together and can not be taken individually It is possible to create several reading sets; distinction is done by adding a two digit number suffix (nn) to the 'DWDecimal' identifier.

<i>Designation</i>	<i>Description</i>
Router1.AS1.Diag.DWDecimalnn.MFA	Specifies the address of the MFA that will be address.
Router1.AS1.Diag.DWDecimalnn.DW	Specifies the DW that will be addressed.
Router1.AS1.Diag.DWDecimalnn.Read	Starts the reading of the DW.
Router1.AS1.Diag.DWDecimalnn.Data	With this item the value can be transmitted.

5.4.7.4 Access a DW in hexadecimal format

The 4 following items are linked together and can not be taken individually It is possible to create several reading sets; distinction is done by adding a two digit number suffix (nn) to the 'DWHex' identifier.

<i>Designation</i>	<i>Description</i>
Router1.AS1.Diag.DWHexnn.MFA	Specifies the address of the MFA that will be address.
Router1.AS1.Diag.DWHexnn.DW	Specifies the DW that will be addressed.
Router1.AS1.Diag.DWHexnn.Read	Starts the reading of the DW.
Router1.AS1.Diag.DWHexnn.Data	With this item the value can be transmitted.

5.4.7.5 Access a DW in measure format (real)

The 4 following items are linked together and can not be taken individually. It is possible to create several reading sets; distinction is done by adding a two digit number suffix (nn) to the 'DWMeasure' identifier.

<i>Designation</i>	<i>Description</i>
Router1.AS1.Diag.DWMeasurenn.MFA	Specifies the address of the MFA that will be address.
Router1.AS1.Diag. DWMeasurenn.DW	Specifies the DW that will be addressed.
Router1.AS1.Diag. DWMeasurenn.Read	Starts the reading of the DW.
Router1.AS1.Diag. DWMeasurenn.Data	With this item the value can be transmitted.

5.5 Usage of items for connection state

Some items can be used to control the state of the connection with the router and on the novaNet bus connected automation stations:

- Net1.OnLine* : Shows with the state 'True' that the connection to the router is established.
- Net1.OffLine* : Shows with the state 'True' that the connection is cancelled (if connection was established before)
- Net1.TLFailure*: Shows that the ASNOVANET network is interrupted. This bit can only be 'True' if the connection with the router has been established.

- Net1.ASxxx.OnLine* : Shows the connection with a specific AS.
- Net1.ASxxx.OffLine* : Shows which connection with a specific AS is interrupted (if connection was established before).

To realise a novaNet network **connection interruption** the following condition can be used:

(Net1.OffLine OR Net1.TLFailure)

To realise if the novaNet network connection is online the following condition can be used:

(Net1.OnLine AND NOT Net1.TLFailure)

Note: *Net1.Connect* is a command to use if the connection with the router will be opened or closed. It should not be used to display the connection status.

5.6 Usage of Remote OPC (DCOM)

The OPC server can be used by a remote client only if the computer and the application are configured with correct DCOM settings. This settings can be done with help of the Windows application 'dcomcnfg.exe'.

It is not possible to provide a sample configuration because the security requirements are different for each application. But in all cases it is recommended to follow some basic rules for all computers where the OPC server is running:

- Keep all the default COM security settings for the computer (access and launch permissions). To secure access to the server it can be required to abrogate the access rights for 'all users'.
- Keep all the default DCOM communication properties for the computer (Connect / Identify).
- For the application DCOM 'SAUTER ASNovanetRemote OPC Server V1.0':
 - Set up a user account with password (and no administrator account) for the operation of the server on the register 'Identify'. If the computer is member of Windows domain the user account has to be of this domain.
 - Eventually add certain user accounts in the register 'Security' for access and launch permissions to accomplish the desired requirements and security limits.

Limitation of this version: Because the OPC server communicates with the program (OCSTrace) to visualise traces using a Windows mechanism it is required that both executed programs are started from the same user. If the OPC server is running through a user account as described above it cannot communicate with the program to visualise the traces. This can cause problems during the phase of installation and tuning. In this case it is recommended to specify the user ID for the OPC server to 'INTERACTIF'. In this configuration the server cannot run as closed session.



5.7 Client application : Usage of the time program control

In the client application, insert an OLE object corresponding to the chosen component:

Sauter.TimeProgram Control	for the English version
Sauter.TimeProgramFra Control	for the French version

The ProgID of the time program is *Sauter.TimeProgramCtl.1* and *Sauter.TimeProgramCtlFra.1*

The control is stand alone and no other parameterisation is needed. Nevertheless, this component is using the services from the OPC server. Therefore, the OPC server needs to be installed on the same machine and running in order for the component to work properly.

Note : also the control is an ActiveX component, it can not be seen in the ActiveX control list of the system. For example to be able to use it in Visual Basic (version 6), it has to be selected in the insertable objects and not from the ActiveX list in menu Project/Component.

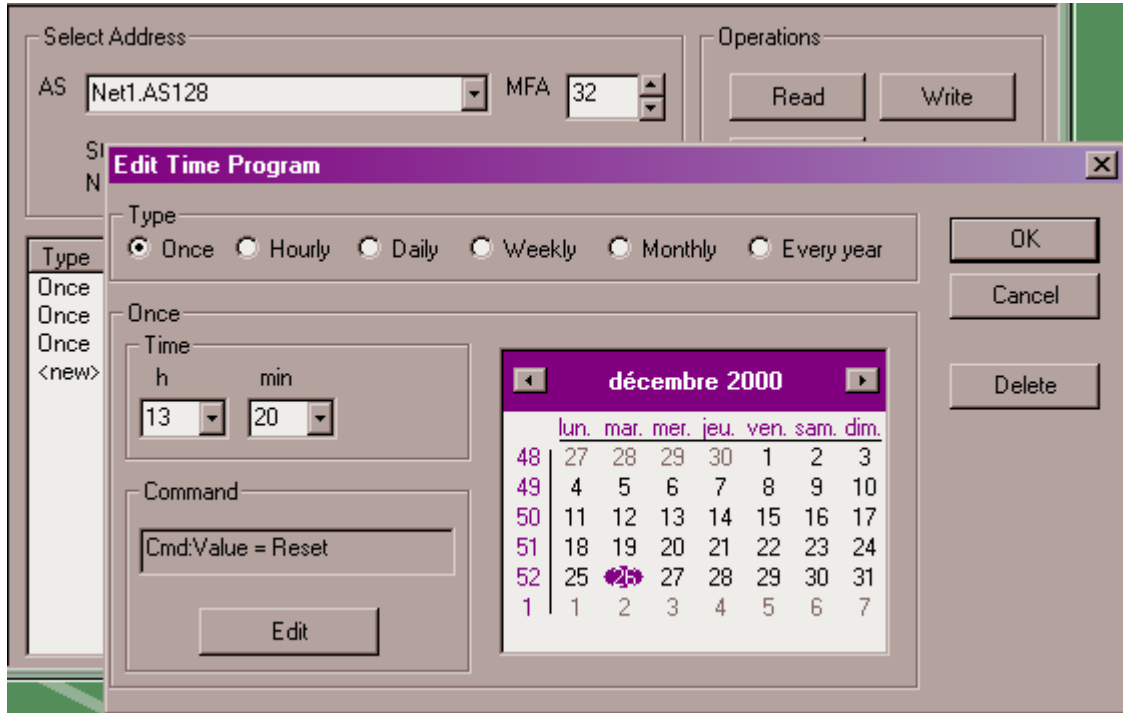
5.7.1 Usage of the control

5.7.1.1 First page

Type	Time	Date / Weekdays	Command
Once	13:20	mardi 26 décembre 2000	Cmd:Value = Reset
Once	11:11	jeudi 28 décembre 2000	Cmd:Value = Reset
Once	14:55	mardi 26 décembre 2000	Cmd:Value = Set 1
<new>			

- 1 Use the dropdown combo box 'AS' to select an automation station to explore. Check the status line to see the result of the operation, this line will indicate whether the selected automation station can be explored.
- 2 Select the MFA to be programmed using the 'MFA' input box.
- 3 Double-click on the line to be edited from the list. With clicking on <new>, a new time program will be created.

5.7.1.2 Dialog to edit a time program



This dialog allows you to fully edit a time program.

- 1 Select the type of time program (period) using the upper buttons. Depending on this first choice the relevant parameters are shown to the user.
- 2 Change the starting time in the 'Time' input box. In 'hourly' mode, the hour field contains '*' to indicate that the hour parameter is not relevant and cannot be changed, since it will be started every hour.
- 3 Change the starting date. Depending on the type of time program, you will be able to enter :
 - a date using the calendar ('once' and 'yearly' mode)
 - a day of the week (in 'daily' and 'weekly' mode)
 - a day of the month (in 'monthly' mode)
- 4 Click on the 'Edit' button to change the command.

The 'Delete' button is allowing the deletion of the currently selected time program (after confirmation).

Notes : In field 'Hour', the value '*' means starting every hour.

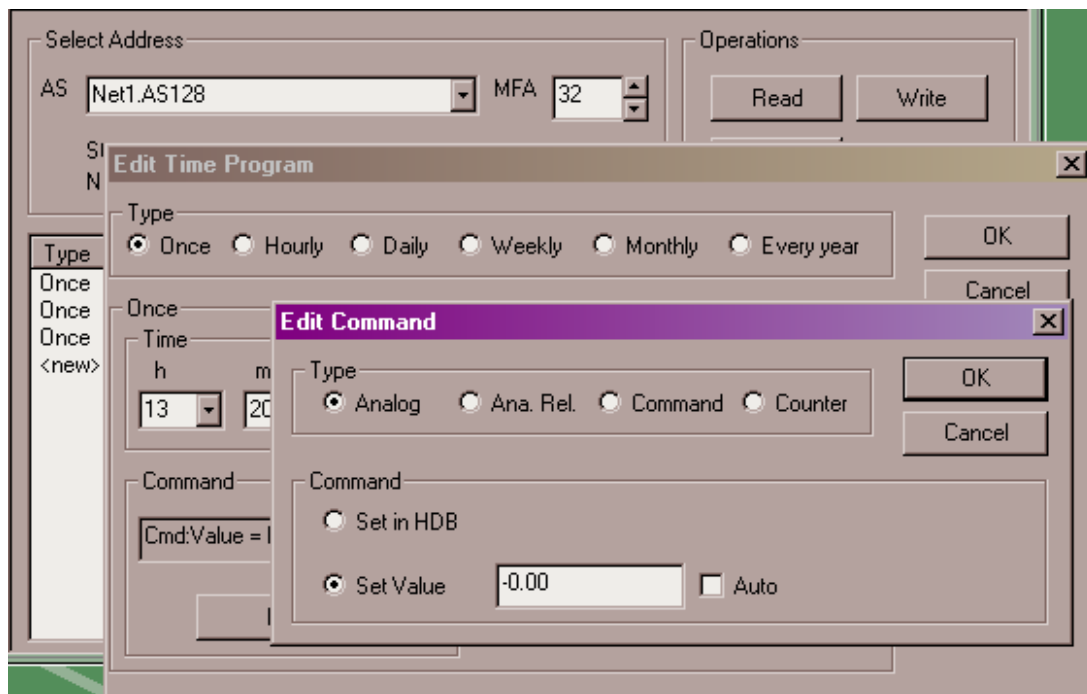
In the 'Minutes' field the following values have a special meaning:

- P4 : means command will be executed every 4 minutes
- P8 : means command will be executed 8 times an hour
- P15 : means command will be executed every 15 minutes
- P30 : means command will be executed every 30 minutes

In "Weekly" mode, selection of the following days is possible:

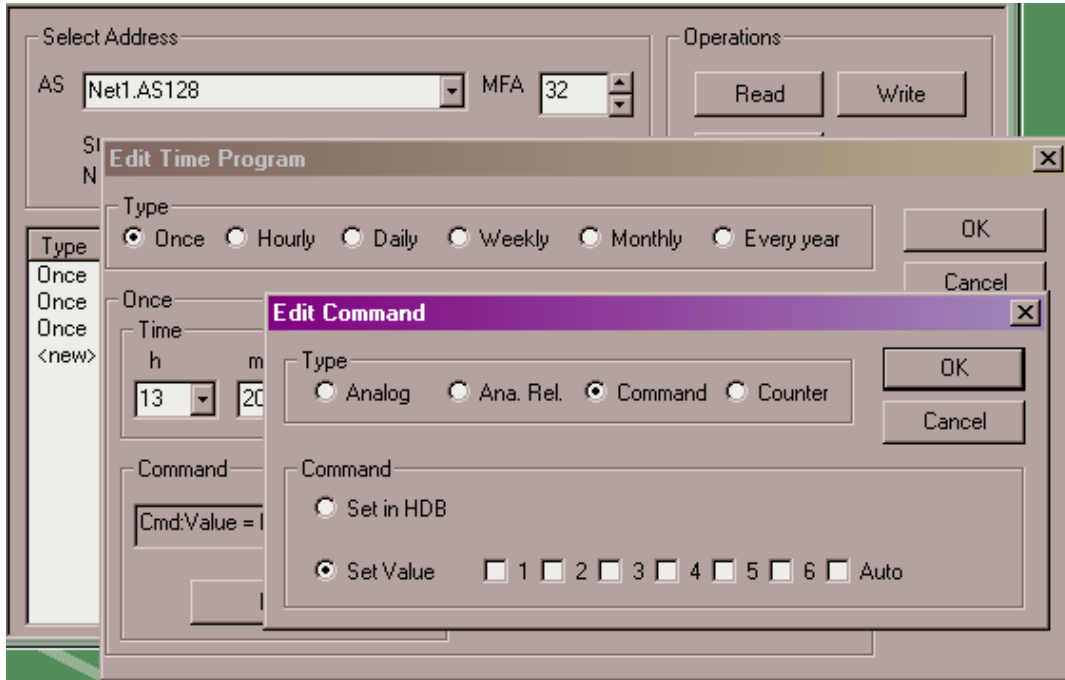
- Monday to Sunday (fill or replacement): Activation on the day of the week indicated, taking into account the possible replacement executed by programming the calendar.
- Special day 1 to Special day 8: Special days defined by the calendar
- Every day except (Monday, Tuesday,...weekend): Activation every day of the week except the indicated day (or the weekend).
- Monday to Sunday (real): Activation on the real day of the week, independently of replacement days programmed by means of the calendar.

5.7.1.3 Dialog to edit a analogue command



- 1 Choose the type of command (Analogue in the screenshot). ATTENTION: Make sure the type is compatible with the selected MFA !
- 2 Depending on the type, the dialog will display the relevant parameters to the user.
- 3 Use buttons in 'Command' box to define the action to be executed:
 - Select 'Set in HDB' for having the value transferred in the historical database.
 - Select 'Set Value' for writing a value.
 - If 'Auto' is checked, the value is set to the automatic modus.

5.7.1.4 Dialog to edit a binary command



- 1 Choose the type of command (Command (binary) in the screenshot).
ATTENTION: Make sure the type is compatible with the selected MFA !
- 2 Depending on the type, the dialog will display the relevant parameters to the user.
- 3 Use buttons in 'Command' box to define the action to be executed:
Select 'Set in HDB' for having the value transferred in the historical database.
Select 'Set Value' for writing a value. The checkboxes 1 to 6 represent the 6 output stages for the command. Checking a box will set the corresponding output stage to 1, where it is not checked it will set the output to 0.
If 'Auto' is checked, the command is set to the automatic mode.

5.7.1.5 Operations on main page

Select Address

AS: Net1.AS128 MFA: 32

Status: Selected AS On Line
Number of Time Programs for this AS: 3 (Modified)

Operations: Read, Write, Calendar

Type	Time	Date / Week days	Command
Once	13:20	mardi 26 décembre 2000	Cmd Value = Reset
Once	11:11	jeudi 28 décembre 2000	Cmd Value = Reset
Once	14:55	mardi 29 décembre 2000	Cmd Value = Set 1
<new>			

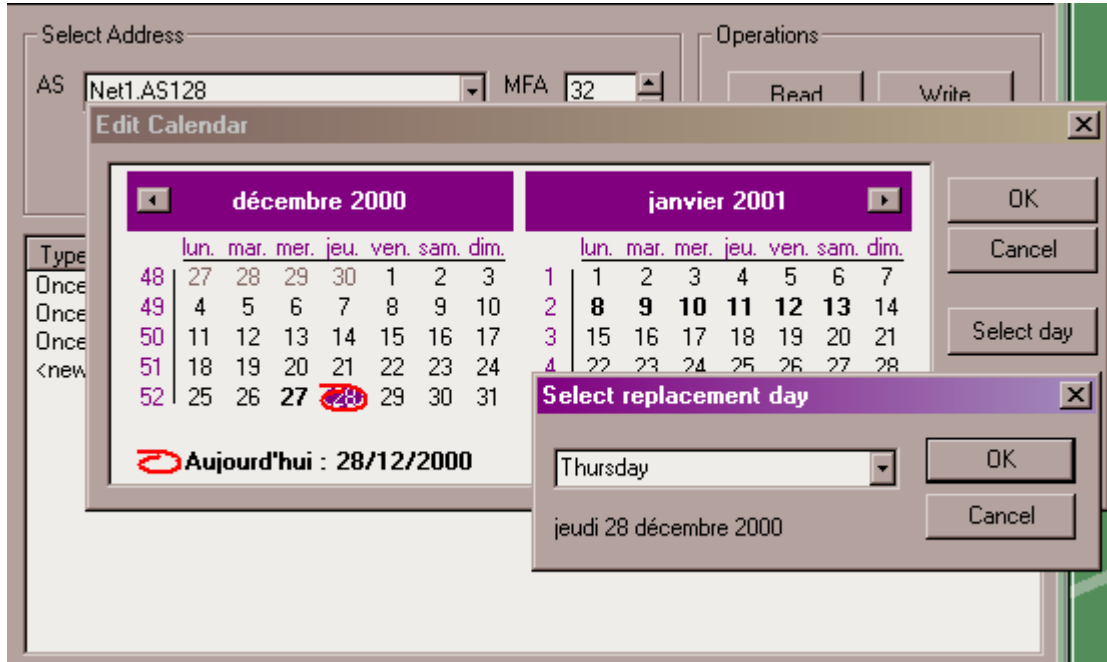
This counter indicates the total number of time programs defined in the automation station (at the time it was read).

This indicator means some modifications have been done and are not yet saved to the automation station.

When selecting a new automation station, the component will automatically propose to save the changes.

- The 'Read' button is forcing a new read from the selected automation station. ATTENTION : all changes will be lost.
- The 'Write' button is forcing a write of the time programs and calendar to the automation station.
- The 'Calendar' button opens the calendar dialog window to be edited

5.7.1.6 Edit of the calendar



- 1 The calendar edit dialog is displaying an annual calendar for two years
- 2 To change the replacement day of a given date :
- 3 Select the date in the calendar.
- 4 Click on button 'Select day'.
- 5 A dialog allows you to choose a replacement day on the given date.
- 6 The bold displayed days have a changed replacement day.

6 Operation of OPC Server

6.1 Read and write

The 'AsyncRead' and 'AsyncWrite' parameters allows to choose an synchronous or asynchronous execution of the read/write operations. The choice is mainly driven by the client application.

In order to limit the number of transactions on the communication bus, the OPC server is grouping the read and write requests, and generates combined transactions. The collecting time is specified in the 'ReadDelay' and 'WriteDelay' parameters, in the configuration file.

Normally, the server is doing a synchronous read transaction on the automation station on each reading of an item. Nevertheless, because a number of client applications are doing a periodical polling that could possibly interfere with the internal refreshing process, the 'IgnoreRead' parameter allows (if set to -1) to ignore all reading requests. The update will happen with spontaneous sending of values to the client application.

The 'ReadMaskDelay' parameter specifies the time during which all values returned by the refreshing process are ignored after a writing operation, this prevents updating the client application with inconsistent data. The default value of 3 seconds should apply in most cases. If a fluctuation is detected on writing processes, this value has possibly to be increased.

The 'ContractTimeout' parameter specifies the maximum wait time when executing a request on the bus. It can be increased if related error messages are detected in the trace window.

The 'HDBCContractTimeout' parameter specifies the maximum wait time when executing a read of the historical database on the bus. It can be increased if related error messages are found in the trace window.

6.2 Presence test of the automation station

If the revision of the Router/Routel firmware is older as 'F':

The OPC server makes a read of word 'MFA60DW6' for each declared automation station on regular time interval in order to check the communication line status to each automation station. This polling occurs with a period defined in the 'StatusPolling' parameter in the configuration file. A value of 0 suppresses this polling.

If the revision of the Router/Routel firmware is 'F' or newer:

The OPC server is scanning the router to get the number of automation stations on the network. As soon as the amount is changed the server requests a spontaneous emission from each single automation station to recognise which automation stations are online or offline. The wait time for all feedback messages is declared with the parameter 'CheckAliveDelay'. The server presumes having received all feedbacks if the router does not give new information within a number of successive request cycles defined with a parameter in the supervisory interrogation.

