CAEN
Tools for Discovery

Electronic Instrumentation

CAEN OPC Server 5.x

OPC Server for CAEN Power Supplies

Rev. 15 - 1 July 2014

Purpose of this User Manual

This User's Manual contains the full description of the **OPC Server for CAEN Power Supplies**.

Change Document Record

Date	Revision	Changes
20 December 2013	14	OPC Rel. 5.x
1 July 2014	15	Updated SY4527 / SY5527 System control

Symbols, abbreviated terms and notation

T.B.D.

Reference Document

SY1527 User's Manual
SY4527 User's Manual
V6533 User's Manual
VME8100 and VME8200 User's Manual

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1. Introduction

Overview

CAEN has taken a new step forward in power supplies' ease of use and integration into Detector Control Systems (DCS). A newly released suite of applications guarantees CAEN power supplies' interoperability between virtually all available computing environments and communication protocols (TCP/IP, CANbus...).

In the latest years OPC (OLE for Process Control) has clearly emerged as one of the most popular standards in the world of industry automation. OPC is an open interface based on the OLE/COM (now ActiveX) and DCOM technology; OPC offers "Plug&Play" connectivity between disparate hardware devices. The introduction of the OPC interface has caused the number of driver developments which hardware manufacturers implement for their components to be reduced to only one: *the OPC server*. On the other hand, OPC client applications (from any vendor) can communicate with the OPC server to exchange data in a standard way. Each device property is accessed via an *OPC item*. An OPC server creates OPC items on behalf of an OPC client. The client's OPC items are organised in *OPC groups* with a hierarchical structure.

CAEN, in close collaboration with CERN (IT/CO group), has developed an OPC server which allows powerful, flexible, and yet simple control of its power supply systems, through various communication path, by any OPC compliant client application.

CAEN HV OPC Server is fully compliant with the OPC Data Access 2.0 specifications; this version provides:

- CAEN Power Supply Systems, V65XX power supplies, VME8x00 crates
- CONET, USB2.0, TCP/IP caenecommunication path
- DCOM based interface for local/remote OPC server configuration

Support

Our Software Support Group is available for questions, support and any other software related issue concerning CAEN Power Supplies; for software support visit the page **http://www.caen.it/computing/support.php**

Moreover, a newsletter on CAEN Software issues (CAEN SOFTWARE NEWS) will be periodically sent via e-mail to all subscribers to our mailing list. For subscription to the free newsletter send an e-mail to **support.computing@caen.it**

2. Installation and configuration

Install the OPC server

Unzip the CAENHVOPCServer_5.x.zip file and then launch setup.exe; this will install all the OPC server (version 5.x) components on your local machine. The OPC server will be configured as a Windows OS service.

OPC server configuration interface

The software release 5.X has a new user interface, based on DCOM technology, which allows remote configuration of the OPC server. A sample configuration program is provided (OPC Server Configurator)

CAEN OPC server configurator tool

Installation

Unzip the CAENHVOPCServerConfiguratorSetup zip file and then launch setup.exe; this will install the CAEN HV OPC Server Configurator components on your local machine.

OPC Server configuration

From Start/Programs/CAEN run CAEN HV OPC Server Configurator, the following window will be displayed:

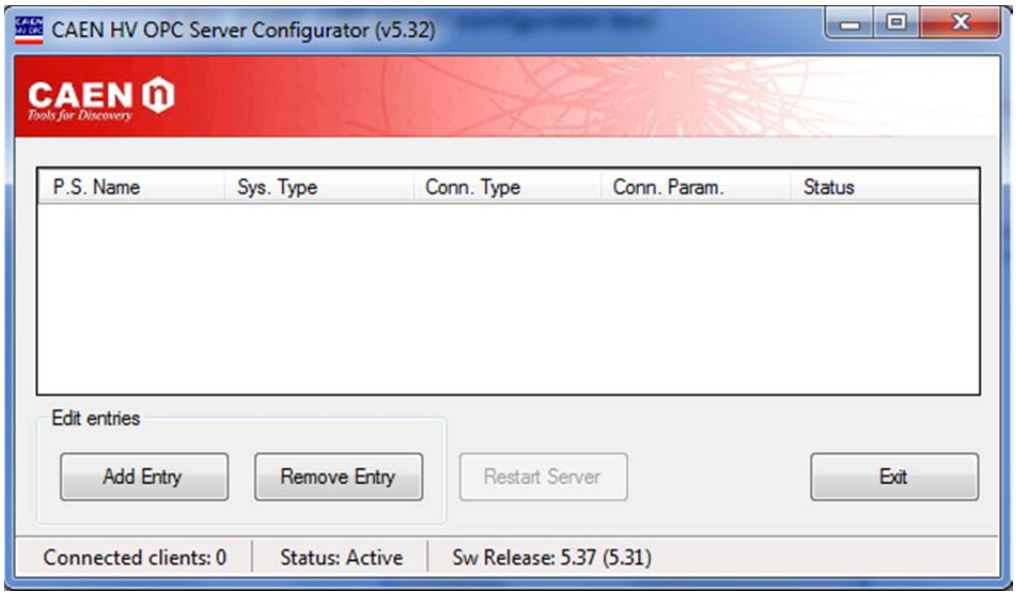
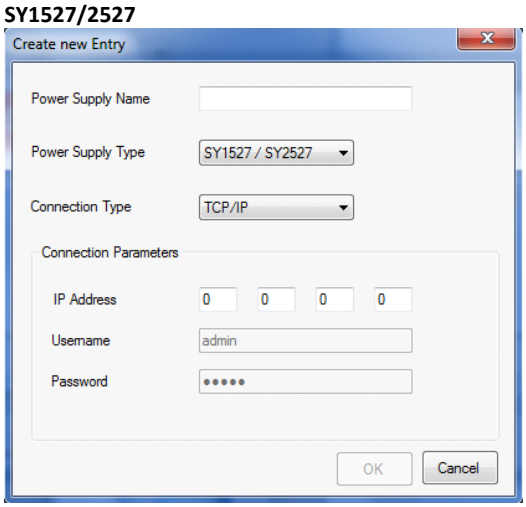


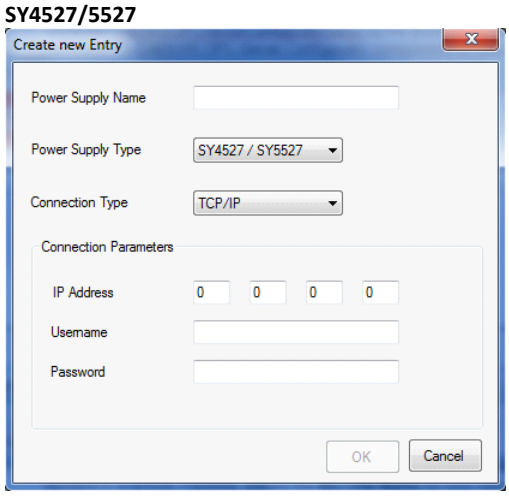
Fig. 1: CAEN HV OPC Server Configurator start up window

Click on the **Add Entry** button, one of the following windows will be displayed, depending on the selected device:

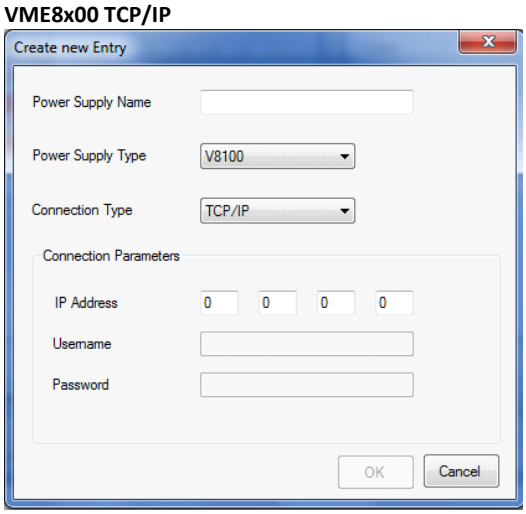
SY1527/2527



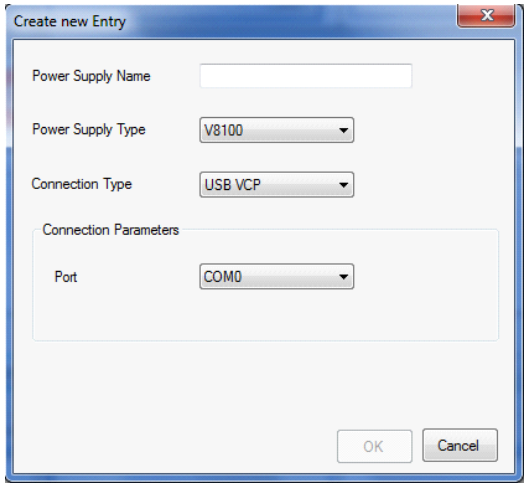
SY4527/5527



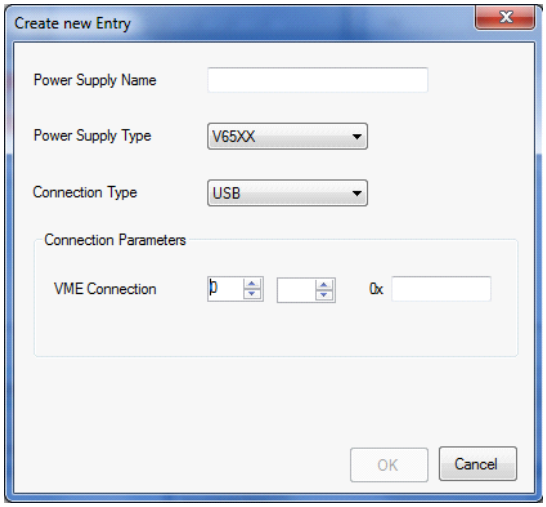
VME8x00 TCP/IP



VME8x00 USB VCP



V65xx USB



V65xx PCI OPTICAL LINK

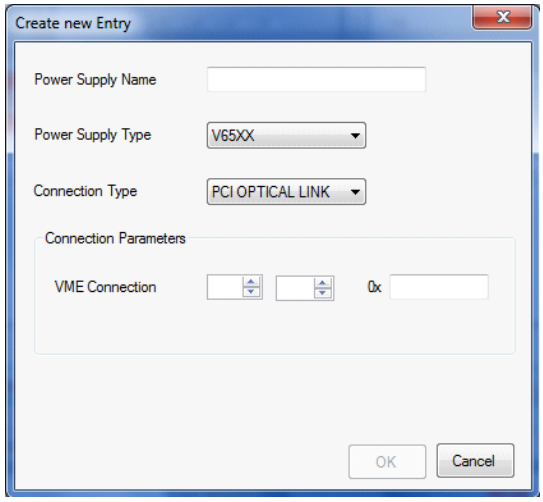


Fig. 2: Connection parameters

Once entered the *Power Supply Name* in the relevant field, the *Connection Type* must be selected; then enter the correct connection parameters and click on the OK button, the following window will be displayed.

Possible values for Status are: Ko, Ok or Pending. The Status is Pending immediately after adding a new Entry, until the OPC Server has connected to the Power Supply, then it becomes either Ok or Ko, depending whether the connection is successful or faulty.

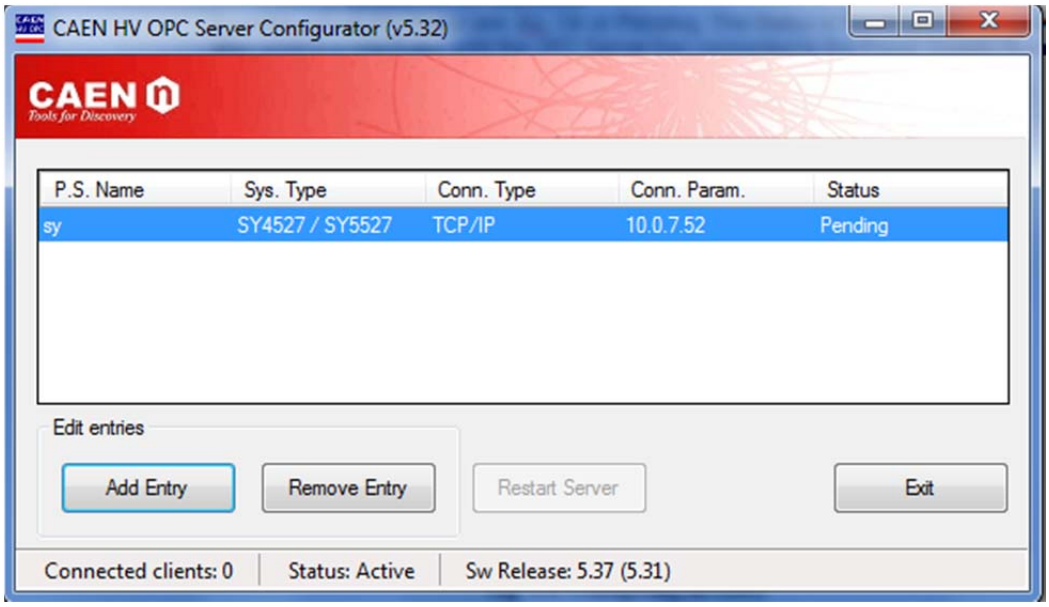


Fig. 3: Configuring an Entry

Select a P.S. name and click on the **Configure Entry** button to open the relevant Configuration File; insert all desired system, board and channel items (cfr. § 3 "Server address space description") and then, from the **File** menu, select **Send to Server** (optionally it is possible to save a local copy of the Configuration file).
To configure another power supply system, simply click on the **Add Entry** button and repeat the steps described above.

3. Server address space description

OPC groups and items

The OPC groups provide a way for clients to organise the data they want to access to; within each group, the OPC items represent connections to data sources; several data types are supported: boolean, integer, string, …. The server address space has a tree-like structure which will be described in detail in the next chapter; OPC clients can browse the available data items in the server like illustrated in the figure below.

