

UM2463

CAEN HV Control Software

Rev. 1 - 10 December 2012

Purpose of this User Manual

This User's Manual contains the full description of the CAEN HV Control Software.

Change Document Record

Date	Revision	Changes
19 March 2012	0	Preliminary
10 December 2012	1	Menu modifications, advanced settings

Symbols, abbreviated terms and notation

T.B.D.

Reference Document

T.B.D.

CAEN S.p.A.
Via Vetraia, 11 55049 Viareggio (LU) - ITALY
Tel. +39.0584.388.398 Fax +39.0584.388.959
info@caen.it
www.caen.it

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1 Introduction

The CAEN HV Control Software is an application that allows to manage all the System, Board and Channel parameters related to the SY4527 and SY5527 power supply systems.

CAEN HV Control Software can be executed directly on the SY4527 power supply systems if they are provided with the A4534 LCD Touch Screen; otherwise it can be run on external host PC, connected to the system via TCP/IP, or Tablet PC, connected via wi-fi dongle, whether the A4534 LCD Touch Screen is installed or not.

System requirements

The host PC shall run Windows or Linux OS.

2 Installation

Download and launch the CAENHVControlSw setup file supported by your OS and follow the installation wizard instructions. Click on the shortcut icon and Welcome Window appears as shown below

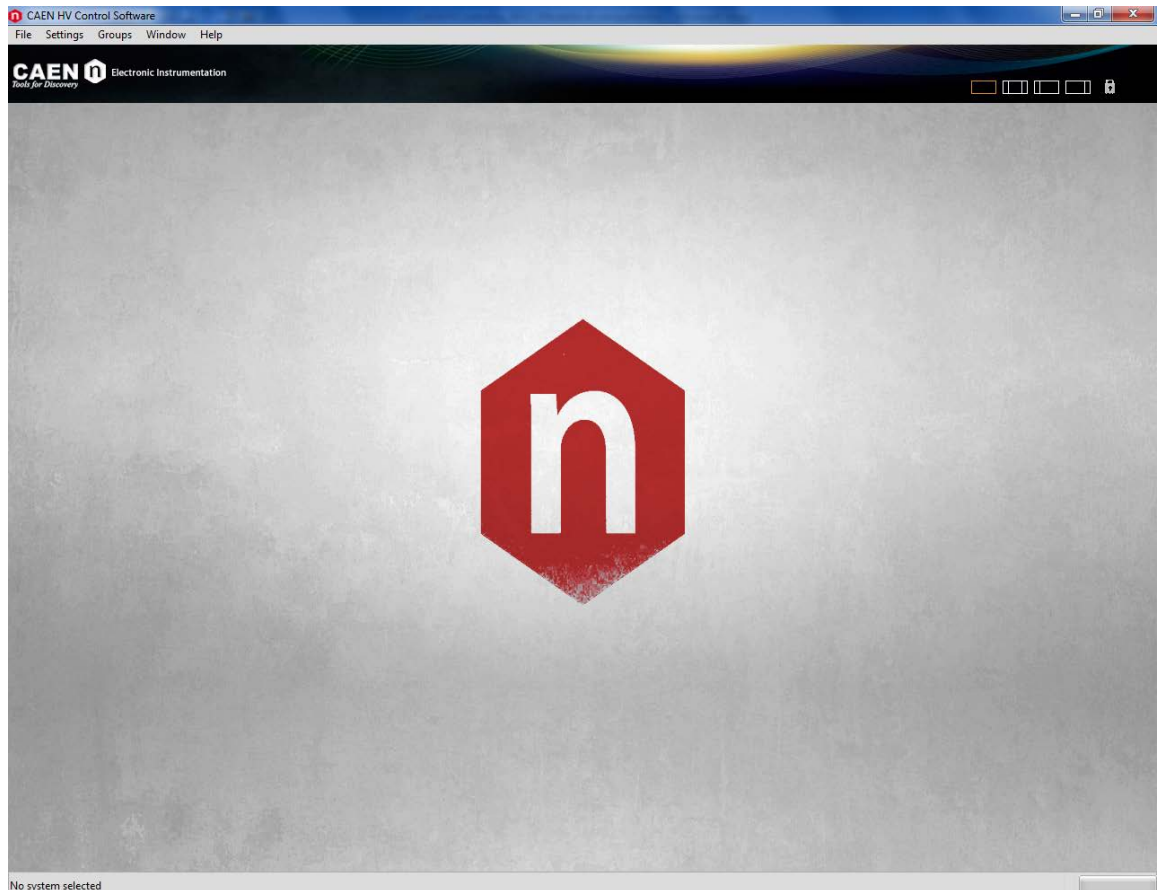


Fig. 1 – Welcome Window

Control Software enhancement activation

CAEN HV Control Software functionality enhancement is available upon purchase. If you have purchased the “Control software functionality enhancement activation code” (ordering code WSW4536XAAAA), prior to installation of the CAEN HV Control Software, you have to:

- access the System via the Web configurator (see SY4527 User’s manual) as “admin”
- go to “Main menu” > License Manager; the following window will open

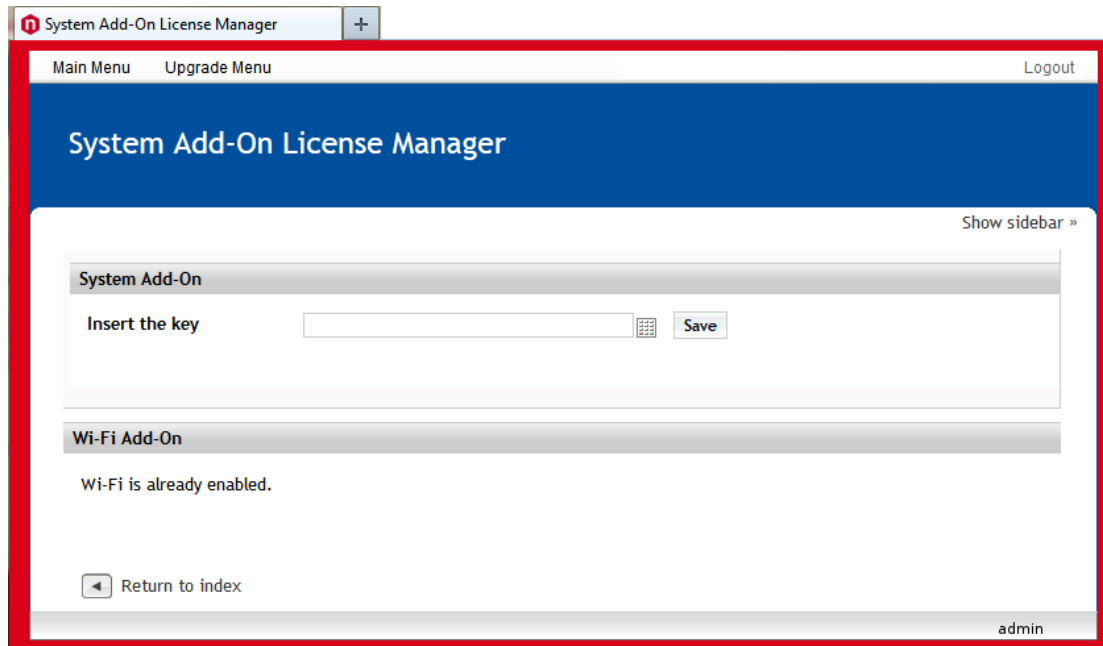


Fig. 2 – Add On License Manager of Web Configurator tool

- Type the “enhancement activation code” you received into the “Insert key” field than select save.
- Install CAEN HV Control Software as described above; the “Advanced Features” (see page 21) will work!