6.3 Information with spontaneous messages

The OPC server is automatically setting the automation stations to have spontaneous messages for measurement values, BinaryFeedback and counter values. The parameterisation of the spontaneous subscribed data points is done in the INI file associated to the network.

The programming of the spontaneous messages depends on the operation mode:

- **Router-Mode**

The mode of spontaneous message 'online' is programmed during the start of the connection (Detection of the presence of the automation station). MFAs which are not for 'online' mode parameterised are programmed with the 'offline' mode. During disconnection a new re-programming is not required.

- **Routel-Mode – outgoing call manually activated (with writing of item Net1.Connect)**

The mode of spontaneous message 'online' is programmed during the start of the connection (Detection of the presence of the automation station). MFAs which are not for 'online' mode parameterised are programmed with the 'offline' mode. MFAs with 'online' mode programmed are re-programmed to 'offline' mode during disconnection.

- **Routel-Modus – incoming call**

The mode of spontaneous message 'offline' is programmed during the start of the connection (Detection of the presence of the automation station). Only MFAs with 'online' mode programmed are re-programmed. In order to the case that a outgoing call would be interrupted earlier, it can invalidate this programming 'online'. During disconnection a new re-programming is not required.



6.4 Information with polling requests

Those information of the automation stations cannot be notified spontaneous are read by a polling procedure with a rate that is specified in the parameter 'ReadPolling'. A value of 0 suppresses the polled reads. The polling is only executed in the router mode.

Depending on the client, it can make sense to stop this polling to not overload the communication lines.



novaNet OPC Server

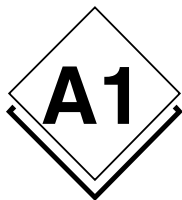
Operation of OPC Server



ANNEX

A1 List of all items of the OPC server

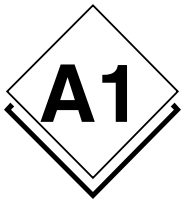
Hierarchy	Description	Data type	R/W	Comment
Traces	Defines the trace message level.	VT_I1	R/W	Allows filtering and limitation of trace messages
Watchdog	Watchdog indicator	VT_I2	R/W	Positioned at 1 periodically in normal state.
WatchdogDate	Watchdog indicator	VT_BSTR	R	Updated periodically in normal state.
WatchdogInfo	Information on the origin of watchdog activation.	VT_BSTR	R	"OK" in normal state.
WatchdogTest	Watchdog test item (allows manual activation of the WD for test).	VT_BOOL	R/W	Item invisible in the browser.
ComLines				
	<i>Branch of descriptors for communication lines (remote connection via modem)</i>			
.LineXXX	<i>Branch of a line</i>			Defines the logical name of a line
.Name	Name of the line	VT_BSTR	R	Logical name
.State	State of the line (error message)	VT_BSTR	R	
.OnLine	Connection indicator	VT_BOOL	R	
.PhoneNumber	Phone number	VT_BSTR	R	Only for outgoing calls
.DeviceName	System name of this line (TAPI)	VT_BSTR	R	Name of the 'TAPI' device connected to this line
RouterXXX				
	<i>Branch of a router</i>	--		Defines the logical name of the AS network
.ComPort	Communication port number	VT_I1	R/W	With W: forces a new initialization of the communication
.ComSpeed	Communication speed (Baud rate)	VT_I4	R	
.Address	PC-Address	VT_I4	R	Defined in the configuration file
.Connect	Command for connection / disconnection	VT_BOOL	R/W	
.ConnectDate	Date of the last connection	VT_BSTR	R	
.OnLine	State: Router connected	VT_BOOL	R	
.OffLine	Status: Abortion of the connection with the router	VT_BOOL	R	
.NetworkError	Last error code received from router	VT_I4	R	
.Id	Identification string of router	VT_BSTR	R	
.SetDate	Flag to write current date to all automation stations	VT_BOOL	W	With W: current date is sent to all automation stations
.NetworkID	ID of ASNOVANET network	VT_UI4	R	Network ID (for distinction / incoming calls)
.ClientID	ID of the application in the router	VT_BSTR	R	
.Violation	Flag / Indicates a call by a violation	VT_BOOL	R	
.PowerReturn	Flag / Indicates a call by power return	VT_BOOL	R	
.TLFFailure	Flag / Indicates a call by total failure of the novaNet bus	VT_BOOL	R	
.ASmutation	Flag / Indicates a call by changes of number of connected AS	VT_BOOL	R	
.State	Shows in text format the state of the connection	VT_BSTR	R	
.NumASOnBus	Indicates the number of controllers present on the bus	VT_I4	L	



List of all items of the OPC server

.NumTelegramsToRead	Indicates the number of telegrams waiting to be read in the router.	VT_I4	L	
.CheckAlive	Allows manual activation of a CheckAlive procedure.	VT_BOOL	L/E	
.ComLine	<i>Branch of descriptors for used communication lines</i>	--		
.Name	Name of the used line	VT_BSTR	R	Defines the logical name of the used communication line
.PhoneNumber	Phone number to be dialled	VT_BSTR	R/W	
.State	State of the line (error message)	VT_BSTR	R/W	Copy of line state
.Incoming	Indicates if incoming call or outgoing call	VT_BOOL	R	If true, incoming call
.NumIncoming	Counter of incoming calls since start of server	VT_I4	R	
.NumOutgoing	Counter of outgoing calls since start of server	VT_I4	R	
.Routel	<i>Branch for input of routel parameters</i>	--		The parameter for routel
.PhoneChannel1	Number to be dialled for phase 1	VT_BSTR	R/W	
.PhoneChannel2	Number to be dialled for phase 2	VT_BSTR	R/W	
.PhoneChannel3	Number to be dialled for phase 3	VT_BSTR	R/W	
.ASXXX	<i>Branch of an automation station</i>	--		
.OnLine	State: Automation station connected	VT_BOOL	R	1: Automation station connected, 0: Automation station not connected
.OffLine	State: Break of connection with automation station	VT_BOOL	R	
.Address	Address of automation station	VT_I4	R	Defined in the configuration file
.PowerFail	Indication for battery power	VT_BOOL	R	
.Date	Current date of automation station	VT_BSTR	R	
.Id	Identification string of automation station	VT_BSTR	R	
.Refresh	Request to read all items	VT_BOOL	W	With W: all items subscribe to the automation station are being read
.MFAnnn	<i>Branch of MFA</i>	--		
.DWnnn	Access to a DW in decimal format	VT_I4	R/W	
.DWHexnnn	Access to a DW in hex format	VT_BSTR	R/W	
.DWMmeasurennn	Access to a DW as a measurement	VT_R8	R/W	
.Measure	Read of a measurement	VT_R8	R	
.SetPoint	Write of a analogue command	VT_R8	R/W	
.SetPointAuto	Checking the auto bit for the analogue command	VT_BOOL	R/W	
.SetPointFeedback	Re-read the actual analogue command	VT_R8	R	
.SetPointFeedbackAuto	Re-read the auto bit of the actual analogue command	VT_BOOL	R	
.SetPointFeedbackLocal	Re-read the local bit of the actual analogue command	VT_BOOL	R	
.Counter	Read of counter	VT_R8	R	
.Command	Write binary command	VT_I1	R/W	Ordered: 1, 2, 3, 4, 5, 6, auto, local
.Cmd1	- Word decomposition into bits	VT_BOOL	R/W	Bit I
.Cmd2		VT_BOOL	R/W	Bit II
.Cmd3		VT_BOOL	R/W	Bit III
.Cmd4		VT_BOOL	R/W	Bit IV
.Cmd5		VT_BOOL	R/W	Bit V

.Cmd6		VT_BOOL	R/W	Bit VI
.Auto		VT_BOOL	R/W	Bit Auto
.Local		VT_BOOL	R/W	Bit Local
.CommandFeedback	Re-read the binary command	VT_I1	R	Ordered: 1, 2, 3, 4, 5, 6, auto, local
.Cmd1	- <i>Word decomposition into bits</i>	VT_BOOL	R	Bit I
.Cmd2		VT_BOOL	R	Bit II
.Cmd3		VT_BOOL	R	Bit III
.Cmd4		VT_BOOL	R	Bit IV
.Cmd5		VT_BOOL	R	Bit V
.Cmd6		VT_BOOL	R	Bit VI
.Auto		VT_BOOL	R	Bit Auto
.Local		VT_BOOL	R	Bit Local
.BinaryFeedback	Read binary feedback	VT_BOOL	R	
.Bit24	- <i>Word decomposition into bits</i>	VT_BOOL	R	
.Bit25		VT_BOOL	R	
.Bit26		VT_BOOL	R	
.Bit27		VT_BOOL	R	
.Bit28		VT_BOOL	R	
.Bit29		VT_BOOL	R	
.Bit30		VT_BOOL	R	
.Bit31		VT_BOOL	R	
.History				
	<i>Branch for historical data</i>	--		
.StartDate	Global start date	VT_BSTR	R/W	Common date for all MFAs
.EndDate	Global end date	VT_BSTR	R/W	Common date for all MFAs
.MFAAnn				
	<i>Branch of a MFA</i>	--		
.StartDate	Local start date of MFA	VT_BSTR	R/W	
.EndDate	Local end date of MFA	VT_BSTR	R/W	
.Read	Read command	VT_BOOL	W	Starts the reading of the specified range of dates
* .CurrentDate	Sends back the last read date of the historical data.	VT_BSTR	R	For progress control
* .CurrentCount	Progress counter, during reads	VT_I4	R	For progress control
* .Status	State of HDB / possible errors	VT_I4	R	For progress control
* .Measure	Read of historical measurement values	VT_R8	R	
* .Counter	Read of historical counter values	VT_R8	R	
* .BinaryFeedback	Read of historical binary feedback	VT_I1	R	
* .Bit24	- <i>Word decomposition into bits</i>	VT_BOOL	R	
* .Bit25		VT_BOOL	R	
* .Bit26		VT_BOOL	R	
* .Bit27		VT_BOOL	R	
* .Bit28		VT_BOOL	R	
* .Bit29		VT_BOOL	R	
* .Bit30		VT_BOOL	R	
* .Bit31		VT_BOOL	R	
* : Items noted with stern asterisk are private: each client receives own values				
.Diag				Items for direct access to memory in automation station
	<i>Branch for direct access items</i>	--		
.ColumnXXX				
	<i>To read from a DW column</i>	--		For diagnosis or special functions
.MFA	MFA selection	VT_I2	R/W	
.DW	First DW selection	VT_I2	R/W	
.Count	Selection for number of DW to read/write	VT_I2	R/W	