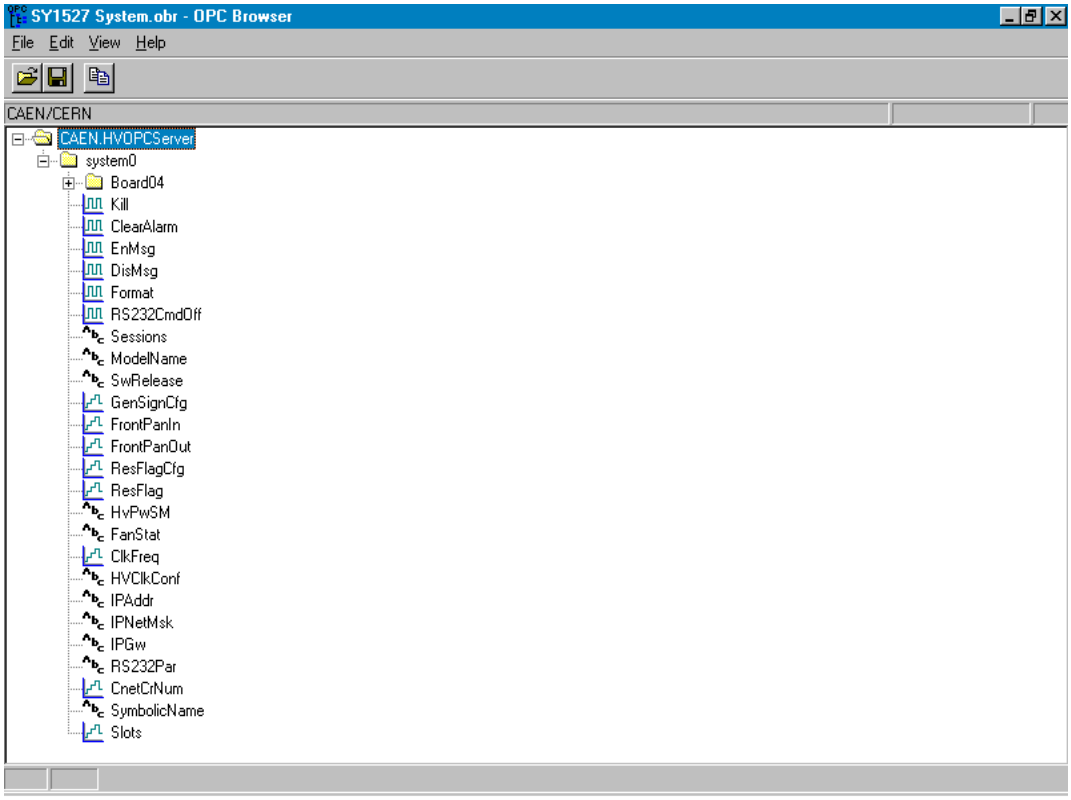


Fig. 4: Browsing the server address space

Data access mechanism

Four communication mechanisms have been defined for data access: synchronous and asynchronous read/write, refresh and subscription; the client defines the update rate at which the items' values will be refreshed by the server. When a client subscribes to a list of Items, the server notifies it if any data change occurs. The client can optionally specify a band of tolerance (or deadband) so that it is not notified by the server if the changes are within a fixed percentage of the data range.

Items properties

Associated with each Item there is a set of Specific properties: Canonical Data Type, Value, Quality Flag (Good/Bad), Time Stamp, Access Rights, Server Scan Rate. The Time Stamp indicates the time the Value and the Quality was obtained from the device. With OPC Data Access 2.0 a second set of Recommended properties has been released: the CAEN OPC Server provides Engineering Units (EU), High EU (the highest value that can be returned from the

device for analog data), Low EU (the lowest value that can be returned from the device for analog data) and the Contact Close/Open Labels (CLOSE/OPEN strings associated with boolean values).

Each item is fully identified in the server address space during data access by an ItemID; the ItemID has the following general syntax:

PowerSupplyName.BoardXX.ChanYYY.ItemName

Items of the kind *PowerSupplyName.ItemName* are associated with general system parameters.

Items of the kind *PowerSupplyName.BoardXX.ItemName* are associated with boards' parameters.

Items of the kind *PowerSupplyName.BoardXX.ChanYYY.ItemName* are associated with channels' parameters.

4. SY4527 / SY5527 Power Supply System

This chapter describes the OPC Items which are available for the SY 4527 / SY 5527 system control.

SY4527 / SY5527 System control

OPC Items available for general system control are fully listed in Table 1. For a detailed description of the SY4527 / SY5527 system operation, refer to SYx527 User's manual

A write access to the **Kill** Item (Value = 1) allows to switch OFF at the max rate all system channels;

A write access to the **Clear Alarm** Item (Value = 1) allows to clear channels' alarm messages;

A read access to the **Sessions** Item returns a string with the list of Users connected to the system, their access level, communication line and access time;

A read access to the **ModelName** Item returns a string indicating the system model (SY4527, SY5527, …).

A read access to the **SwRelease** Item returns a string indicating the system firmware release (example: 2.00.00).

The **GenSignCfg** Item allows to configure the GEN signal by writing an 16 bit pattern as follows:

Bit 0: GEN enable
Bit 1: GEN always ON
Bit 2: GEN ON due to OvV (Over Voltage)
Bit 3: GEN ON due to OvC (Over Current)
Bit 4: GEN ON due to UnV (Under Voltage)
Bit 5: GEN ON due to TRIP
Bit 6÷7: Don't care (=0)
Bit 8: GEN enable MASK
Bit 9: GEN always ON MASK
Bit 10: GEN ON due to OvV (Over Voltage) MASK
Bit 11: GEN ON due to OvC (Over Current) MASK
Bit 12: GEN ON due to UnV (Under Voltage) MASK
Bit 13: GEN ON due to TRIP MASK
Bit 14÷15: Don't care (=0)

This Item is a 2-byte integer; in order to set or reset bits 0..5, it is necessary to set to 1 the corresponding "MASK" bit (bits 8..13).

A read access to the **FrontPanIn** Item returns a 16 bit patterns indicating the system inputs and switches status, as follows:

Bit 0: Vsel, 0=V0 1=V1
Bit 1: Isel, 0=I0 1=I1
Bit 2: Kill
Bit 3: Interlock
Bit 4: Remote Enable
Bit 5: Local Enable
Bit 6: TTL/NIM, 0=TTL 1=NIM
Bit 7÷15: Don't care (=0)

A read access to the **FrontPanOut** Item returns a 16 bit patterns indicating the system outputs status, as follows:

Bit 0: OVC
Bit 1: UNV
Bit 2: OVV
Bit 3: CHON

Bit 4÷7: Don't care (=0)
Bit 8: Fan failure
Bit 9: OVT
Bit 10÷15: Don't care (=0)

The **ResFlagCfg** Item allows to configure the system reset by writing an 16 bit pattern as follows:

Bit 0: backplane reset due to CPU failure
Bit 1: always set to 1
Bit 2: backplane reset due to front panel reset input signal
Bit 3: CPU reset due to front panel reset input signal
Bit 4÷5: always set to 1
Bit 6÷15: always set to 0

A read access to the **ResFlag** Item returns a 16 bit pattern with the reset flag status:

Bit 0: backplane reset due to CPU failure
Bit 1: always set to 1
Bit 2: backplane reset due to front panel reset input signal
Bit 3: CPU reset due to front panel reset input signal
Bit 4÷5: always set to 1
Bit 6÷15: always set to 0

A read access to the **HvPwSM** Item returns a string with the power supply module status, like follows: "ACstatus:Primary:Add 0:Add 1:Add 2 ". If:

ACstatus = -1 ⇒ FAIL
ACstatus = 1 ⇒ GOOD
Primary = -1 ⇒ Primary supply module FAIL
Primary = 1 ⇒ Primary supply module GOOD
Add X = -1 ⇒ Add on supply module nr. X FAIL
Add X = 0 ⇒ Add on supply module nr. X NOT PRESENT
Add X = 1 ⇒ Add on supply module nr. X GOOD

A read access to the **HVFanStat** Item returns a string with the cooling fans status. If:

status = -1 ⇒ FAIL
status = 1 ⇒ GOOD

A read access to the **HVFanSpeed** Item returns a string with the cooling fans speed, The speed parameter is expressed in rpm.

A read access to the **ClkFreq** Item returns an integer idicating the clock frequency as follows:

ClkFreq = -1 ⇒ FAIL
ClkFreq = 0 ⇒ 50 Hz
ClkFreq = 1 ⇒ 60 Hz
ClkFreq = 2 ⇒ 400 Hz

A read access to the **HVClkConf** Item returns a string with the clock configuration like "clock:status", where if:

Clock = 1 ⇒ MASTER
Clock = 0 ⇒ SLAVE
Status = -1 ⇒ FAIL
Status = 0 ⇒ NOT PRESENT
Status = +1 ⇒ GOOD

The **IPaddress** item allows to specify the system IP address (for example 192.168. 0.1);

The **IPNetMsk** item allows to specify the system IP net mask (for example 255.255.255.0);

The **IPGw** item allows to specify the system IP gateway (for example 0.0.0.0);

A read access to the **Slots** Item returns the number of system's slots.

A read access to the **ConnStatus** Item returns a string with the connection status of the system. If:

status = OK ⇒ CONNECTED
status = KO ⇒ DISCONNECTED

The **CPULoad** item allows to monitor the load on the system CPU
This item has the following format: value1:value5:value15
Value1, value5 and value15 are the average CPU loads, calculated respectively over one, five and fifteen minutes.

The **CmdQueueStatus** item allows to monitor the number of commands in queue in the system; if CmdQueueStatus >0 then the System is performing commands on the boards, therefore monitor values may not be updated until all queued commands are executed. As soon as all commands are performed and CmdQueueStatus returns to 0, monitor values are updated to correct values.

The **MemoryStatus** item allows to monitor the system memory usage
This item has the following format: value0:value1:value2:value3
Value0 is the total memory, value1 is the used memory, value2 is the free memory, value3 is the buffers memory

Table 1 – SY4527/ SY5527 System Items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.Kill	Boolean	W	Kill all channels
PowerSupplyName.ClearAlarm	Boolean	W	Clear alarm
PowerSupplyName.Sessions	String	R	List Users connected to system
PowerSupplyName.ModelName	String	R	System name
PowerSupplyName.SwRelease	String	R	System firmware release
PowerSupplyName.GenSignCfg	2-byte integer	R/W	GEN signal configuration
PowerSupplyName.FrontPanIn	2-byte integer	R	System input status
PowerSupplyName.FrontPanOut	2-byte integer	R	System output status
PowerSupplyName.ResFlagCfg	2-byte integer	R/W	Reset Flag configuration
PowerSupplyName.ResFlag	2-byte integer	R	Reset Flag status
PowerSupplyName.HvPwSM	String	R	Power supply modules status
PowerSupplyName.HVFanStat	String	R	Fan status
PowerSupplyName.HVFanSpeed	String	R	Fan speed
PowerSupplyName.ClkFreq	2-byte integer	R	Clock frequency
PowerSupplyName.HVClkConf	String	R	Clock configuration
PowerSupplyName.IPAddr	String	R/W	System IP address
PowerSupplyName.IPNetMsk	String	R/W	System IP net mask
PowerSupplyName.IPGw	String	R/W	System IP gateway
PowerSupplyName.SymbolicName	String	R/W	System symbolic name
PowerSupplyName.Slots	2-byte integer	R	Slots number
PowerSupplyName.ConnStatus	String	R	connection status
PowerSupplyName.CPULoad	2-byte integer	R	load on the system CPU
PowerSupplyName.CmdQueueStatus	2-byte integer	R	number of commands in queue
PowerSupplyName.MemoryStatus	2-byte integer	R	system memory usage

SY4527 / SY5527 Board control

This chapter describes the Items which are available for the control of a generic SY4527 / SY5527 system board (for example the Mod. A 1832N). The list of Items may differ for some custom boards (refer to the board's manual for further details).

A read access to the **Model** Item returns a string with the board model.

A read access to the **Description** Item returns a string with the board synthetic description (for example “12 Ch Neg 6 kV 1/0.2 mA”).
A read access to the **Fmw Release** item returns a string with the board firmware release.

A read access to the **SerNum** item returns the board serial number.

A read access to the **NrOfCh** item returns the number of board’s channels.

A read access to the **BdStatus** item returns the status of generic board's parameters, namely:

bit 0: PowerFail; if 1, it indicates a failure in the channels local power supply
bit 1: Firwmare Checksum Error; if 1, it indicates an error in the board firmware checksum
bit 2: HVMax Calibration Error; if 1, it indicates that the board HVMax parameter (if present) is not calibrated
bit 3: Temperature Calibration Error; if 1, it indicates that the board temperature sensor (if present) is not calibrated
bit 4: Under Temperature; if 1, it indicates that the board temperature sensor (if present) signals a board temperature < 5 °C
bit 5: Over Temperature; if 1, it indicates that the board temperature sensor (if present) signals a board temperature > 65 °C
bits 6..31: Reserved for future use

A read access to the **HVMax** item returns the voltage hardware limit set by trimmer on the board.

A read access to the **HVMax#EU** item returns a string with the HVMax Engineering Units.

A read access to the **HVMax#HighEU** item returns the highest possible HVMax value.

A read access to the **HVMax#LowEU** item returns the lowest possible HVMax value.

A read access to the **Temp** item returns the board’s temperature.

A read access to the **Temp#EU** item returns a string with the Temp Engineering Units.

A read access to the **Temp#HighEU** item returns the highest possible Temp value.

A read access to the **Temp#LowEU** item returns the lowest possible Temp value.

Table 2 – SY4527/ SY5527 Board items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Model	String	R	Board model
PowerSupplyName.BoardXX.Description	String	R	Board description
PowerSupplyName.BoardXX.Fmw Release	String	R	Board firmware release
PowerSupplyName.BoardXX.SerNum	2-byte integer	R	Board serial number
PowerSupplyName.BoardXX.NrOfCh	2-byte integer	R	Number of channels
PowerSupplyName.BoardXX.BdStatus	2-byte integer	R	Board status
PowerSupplyName.BoardXX.HVMax	4-byte real	R	Hardware voltage limit
PowerSupplyName.BoardXX.HVMax#EU	String	R	HVMax EU
PowerSupplyName.BoardXX.HVMax#HighEU	8-byte real	R	HVMax upper limit
PowerSupplyName.BoardXX.HVMax#LowEU	8-byte real	R	HVMax lower limit
PowerSupplyName.BoardXX.Temp	4-byte real	R	Board temperature
PowerSupplyName.BoardXX.Temp#EU	String	R	Temperature EU
PowerSupplyName.BoardXX.Temp#HighEU	8-byte real	R	Temp upper limit
PowerSupplyName.BoardXX.Temp#LowEU	8-byte real	R	Temp lower limit

SY4527 / SY5527 Channel control

This chapter describes the items which are available for the control of a generic channel within the SY4527 / SY5527 system. The list of items may differ in case of channels belonging to custom boards (refer to the board's manual for further details).

The **Name** item allows to assign to the channel a symbolic name.

The **V0set** item allows to set V0; see SYx527 User's manual for further details.

A read access to the **V0set#EU** item returns a string with the V0set Engineering Units.

A read access to the **V0set#HighEU** item returns the highest possible V0set value.

A read access to the **V0set#LowEU** item returns the lowest possible V0set value.

The **I0set** item allows to set I0; see SYx527 User's manual for further details.

A read access to the **I0set#EU** item returns a string with the I0set Engineering Units.