System Log-in

In order to access the system, click on (on the Menu Bar, see page 8)

File > connect

The log-in form will be shown:

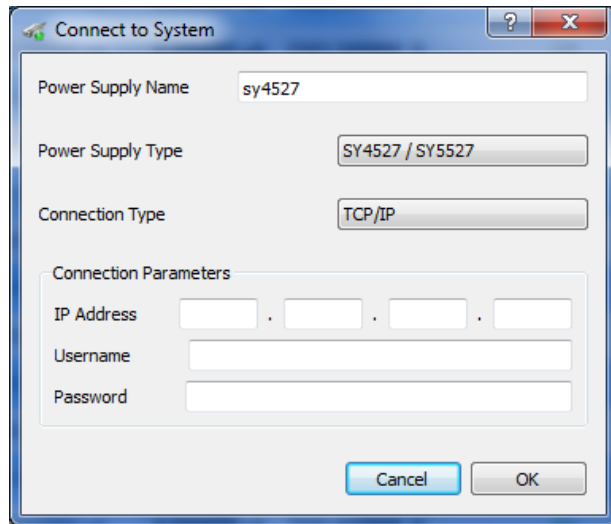


Fig. 3 – Log-in form

Select Power Supply and Connection type, then enter:

- System IP address (of your local network)
- system name (User defined)
- User name: admin (default)
- Password: admin (default)

click on OK and the Main Menu will be shown

3 System configuration

Menu bar

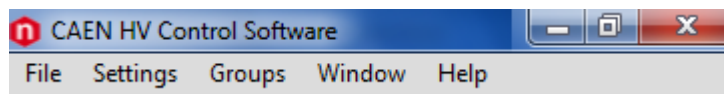


Fig. 4 – CAEN HV Control Software Menu bar

The Menu bar has the following options:

- File: allows to connect/quit the system; “Autosave” allows to store the present Panels layout menu settings
- Settings: allows Custom view design (see page 11); allows to load/save a configuration file (see page 14)
- Groups: allows to manage Groups (see page 24)
- Window: allows to set the layout of panels and main menu (see page 25)
- Help: contains software revision info

Main Window

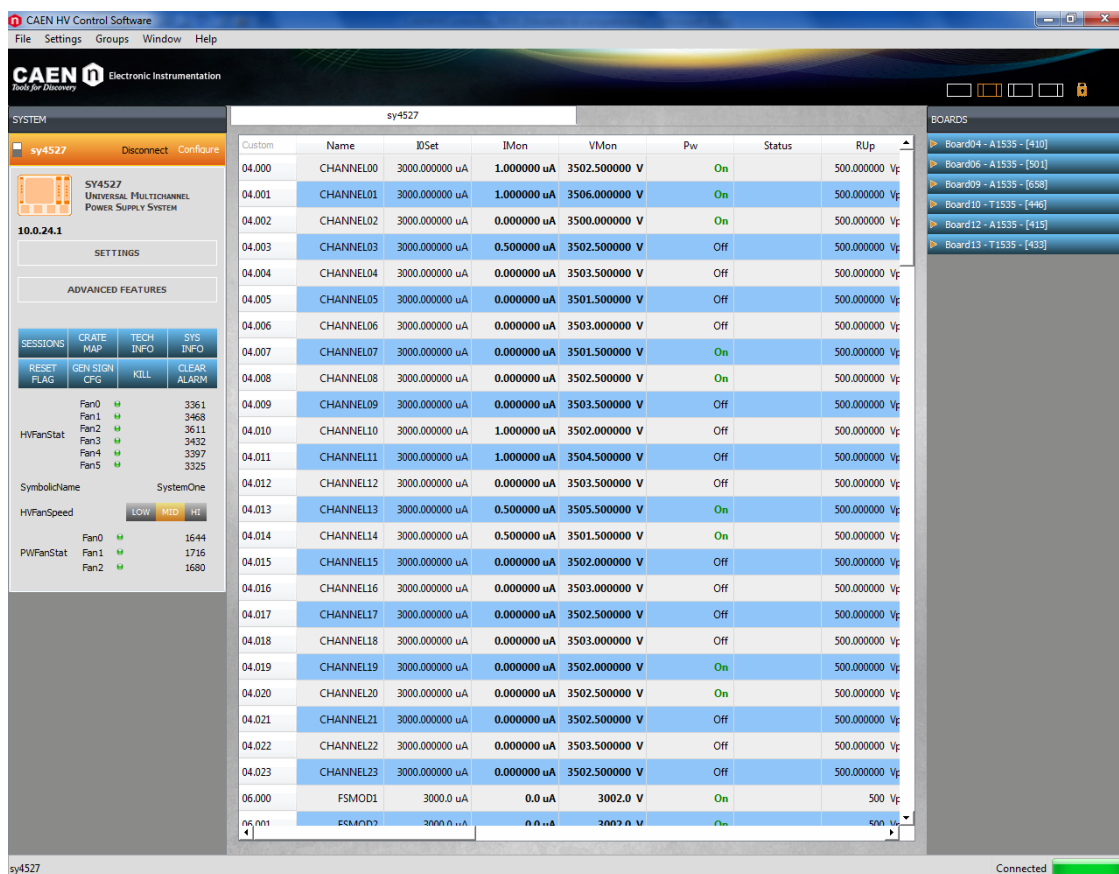


Fig. 5 – Main Window panels

The Main Window is split into three panels: System Panel, Channels Panel and Boards Panel. The buttons in the upper right corner (enabled by clicking the “lock” icon, see figure) allows to view:

- All panels
- Channel panel only
- System panel + Channels panel only
- Channels panel + Boards panel only



Fig. 6 – View buttons

Channels Panel

Custom	Name	IDSet	IMon	VMon	Pw	Status	RUp	RDWn	V0Set	V1Set	IISet
07.000	PRIMARY	25.00 mA	0.00 mA	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	3.00 mA
07.001	CHANNEL01	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.002	CHANNEL02	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.003	CHANNEL03	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.004	CHANNEL04	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.005	CHANNEL05	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.006	CHANNEL06	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.007	CHANNEL07	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.008	CHANNEL08	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.009	CHANNEL09	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.010	CHANNEL10	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.011	CHANNEL11	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.012	CHANNEL12	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.013	CHANNEL13	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.014	CHANNEL14	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.015	CHANNEL15	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.016	CHANNEL16	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.017	CHANNEL17	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.018	CHANNEL18	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.019	CHANNEL19	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.020	CHANNEL20	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.021	CHANNEL21	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.022	CHANNEL22	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.023	CHANNEL23	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.024	CHANNEL24	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.025	CHANNEL25	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.026	CHANNEL26	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.027	CHANNEL27	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-
07.028	CHANNEL28	-	-	0.0 V	Off		500 Vps	500 Vps	1000.0 V	0.0 V	-

Fig. 7 – Channel Parameters panel

Channel Parameters Columns

All parameters and alarm messages from the Power Supply boards are listed in the Channel Parameters Columns: these parameters allow for channel parameter setting and for status control of the channels and of the boards inserted into the crate; the leftmost column indicates slot and channel number. The scroll bars allows to display all the rows and columns.

By left clicking on the item name, it is possible to “drag and drop” rows and columns; this is a “volatile” setting and it is not saved in the configuration file.

In order to update one settable parameter, simply left click on it and type the desired value, within the allowed range, then press <Enter>.

Left click on a column header (set parameters), allow to select all the values in the column (the column will become yellow) and the set value will be written to all channels; it is furthermore possible to select more channels with either combination <ctrl>+<left click> or <shift>+<left click>.

NOTICE! THE TYPES OF PARAMETERS AND ALARM MESSAGES DISPLAYED IN THE CHANNELS WINDOW DEPENDS ON THE TYPE OF BOARD USED: THE PARAMETERS AND ALARMS HERE BELOW REFER TO THE MOD. A1535 HV PWS BOARD!

The combo box in the upper left corner allows to select between Custom, Full and Minimal Tab: “custom” is the Tab with the settings programmed as explained by **Configure** section (page 14); “full” Tab shows all channel and parameters and “minimal” Tab only a factory programmed subset of parameters. This option is not available when “Custom View” (see page 11) is used: in that mode the Tab is always “custom”.