List of all items of the OPC server

.Read	Command to read	VT_BOOL	W	
.Data	Results	VT_ARRAY VT_UI4	R/W	
.LineXXX	<i>To read from a DW line</i>	--		
.MFA	First MFA selection	VT_I2	R/W	
.DW	DW selection	VT_I2	R/W	
.Count	Selection for number of MFAs to read/write	VT_I2	R/W	
.Read	Command to read	VT_BOOL	W	
.Data	Results	VT_ARRAY VT_UI4	R/W	
.DWDecimalXXX	<i>To read a DW in decimal format</i>	--		
.MFA	MFA selection	VT_I2	R/W	
.DW	DW selection	VT_I2	R/W	
.Read	Command to read	VT_BOOL	W	
.Data	Result	VT_I4	R/W	
.DWHexXXX	<i>To read a DW in hex format</i>	--		
.MFA	MFA selection	VT_I2	R/W	
.DW	DW selection	VT_I2	R/W	
.Read	Command to read	VT_BOOL	W	
.Data	Result	VT_BSTR	R/W	
.DWMeasureXXX	<i>To read a DW as measurement</i>	--		
.MFA	MFA selection	VT_I2	R/W	
.DW	DW selection	VT_I2	R/W	
.Read	Command to read	VT_BOOL	W	
.Data	Result	VT_R8	R/W	

NOTE:

The bolded IDs represents a start of a new branch (of the tree)

Data type definition:

VT_DATE	Date in OLE format
VT_BSTR	Character string (variable size)
VT_UI1	Unsigned byte
VT_I1	Signed byte
VT_I2	Signed word with 2 bytes
VT_I4	Signed word with 4 bytes
VT_R4	Real with 4 bytes (float)
VT_BOOL	Boolean with 1 byte (true/false)
VT_ARRAY...	Array of ...

EXAMPLES:

Writing "2" in item "Admin.Port" will result in re-initialization of the communication using COM2 (if previously it was COM1)

Read of item "Router1.Speed" : 19200 returns current speed in bauds.

The item "Router1.AS00012.OnLine" indicates the connection status of automation station 'AS00012' on router 'Router1'.

The item "Router1.AS00012.MFA3.DW6" is addressing (only in read only mode) the DW 6 on MFA 3 of the 'AS00012 automation station.

The item "Router1.AS00012.MFA3.Counter" is reading counter declared in MFA 3 of automation station AS00012.

A2 History of changes

Version 2.1.0.0 to 2.2.0.4

Correction	Evolution	Description
	x	Added item [Router].ConnectDate that shows date of last connection.
	x	Added item [Router].OffLine. This item changes to 'True', if attempted connection is not established. It could be useful to activate an alarm to show the non presence of a router. The item is set to 'False' if the next connection with the router is successful.
	x	Added item [Router].[ASxxx].OffLine. This item changes to 'True', if the automation station is not 'online' while the router is being connected. It is useful to activate an alarm to show the non presence of an automation station. The item set to 'False' if the next connection with the automation station is successful.
x		The items TLFailure, ASMutation, PowerReturn und Violation keep operative after a disconnection. Thus, visual traces of these alarms stay in operation.
x		The item TLFailure is set to 'True' in router mode if the novaNet bus is disconnected.
x		The connection with a call of the routel is being established again normally after a failure (disconnection) of the novaNet bus.
x		Oppression of a inadequate disconnection after a minute.
	x	Retry of last sent frame after a receiving error.
	x	Identification of calling island with help of the ID string available from the routel and not anymore with the numerical ID. The ID string has to be subscribed in the initialisation file with the variable NetworkID (was used to contain the numerical ID).
x		Correction of occurred error with retrieval of historical data.
x		Correction of not happened actualisation of entries when just the spontaneous message of a measurement is executed.
x		Oppression of writes for DW0 on page 1 of the routel.
	x	Actualisation of IDs of EPROMS EYR203 and EYL106.
	x	Support for revision F of EYZ291 EPROM.
	x	Dating the OPC server to UTC time.
	x	The exception date 01/01/1996 is now coded on UTC.
x		Return to the identified and corrected date fort he HDB messages.
	x	Change in the management of the feedback messages.

Version 2.2.0.4 to 2.2.0.5

Correction	Evolution	Description
x		Correction in the operation of the item TLFailure to take account of the connection mode of the router or routel.

Version 2.2.0.5 to 2.2.0.6

Correction	Evolution	Description
	x	Managing the routine checkalive – Recognition of presence of automation stations with EPROM router F or later – the old recognition method (polling date) is still active if the EPROM is older than revision F. The CheckAlive request is repeated if not all automation stations reply (only in router mode. No retries in routel mode).
	x	Changes in the connection sequence to allow two programming modes for spontaneous messages: online (during the connection), offline (with disconnected connection) to allow spontaneous messages with a network connection. The offline mode is programmed during disconnection (with outgoing call) and during connection (with incoming call and only if online mode is configured for the MFA).
	x	The parameter AutoConnectOnStart allows with the start in routel mode to suppress the automatic connection establishment.
	x	Specifying specific PC address for each network.
x		Change in the connection routine: better synchronisation with the connection state in routel mode.
	x	Displays the steps of connection state with item [Router].State.



History of changes

		<p>Connection: Connecting..., On Refresh..., Connected Disconnection: Parameter Setting..., Disconnected</p> <p>The time for the step 'On Refresh' depends on the number of values to be read.</p>
x		Oppression to save temporary connection errors those would produce a wrong disconnection of the connection with the automation stations.
	x	Parameterisation of wait time in the polling loop for the router. Default value = 15 ms. Added parameter: RouterPolling Delay.
x		Oppression of error message: R291: Response: F7 frame too short. This message was shown with a temporary error on the novaNet bus; the router sends therefore empty data frames (they are displayed correctly though; these frames have not special importance and can be ignored). A debugging trace is now showing this case.
	x	<p>Management of retrieving the changed historical data. This is done in a separate thread that takes the process till the data is transferred to the clients. It allows the subscription of multiple clients to the same item and if required it manages the frequency for each different client. During the retrieval of the data is a re-read not possible. Supervision of the start and end date. Added state item to control the progress. Oppression of the message from values, that are older than the start date (the protocol transfers in blocks of 16 values) The value items and CurrentCount and CurrentDate are exceptions from now on (an item has for each client its own value) Addition of parameters HDBRetrieveTimeout to specify the maximal time to send back the historical data to the clients. The retrieval process is interrupted if not all clients will have retrieved all values.</p>
x		Item [Router].[Line].State: Addition of an information for a failure of the connection.
	x	Addition of the parameter SetRouteNotification that allows invalidating the programming of spontaneous messages with incoming calls in routel mode to optimise the connection time.
	x	Changes in the connection sequence to allow two programming modes for spontaneous messages: online (during the connection), offline (with disconnected connection). The offline mode is programmed during disconnection.
	x	The parameter AutoConnectOnStart allows with the start in routel mode to suppress the automatic connection establishment.
	x	Specifying specific PC address for each network.
x		Change in the connection routine: better synchronisation with the connection state in routel mode.
x		Correction of initial value for the dates in the history branch. The default date (01/01/1996) is set to the current date when the item is subscribed. These items have now the property BAD and with not read historical data they are 01/01/1996.
	x	Added a trace message (warning) if receiving an alarm bit in the historical database of MFA60.
	x	Added traces messages (debugging) to show the programming of the spontaneous messages for each MFA
x		Managing autoconnection with a write of item [Router].[AS].Refresh.
x	x	Timeout management of changed connection. The timeouts are 2 seconds in router mode (fixed setting) and in routel mode adjustable but with a default value of 5 seconds.
	x	Added a server parameter RoutelCommTimeout to control the timeout of the connection in routel mode.
x		The items NetworkID and NetworkError can now only be read.
x	x	Actualisation of user manual (Version 2.2.0.6).
	x	<p>Changes in the management of item properties:</p> <p>In router mode and KeepValid parameter = 0:</p> <p>Router/AS not connected: BAD: NotConnected Router/AS connected: GOOD: NonSpecific Router/AS not connected: BAD: LastKnown</p> <p>In router mode and KeepValid parameter = 1:</p> <p>Router/AS not connected: BAD: NotConnected Router/AS connected: GOOD: NonSpecific Router/AS not connected: GOOD: NotConnected</p>



		<p>In routel mode:</p> <p>Routel not connected: BAD: NotConnected Routel connected: GOOD: NonSpecific ... AS OffLine detected: BAD: LastKnown Routel not connected: BAD: LastKnown ... AS Online detected: GOOD: NonSpecific Routel not connected: GOOD: NotConnected</p> <p>In this case the property GOOD can be retained after disconnection (if the AS during disconnection was online)</p> <p>The items in the history branch are not involved of a disconnection. The service items (OnLine, Connect..) stay always valid.</p>
	x	<p>Change in the meaning of offline items; those items indicate a default condition for the connection: [Router].OffLine changes to 1 if the attempt for a connection with the router/routel fails. [Router].[Net].OffLine changes to 1 if the automation station does not respond on a request.</p> <p>The state Connected / Not Connected is always shown with the online items.</p>
	x	<p>Oppression of reads from MFA60DW2 during the connection establishment. The item [Router].[AS].PowerFail is set default to 0. It is actualised with a spontaneous message from value.</p>
	x	<p>The management of the spontaneous message for the item CommandFeedback was not supported but is now added.</p>
	x	<p>In routel mode (incoming and outgoing) the bits 10, 14, and 17 of DW2 are not set to 1 anymore on the 1st routel page. The current value in the routel is kept.</p>
	x	<p>Added the parameter IdleDetectionCount to specify the criteria to acquire the inactivity on the bus: Number of consecutive reads of router reading pointers without successful transmitted values (immobile pointer). This parameter is used to get the end of the checkalive process.</p>
x		<p>Changes in the management of the communication error handling: Each transaction (request of router) can be repeated maximal 10 times upon an error within 30 seconds. If no responses is received within this conditions after this time the connection will be disconnected (without writing the pointer in routel mode). In routel mode the scheduled writes will be cancelled (and therefore will be lost) to avoid a collision of the PC and routel with an immediate and simultaneous repetition..</p>
	x	<p>In routel mode and with the automatic outgoing call the spontaneous messages are not programmed to 'online' and 'offline' mode to limit the connection time and to avoid the actualisation of the values which is not requested with an automatic connection (Writing of commands, reading of HDB, reading/writing of time programs)</p>
x		<p>Correction in the management routine for requests: The termination of the timeout for the request lead in some cases to a deadlock that disconnected the communication and avoided the termination of the server.</p>
x		<p>Changes in the synchronisation of the connection establishment in routel mode: It is assumed that all telegrams are transmitted to the routel before the reading and writing requests are started. Therefore it is prevented that the transmission of the first requests is cancelled by the timeout, if the information volume is too big (i.e. re-transmission of HDB values caused by a connection error).</p>
	x	<p>Changes in the code interpretation of spontaneous messages in router mode to be consistent with the routel mode: The code of a spontaneous message can be shown in online mode (10 to 70) as well in offline mode (0 to 7 as before). The online mode has priority if it is not 0. Thus the compatibility with earlier versions is assured.</p>
x		<p>Correction in the interpretation of MULTIRANDOM frames: A check of the generic receiver address occurs with the first value of the frame. If the first value was not meant to be for the PC the whole frame had been rejected.</p>