A read access to the **I0set#HighEU** item returns the highest possible I0set value.

A read access to the **I0set#LowEU** item returns the lowest possible I0set value.

The **V1set** item allows to set V1; see SYx527 User's manual, for further details.

A read access to the **V1set#EU** item returns a string with the V1set Engineering Units.

A read access to the **V1set#HighEU** item returns the highest possible V1set value.

A read access to the **V1set#LowEU** item returns the lowest possible V1set value.

The **I1set** item allows to set I1; see SYx527 User's manual for further details.

A read access to the **I1set#EU** item returns a string with the I1set Engineering Units.

A read access to the **I1set#HighEU** item returns the highest possible I1set value.

A read access to the **I1set#LowEU** item returns the lowest possible I1set value.

The **RUp** item allows to program the ramp-up rate; see SYx527 User's manual, for further details.

A read access to the **RUp#EU** item returns a string with the RUp Engineering Units.

A read access to the **RUp#HighEU** item returns the highest possible RUp value.

A read access to the **RUp#LowEU** item returns the lowest possible RUp value.

The **RDWn** item allows to program the ramp-down rate; see SYx527 User's manual, for further details.

A read access to the **RDWn#EU** item returns a string with the RDWn Engineering Units.

A read access to the **RDWn#HighEU** item returns the highest possible RDWn value.

A read access to the **RDWn#LowEU** item returns the lowest possible RDWn value.

The **Trip** item allows to program the trip time; see SYx527 User's manual, for further details.

A read access to the **Trip#EU** item returns a string with the Trip Engineering Units.

A read access to the **Trip#HighEU** item returns the highest possible Trip value.

A read access to the **Trip#LowEU** item returns the lowest possible Trip value.

The **SVMax** item allows to set the software voltage limit; see SYx527 User's manual, for further details.

A read access to the **SVMax#EU** item returns a string with the SVMax Engineering Units.

A read access to the **SVMax#HighEU** item returns the highest possible SVMax value.

A read access to the **SVMax#LowEU** item returns the lowest possible SVMax value.

The **VMon** item returns back the VMon value; see SYx527 User's manual, for further details.

A read access to the **VMon#EU** item returns a string with the VMon Engineering Units.

A read access to the **VMon#HighEU** item returns the highest possible VMon value.

A read access to the **VMon#LowEU** item returns the lowest possible VMon value.

The **IMon** item returns back the IMon value; see SYx527 User's manual, for further details.

A read access to the **IMon#EU** item returns a string with the IMon Engineering Units.

A read access to the **IMon#HighEU** item returns the highest possible IMon value.

A read access to the **IMon#LowEU** item returns the lowest possible IMon value.

A read access to the **Status** item returns back a 16 bit pattern indicating channel status, as follows:

Bit 0: ON/OFF
Bit 1: Ramp Up
Bit 2: Ramp Down
Bit 3: OverCurrent
Bit 4: OverVoltage
Bit 5: UnderVoltage
Bit 6: External Trip
Bit 7: Over HVmax
Bit 8: External Disable
Bit 9: Internal Trip
Bit 10: Calibration Error
Bit 11: Unplugged ("remote" boards only)
Bit12: UnderCurrent
Bit13: OverVoltage Protection
Bit14: Power Fail
Bit15: Temperature Error

The **Pw** item allows to switch ON/OFF the channel.

A read access to the **Pw#CoOpen** returns back the label "Off" associated to Pw=0.

A read access to the **Pw#CoClose** item back the label "On" associated to Pw=1.

The **POn** item allows to select the power ON option, as follows

POn=1 ⇒ Enabled
POn=0 ⇒ Disabled

see SYx527 User's manual for further details.

A read access to the **POn#CoOpen** returns back the label "Disabled" associated to POn=0.

A read access to the **POn#CoClose** item returns back the label "Enabled" associated to POn=1.

The **PDwn** item allows to select the power-down option, as follows

PDwn=1 ⇒ RAMP
PDwn=0 ⇒ KILL

see SYx527 User's manual, for further details.

A read access to the **PDwn#CoOpen** item returns back the label "Kill" associated to PDwn=0.

A read access to the **PDwn#CoClose** item returns back the "Ramp" associated to PDwn=1.

The **TripInt** item allows to program the internal trip time.

A read access to the **TripInt#EU** item returns a string with the TripInt Engineering Units.

A read access to the **TripInt#HighEU** item returns the highest possible TripInt value.

A read access to the **TripInt#LowEU** item returns the lowest possible TripInt value.

The **TripExt** item allows to program the external trip time.

A read access to the **TripExt#EU** item returns a string with the TripExt Engineering Units.

A read access to the **TripExt#HighEU** item returns the highest possible TripExt value.

A read access to the **TripExt#LowEU** item returns the lowest possible TripExt value.

Table 3 – SY4527/ SY5527 Channel items

ItemID	Data Type	Access Type	Description
PowerSupplyName.BoardXX.ChanYYY.Name	String	R/W	Channel name
PowerSupplyName.BoardXX.ChanYYY.V0Set	4-byte real	R/W	Set V0 voltage limit
PowerSupplyName.BoardXX.ChanYYY.V0Set#EU	String	R	V0set EU
PowerSupplyName.BoardXX.ChanYYY.V0Set#HighEU	8-byte real	R	V0set upper limit
PowerSupplyName.BoardXX.ChanYYY.V0Set#LowEU	8-byte real	R	V0set lower limit
PowerSupplyName.BoardXX.ChanYYY.I0Set	4-byte real	R/W	Set I0 current limit
PowerSupplyName.BoardXX.ChanYYY.I0Set#EU	String	R	I0set EU
PowerSupplyName.BoardXX.ChanYYY.I0Set#HighEU	8-byte real	R	I0set upper limit
PowerSupplyName.BoardXX.ChanYYY.I0Set#LowEU	8-byte real	R	I0set lower limit
PowerSupplyName.BoardXX.ChanYYY.V1Set	4-byte real	R/W	Set V1 voltage limit
PowerSupplyName.BoardXX.ChanYYY.V1Set#EU	String	R	V1set EU
PowerSupplyName.BoardXX.ChanYYY.V1Set#HighEU	8-byte real	R	V1set upper limit
PowerSupplyName.BoardXX.ChanYYY.V1Set#LowEU	8-byte real	R	V1set lower limit
PowerSupplyName.BoardXX.ChanYYY.I1Set	4-byte real	R/W	Set I1 current limit
PowerSupplyName.BoardXX.ChanYYY.I1Set#EU	String	R	I1set EU
PowerSupplyName.BoardXX.ChanYYY.I1Set#HighEU	8-byte real	R	I1set upper limit
PowerSupplyName.BoardXX.ChanYYY.I1Set#LowEU	8-byte real	R	I1set lower limit
PowerSupplyName.BoardXX.ChanYYY.RUp	4-byte real	R/W	Set ramp-up rate
PowerSupplyName.BoardXX.ChanYYY.RUp #EU	String	R	Ramp up rate EU
PowerSupplyName.BoardXX.ChanYYY.RUp #HighEU	8-byte real	R	RUp upper limit
PowerSupplyName.BoardXX.ChanYYY.RUp #LowEU	8-byte real	R	RUp lower limit
PowerSupplyName.BoardXX.ChanYYY.RDWn	4-byte real	R/W	Set ramp-down rate

ItemID	Data Type	Access Type	Description
PowerSupplyName.BoardXX.ChanYYY.RDWn #EU	String	R	Ramp down rate EU
PowerSupplyName.BoardXX.ChanYYY.RDWn #HighEU	8-byte real	R	RDwn upper limit
PowerSupplyName.BoardXX.ChanYYY.RDWn #LowEU	8-byte real	R	RDwn lower limit
PowerSupplyName.BoardXX.ChanYYY.Trip	4-byte real	R/W	Set trip time
PowerSupplyName.BoardXX.ChanYYY.Trip #EU	String	R	Trip time EU
PowerSupplyName.BoardXX.ChanYYY.Trip #HighEU	8-byte real	R	Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.Trip #LowEU	8-byte real	R	Trip time lower limit
PowerSupplyName.BoardXX.ChanYYY.SVMax	4-byte real	R/W	Set software voltage limit
PowerSupplyName.BoardXX.ChanYYY.SVMax #EU	String	R	SVMax EU
PowerSupplyName.BoardXX.ChanYYY.SVMax#HighU	8-byte real	R	SVMax upper limit
PowerSupplyName.BoardXX.ChanYYY.SVMax#LowEU	8-byte real	R	SVMax lower limit
PowerSupplyName.BoardXX.ChanYYY.VMon	4-byte real	R	VMon
PowerSupplyName.BoardXX.ChanYYY.VMon #EU	string	R	VMon EU
PowerSupplyName.BoardXX.ChanYYY.VMon#HighU	8-byte real	R	VMon upper limit
PowerSupplyName.BoardXX.ChanYYY.VMon#LowEU	8-byte real	R	VMon lower limit
PowerSupplyName.BoardXX.ChanYYY.IMon	4-byte real	R	IMon
PowerSupplyName.BoardXX.ChanYYY.IMon #EU	string	R	IMon EU
PowerSupplyName.BoardXX.ChanYYY.IMon#HighU	8-byte real	R	IMon upper limit
PowerSupplyName.BoardXX.ChanYYY.IMon#LowEU	8-byte real	R	IMon lower limit
PowerSupplyName.BoardXX.ChanYYY.Status	2-byte integer	R	Channel status
PowerSupplyName.BoardXX.ChanYYY.Pw	boolean	R/W	Power ON/OFF
PowerSupplyName.BoardXX.ChanYYY.Pw#CoClose	string	R	Pw close label
PowerSupplyName.BoardXX.ChanYYY.Pw#CoOpen	string	R	Pw open label
PowerSupplyName.BoardXX.ChanYYY.POn	boolean	R/W	Power ON options
PowerSupplyName.BoardXX.ChanYYY.POn#CoClose	string	R	POn close label
PowerSupplyName.BoardXX.ChanYYY.POn#CoOpen	string	R	POn open label
PowerSupplyName.BoardXX.ChanYYY.PDwn	boolean	R/W	Power down options
PowerSupplyName.BoardXX.ChanYYY.PDwn#CoClose	string	R	PDwn close label
PowerSupplyName.BoardXX.ChanYYY.PDwn#CoOpen	string	R	PDwn open label
PowerSupplyName.BoardXX.ChanYYY.TripInt	4-byte real	R/W	Set Internal trip time
PowerSupplyName.BoardXX.ChanYYY.TripInt #EU	string	R	Internal Trip time EU
PowerSupplyName.BoardXX.ChanYYY.TripInt#HighU	8-byte real	R	Int. Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.TripInt#LowEU	8-byte real	R	Int. Trip time lower limit
PowerSupplyName.BoardXX.ChanYYY.TripExt	4-byte real	R/W	Set external trip time
PowerSupplyName.BoardXX.ChanYYY.TripExt #EU	string	R	External Trip time EU
PowerSupplyName.BoardXX.ChanYYY.TripExt#HighU	8-byte real	R	Ext. Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.TripExt#LowEU	8-byte real	R	Ext. Trip time lower limit

5. SY1527 / SY2527 Power Supply System

This chapter describes the OPC Items which are available for the SY 1527 / SY 2527 system control.

SY1527 / SY2527 System control

OPC Items available for general system control are fully listed in Table 4. For a detailed description of the SY 1527 / SY 2527 system operation, refer to System User's manual.

A write access to the **Kill** Item (Value = 1) allows to switch OFF at the max rate all system channels;

A write access to the **Clear Alarm** Item (Value = 1) allows to clear channels' alarm messages;

A write access to the **Format** Item (Value = 1) causes the Format command to be executed ;

A read access to the **Sessions** Item returns a string with the list of Users connected to the system, their access level, communication line and access time;

A read access to the **ModelName** Item returns a string indicating the system model (SY1527, SY2527, …).

A read access to the **SwRelease** Item returns a string indicating the system firmware release (1.10.00 or later).

The **GenSignCfg** Item allows to configure the GEN signal by writing an 16 bit pattern as follows:

Bit 0: GEN enable
Bit 1: GEN always ON
Bit 2: GEN ON due to OvV (Over Voltage)
Bit 3: GEN ON due to OvC (Over Current)
Bit 4: GEN ON due to UnV (Under Voltage)
Bit 5: GEN ON due to TRIP
Bit 6÷7: Don't care (=0)
Bit 8: GEN enable MASK
Bit 9: GEN always ON MASK
Bit 10: GEN ON due to OvV (Over Voltage) MASK
Bit 11: GEN ON due to OvC (Over Current) MASK
Bit 12: GEN ON due to UnV (Under Voltage) MASK
Bit 13: GEN ON due to TRIP MASK
Bit 14÷15: Don't care (=0)

This Item is a 2-byte integer; in order to set or reset bits 0..5, it is necessary to set to 1 the corresponding "MASK" bit (bits 8..13).

A read access to the **FrontPanIn** Item returns a 16 bit patterns indicating the system inputs and switches status, as follows:

Bit 0: Vsel, 0=V0 1=V1
Bit 1: Isel, 0=I0 1=I1
Bit 2: Kill
Bit 3: Interlock
Bit 4: Remote Enable
Bit 5: Local Enable
Bit 6: TTL/NIM, 0=TTL 1=NIM
Bit 7÷15: Don't care (=0)

A read access to the **FrontPanOut** Item returns a 16 bit patterns indicating the system outputs status, as follows:

Bit 0: OVC
Bit 1: UNV
Bit 2: OVV
Bit 3: CHON
Bit 4÷7: Don't care (=0)
Bit 8: Fan failure
Bit 9: OVT
Bit 10÷15: Don't care (=0)

A read access to the **HvPwSM** Item returns a string with the power supply module status, like follows: "ACstatus:Primary:Add 0:Add 1:Add 2 ". If:

ACstatus = -1 ⇒ FAIL
ACstatus = 1 ⇒ GOOD
Primary = -1 ⇒ Primary supply module FAIL
Primary = 1 ⇒ Primary supply module GOOD
Add X = -1 ⇒ Add on supply module nr. X FAIL
Add X = 0 ⇒ Add on supply module nr. X NOT PRESENT
Add X = 1 ⇒ Add on supply module nr. X GOOD

A read access to the **FanStat** Item returns a string with the 6 fans (3 for the SY 2527) status and speed, like follows: "status:speed: status:speed: … status:speed". If:

status = -1 ⇒ FAIL
status = 1 ⇒ GOOD

The speed parameter is expressed in rpm.