The parameters displayed in the Channels Window for each channel of each board are:

Table 1 – Available Channel Parameters

Parameter	Description
CHANNEL NAME (settable):	descriptive name for the relevant channel
V0SET (settable):	the first of the two allowed voltage programmable values.
I0SET (settable):	the first of the two allowed current limit programmable values
V1SET (settable):	the second of the two allowed voltage programmable values
I1SET (settable):	the second of the two allowed current limit programmable values
RUp (settable):	the Ramp-Up parameter value, i.e. the maximum voltage programmable increase rate.
RDWn (settable):	the Ramp-Down parameter value, i.e. the maximum voltage programmable decrease rate.
TRIP (settable):	the TRIP parameter value, i.e. the maximum time an Over Current condition is allowed to last.
SVMAX (settable):	the maximum voltage value programmable for the channel. If the value set as SVMAX is less than the current value of the V0SET/ V1SET parameter, the latter will automatically decrease to the SVMAX value.
VMON (monitor):	monitored voltage value
IMON (monitor):	monitored current value
STATUS (monitor):	it displays the channel status.
PW (ON/OFF):	the Power parameter shows the ON/OFF channel status. As this parameter is set ON, the channel is switched on (if the INTERLOCK is not active and if the channel is enabled either locally or remotely).
POn (EN/DIS):	Power-On option, which can be enabled or disabled. If this option is enabled, at Power-On or after a Restart each channel is restored in the same condition (defined by the Power parameter) it was before the Power-Off or Reset. If this option is disabled, at Power-On or after a Restart all the channels are off, independently from the condition in which they were before the Power-Off or Reset.
PDwn (Kill/Ramp):	Power-Down option, which can be set as KILL or RAMP. It affects the way the channels react at a Power-Off command caused by a TRIP condition. If the KILL option is selected, the relevant channel will be switched off at the maximum rate available. If the RAMP option is selected, the voltage will drop to zero at a rate determined by the value of the Ramp-Down parameter programmed for that channel.
TripInt:	2N-bit word (Dec. $0 \div 2^{2N-1}$), where N is the number of the board's Internal Trip Bus lines. Bits [0;N-1] allow the channel to sense the trip status from the corresponding lines when set to one; in the same way, bits [N;2N-1] allow the channel to propagate the trip status over the Trip Bus: bit N on line 0 and so on (see SY4527 User's manual). Please check also the Board User's Manual, since some boards provide a decimal TripInt parameter, while other boards provide a hexadecimal TripInt.
TripExt:	Must be set in the $0 \div 255$ range. Bits [0;3] allow the channel to sense the trip status from the corresponding lines when set to one; in the same way, bits [4;7] allow the channel to propagate the trip status over the trip bus: bit 4 on line 0 and so on (see SY4527 User's manual). Please check also the Board User's Manual, since some boards provide a decimal TripExt parameter, while other boards provide a hexadecimal TripExt.

Custom View

CAEN HV Control Software allows to display a set of channel and parameters among those in the controlled system network; in order to do this, go to (on Menu Bar)

Settings > Custom View

As the Custom View pop up windows opens, select “parameters” tab and add items to be displayed by clicking on them; they will be hi-lighted in blue:

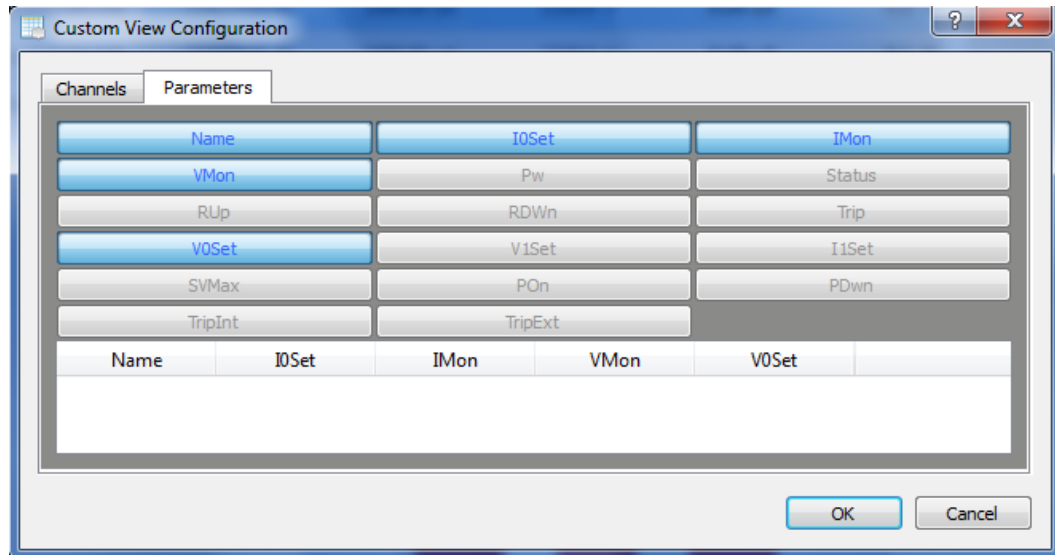


Fig. 8 – Custom View parameter selection

The “enabled” parameters will be displayed in light blue; the bottom row shows the enabled parameters; by left clicking on the item it is possible to “drag and drop” it along the row: this allows to select the column order in the **Channels Panel**.

When you are ready, select “Channels” tab;

Then select by clicking, the system and/or board to be ‘customized’:

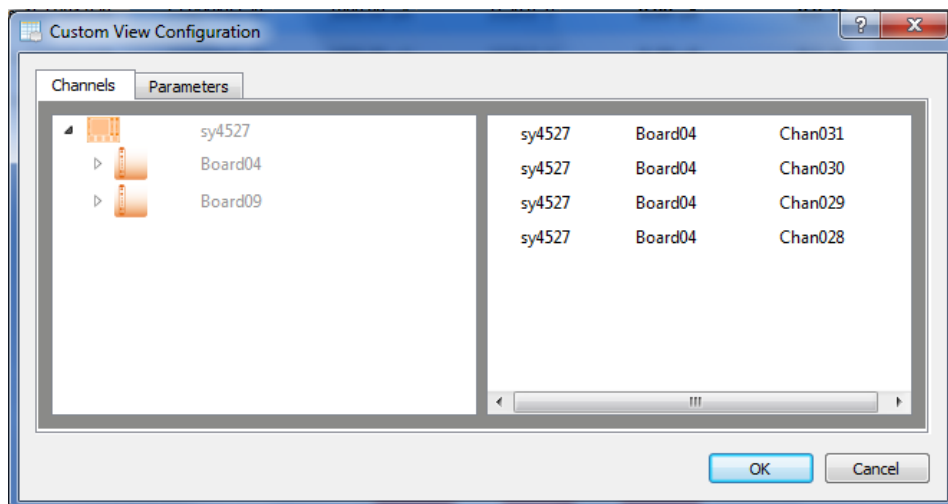


Fig. 9 – Custom View Channel selection

It is possible to add channels to Custom View by clicking on them; selected channels will be shown in the right column.

The order of the Systems, Boards and Channel in the network is the same sequence used when they have been selected.

At this point click [OK]. You will be re-directed to Main Menu. Now, if you click the Custom View thumbnail in the Channel section, only the selected parameters and channels will be shown:

sy4527		CustomView			
	Name	IOSet	V0Set	IMon	VMon
(sy4527)04.031	CHANNEL31	1000.00 uA	1520.0 V	0.00 uA	0.0 V
(sy4527)04.030	CHANNEL30	1000.00 uA	1520.0 V	0.00 uA	0.0 V
(sy4527)04.029	CHANNEL29	1000.00 uA	1520.0 V	0.20 uA	0.1 V
(sy4527)04.028	CHANNEL28	1000.00 uA	1520.0 V	0.00 uA	0.2 V

Fig. 10 – Custom View Channel section

Configuration files

Configuration files of Custom view and System settings (see also **Configure** section) can be saved and retrieved by using Settings > Save/Load;

The following pop up will be shown; it is possible to save the configuration of all connected systems or only a selection of these, besides for example we decide to save the custom view setting:

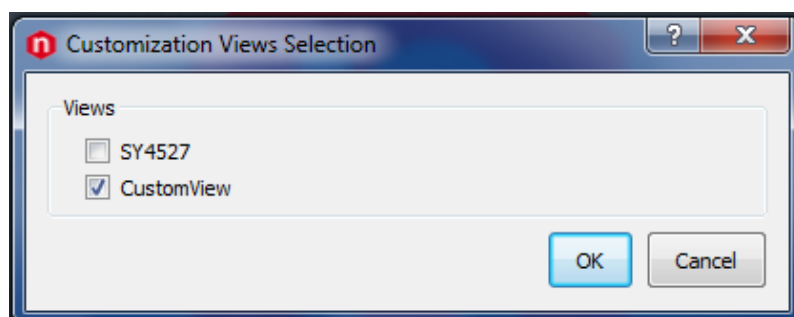


Fig. 11 – Custom View Configuration file record

The configuration file will be saved as csc file:

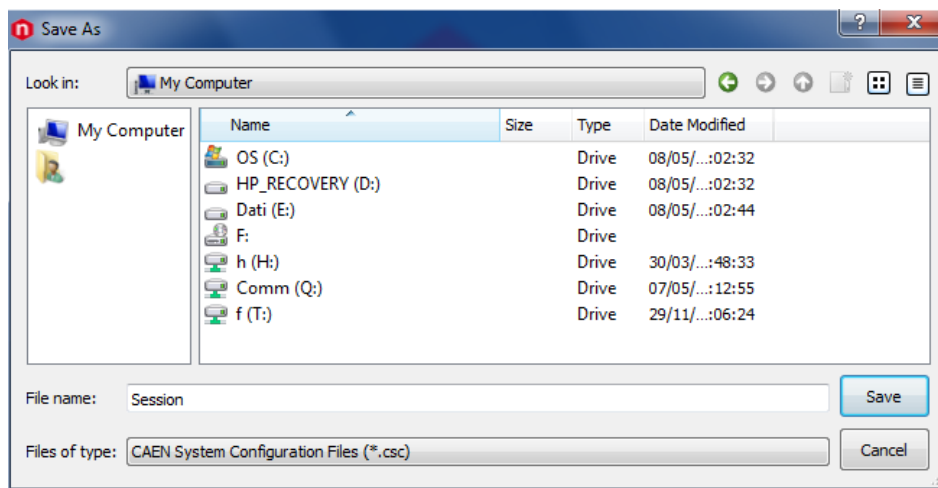


Fig. 12 – Custom View Configuration file saving options

Then it will be possible to retrieve it in a later moment, by going to Settings > Load:

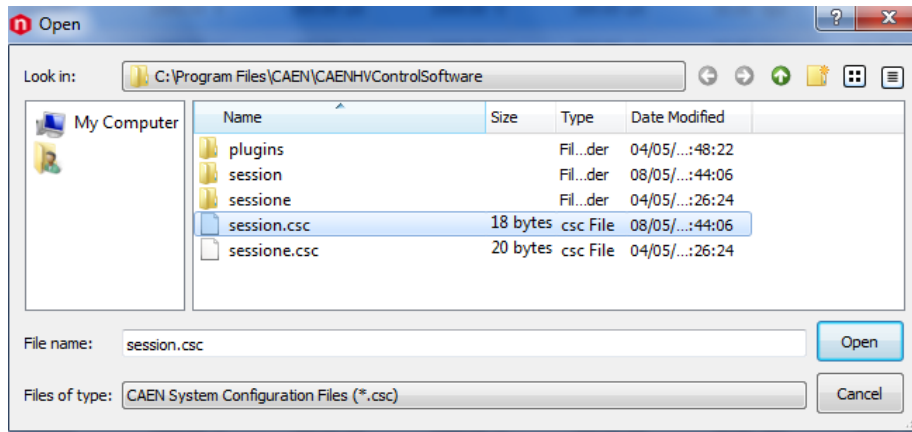


Fig. 13 – Custom View Configuration file load

Once selected the desired file, a dialog box will allow to select the configurations for the used systems; if it is necessary to connect to one or more selected systems, user ID and password must be entered:

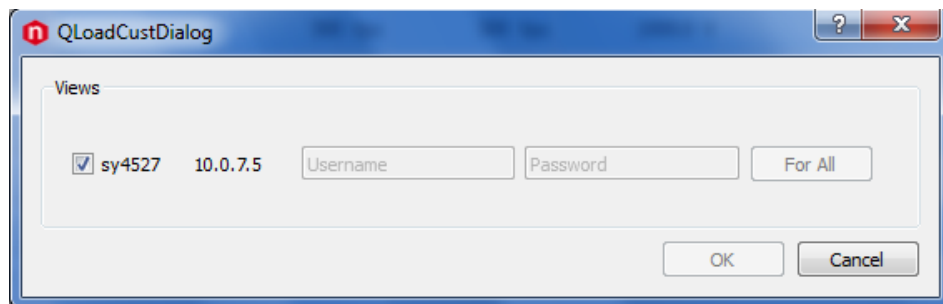


Fig. 14 – Load dialog box

System Panel

The leftmost panel houses all the system settings

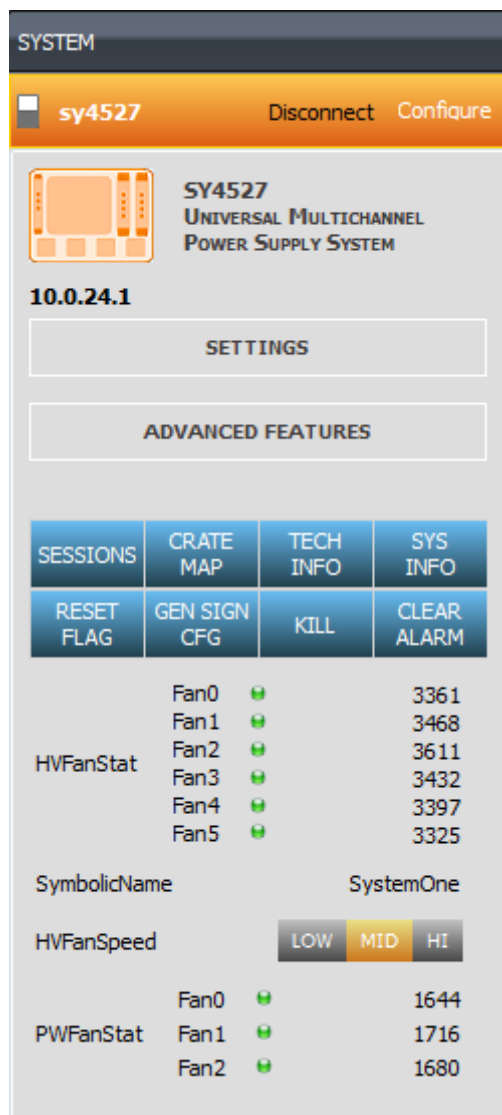


Fig. 15 – System settings

The SYSTEM Panel allows also to:

- set Hv Fan Speed (LO, MD, HI) and Symbolic name
- monitor HV Fan Status and Power Fan Status

System bar

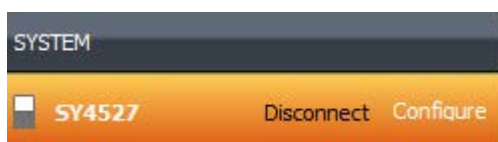


Fig. 16 – System bar options

This sub menu hosts two options:

Disconnect

It allows to disconnect from the System

Configure

This option allows to select which boards, channels and parameters of the connected System, will be displayed in the **Channels Panel**.