History of changes

Version 2.2.0.6 to 2.2.0.7

3.2.2005

Correction	Evolution	Description
	x	Component for the time program: Change in the UI for the daily time program in the format 'daily except...'. These time programs are now available in weekly formats.
	x	Component for the time program: Added the codes of an exception day for the real days in the weekly format.
x		Component for the time program: Different changes in the coding of the data words corresponding to the commands.
	x	Consideration of the 4 possible routel recipients with the programming of the spontaneous messages and the CheckAlive request. The bits 16 and 17 of the DW32 are set for each island registered PC address regarding to the INI file.

Version 2.2.0.7 to 2.2.0.8

Correction	Evolution	Description
	x	Adds an option that inhibits automatic connection per island at start-up, in routel as well as in router. Parameter INI: AutoConnectOnStart (for each island).
	x	Integration of TAPI diagnostic routines. "A log file of traces relating to TAPI activities". Generation of the file can be deactivated: Parameter INI: LogTAPIEvents (Server section)
	x	Addition of a modem monitoring task. If a free modem is not available, then closing and reopening of the line is forced. The frequency is configurable: Parameter INI: ChekTAPIPeriod (Server section) Indicates the polling period in milliseconds (0 to deactivate, 180000 default)
x		Addition of a line cut-off function on incoming calls if no routel has been detected after 30 seconds. The line is interrupted and returned to the pool.
x		Following an out-going connection failure, the line is closed, reopened and then returned to the pool
	x	Addition of a watchdog which monitors the activity of internal polling tasks of the server (3 tasks per island plus the TAPI management task). Creation of 3 items:- - Watchdog: Used for implementing the full watchdog in E ² . - WatchdogDate: Displays the server date in text, updated periodically by period of the watchdog. - WatchdogInfo: Displays a text identifying the task at the origin of activation of the watchdog. Parameter INI: WatchdogPeriod (Server section). Watchdog period in milliseconds (10000 default, 2000 minimum value).
	x	Modification of the CheckAlive detection. Addition of a masking delay before taking into account "UGL number changed" data originating from the router. This avoids launching CheckAlive repetition when the bus is loaded and the router returns an account error. Parameter INI: CheckAliveMaskDelay (per island). In milliseconds (default value 15000).
x		The CheckAlive is not launched if data for a change in the number of controllers is received during a disconnection.
	x	Modification of "Connected" status detection. During connection, the State item moves to the 'Connected' state when the queue file for router values is emptied AND the 'NetworkIdle' condition has been detected.
	x	Modification of the subscription sequence of items: Request for asynchronous reading (instead of synchronous) and improved management of internal lock-in during subscription to optimise subscription. Addition of parameters to specify the size of internal queue files: Parameter INI: WriteQueueSize (Server section) default = 16000 Parameter INI: ReadQueueSize (Server section) default = 4000 The write queue file is common to all the ASs in the island, the read queue file concerns only one AS.
	x	Addition of NumASOnBus item (router branch) which indicates the number of ASs



		detected by the router.
	x	Addition of NumTelegramsToRead item (router branch) which indicates the number of telegrams in the router queue file.
	x	Addition of CheckAlive item allowing manually activating a CheckAlive procedure.
	x	Improvement of the trace messages: - IOPCServerDisp::get_Count traces deleted. - IOPCItemMgtDisp.get_Count traces of group deleted. - The name of the island to R291 et ASNOVANET traces added.
	x	Time programmes component: Addition of codes for the day of replacement of real days in the weekly model.
x		Time programmes component: Various corrections for coding data words as a function of the commands.

Version 2.2.0.8 to 2.2.0.9

Correction	Evolution	Description
	x	Modification of operation mode of the masking delay before taking into account 'AS number changed' data originating from the router:- 1) Reading of this counter by the driver in the router is executed in steps of 15 seconds instead of 10 seconds. 2) This reading will be validated by the programme only if, during a period T (defined by parameter CheckAliveMaskDelay), all the acquired values are identical. If a value validated at the end of a period T is different to the validated value of the preceding period, then there will be a reaction from the driver which will launch the procedure for recognition of ASs present. 3) If during the period of validation T, one or several acquired values are not identical, the number of ASs present will not be validated by the programme, which will not activate any reaction at the end of this period. At the end of the period of timer T, a new period of validation commences. 4) If the value defined in timer T (parameter CheckAliveMaskDelay) is set to 0, each value read by the driver in the router will be validated and can therefore possibly activate a reaction from the programme. 5) With this modification, detection of a new state of AS absence or presence will therefore be delayed by the value of timer T.
	x	Modification of the activation time of daily time correction in all the controllers: 12:00 instead of 00:00.
	x	Takes into account the 4 possible destination routels when programming spontaneous feedback and CheckAlive requests. Bits 16 and 17 of word DW34 are positioned as a function of the PC address declared in the ini file for each island

Version 2.2.0.9 to 2.2.0.10

Correction	Evolution	Description
	x	Increased buffer size in the INI file for the lecture of the list of up to 2000 automation stations (each station can have an identification name of up to 32 characters). The buffer can have a total of 66560 characters.

Version 2.2.0.10 to 2.2.0.11

17.2.2006

Correction	Evolution	Description
	x	Change in the consideration of the counter for the available automation stations:



History of changes

		<p>The reads for the available AS counters (Page1/DW57/bits16-31) is considered only if the UKB ("CircleControlBit") cycle-counter (Page1/DW7/bits12-13) has the value 3. After a cold start the checkalive procedure is started only if the router has finished three complete request cycles.</p> <p>The change of the value of the UKB cycle-counter is shown in the progress window over the message 'UKB cycle counter = x'.</p>
	x	<p>Logging of the data traffic and saving into text files.</p> <p>For each connection the data traffic is being saved into time limited files. The maximum amount of data is being able to be parameterised. If the amount is reached the oldest file is deleted before a new one is being created.</p> <p>Parameterisation in the section [Server]</p> <p>NovaNetLogFiles = N,1,1 : On / Off and parameterisation of the recording of the data traffic.</p> <p>NovaNetLogFilesDirectory = (empty) : Saving path for the files.</p> <p>NovaNetLogFilesTest = 0 : On / Off switch in the test mode of the recording of the data traffic (reserved only for test and quality assurance).</p>



A3 Operation sequence

A3.1 Direct Connection: ROUTER mode

A3.1.1 Start of server

With the start of the server the connection request is activated (Connect = -1).
The connection is started automatically.

A3.1.2 Connection establishment

A3.1.2.1 Sequence of the connection in router mode

Step	Description	Router state
1	➔Manual activation of the connection with writing -1 to the item [Router].Connect.	OnLine = 0 OffLine =0 « Disconnected »
2	Opening of communication port	« Connecting... »
3	Reading router information (page 0) and synchronisation of pointer	OnLine = -1 OffLine =0
4	Writing PC address to the router	
5	Launch of 'CheckAlive' process: Sending the command to acquire the automation stations online on the bus.	« On Refresh... »
6	Calculating the refresh time depending on the numbers on the bus connected automation stations and the number of values to be actualised for each automation station ➔ actualisation timer	
7	➔Timeout for the actualisation timer	« Connected »

3.1.2.1.1 On registration of the presence of an automation station

An automation station is being registered to be online if the server is receiving a value from the automation station. In general the first received value is a feedback on the 'checkalive' request.

Step	Description	State of the AS
1	No value received by automation station	OnLine = 0 OffLine =0
2	➔A value received by the automation station	OnLine = -1 OffLine =0
3	Usually program spontaneous messages for this automation station in 'Online' mode; if no values in 'Online' mode, program 'Offline' mode.	
4	Reading of values that are registered items, which are not just notified caused by spontaneous actualisation.	



Operation sequence

3.1.2.1.2 On registration of a non-presence of an automation station

An automation station is being registered to be offline if it has not responded on a 'CheckAlive' request or the writing request was failing.

<i>Step</i>	<i>Description</i>	<i>State of the AS</i>
1	No response on the 'CheckAlive' request or a failed write request	OnLine = 0 OffLine =-1

A3.1.3 Disconnection

<i>Step</i>	<i>Description</i>	<i>Router state</i>
1	➔Manual termination of the connection with writing 0 to the item [Router].Connect.	OnLine = -1 OffLine =0 « Connected »
2	Actualisation of status in all automation stations (OnLine = 0)	« Disconnecting... »
3	Terminates all running requests	
4	Closes the communication port	OnLine = 0 OffLine =0 « Disconnected »

A3.1.4 Connection error

The registration of a connection error is retrying the running transaction up to 10 times or for a maximum time of 30 seconds.

If no response is received the sequence to terminate the connection is executed and after 5 seconds the sequence for a new reconnection will be started. As long the item Connect is -1 the re-connection will be tried continuously.

<i>Step</i>	<i>Description</i>	<i>Router state</i>
1	➔Not recovering connection error	OnLine = 0 OffLine =-1 « Disconnected »

A3.2 Remote operation: ROUTEL mode

A3.2.1 Start of server

With the start of the server the connection is started only if the parameter 'Auto-connectOnStart' is 1.