A read access to the **ClkFreq** Item returns an integer idicating the clock frequency as follows:

ClkFreq = -1 ⇒ FAIL
ClkFreq = 0 ⇒ 50 Hz
ClkFreq = 1 ⇒ 60 Hz
ClkFreq = 2 ⇒ 400 Hz

A read access to the **HVClkConf** Item returns a string with the clock configuration like "clock:status", where if:

Clock = 1 ⇒ MASTER
Clock = 0 ⇒ SLAVE
Status = -1 ⇒ FAIL
Status = 0 ⇒ NOT PRESENT
Status = +1 ⇒ GOOD

see SYx527 User's manual for further details.
The **IPaddress** item allows to specify the system IP address (for example 192.9.200.48);

The **IPNetMsk** item allows to specify the system IP net mask (for example 255.255.255.0);

The **IPGw** item allows to specify the system IP gateway (for example 0.0.0.0);

The **RS232Par** item allows to configure the RS232 parameters (for example 115200:8:1:N:XON/XOFF);

The **CnetCrNum** item allows to specify the CAENET crate number; see SYx527 User's manual for further details.

The **SymbolicName** Item allows to assign to the system a symbolic name.

A read access to the **Slots** Item returns the number of system's slots.

A read access to the **ConnStatus** Item returns a string with the connection status of the system. If:

status = OK ⇒ CONNECTED
status = KO ⇒ DISCONNECTED

A read access to the **EventStatus** Item returns a string with the connection type status of the system. If:

status = Enabled ⇒ CONNECTED with Event Mode ENABLED
status = Disabled ⇒ Event Mode NOT AVAILABLE
status = GlobalOPCDisable ⇒ Event Mode AVAILABLE BUT NOT ENABLED

The **OPCServerEventMode** item allows to enable the Event Mode function (if supported)
TRUE ⇒ Event Mode function enabled (default)
FALSE ⇒ Event Mode function disabled
When this item is set to False, the EventStatus Item reports GlobalOPCDisable

The **OPCServerVerifyTime** item allows to set the Cached Values Timeout (i.e. a set value is considered good as long as the OPCServerVerifyTime)
2byte bit integer (unit = seconds); default value = 600s

The **OPCServerLiveInsertion** item allows to enable the Live Insertion detection
TRUE ⇒ Live Insertion detected and automatic reboot
FALSE ⇒ Live Insertion ignored (default)

The **CPULoad** item allows to monitor the load on the system CPU
This item has the following format: value1:value5:value15
Value1, value5 and value15 are the average CPU loads, calculated respectively over one, five and fifteen minutes.

The **CmdQueueStatus** item allows to monitor the number of commands in queue in the system; if CmdQueueStatus >0 then the System is performing commands on the boards, therefore monitor values may not be updated until all queued commands are executed. As soon as all commands are performed and CmdQueueStatus returns to 0, monitor values are updated to correct values.

The **MemoryStatus** item allows to monitor the system memory usage
This item has the following format: value0:value1:value2:value3
Value0 is the total memory, value1 is the used memory, value2 is the free memory, value3 is the buffers memory

Table 4 – SY1527/ SY2527 System Items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.Kill	Boolean	W	Kill all channels
PowerSupplyName.ClearAlarm	Boolean	W	Clear alarm
PowerSupplyName.EnMsg	Boolean	W	To be implemented
PowerSupplyName.DisMsg	Boolean	W	To be implemented
PowerSupplyName.Format	Boolean	W	Execute Format command
PowerSupplyName.RS232CmdOff	Boolean	W	To be implemented
PowerSupplyName.Sessions	String	R	List Users connected to system
PowerSupplyName.ModelName	String	R	System name
PowerSupplyName.SwRelease	String	R	System firmware release
PowerSupplyName.GenSignCfg	2-byte integer	R/W	GEN signal configuration
PowerSupplyName.FrontPanIn	2-byte integer	R	System input status
PowerSupplyName.FrontPanOut	2-byte integer	R	System output status
PowerSupplyName.ResFlagCfg	2-byte integer	R/W	To be implemented
PowerSupplyName.ResFlag	2-byte integer	R	To be implemented
PowerSupplyName.HvPwSM	String	R	Power supply modules status
PowerSupplyName.FanStat	String	R	Fan status
PowerSupplyName.ClkFreq	2-byte integer	R	Clock frequency
PowerSupplyName.HVClkConf	String	R	Clock configuration

ItemID	Data Type	Access Rights	Description
PowerSupplyName.IPAddr	String	R/W	System IP address
PowerSupplyName.IPNetMsk	String	R/W	System IP net mask
PowerSupplyName.IPGw	String	R/W	System IP gateway
PowerSupplyName.RS232Par	String	R/W	RS232 parameters
PowerSupplyName.CnetCrNum	2-byte integer	R/W	CAENET crate number
PowerSupplyName.SymbolicName	String	R/W	System symbolic name
PowerSupplyName.Slots	2-byte integer	R	Slots number
PowerSupplyName.ConnStatus	String	R	connection status
PowerSupplyName.EventStatus	String	R	Event Status
PowerSupplyName.OPCServerEventMode	String	R/W	Event Mode status
PowerSupplyName.OPCServerVerifyTime	2-byte integer	R/W	Verify Time value
PowerSupplyName.OPCServerLiveInsertion	String	R/W	Live Insertion status
PowerSupplyName.CPULoad	2-byte integer	R	load on the system CPU
PowerSupplyName.CmdQueueStatus	2-byte integer	R	number of commands in queue
PowerSupplyName.MemoryStatus	2-byte integer	R	system memory usage

SY1527 / SY2527 Board control

This chapter describes the Items which are available for the control of a generic SY 1527 / SY 2527 system board (for example the Mod. A 1832N). The list of Items may differ for some custom boards (refer to the board's manual for further details).

A read access to the **Model** Item returns a string with the board model.

A read access to the **Description** Item returns a string with the board synthetic description (for example "12 Ch Neg 6 kV 1/0.2 mA").
A read access to the **Fmw Release** item returns a string with the board firmware release.

A read access to the **SerNum** item returns the board serial number.

A read access to the **NrOfCh** item returns the number of board's channels.

A read access to the **BdStatus** item returns the status of generic board's parameters, namely:

bit 0: PowerFail; if 1, it indicates a failure in the channels local power supply
bit 1: Firwmare Checksum Error; if 1, it indicates an error in the board firmware checksum
bit 2: HVMax Calibration Error; if 1, it indicates that the board HVMax parameter (if present) is not calibrated
bit 3: Temperature Calibration Error; if 1, it indicates that the board temperature sensor (if present) is not calibrated
bit 4: Under Temperature; if 1, it indicates that the board temperature sensor (if present) signals a board temperature < 5 °C
bit 5: Over Temperature; if 1, it indicates that the board temperature sensor (if present) signals a board temperature > 65 °C
bits 6..31: Reserved for future use

A read access to the **HVMax** item returns the voltage hardware limit set by trimmer on the board.

A read access to the **HVMax#EU** item returns a string with the HVMax Engineering Units.

A read access to the **HVMax#HighEU** item returns the highest possible HVMax value.

A read access to the **HVMax#LowEU** item returns the lowest possible HVMax value.

A read access to the **Temp** item returns the board's temperature.

A read access to the **Temp#EU** item returns a string with the Temp Engineering Units.

A read access to the **Temp#HighEU** item returns the highest possible Temp value.

A read access to the **Temp#LowEU** item returns the lowest possible Temp value.

Table 5 – SY1527/ SY2527 Board items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Model	String	R	Board model
PowerSupplyName.BoardXX.Description	String	R	Board description
PowerSupplyName.BoardXX.Fmw Release	String	R	Board firmware release
PowerSupplyName.BoardXX.SerNum	2-byte integer	R	Board serial number
PowerSupplyName.BoardXX.NrOfCh	2-byte integer	R	Number of channels
PowerSupplyName.BoardXX.BdStatus	2-byte integer	R	Board status
PowerSupplyName.BoardXX.HVMax	4-byte real	R	Hardware voltage limit
PowerSupplyName.BoardXX.HVMax#EU	String	R	HVMax EU
PowerSupplyName.BoardXX.HVMax#HighEU	8-byte real	R	HVMax upper limit
PowerSupplyName.BoardXX.HVMax#LowEU	8-byte real	R	HVMax lower limit
PowerSupplyName.BoardXX.Temp	4-byte real	R	Board temperature
PowerSupplyName.BoardXX.Temp#EU	String	R	Temperature EU
PowerSupplyName.BoardXX.Temp#HighEU	8-byte real	R	Temp upper limit
PowerSupplyName.BoardXX.Temp#LowEU	8-byte real	R	Temp lower limit

SY1527 / SY2527 Channel control

This chapter describes the items which are available for the control of a generic channel within the SY1527 / SY2527 system. The list of items may differ in case of channels belonging to custom boards (refer to the board's manual for further details).

The **Name** item allows to assign to the channel a symbolic name.

The **V0set** item allows to set V0;

A read access to the **V0set#EU** item returns a string with the V0set Engineering Units.

A read access to the **V0set#HighEU** item returns the highest possible V0set value.

A read access to the **V0set#LowEU** item returns the lowest possible V0set value.

The **I0set** item allows to set I0;

A read access to the **I0set#EU** item returns a string with the I0set Engineering Units.

A read access to the **I0set#HighEU** item returns the highest possible I0set value.

A read access to the **I0set#LowEU** item returns the lowest possible I0set value.

The **V1set** item allows to set V1;

A read access to the **V1set#EU** item returns a string with the V1set Engineering Units.

A read access to the **V1set#HighEU** item returns the highest possible V1set value.

A read access to the **V1set#LowEU** item returns the lowest possible V1set value.

The **I1set** item allows to set I1;

A read access to the **I1set#EU** item returns a string with the I1set Engineering Units.

A read access to the **I1set#HighEU** item returns the highest possible I1set value.

A read access to the **I1set#LowEU** item returns the lowest possible I1set value.

The **RUp** item allows to program the ramp-up rate;

A read access to the **RUp#EU** item returns a string with the RUp Engineering Units.

A read access to the **RUp#HighEU** item returns the highest possible RUp value.

A read access to the **RUp#LowEU** item returns the lowest possible RUp value.

The **RDWn** item allows to program the ramp-down rate;

A read access to the **RDWn#EU** item returns a string with the RDWn Engineering Units.

A read access to the **RDWn#HighEU** item returns the highest possible RDWn value.

A read access to the **RDWn#LowEU** item returns the lowest possible RDWn value.

The **Trip** item allows to program the trip time;

A read access to the **Trip#EU** item returns a string with the Trip Engineering Units.

A read access to the **Trip#HighEU** item returns the highest possible Trip value.

A read access to the **Trip#LowEU** item returns the lowest possible Trip value.

The **SVMax** item allows to set the software voltage limit;

A read access to the **SVMax#EU** item returns a string with the SVMax Engineering Units.

A read access to the **SVMax#HighEU** item returns the highest possible SVMax value.

A read access to the **SVMax#LowEU** item returns the lowest possible SVMax value.

The **VMon** item returns back the VMon value;.

A read access to the **VMon#EU** item returns a string with the VMon Engineering Units.

A read access to the **VMon#HighEU** item returns the highest possible VMon value.

A read access to the **VMon#LowEU** item returns the lowest possible VMon value.

The **IMon** item returns back the IMon value;

A read access to the **IMon#EU** item returns a string with the IMon Engineering Units.

A read access to the **IMon#HighEU** item returns the highest possible IMon value.

A read access to the **IMon#LowEU** item returns the lowest possible IMon value.

A read access to the **Status** item returns back a 16 bit pattern indicating channel status, as follows:

Bit 0: ON/OFF
Bit 1: Ramp Up
Bit 2: Ramp Down
Bit 3: OverCurrent
Bit 4: OverVoltage

Bit 5: UnderVoltage
Bit 6: External Trip
Bit 7: Over HVmax
Bit 8: External Disable
Bit 9: Internal Trip
Bit 10: Calibration Error
Bit 11: Unplugged (“remote” boards only)
Bit12: UnderCurrent
Bit13: OverVoltage Protection
Bit14: Power Fail
Bit15: Temperature Error

The **Pw** item allows to switch ON/OFF the channel.

A read access to the **Pw#CoOpen** returns back the label “Off” associated to Pw=0.

A read access to the **Pw#CoClose** item back the label “On” associated to Pw=1.

The **POn** item allows to select the power ON option, as follows

POn=1 ⇒ Enabled
POn=0 ⇒ Disabled

A read access to the **POn#CoOpen** returns back the label “Disabled” associated to POn=0.

A read access to the **POn#CoClose** item returns back the label “Enabled” associated to POn=1.

The **PDwn** item allows to select the power-down option, as follows

PDwn=1 ⇒ RAMP
PDwn=0 ⇒ KILL

A read access to the **PDwn#CoOpen** item returns back the label “Kill” associated to PDwn=0.

A read access to the **PDwn#CoClose** item returns back the “Ramp” associated to PDwn=1.

The **TripInt** item allows to program the internal trip time.

A read access to the **TripInt#EU** item returns a string with the TripInt Engineering Units.

A read access to the **TripInt#HighEU** item returns the highest possible TripInt value.

A read access to the **TripInt#LowEU** item returns the lowest possible TripInt value.

The **TripExt** item allows to program the external trip time.

A read access to the **TripExt#EU** item returns a string with the TripExt Engineering Units.

A read access to the **TripExt#HighEU** item returns the highest possible TripExt value.

A read access to the **TripExt#LowEU** item returns the lowest possible TripExt value.