By clicking on <Configure> the following window opens [Channels] tab:

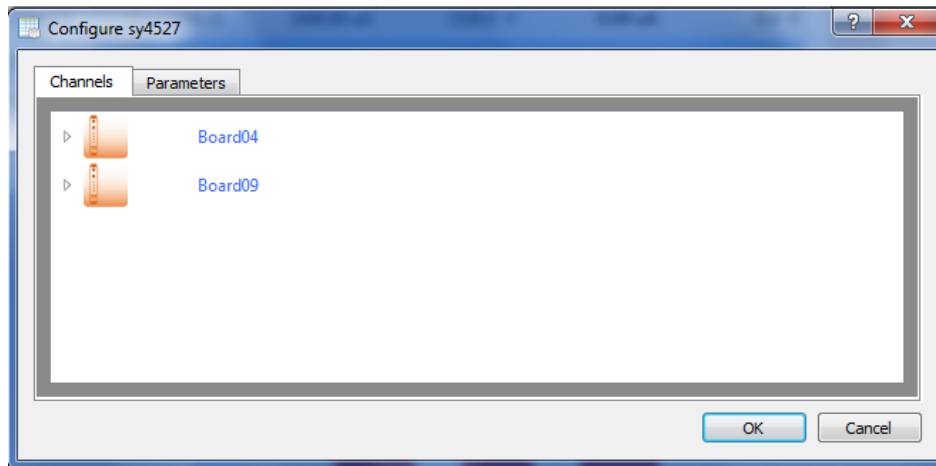


Fig. 17 – System boards configuration

The order of the boards to be displayed into the **Channels Panel** can be selected by the User, by dragging and dropping the icons with the mouse left button.

By clicking on the board icon pointer of the board, this one is “expanded” with the channels numbers:

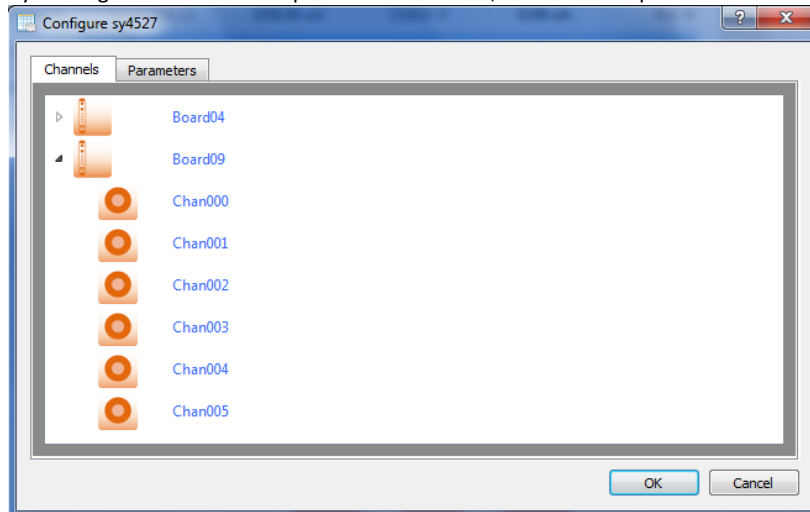


Fig. 18 – System channels configuration

In order to remove one channel or board from the **Channels Panel** (see page 9), click on the relevant name: the item name will become gray and the relevant rows in the **Channels Panel**, will be removed (background).

By opening the [Parameters] tab, the following window opens:

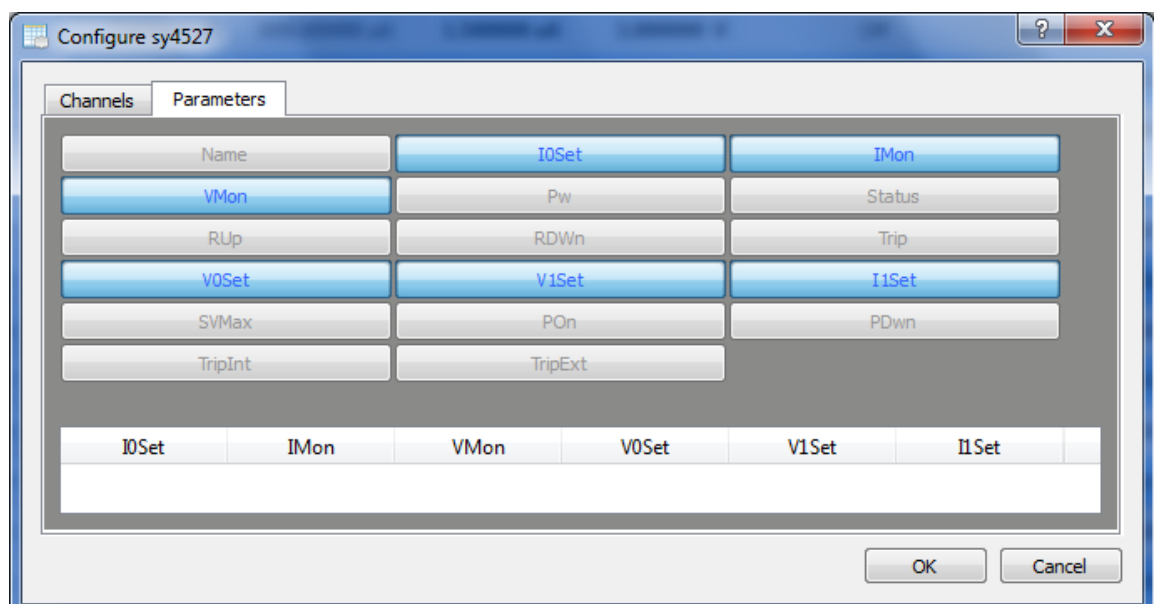


Fig. 19 – System parameters configuration

In order to remove one parameter from the **Channels Panel**, click on the relevant box: the item box will become gray and the relevant column in the **Channels Panel** will be removed.

The “enabled” parameters will be displayed in light blue; the bottom row shows the enabled parameters; by left clicking on the item it is possible to “drag and drop” it along the row: this allows to select the column order in the **Channels Panel**.

Once these settings are done, the **Channels Panel** will display the updated configuration (only selected channels and parameters are shown); the configuration can be saved and retrieved it in a later moment, by using (on the Menu Bar) Settings > Save/Load;

The following pop up will be shown:

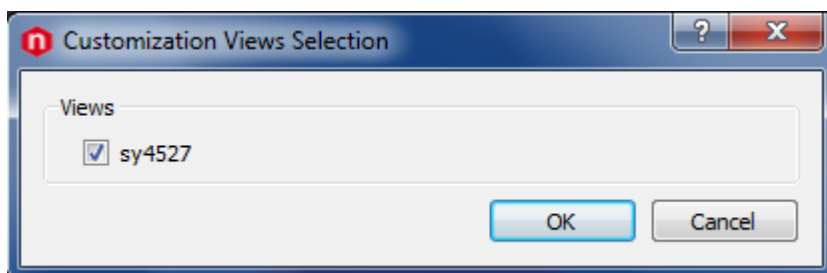


Fig. 20 – System Configuration file record

Click on OK, then select the configuration file name (csc file type, for example “system.csc”) and path:

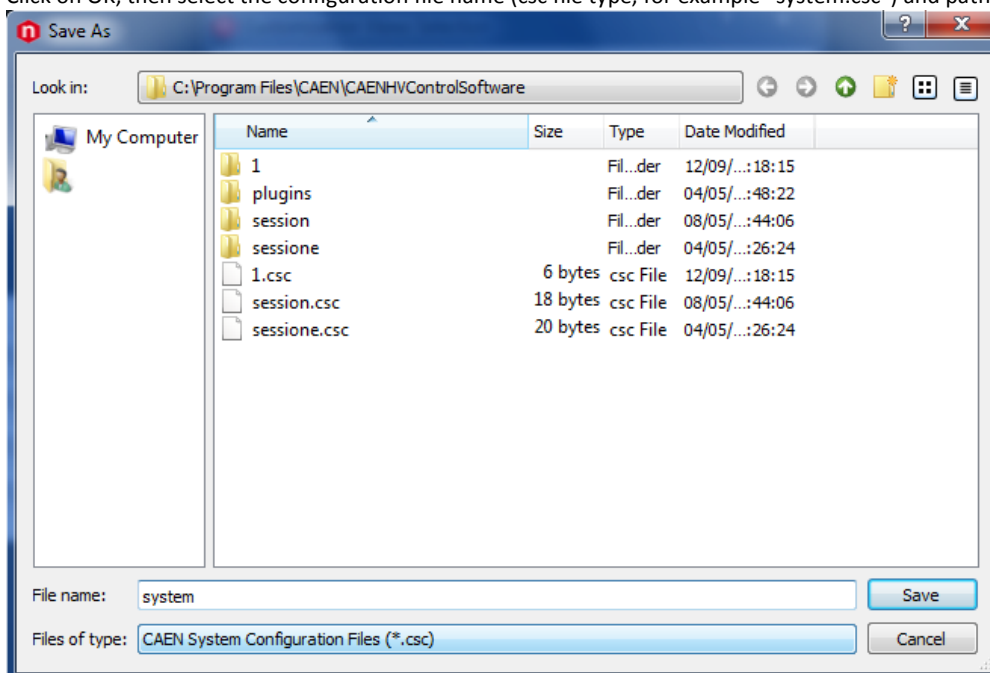


Fig. 21 – System Configuration file saving options

Then it will be possible to retrieve it in a later moment, by going to Settings > Load:

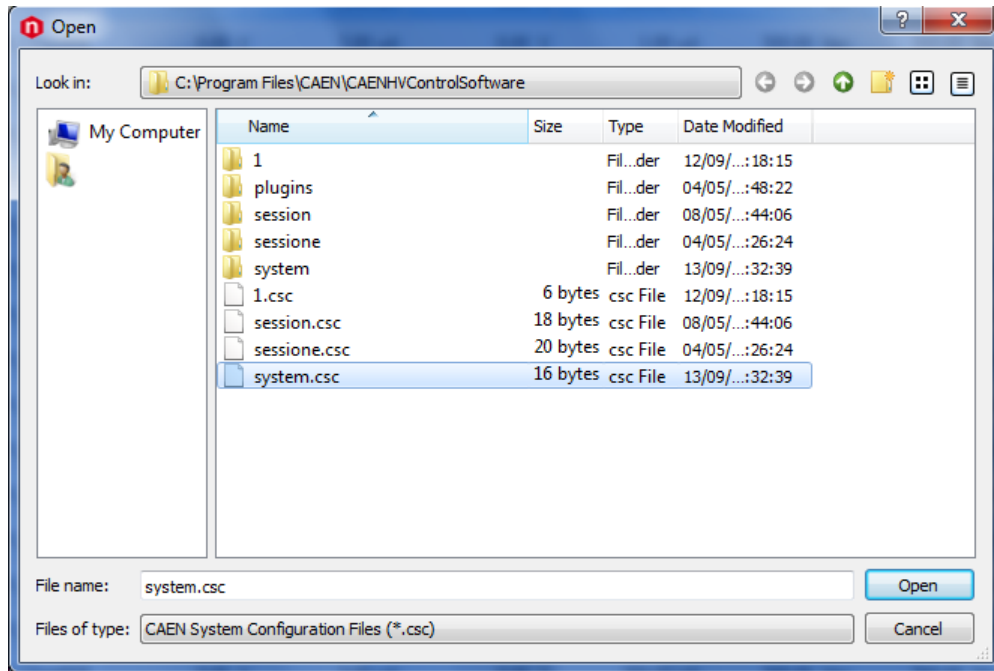


Fig. 22 – System Configuration csc file load

N.B.: A retrieved configuration file works properly if the System layout (board types and slots) has remained the same!

Settings

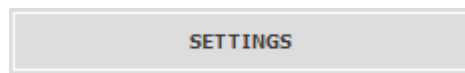


Fig. 23 – Settings Button

The Settings options allows to access the SY4527 Web configurator, described in the UM2462 - SY4527 User Manual

System Information



Fig. 24 – System buttons

The System buttons allow to access the following parameters:

SESSION

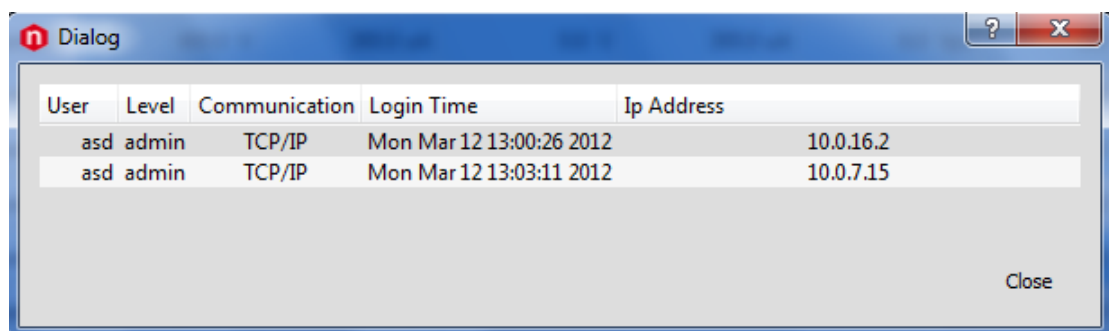


Fig. 25 – Session dialog box

The Session Window displays all the users (Username) presently connected to the system and gives information about their Access Level as Guest, User or Administrator (Level), the Communication Line (Comm Line) they are using, Login Time: the time (day, month, hour, year) at which they started the connection and the IP Address used.

KILL

As Kill is selected, the pop-up window shown below will appear: if you want to forward the KILL command, select the YES button

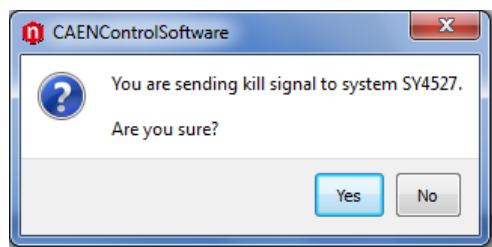


Fig. 26 – KILL dialog box

CLEAR ALARM

The Clear Alarm command allows to remove all the alarm conditions which appeared in the Channel Status column of the Channel Window. This operation automatically resets the alarm conditions without requiring the power on of the channels. Moreover, it sets the TRIP counter again to its initial programmed value, so that the TRIP counter will start again from the programmed TRIP value as soon as another Over Current condition occurs.

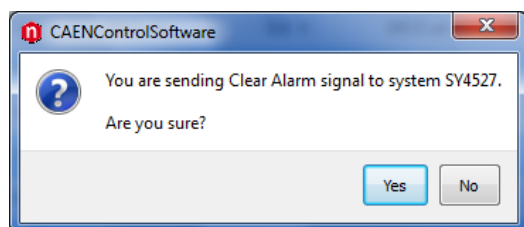


Fig. 27 – Clear Alarm dialog box

GENERAL SIGNAL CONFIGURATION

This command allows to define the condition to assert the GEN signal and light up the relevant LED. The relevant pop-up window contains a list of quantities which allow to define the condition for asserting the GEN signal according to the following relation:

$$\text{GEN} = \text{ENABLE} \wedge (\text{OVC} \vee \text{OVV} \vee \text{UNV} \vee \text{TRIP} \vee \text{ALWAYS}) .$$

To select any of these quantities flag the relevant field then select OK.

ENABLE corresponds to enable the GEN signal generation and consequently must be always selected in order to assert the GEN signal.

OVC, OVV, UNV, TRIP are signals for system status monitoring, If one or more of them are selected and the ENABLE is selected too, the GEN signal is asserted TRUE at the occurrence of any of the selected conditions.

ALWAYS allows to assert the GEN signal TRUE anyway. If it is selected and the ENABLE is selected too, it asserts the GEN signal TRUE anyway, independently from the status of the other signals mentioned above (OVC, OVV, UNV and TRIP).

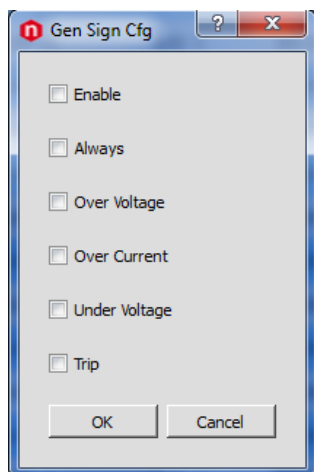


Fig. 28 – GEN signal dialog box

CRATE MAP

Crate Map shows what types of boards are inserted into the crate and in which slot they are plugged into.

The Crate Map Window is shown below: the first column on the left indicates the number of the Slot (from 0 to 15) together with the model of the board inserted into the slot (if any). A short description of the board with its features and serial number follows the board model. Last column shows the firmware release.