A3.2.2 Outgoing call to the island manually activated

A3.2.2.1 Sequence of the connection with the routel

Step	Description	Router state
1	➔ Manual activation of the connection with writing -1 to the item [Router].Connect.	OnLine = 0 OffLine = 0 « Disconnected »
2	Looking for a free communication port from the ports defined in the INI file. Opening the communication port and reservation of the modem. If the modem or the line is not available this step is repeated for ever.	« Connecting... »
3	Numbering. If the remote routel is not available (no response or occupied line) the retry of the call will be done as often it is specified with the parameter 'NumRetries' and with a wait delay between 2 retries as defined in the parameter 'RetryDelay'. If the connection cannot be established after those retries the request for the connection is stopped (Connect = 0)	
4	➔ Connected line with the modem of the remote routel	
5	Reading the routel information (page 0 and 1) and synchronisation of the pointer. Deleting the bits 11, 15, 19, 23, 31 of word 7 on page 1 of routel.	OnLine = -1 OffLine = 0
6	Writing the PC address to the routel	
7	Starting the 'CheckAlive' process: Sending the command to acquire the present automation stations on the bus.	« On Refresh... »
8	Calculating the refresh time depending on the numbers on the bus connected automation stations and the number of values to be actualised for each automation station ➔ actualisation timer	
9	➔ Timeout for the actualisation timer	« Connected »

A3.2.2.1.1 On registration of the presence of an automation station

An automation station is being registered to be online if the server is receiving a value from the automation station. In general the first received value is a feedback on the 'checkalive' request.

Step	Description	State of the AS
1	No value received by automation station	OnLine = 0 OffLine = 0
2	➔ A value received by the automation station	OnLine = -1 OffLine = 0
3	Usually program spontaneous messages for this automation station in 'Online' mode; if no values in 'Online' mode, program 'Offline' mode.	
4	Reading of values that are registered items, which are not just notified caused by spontaneous actualisation.	



Operation sequence

A3.2.2.1.2 On registration of a non-presence of an automation station

An automation station is being registered to be offline if it has not responded on a 'CheckAlive' request or the writing request was failing.

Step	Description	State of the AS
1	No response on the 'CheckAlive' request or a failed write request	OnLine = 0 OffLine =-1

A3.2.2.2 Disconnection

Step	Description	Router state
1	→Manual termination of the connection with writing 0 to the item [Router].Connect or timeout by the parameter 'ManualInactivityTime' defined connection timer, if the net transmits no values.	OnLine = -1 OffLine =0 « Connected »
2	Programming of the spontaneous message for all online automation stations which are configured in 'Offline' mode if they were programmed to 'online' at connection.	«Disconnecting ... parameter setting...»
3	Actualisation of status in all automation stations (OnLine = 0)	
4	Terminates all running requests	
5	Writing of routel pointer (Note. This writing process occurs during the whole connection time periodically)	
6	Hang up of line and closing the communication port. If the line in automatic response mode (parameter in ini file) this port will be open suddenly to reserve the modem.	OnLine = 0 OffLine =0 « Disconnected »

A3.2.2.3 Connection error

The registration of a connection error is retrying the running transaction up to 10 times or for a maximum time of 30 seconds.

If no response is received the line will be dropped and all waiting requests are cancelled. The connection command is cancelled to avoid a call collision if the routel would call again.

Step	Description	Router state
1	→Not recovering connection error	OnLine = 0 OffLine =-1 « Disconnected »



A3.2.3 Outgoing call to the island automatically activated

A3.2.3.1 Sequence of the connection with the routel

Step	Description	Router state
1	➔ Automatic activation of the connection with writing or reading of an item related to an address in the automation station	OnLine = 0 OffLine = 0 « Disconnected »
2	Looking for a free communication port from the ports defined in the INI file. Opening the communication port and reservation of the modem. If the modem or the line is not available this step is repeated for ever.	« Connecting... »
3	Numbering. If the remote routel is not available (no response or occupied line) the retry of the call will be done as often it is specified with the parameter 'NumRetries' and with a wait delay between 2 retries as defined in the parameter 'RetryDelay'. If the connection cannot be established after those retries the request for the connection is stopped	
4	➔ Connected line with the modem of the remote routel	
5	Reading the routel information (page 0 and 1) and synchronisation of the pointer. Deleting the bits 11, 15, 19, 23, 31 of word 7 on page 1 of routel.	OnLine = -1 OffLine = 0
6	Writing the PC address to the routel	« On Refresh... »
7	Setting the actualisation timer to 1 second.	
8	➔ Timeout for the actualisation timer	« Connected »

A3.2.3.1.1 On registration of the presence of an automation station

An automation station is being registered to be online if the server is receiving a value from the automation station. In general the first received value is a feedback on the 'checkalive' request.

Step	Description	State of the AS
1	No value received by automation station	OnLine = 0 OffLine = 0
2	➔ A value received by the automation station	OnLine = -1 OffLine = 0

A3.2.3.1.2 On registration of a non-presence of an automation station

An automation station is being registered to be offline if it has not responded on a 'CheckAlive' request or the writing request was failing.

Step	Description	State of the AS
1	A failed write request	OnLine = 0 OffLine = -1



A3.2.3.2 Disconnection

Step	Description	Router state
1	→ Timeout of connection timer defined by the parameter 'InactivityTime', if the net does not transmit values.	OnLine = -1 OffLine = 0 « Connected »
2	Actualisation of status in all automation stations (OnLine = 0)	
3	Terminates all running requests	
4	Writing of routel pointer (Note. This writing process occurs during the whole connection time periodically)	
5	Hang up of line and closing the communication port. If the line is in automatic response mode (parameter in ini file) this port will be open suddenly to reserve the modem.	OnLine = 0 OffLine = 0 « Disconnected »

A3.2.3.3 Connection error

The registration of a connection error is retrying the running transaction up to 10 times or for a maximum time of 30 seconds.

If no response is received the line will be dropped and all waiting requests are cancelled. The connection command is cancelled to avoid a call collision if the routel would call again.

Step	Description	Router state
1	→ Not recovering connection error	OnLine = 0 OffLine = -1 « Disconnected »

A3.2.4 Incoming call from the island

A3.2.4.1 Sequence of the connection with the routel

Step	Description	Router state
1	→ Registration of a incoming call on a monitored line.	OnLine = 0 OffLine = 0 « Disconnected »
2	→ Connected line with the modem of the remote routel	
3	Reading the routel information (page 0 and 1) and synchronisation of the pointer. Deleting the bits 11, 15, 19, 23, 31 of word 7 on page 1 of routel.	OnLine = -1 OffLine = 0
4	Writing the PC address to the routel	
5	Starting the 'CheckAlive' process: Sending the command to acquire the present automation stations on the bus.	« On Refresh... »
6	Setting the actualisation timer to 1 second.	
7	→ Timeout for the actualisation timer	« Connected »

A3.2.4.1.1 On registration of the presence of an automation station

An automation station is being registered to be online if the server is receiving a value from the automation station. In general the first received value is a feedback on the 'checkalive' request.

Step	Description	State of the AS
1	No value received by automation station	OnLine = 0 OffLine = 0
2	→ A value received by the automation station	OnLine = -1 OffLine = 0
3	Programming of the spontaneous messages of the automation station in offline mode for each data point that is programmed in online mode. The goal is to delete all online programming those would exist further after an unexpected disconnection.	

A3.2.4.1.2 On registration of a non-presence of an automation station

An automation station is being registered to be offline if it has not responded on a 'CheckAlive' request or the writing request was failing.

Step	Description	State of the AS
1	No response on the 'CheckAlive' request or a failed write request	OnLine = 0 OffLine = -1

A3.2.4.2 Disconnection

Step	Description	Router state
1	→ Timeout of connection timer defined by the parameter 'InactivityTime', if the net does not transmit values.	OnLine = -1 OffLine = 0 « Connected »
2	Actualisation of status in all automation stations (OnLine = 0)	
3	Terminates all running requests	
4	Writing of routel pointer (Note. This writing process occurs during the whole connection time periodically)	
5	Hang up of line and closing the communication port. If the line is in automatic response mode (parameter in ini file) this port will be open suddenly to reserve the modem.	OnLine = 0 OffLine = 0 « Disconnected »

A3.2.4.3 Connection error

The registration of a connection error is retrying the running transaction up to 10 times or for a maximum time of 30 seconds.

If no response is received the line will be dropped and all waiting requests are cancelled. The connection command is cancelled to avoid a call collision if the routel would call again.

Step	Description	Router state
1	→ Not recovering connection error	OnLine = 0 OffLine = -1 « Disconnected »



A4 Registry of the OPC server

REGEDIT4

[HKEY_CLASSES_ROOT]

[HKEY_CLASSES_ROOT\CLSID]

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}]

@="SAUTER ASNovaNetRemote OPC Server V1.0"

"AppID"="{70DE4D81-DE9C-49b2-990C-D2BD9144F881}"

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\LocalServer32]

@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\OPCASNovaNetRemoteTrace.exe"

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\ProgID]

@="SAUTER.ASNovaNetRemote.1"

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\VersionIndependentProgID]

@="SAUTER.ASNovaNetRemote"

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\Implemented Categories]

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\Implemented Categories\{63D5F430-CFE4-11D1-B2C8-0060083BA1FB}]

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\Implemented Categories\{63D5F430-CFE4-11D1-B2C8-0060083BA1FB}]

[HKEY_CLASSES_ROOT\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\Programmable]

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote]

@="Sauter novaNet OPC Server EY3600 Release 2.2.0.9"

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote\CurVer]

@="SAUTER.ASNovaNetRemote.1"

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote.1]

@="Sauter novaNet OPC Server EY3600 Release 2.2.0.9"

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote.1\CLSID]

@="{70DE4D81-DE9C-49b2-990C-D2BD9144F881}"

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote.1\OPC]

[HKEY_CLASSES_ROOT\SAUTER.ASNovaNetRemote.1\OPC\Vendor]

@="Sauter"

[HKEY_CLASSES_ROOT\TypeLib]

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}]

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0]

@="OCSTK 1.0 Type Library"

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\0]

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\0\win32]

@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\OPCASNovaNetRemoteTrace.exe"

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\FLAGS]

@="0"

[HKEY_CLASSES_ROOT\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\HELPDIR]