Table 6 – SY1527/ SY2527 Channel items

ItemID	Data Type	Access Type	Description
PowerSupplyName.BoardXX.ChanYYY.Name	String	R/W	Channel name
PowerSupplyName.BoardXX.ChanYYY.V0Set	4-byte real	R/W	Set V0 voltage limit
PowerSupplyName.BoardXX.ChanYYY.V0Set#EU	String	R	V0set EU
PowerSupplyName.BoardXX.ChanYYY.V0Set#HighEU	8-byte real	R	V0set upper limit

ItemID	Data Type	Access Type	Description
PowerSupplyName.BoardXX.ChanYYY.V0Set#LowEU	8-byte real	R	V0set lower limit
PowerSupplyName.BoardXX.ChanYYY.I0Set	4-byte real	R/W	Set I0 current limit
PowerSupplyName.BoardXX.ChanYYY.I0Set#EU	String	R	I0set EU
PowerSupplyName.BoardXX.ChanYYY.I0Set#HighEU	8-byte real	R	I0set upper limit
PowerSupplyName.BoardXX.ChanYYY.I0Set#LowEU	8-byte real	R	I0set lower limit
PowerSupplyName.BoardXX.ChanYYY.V1Set	4-byte real	R/W	Set V1 voltage limit
PowerSupplyName.BoardXX.ChanYYY.V1Set#EU	String	R	V1set EU
PowerSupplyName.BoardXX.ChanYYY.V1Set#HighEU	8-byte real	R	V1set upper limit
PowerSupplyName.BoardXX.ChanYYY.V1Set#LowEU	8-byte real	R	V1set lower limit
PowerSupplyName.BoardXX.ChanYYY.I1Set	4-byte real	R/W	Set I1 current limit
PowerSupplyName.BoardXX.ChanYYY.I1Set#EU	String	R	I1set EU
PowerSupplyName.BoardXX.ChanYYY.I1Set#HighEU	8-byte real	R	I1set upper limit
PowerSupplyName.BoardXX.ChanYYY.I1Set#LowEU	8-byte real	R	I1set lower limit
PowerSupplyName.BoardXX.ChanYYY.RUp	4-byte real	R/W	Set ramp-up rate
PowerSupplyName.BoardXX.ChanYYY.RUp #EU	String	R	Ramp up rate EU
PowerSupplyName.BoardXX.ChanYYY.RUp #HighEU	8-byte real	R	Rup upper limit
PowerSupplyName.BoardXX.ChanYYY.RUp #LowEU	8-byte real	R	RUp lower limit
PowerSupplyName.BoardXX.ChanYYY.RDWn	4-byte real	R/W	Set ramp-down rate
PowerSupplyName.BoardXX.ChanYYY.RDWn #EU	String	R	Ramp down rate EU
PowerSupplyName.BoardXX.ChanYYY.RDWn #HighEU	8-byte real	R	RDwn upper limit
PowerSupplyName.BoardXX.ChanYYY.RDWn #LowEU	8-byte real	R	RDwn lower limit
PowerSupplyName.BoardXX.ChanYYY.Trip	4-byte real	R/W	Set trip time
PowerSupplyName.BoardXX.ChanYYY.Trip #EU	String	R	Trip time EU
PowerSupplyName.BoardXX.ChanYYY.Trip #HighEU	8-byte real	R	Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.Trip #LowEU	8-byte real	R	Trip time lower limit
PowerSupplyName.BoardXX.ChanYYY.SVMax	4-byte real	R/W	Set software voltage limit
PowerSupplyName.BoardXX.ChanYYY.SVMax #EU	String	R	SVMax EU
PowerSupplyName.BoardXX.ChanYYY.SVMax#HighU	8-byte real	R	SVMax upper limit
PowerSupplyName.BoardXX.ChanYYY.SVMax#LowEU	8-byte real	R	SVMax lower limit
PowerSupplyName.BoardXX.ChanYYY.VMon	4-byte real	R	VMon
PowerSupplyName.BoardXX.ChanYYY.VMon #EU	string	R	VMon EU
PowerSupplyName.BoardXX.ChanYYY.VMon#HighU	8-byte real	R	VMon upper limit
PowerSupplyName.BoardXX.ChanYYY.VMon#LowEU	8-byte real	R	VMon lower limit
PowerSupplyName.BoardXX.ChanYYY.IMon	4-byte real	R	IMon
PowerSupplyName.BoardXX.ChanYYY.IMon #EU	string	R	IMon EU
PowerSupplyName.BoardXX.ChanYYY.IMon#HighU	8-byte real	R	IMon upper limit
PowerSupplyName.BoardXX.ChanYYY.IMon#LowEU	8-byte real	R	IMon lower limit
PowerSupplyName.BoardXX.ChanYYY.Status	2-byte integer	R	Channel status
PowerSupplyName.BoardXX.ChanYYY.Pw	boolean	R/W	Power ON/OFF
PowerSupplyName.BoardXX.ChanYYY.Pw#CoClose	string	R	Pw close label
PowerSupplyName.BoardXX.ChanYYY.Pw#CoOpen	string	R	Pw open label
PowerSupplyName.BoardXX.ChanYYY.POn	boolean	R/W	Power ON options
PowerSupplyName.BoardXX.ChanYYY.POn#CoClose	string	R	POn close label
PowerSupplyName.BoardXX.ChanYYY.POn#CoOpen	string	R	POn open label
PowerSupplyName.BoardXX.ChanYYY.PDwn	boolean	R/W	Power down options
PowerSupplyName.BoardXX.ChanYYY.PDwn#CoClose	string	R	PDwn close label
PowerSupplyName.BoardXX.ChanYYY.PDwn#CoOpen	string	R	PDwn open label
PowerSupplyName.BoardXX.ChanYYY.TripInt	4-byte real	R/W	Set Internal trip time
PowerSupplyName.BoardXX.ChanYYY.TripInt #EU	string	R	Internal Trip time EU
PowerSupplyName.BoardXX.ChanYYY.TripInt#HighU	8-byte real	R	Int. Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.TripInt#LowEU	8-byte real	R	Int. Trip time lower limit
PowerSupplyName.BoardXX.ChanYYY.TripExt	4-byte real	R/W	Set external trip time
PowerSupplyName.BoardXX.ChanYYY.TripExt #EU	string	R	External Trip time EU
PowerSupplyName.BoardXX.ChanYYY.TripExt#HighU	8-byte real	R	Ext. Trip time upper limit
PowerSupplyName.BoardXX.ChanYYY.TripExt#LowEU	8-byte real	R	Ext. Trip time lower limit

6. VME8x00 Crates

VME8x00 control

CAEN HV OPC Server release 5.X supports the CAEN VME8x00 VME Powered Crates. Connect the VME8x00 to the Host PC via Ethernet, then launch the OPC Server configurator (see § 2):
Select “add entry”, then type name of the Crate, IP address, user name and password.

Select OK, at this point the configurator will return the connection status; for example

P.S. Name	Sys type	Conn. Type	Address	Status
VME Crate	V8100	TCP/IP	10.07.27	Ok

Now the board is ready to be accessed via OPC server; launch the OPC Client (for example the Matrikon OPC Explorer, which is available as freeware):

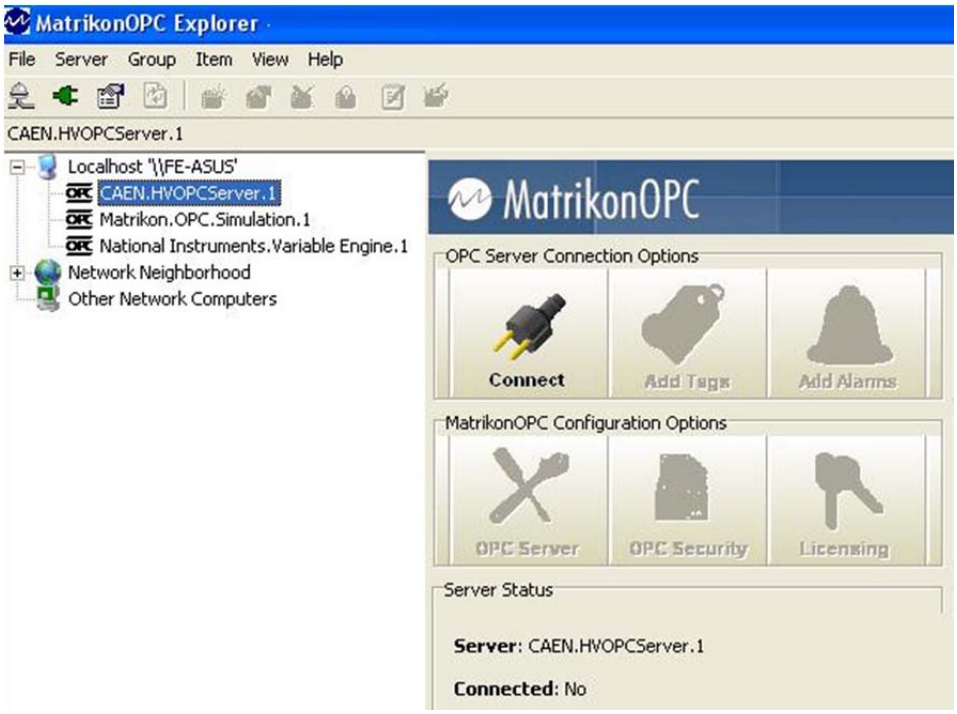


Fig. 5: Matrikon OPC Explorer start up

Select CAEN HV OPC Server in the Host menu, then click on “Connect”

Click on “Tag” Icon in the upper tool bar:

Fig. 6: Matrikon OPC Explorer tool bar

Select “Add Tags”, the following window will open:

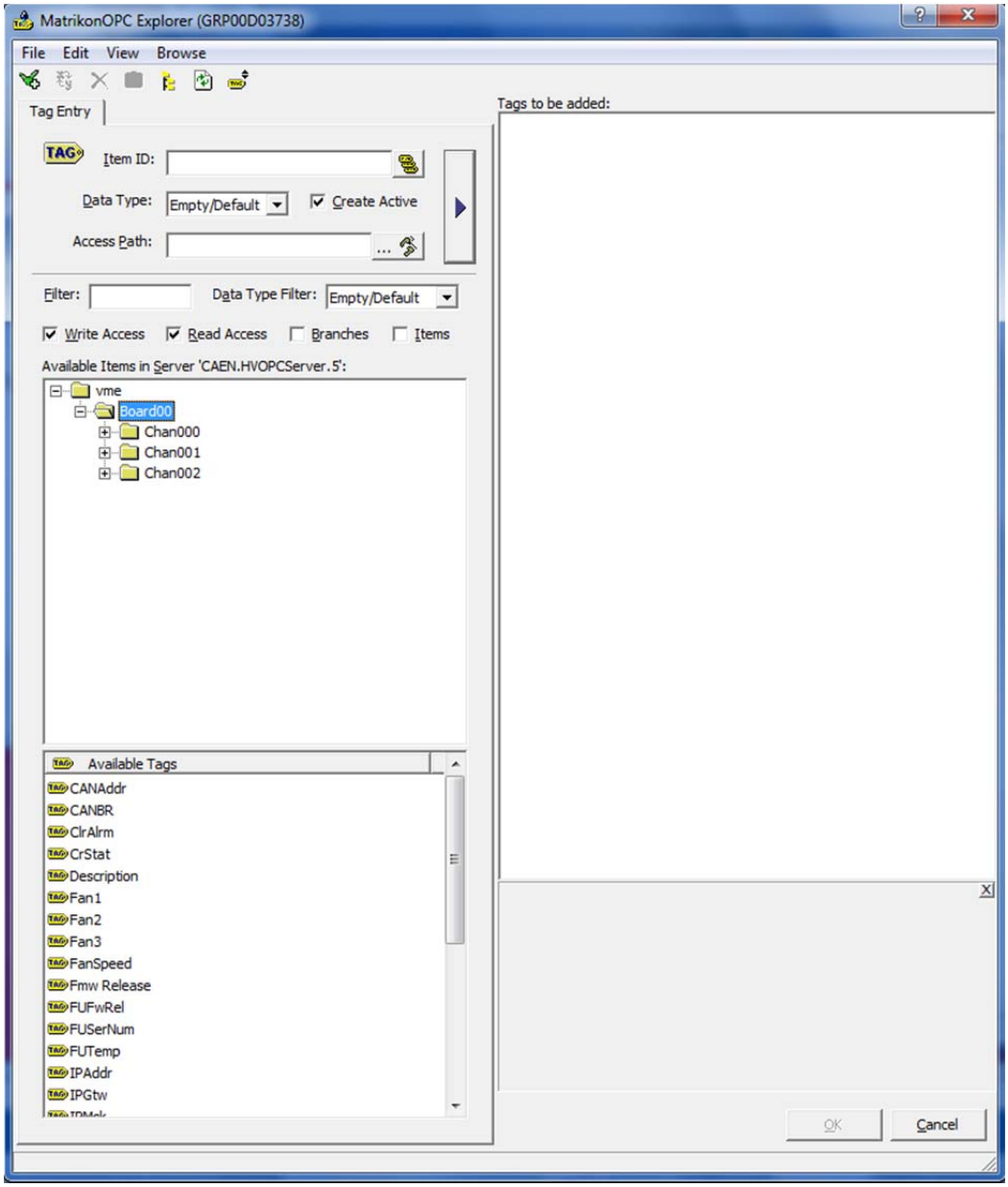


Fig. 7: Matrikon OPC Explorer; VME8100 item list

The VME8100 is detected and the following subfolders are available: VME, BoardXX, ChanXXX; each subfolder contains the relevant OPC items.

In order to edit an Item, double click on it and it will be added to the list on the rightmost tab:

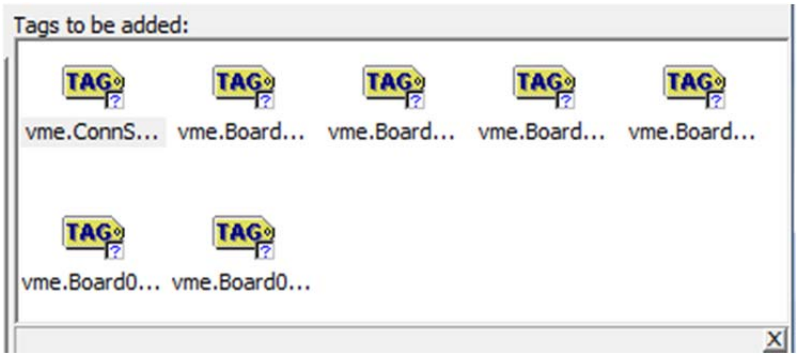


Fig. 8: Matrikon OPC Explorer; VME8100 item selection

Click OK, then the Items will be ready to be monitored and/or edited; in order to do this, right click on the Item name and select “Write values”:

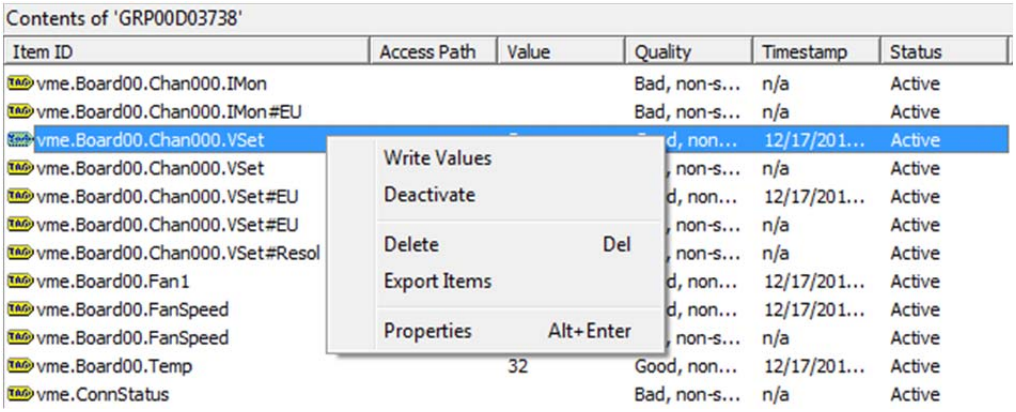


Fig. 9: Matrikon OPC Explorer; VME8x100item content

The following pop up window will allow to edit the Item value:

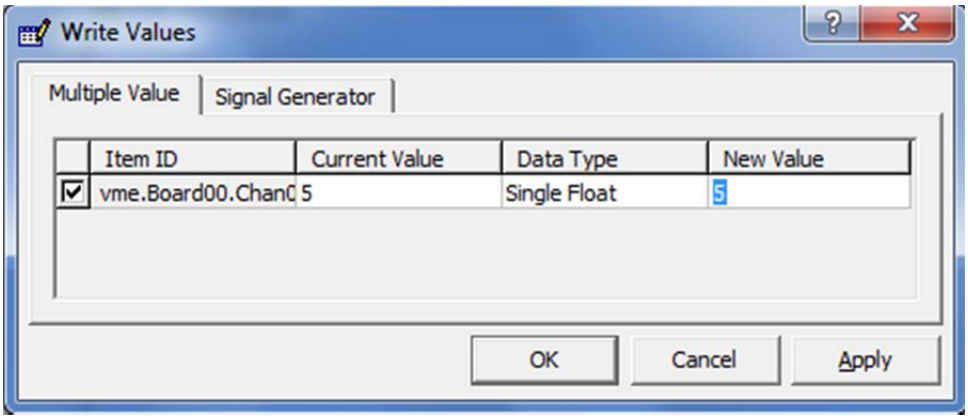
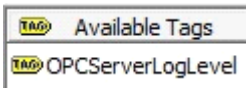


Fig. 10: Matrikon OPC Explorer; VME8x100 item update

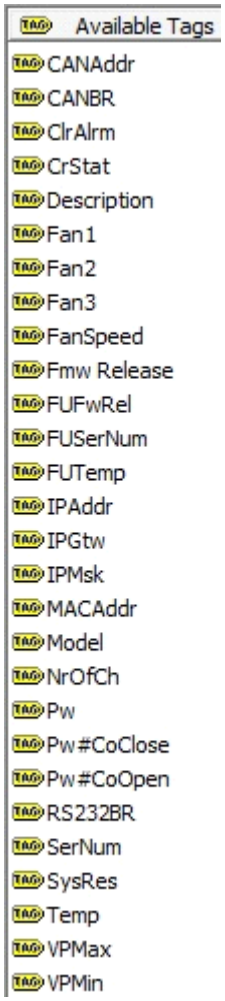
Then it is possible to save the session onto file, by selecting:
File > save session

For the VME8x00 Crates the available OPC items are the following:

System items



Board items



Channel items

Fig. 11: VME8x100 items

7. V65XX VME HV Power Supplies

V65XX control

CAEN HV OPC Server release 5.X supports the CAEN V65XX VME Programmable HV Power Supplies. The support is available when the V65XX are managed through the CAEN VME Controllers; if a third part controller/bridge is used (for example VME SBC), it is necessary to provide a "CAENComm equivalent" library by exporting the functions used by the software (see **www.caen.it** website for all details about VME Controllers and Libraries).

Install the V65XX board properly into the VME Crate, then launch the OPC Server configurator (see § 2):

Select "add entry", then type name of the power supply (for example V6534N), link type ("optical link", if using a V2718 VME bridge or USB if a V1718 is used instead) and VME base address of the board (for example 0x3210):

Select OK, at this point the configurator will return the connection status; for example

P.S. Name	Conn. Type	Address	Status
V6534N	OPTLINK	0_0_32100000	Ok

Now the board is ready to be accessed via OPC server; launch the OPC Client (for example the Matrikon OPC Explorer, which is available as freeware):

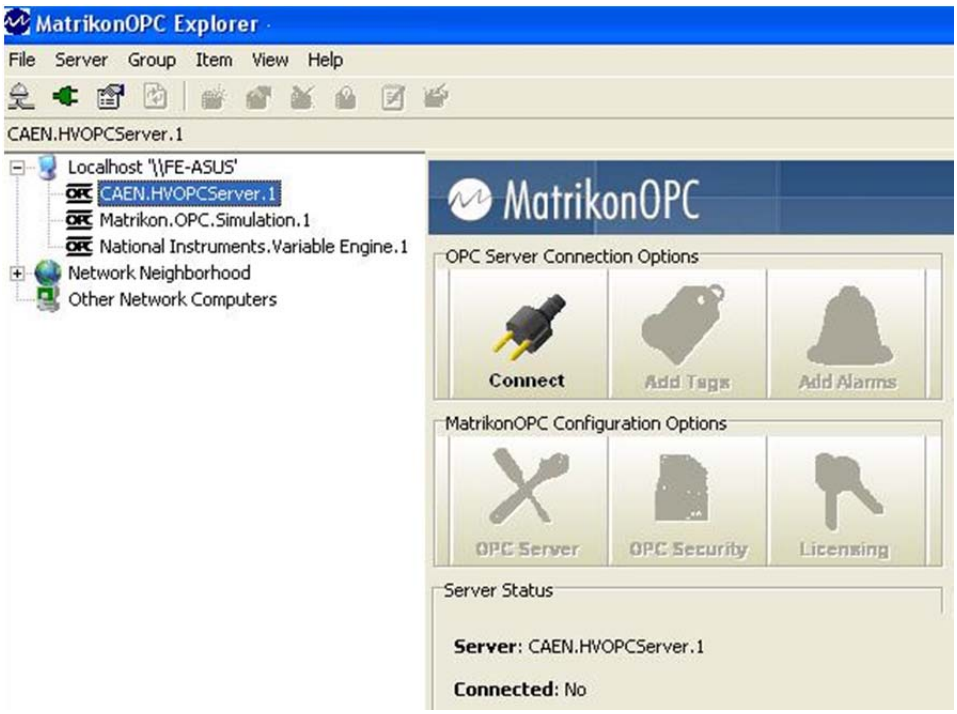


Fig. 12: Matrikon OPC Explorer start up

Select CAEN HV OPC Server in the Host menu, then click on "Connect"

Click on "Tag" Icon in the upper tool bar:

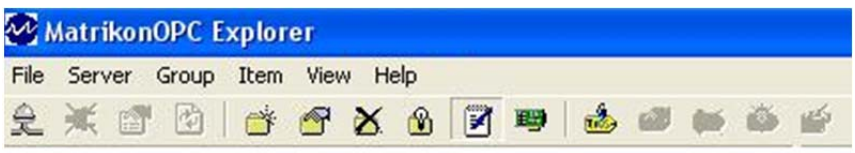


Fig. 13: Matrikon OPC Explorer tool bar

Select "Add Tags", the following window will open:

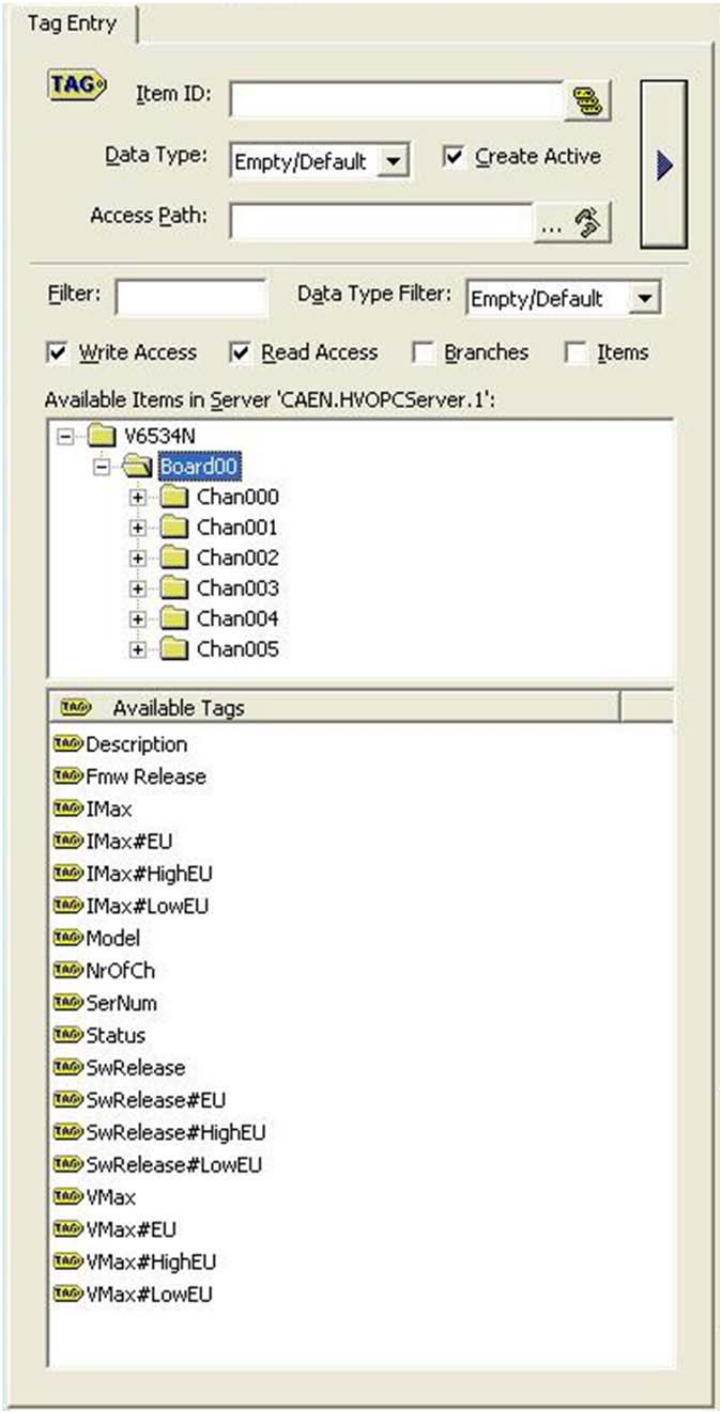


Fig. 14: Matrikon OPC Explorer; V6534N item list

The V6534N is detected and the following subfolders are available: V6534N, BoardXX, ChanXXX; each subfolder contains the relevant OPC items.

In order to edit an Item, double click on it and it will be added to the list on the rightmost tab:

Fig. 15: Matrikon OPC Explorer; V6534N item selection

Click OK, then the Items will be ready to be monitored and/or edited; in order to do this, right click on the Item name and select “Write values”:

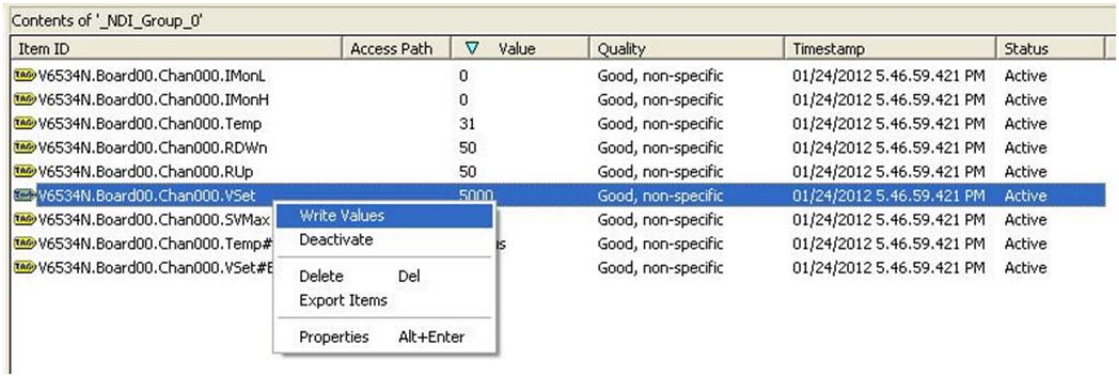


Fig. 16: Matrikon OPC Explorer; V6534N item content

The following pop up window will allow to edit the Item value:

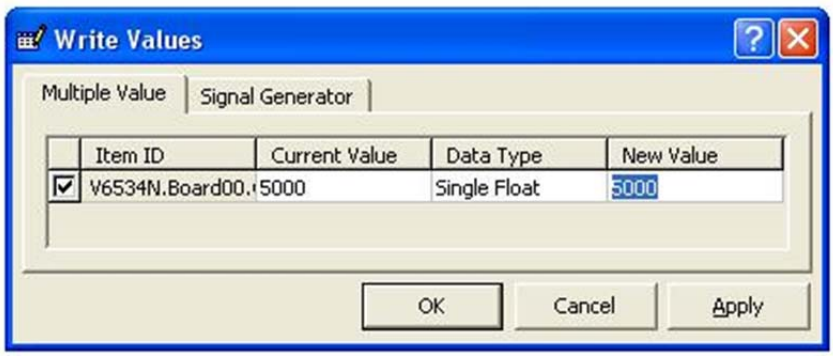


Fig. 17: Matrikon OPC Explorer; V6534N item update

Then it is possible to save the session onto file, by selecting:
File > save session

For the V65XX VME Programmable HV Power Supply boards the available OPC items are the following:

System items

Board items

Channel items

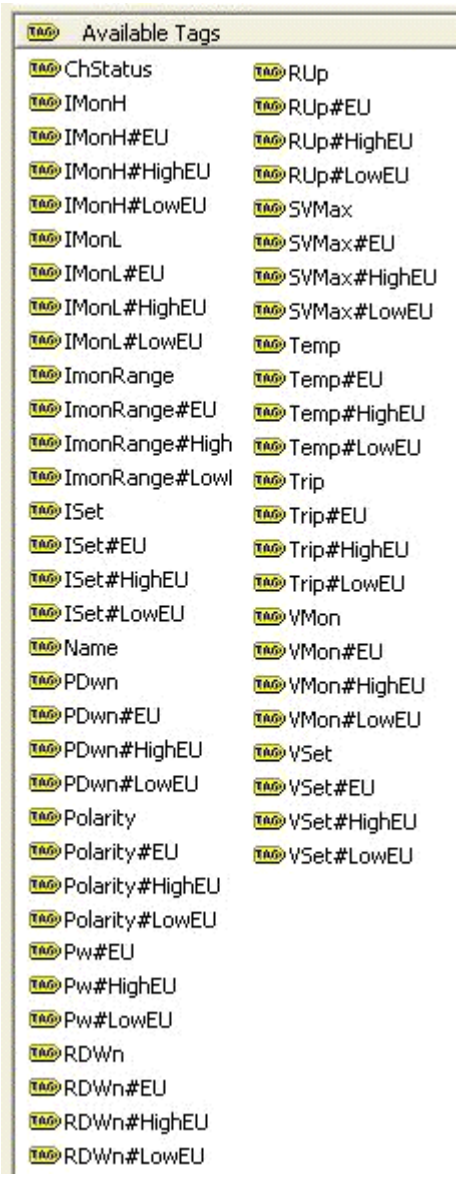


Fig. 18: V6534N items

8. OPC clients connection

The *CAEN HV OPC Server* has been successfully tested with Northern Dynamic OPC Browser ver. 1.0 and the following OPC clients:

- National Instruments Server Explorer ver. 1.1
- Softing OPC Client ver. 2.0
- National Instruments LabView 5.x and later

This chapter is mainly to help the User to familiarise with OPC clients operation.