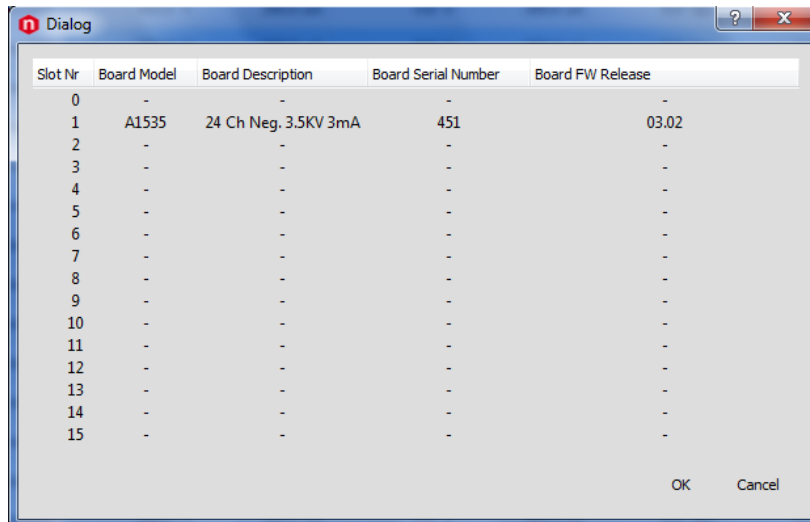


Fig. 29 – Crate Map dialog box

RESET FLAG

This command opens the Reset Flag pop-up window which allows to enable the different reset conditions and to assert TRUE the RESET FLAG output signal (and relevant LED alight) accordingly.

Specifically, the RESET FLAG output signal can be asserted TRUE at the occurrence of one of the following types of resets:

BP WatchDog, i.e. a reset of the board section due to a firmware control failure.

BP Front Panel Reset, i.e. a reset of the board section sent via front panel;

BP User Software Reset, i.e. an auto-reset of the board section due to a command forwarded by the user;

PC Front Panel Reset, i.e. an reset of the CPU section sent via front panel;

PC User Software Reset, i.e. an auto-reset of the CPU section due to a command forwarded by the user;

PC Failure Self Reset, i.e. a reset of the CPU section due to a failure;

If more than one reset types are selected, the RESET FLAG signal will be asserted at the first occurrence of any of them.

This window allows also to enable the relevant reset condition, i.e. if a condition is tagged, it is enabled; if it is not tagged, it is disabled. For example, if the PC front panel reset is not tagged, a signal sent through the front panel connector does not reset the CPU.

Default settings are shown in the figure below:

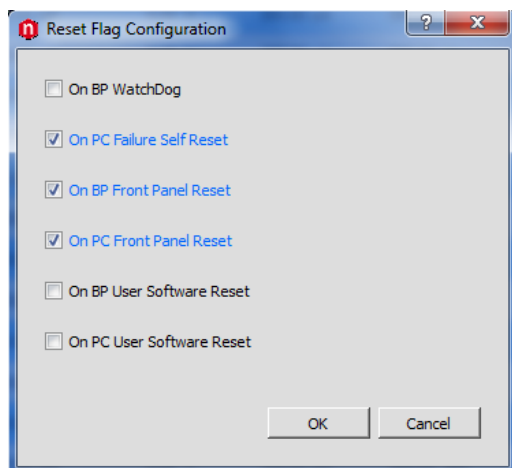


Fig. 30 – Reset Flag dialog box

TECH INFO

This command allows to access to the following dialog tabs:
CPU and Power modules information; provides some data about CPU and FPGA running firmware, power supplies status.

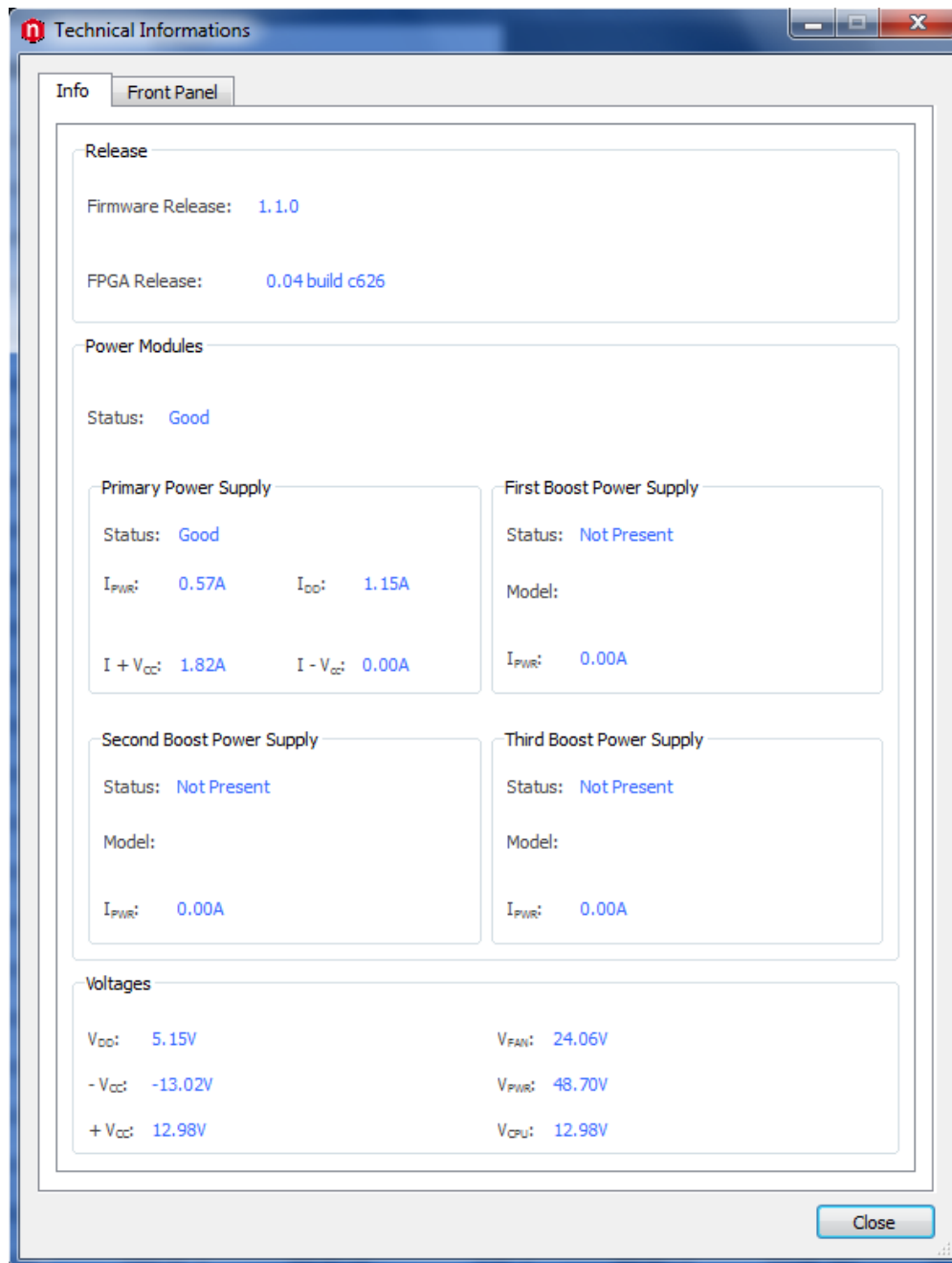


Fig. 31 – CPU and Power supplies info

Front panel tab; provides the status of the CPU front panel monitors and allows to set CPU front panel output signals levels (NIM or TTL); selected level is signalled by relevant front panel led on