@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\"



```
[HKEY_CLASSES_ROOT\AppID]

[HKEY_CLASSES_ROOT\AppID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}]
@="SAUTER ASNovaNetRemote OPC Server V1.0"
"RunAs"="Interactive User"
"AuthenticationLevel"="1"

[HKEY_CURRENT_USER]

[HKEY_LOCAL_MACHINE]

[HKEY_LOCAL_MACHINE\SOFTWARE]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\AppID]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\AppID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}]
@="SAUTER ASNovaNetRemote OPC Server V1.0"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}]
@="SAUTER ASNovaNetRemote OPC Server V1.0"
"AppID"="{70DE4D81-DE9C-49b2-990C-D2BD9144F881}"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\LocalServer32]
@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\OPCASNovaNetRemoteTrace.exe"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\ProgID]
@="SAUTER.ASNovaNetRemote.1"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\VersionIndependentProgID]
@="SAUTER.ASNovaNetRemote"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\ImplementedCategories]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\ImplementedCategories\{63D5F430-CFE4-11D1-B2C8-0060083BA1FB}]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\ImplementedCategories\{63D5F432-CFE4-11D1-B2C8-0060083BA1FB}]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID\{70DE4D81-DE9C-49b2-990C-D2BD9144F881}\Programmable]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote]
@="Sauter novaNet OPC Server EY3600 Release 2.2.0.9"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote\CurVer]
@="SAUTER.ASNovaNetRemote.1"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote.1]
@="Sauter novaNet OPC Server EY3600 Release 2.2.0.9"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote.1\CLSID]
@="{70DE4D81-DE9C-49b2-990C-D2BD9144F881}"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote.1\OPC]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\SAUTER.ASNovaNetRemote.1\OPC\Vendor]
@="Sauter"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}]

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0]
@="OCSTK 1.0 Type Library"
```



```
[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0.0]
[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0.0\win32]
@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\OPCASNovaNetRemoteTrace.exe"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\FLAGS]
@="0"

[HKEY_LOCAL_MACHINE\SOFTWARE\Classes\TypeLib\{5F66E430-FC32-11D0-A25F-0000E81E9085}\1.0\HELPDIR]
@="C:\Program Files\Sauter\EY3600\novaNet OPC Server\"

[HKEY_USERS]

[HKEY_USER_SELECTABLE]
```



novaNet OPC Server
Registry of the OPC server

EY₃₆₀₀

A5 Support of Windows XP SP 2

A5.1 Activating the Windows Firewall

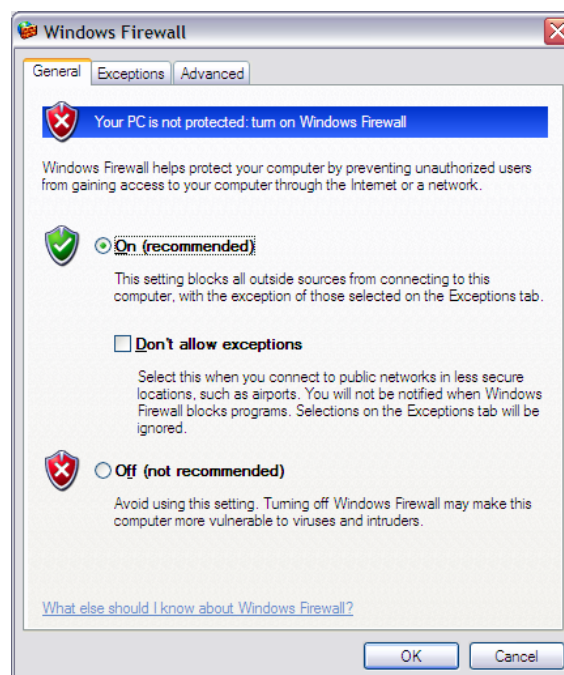
Windows XP is supporting a software firewall with service pack 2 that allows to filter certain information in a network connection. Here the example of a configuration that allows you to use this firewall together with your hardware configuration available OPC servers.

In case of a local application where the communication between a client and an OPC server is not through an Ethernet network it is required to accomplish the following configuration (follow chapter 1.2 DCOM Configuration).

The service pack 2 from Microsoft includes several changes for the management of the OPC layer through COM and DCOM, for the security area and for the attributes of the user access rights.

Note: The text in bold indicates the name of the elements where a mouse click is sufficient.

First you have to be sure that the firewall on the machine is active. For that you go to the **Control Panel** settings and double click on **Windows Firewall**. It will show the following window.



If the check box **On (recommended)** is selected the firewall is active. For a proper functioning with the OPC client/server layer it is required to define the programs that will be included in the exceptions.

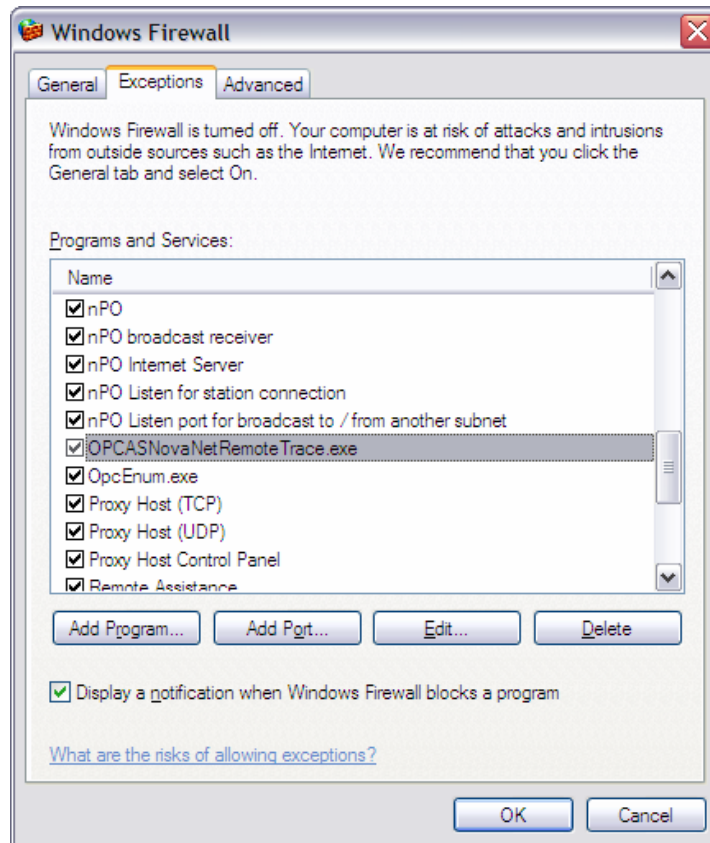
A5.1.1 Adding exceptions

Choose the register **Exceptions** and click on **Add Program...** and browse for the file OPCEnum.exe that will be found in C:\Windows\System32. Add it to the list of programs.

In addition it is required for the novaNet OPC server EY3600 to set in this list if any OPC client on another machine in the network should have access (Change scope...).

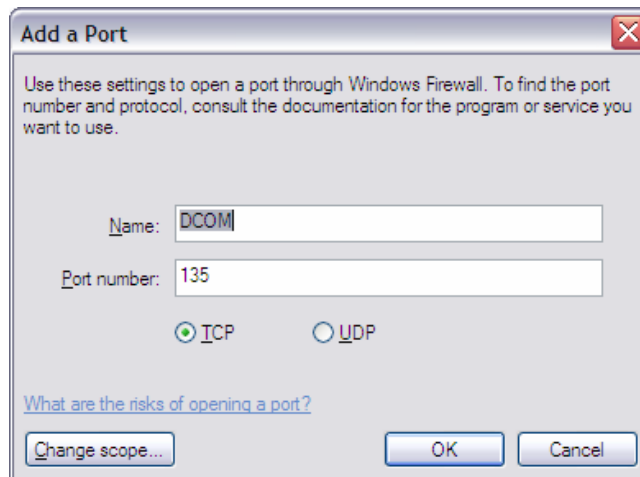
The file is called OPCASNovaNetRemoteTrace.exe and is located under C:\Program Files\Sauter\EY3600\novaNet OPC Server.

The following figure is illustrating these steps.



A5.1.2 Access rights for the network ports

Still in the register **Exceptions** click on **Add Port...** and enter following values:



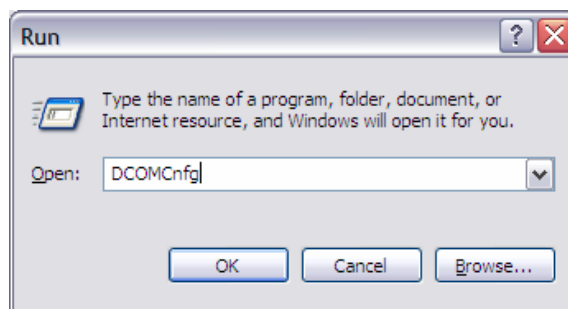
With this you have the possibility to authorise the usage of the port 135 through the firewall to allow the attempts for a communication connection from the OPC client programs that would like to connect to an installed OPC server on the machine.

A5.2 DCOM configuration

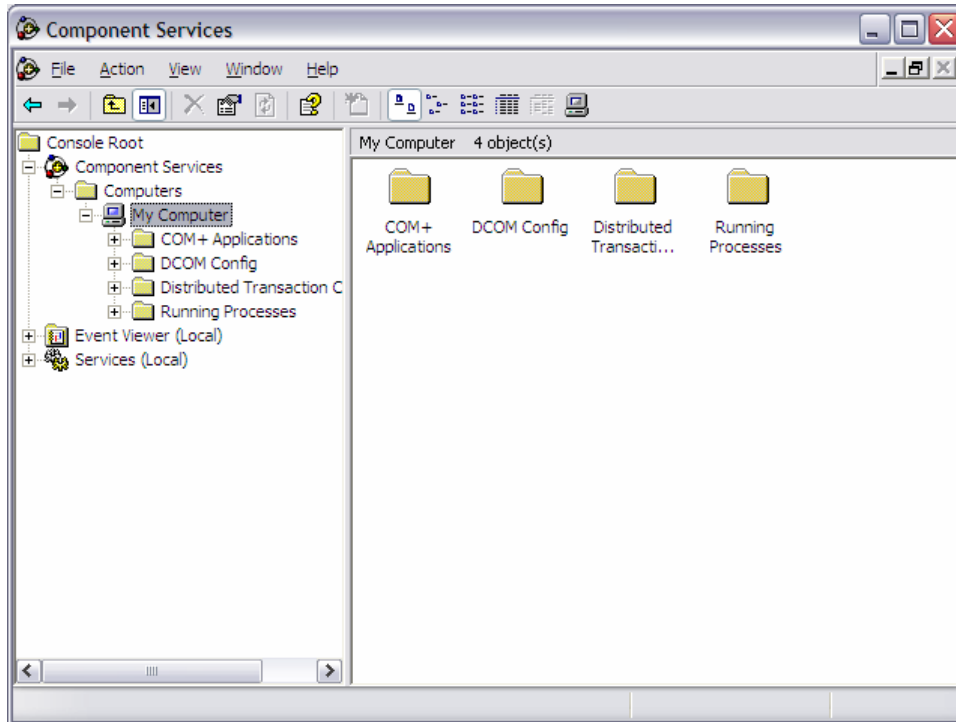
A5.2.1 Launch of DCOMCnfg.exe

Now it is only required to configure the extensive DCOM services from Windows to define the user access rights that would allow the access to the OPC server.