Browsing the server address space

This section illustrates a typical OPC browse session. Start, for example, the ND OPC Browser, go to **File →Browse OPC Server…,** select CAEN.HVOPCServer from the list in the dialog window and then click "OK".

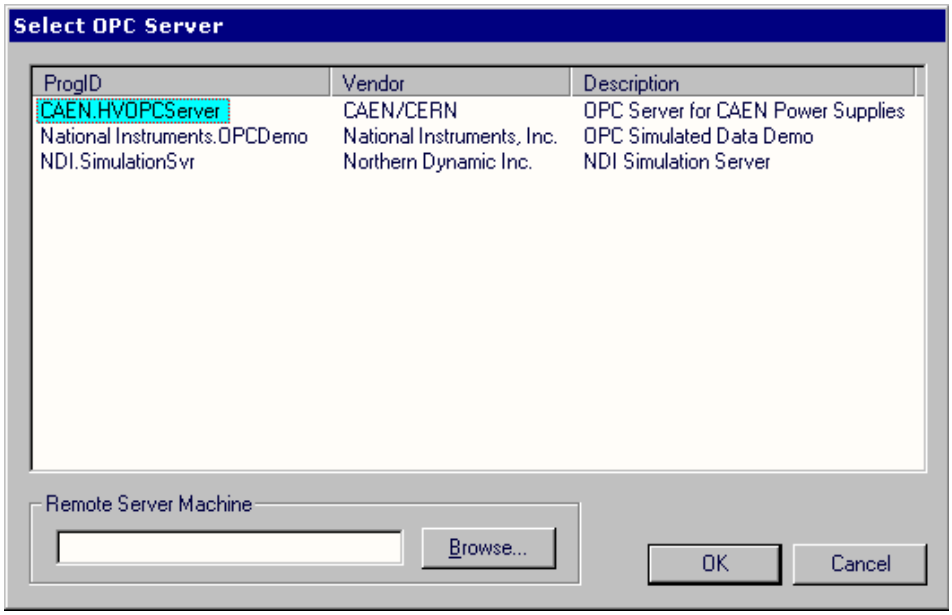


Fig. 19: Selecting the OPC server

In the Browser window is graphically depicted the server address space (see Fig. 3.1). By right clicking on the item tag, it is possible to access the item's Specific properties, like shown in the figure below.

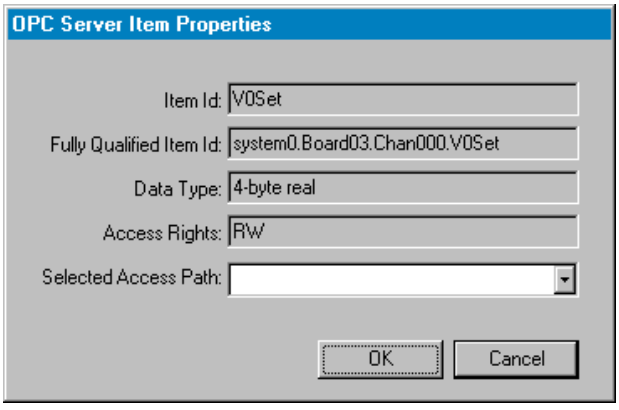


Fig. 20: The item's Specific properties

National Instruments LabView 5.x and later releases

National Instruments LabView 5.x and later releases include a native OPC Client embedded into its set of VIs based on Datasocket technology. You can develop your own LabView application basing it on Datasocket, or you can use some examples provided by National. In this section we will see how to read the temperature of the A1832 board.
In the main dialog of LabView press the "Search examples" button. In the Search Examples Help follow the "OPC" link. Choice the "Browse to OPC Item" example and run it. In the "Select URL path" window select CAEN.HVOPCserver on the machine where it has been registered.

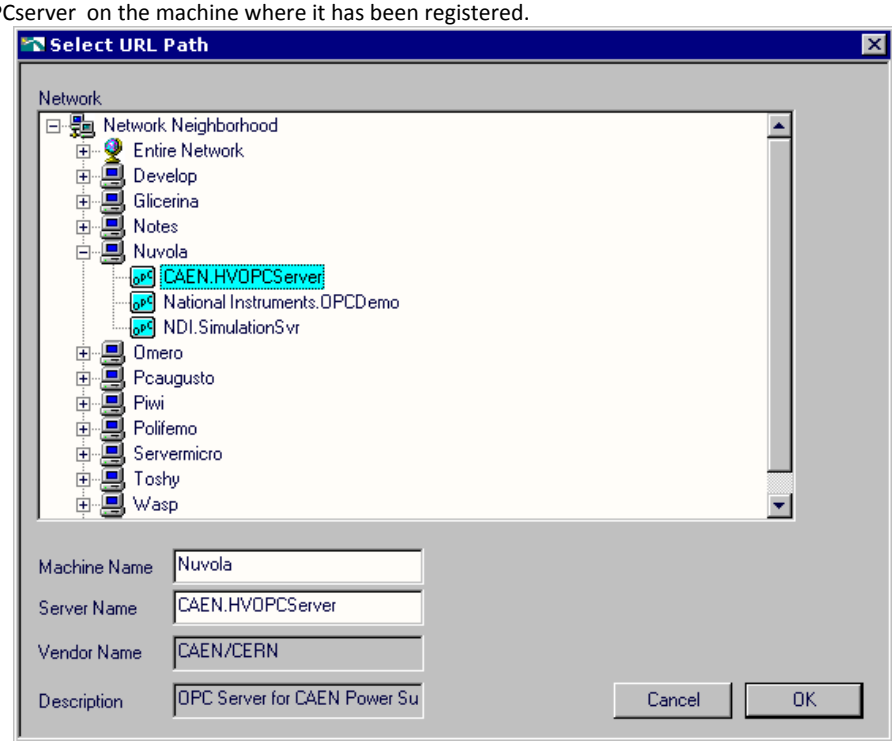


Fig. 21: Selecting URL path to server

This operation causes the automatic start-up of the OPC server; you can browse the server address space and select an ItemID (in our case we will choice the temperature of the board in slot 04: system0.Board04.Temp).

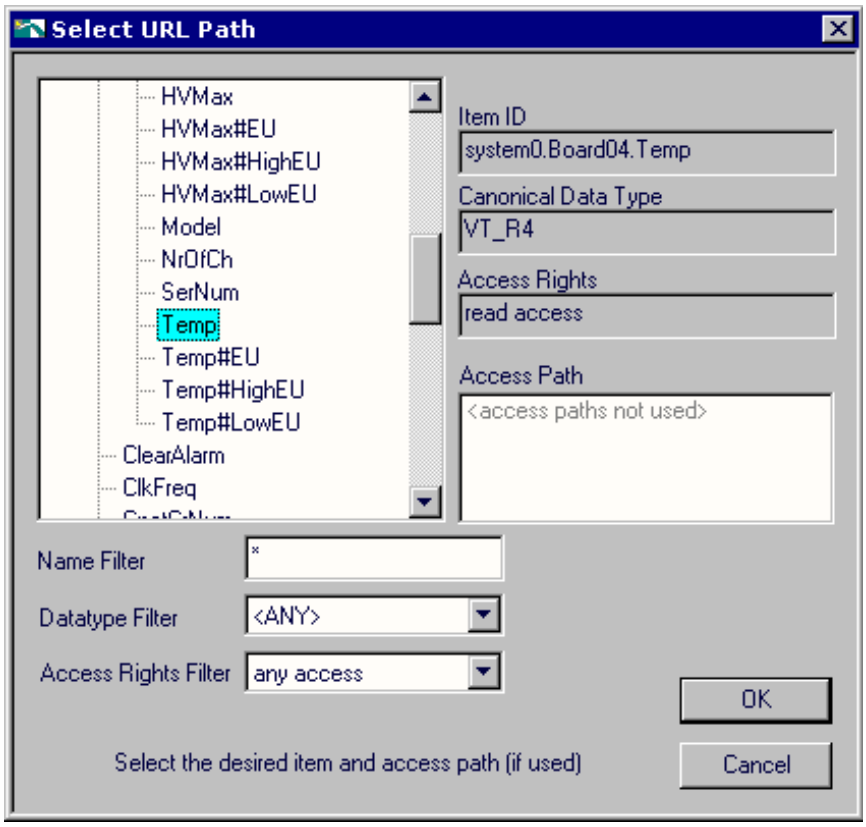


Fig. 22: Selecting an item

The fully qualified ItemID is then showed in the "URL" window of the VI's front panel.

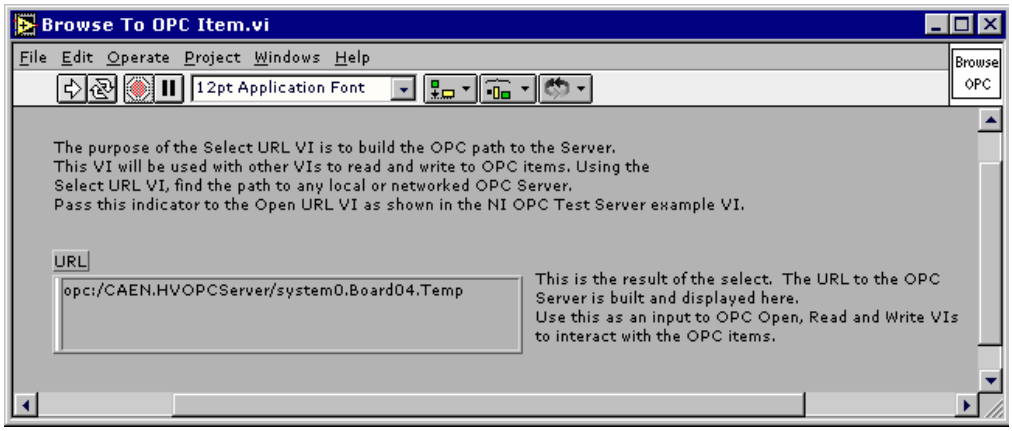


Fig. 23: "URL" window of the VI's front panel

If you want to monitor the current values of the temperature, you can use the "Demo OPC CLient" example: simply set the Hostname (leaving it blank if the OPC server is on the same PC as LabView), the Server Name (CAEN.HVOPCserver) and the Item name (system0.Board04.temp) and then launch the VI.

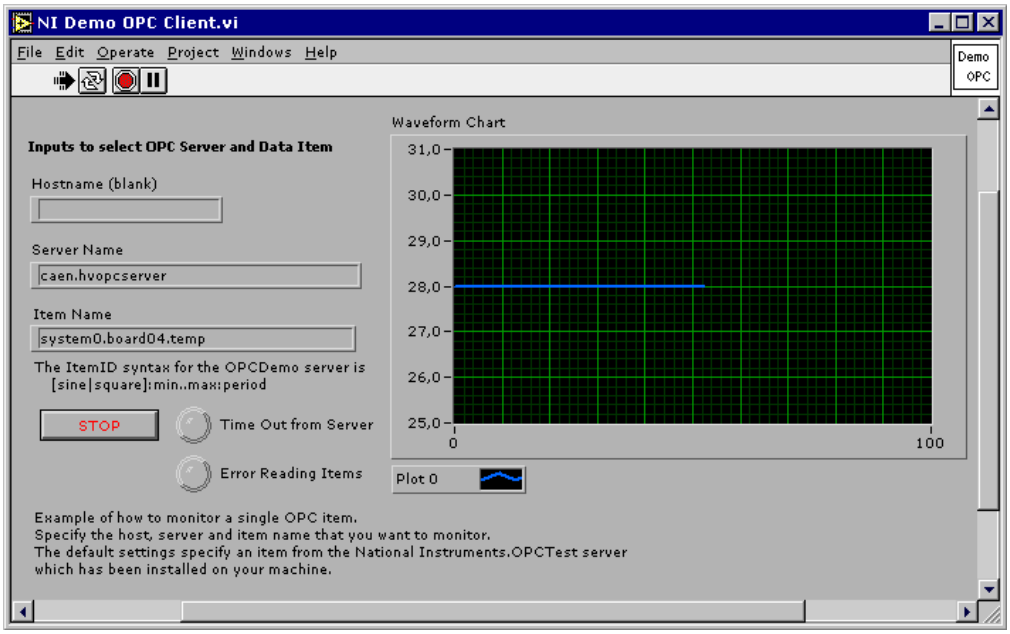


Fig. 24: Temperature plot

National Instruments Server Explorer

This section illustrates how to access data items by the help of NI Server Explorer. In the Server Explorer window select CAEN.HVOPCServer, in the menu bar go to **Servers→Connect to Server** and choose **"**Connect". To create a group, go in the menu bar to **Edit→Add**, specify the group name in the dialog box (for example "group0") and then click on the Add button.

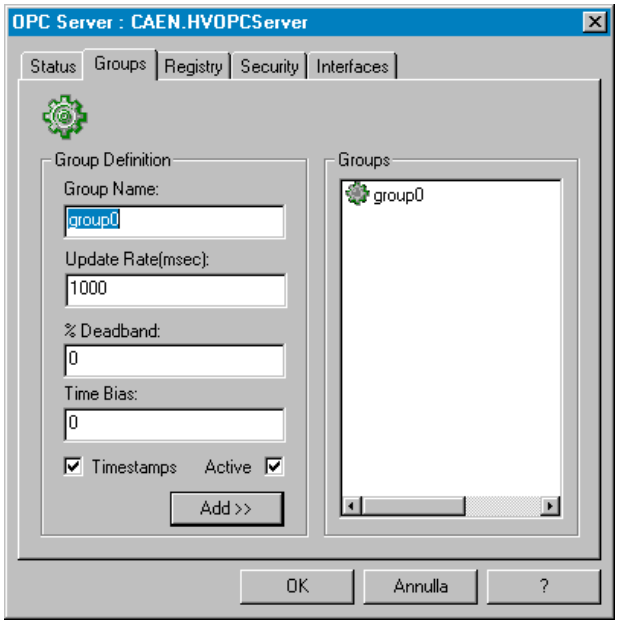


Fig. 25: Creating a group

To add items, select a group in the main window (for example "group0"), go in the menu bar to **Edit→Add,** select the desired items into the Item definition window and then click on the Add button.