For this close the **Windows Firewall** and click in the toolbar on the **start** button and then on **Run...** Enter the name of the program DCOMCnfg as shown in the following figure.

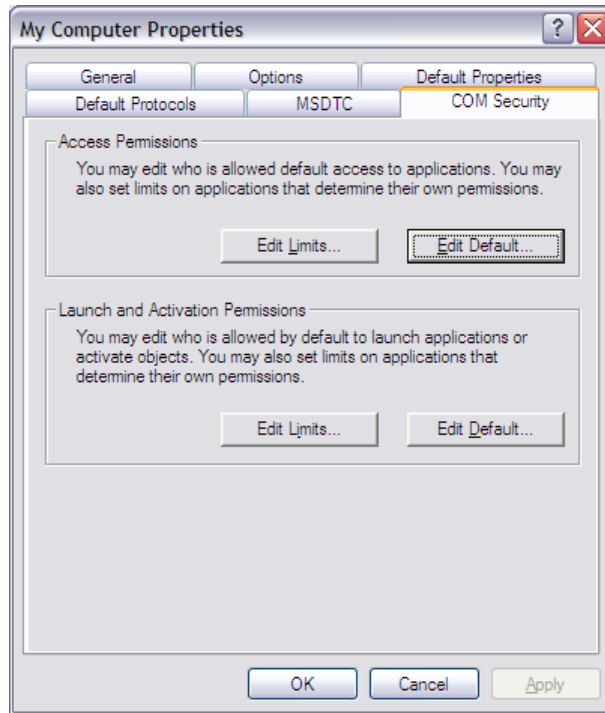


As the program is shown click on the **Component Services** and choose **Computer**. Than you click with a right mouse click on **My Computer** to choose the **Properties** of the DCOM services. The following window shows these steps.

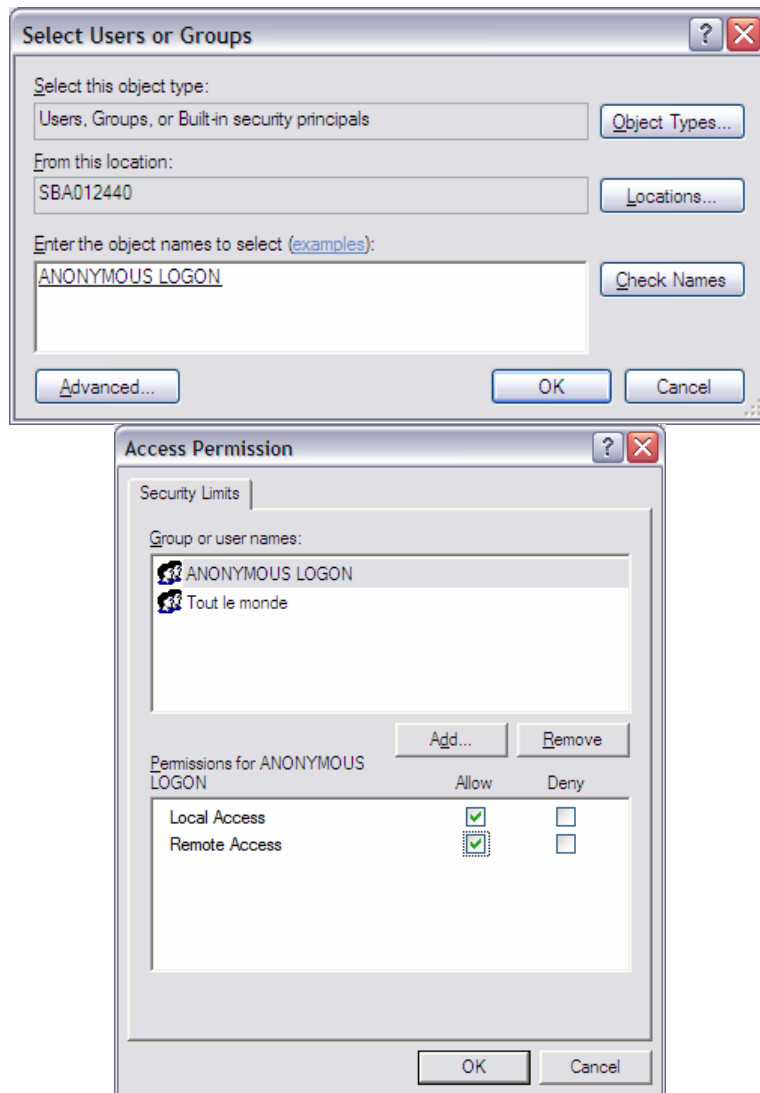


A5.2.2 Adding anonymous user accounts

Click on the register **COM Security**:



Click on the button **Edit Limits...** in the area "Access Permissions", click on **Add...** and enter the name ANONYMOUS LOGON. Then click on **Check Names**. The account ANONYMOUS LOGON is added to the list. Select the box Remote Access in the Allow column as shown in the following figure.



As well for the user group "Everyone" (in figures: "Tout le monde") the **Remote Access** has to be marked.

Note: It is possible to create a user group with the name "OPC Users" to restrict the amount of authorised users which would have access to the OPC server.

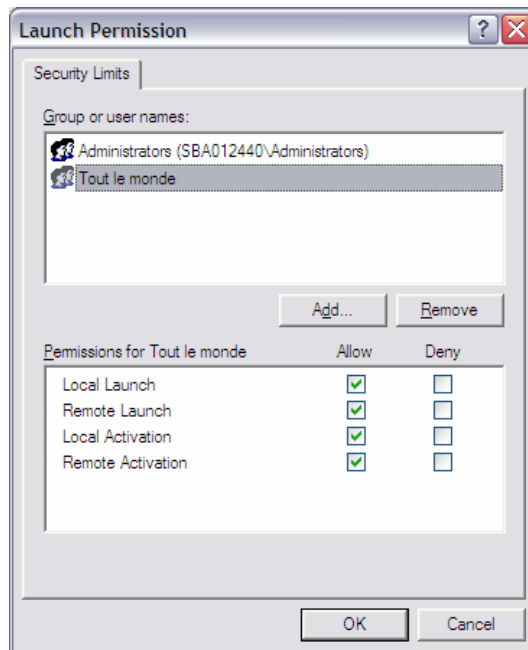
This configuration is required for the OPCEnum service of the OPC layer because with the usage of an anonymous account it allows to get a list of available OPC servers on a target machine for an OPC client from a remote machine.

If you connect without the usage of the OPCEnum service to an OPC server this configuration is not required because the list of available OPC server is recognisable through the registry of the computer as well.

However now all OPC servers with specification Data Access 2.0 use this call method. Therefore it is recommended to configure the system as described to be compatible with this most common calling mechanism for now.

A5.2.3 Launch permission

Click in the window "My Computer Properties" under the rubric "Launch and Activation Permissions" on **Edit Limits...** and select for the group "Everyone" the check box Allow for **Remote Launch** and **Remote Activation** as shown below.



After those last changes you are ready for the operation with Window XP Service Pack 2.



novaNet OPC Server
Support of Windows XP SP 2

EY₃₆₀₀

A6 Recording of PC-291 telegrams

This setting - to listen and record the communication - is included since version 2.2.0.11 and helps to solve problems in the communication between the novaNet OPC Server and the novaNet Router.

The data traffic between the novaNet OPC Server and the novaNet Router (EYZ291) can be saved in several text files.

The recording can be switch on or off through a Server parameter in the OPCASNovaNet.ini file. The recording is organised cyclically in several files. The data traffic is not being affected.

Under normal conditions the recording has to be turned off.

A6.1 Description of the recording function

The files are saved as text files (.txt) and are named as following: opc36xx_Date_Time.txt, where xx describes the COM port and Date_Time is the timestamp when the recording is started.

Each recorded information has its own timestamp. The information is differentiated between inputs and outputs; **RX** for incoming data and **TX** for outgoing data.

The whole control of the recording is done with the definition file **OPCASNovaNet.ini**. In the section **[Server]** there is a key called **NovaNetLogFile** it includes the required parameters:

- Recording active (**Y**) or not active (**N**)
- Amount of files
- Time duration, in minutes, of the recording for each file

This parameter is for each COM connection (each novaNet network) valid.

The recording is running cyclically as long it is active. As soon the amount of files is reached the oldest will be overwritten.

The entry NovaNetLogFiles is only read during the start of the OPC Server. A change during the operation is not being considered

A6.2 Example of a record

With this example the recording can be turned on.

```
[Server]
...
NovaNetLogFiles = Y,24,60
...
```

means the recording creates 24 files, each organised for an hour of data.



Recording of PC-291 telegrams

Fragment of an example of a recording file:

```
...
21/03/06 15:05:52.688 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.688 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.718 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.718 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.748 TX : 55 55 55 55 F0 00 33 00 01 FF 00 00 00 02 00 00
    00 00 03 03 00 FF 00 04 00 00 00 00 05 00 00 00
    00 06 00 00 00 00 07 00 00 09 00 08 00 00 00 00
    09 00 00 00 00 0A 00 00 00 00 0B 00 00 00 00 0C
    00 00 00 00 0D 00 00 00 00 0E 00 00 00 00 0F 00
    00 00 00 10 00 00 00 00 11 00 00 00 7C 12 00 00
    00 43 13 88 20 B4 DF 94 34 D5
21/03/06 15:05:52.748 RX : 00 F0 00 33 00 01 62 04 33 10 C2
21/03/06 15:05:52.748 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.758 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.758 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.768 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.798 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.798 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.828 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.828 RX : 00 F4 00 40 00 01 62 04 33 10 C2
21/03/06 15:05:52.859 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.859 RX : 00 F4 00 40 00 01 63 04 34 10 C2
21/03/06 15:05:52.859 TX : 55 55 55 55 F7 00 62 04 C1
21/03/06 15:05:52.879 RX : 00 F7 00 62 04 01 63 04 34 10 02 09 00 62 04 03
    86 00 14 00 04 20 33 10 00 05 F0 40 19 00 06 88
    20 B4 DF 07 47 22 07 03 08 00 00 00 7C 09 01 90
    00 00 CA
21/03/06 15:05:52.939 TX : 55 55 55 55 F4 00 40 00 01 00 C2
21/03/06 15:05:52.939 RX : 00 F4 00 40 00 01 63 04 34 10 C2
...
```

These files can be taken in account if there are some problems.



A7 Bibliography

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