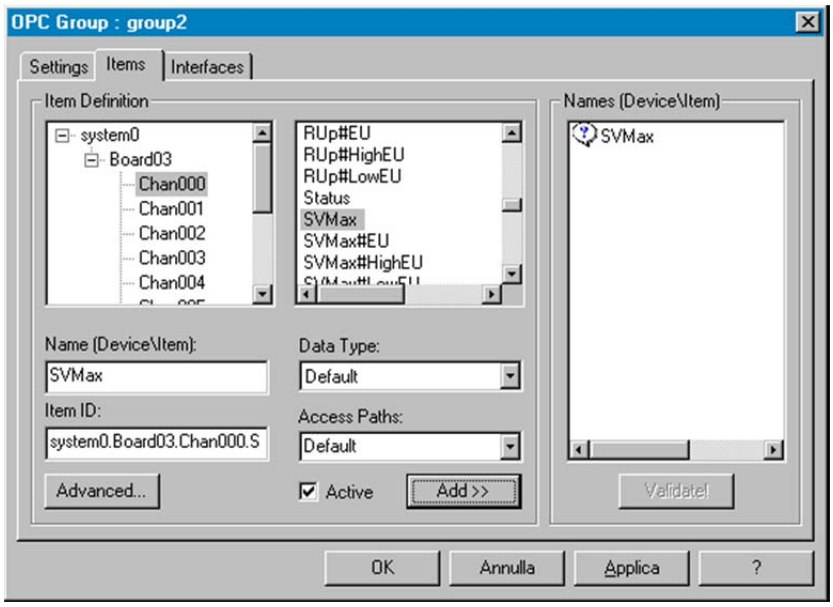


Fig. 26: Adding items to a group

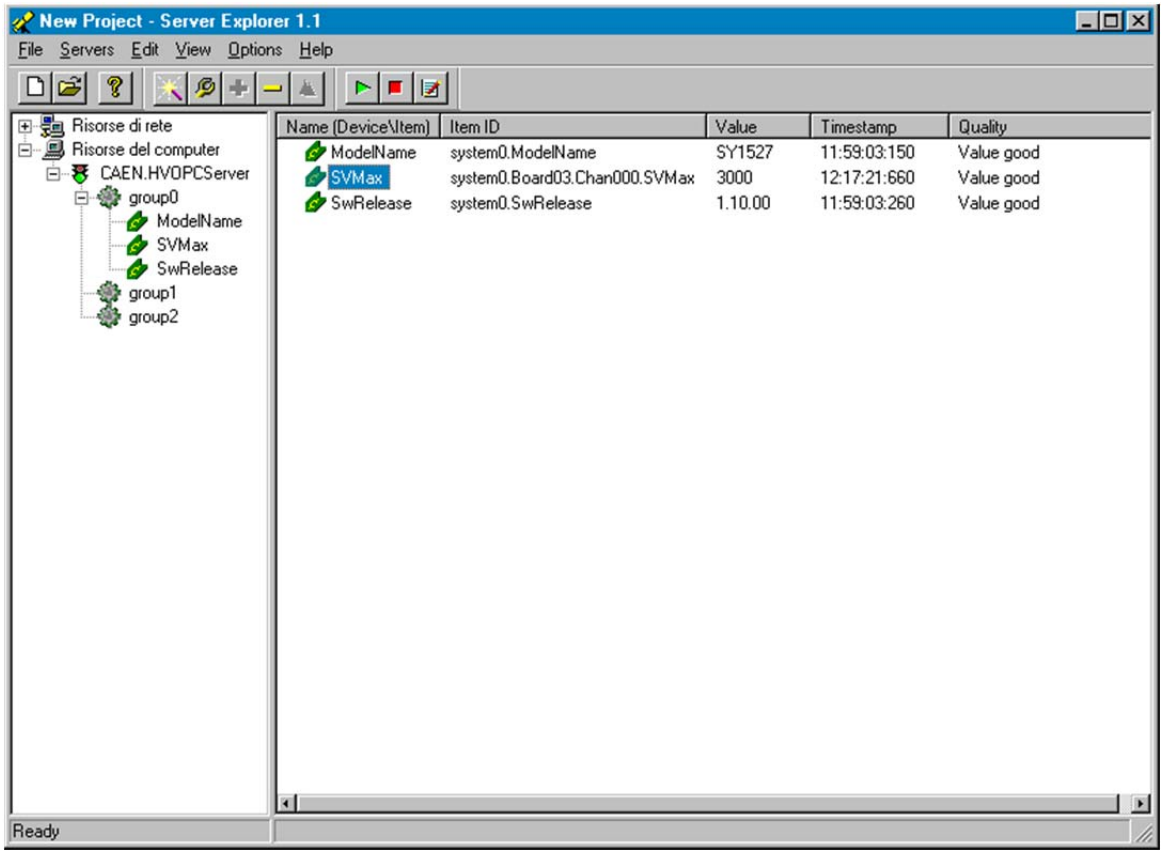


Fig. 27: Active items list

The list of active items appears in the Server explorer main window. To read/write data items or check items' properties, simply double click on the item tag in the main window and select the Read&Write option (see the figure below).

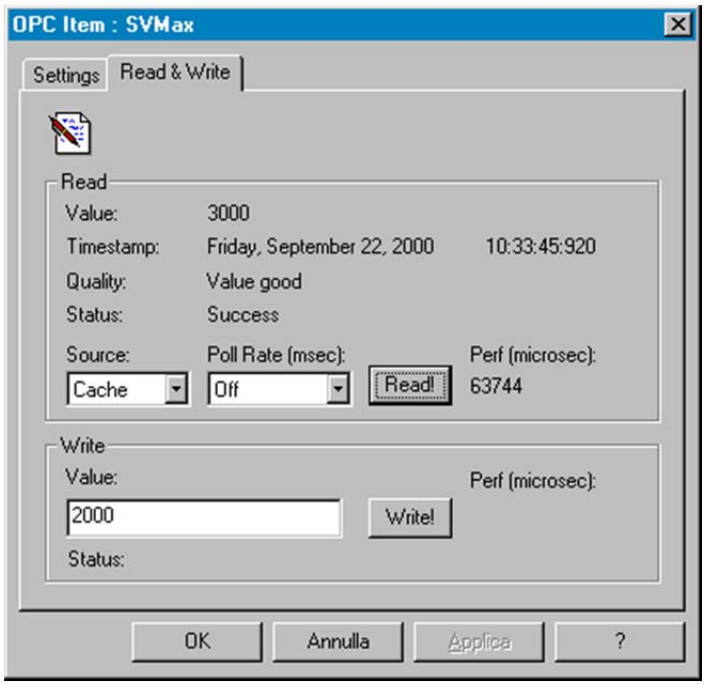


Fig. 28: Read/write data

Softing OPC Client

This section illustrates how to access data items by the help of the Softing OPC Client. In the main menu go to **Server→Add,** in the Browse window double click on "CAEN OPC Server for Power Supplies" then push the OK button; to start the server go to **Server→Start→Deep**.

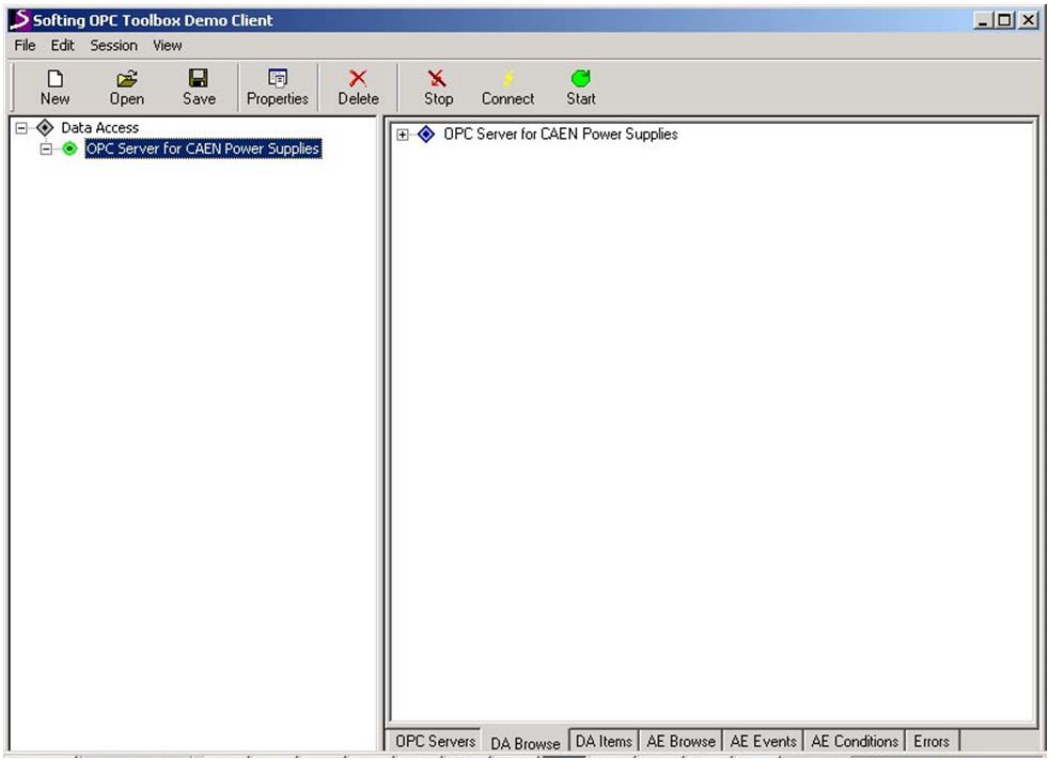


Fig. 29: Connect to OPC server

To add a group, go in the main menu to **Group→Add**, specify the group name in the dialog box and then go to **Group→Start →Deep**. To add items, select a group, go to **Items→Add**, specify the ItemID in the dialog box and click OK, then go to **Item→Start →Deep**. Item properties are indicated in the Properties window.

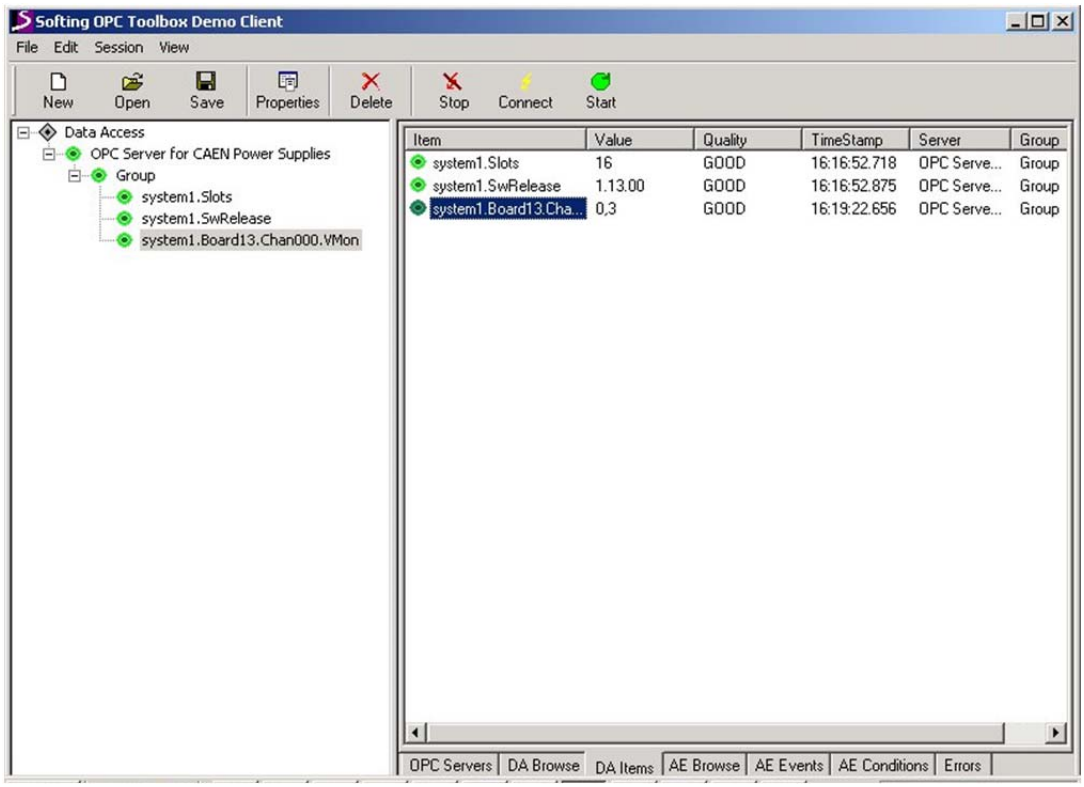


Fig. 30: The VMon item

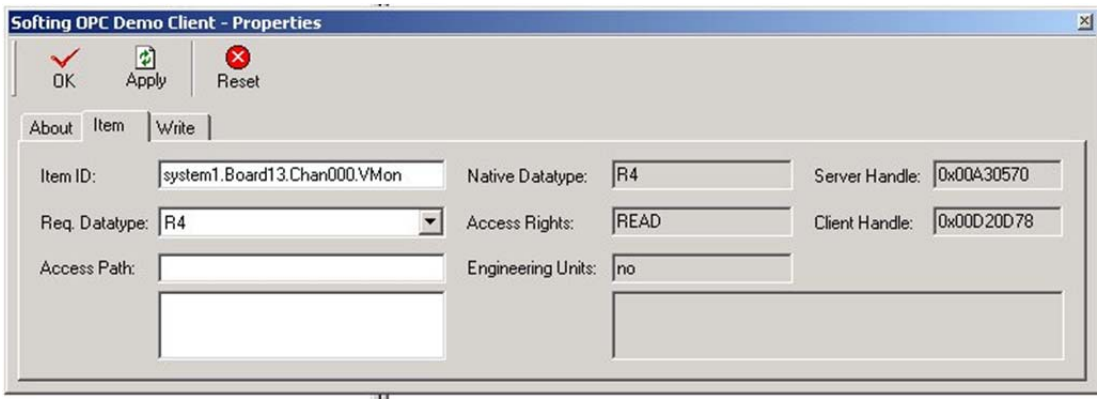


Fig. 31: The VMon item properties

CAEN SpA is acknowledged as the only company in the world providing a complete range of High/Low Voltage Power Supply systems and Front-End/Data Acquisition modules which meet IEEE Standards for Nuclear and Particle Physics. Extensive Research and Development capabilities have allowed CAEN SpA to play an important, long term role in this field. Our activities have always been at the forefront of technology, thanks to years of intensive collaborations with the most important Research Centres of the world. Our products appeal to a wide range of customers including engineers, scientists and technical professionals who all trust them to help achieve their goals faster and more effectively.

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Manual - CAEN OPC Server 5.x rev. 15 - 1 July 2014