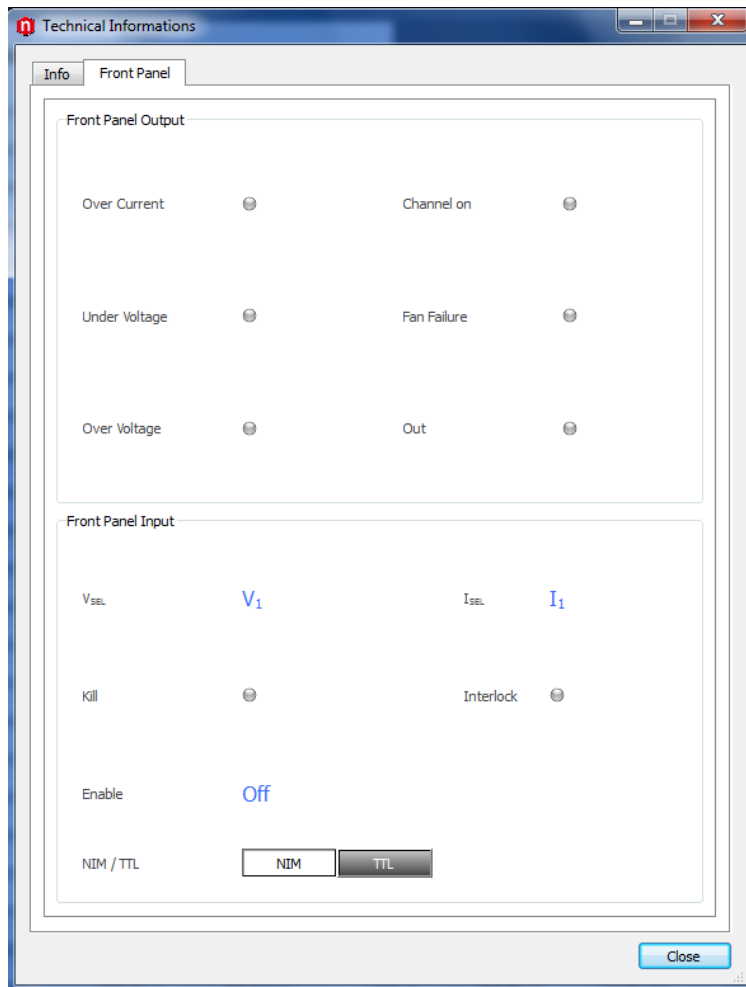


Fig. 32 – CPU front panel info

Advanced Features

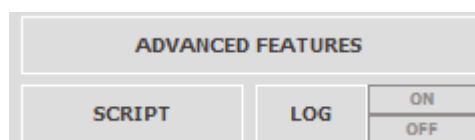


Fig. 33 – Advanced Features button

IMPORTANT!: Advanced Features are available only if SY4527/SY5527 control software functionality enhancement is INSTALLED on the A4528 CPU, and ACTIVATED (see page 6)

The Advanced Features option allows to:

- Create a script
- Create a log file

Advanced Scripting

By clicking on Advanced Features > Script the following dialog window opens:

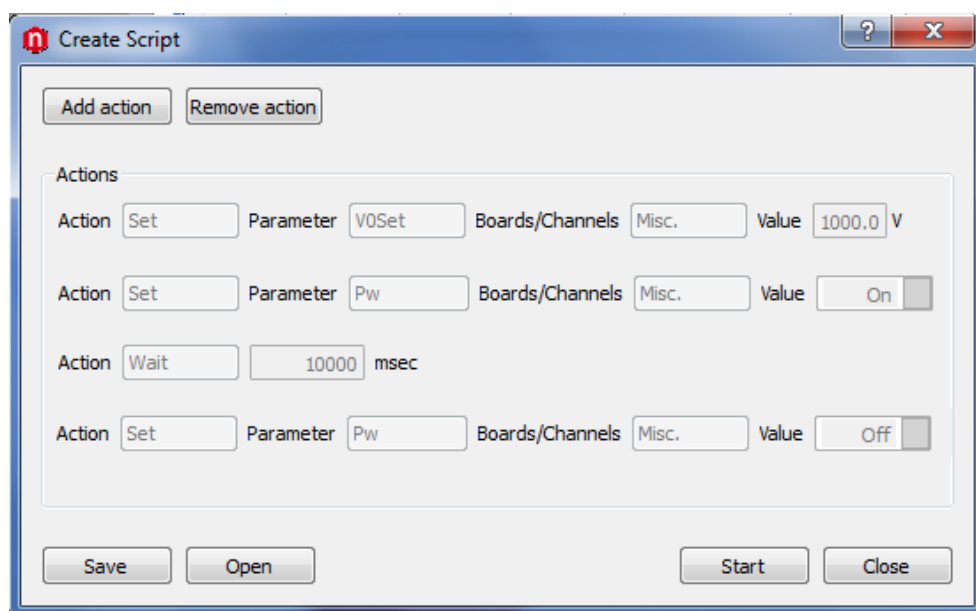


Fig. 34 – Create Script Pop up

This option allows to create or retrieve a “script” that allows to perform one or more setting on a set of channels in the system.

For example we want to program the following sequence (see Fig. 34):

1. set to 1000V the V0set parameter on all channels of the A1536 Board in the Slot 4
2. turn the channels on
3. wait 10 seconds
4. turn the channels off

It is necessary to add 4 actions to the script:

1. choose: Add action > Action [Set] > Parameter [Iset] > Board Channels [Misc: *select board and channels in the same way described by Configure option on page 14*] > Value [*write the desired value, for example 1000V*]
2. set PW ON
3. select Action [wait], and then type the delay value (100000msec)
4. set PW OFF

At this point click [Start] and the “script” will be executed. [Save] button allows to record the script as .cas (CAEN Action Script) file, and [Open] to retrieve it in a later moment.

Advanced Logging

The Log option allows to create a Log file of the values of a certain parameter out of a set of channels in the system. In order to do this, click [Log] button; the following dialog tab will open:

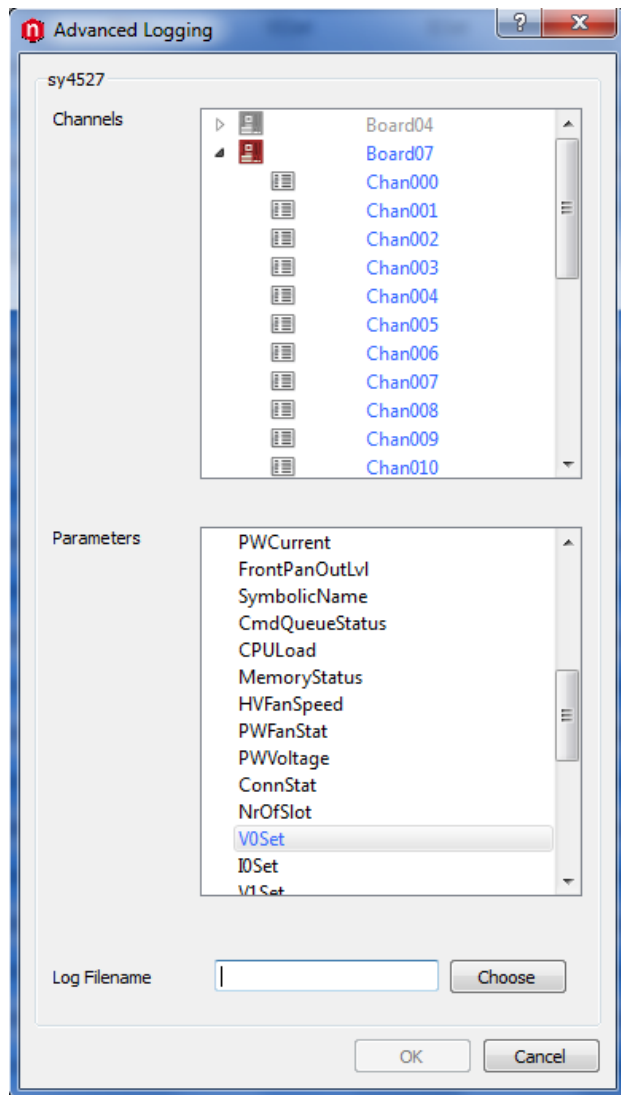


Fig. 35 – Create Log file Pop up

This tab allows to select the System, board and channels parameters to be monitored. Once selection is performed, it is necessary to type Log Filename: the file where the selected parameters will be tracked; at this point click “OK”. Logging will be started by set “Log” to “ON” (it will become RED, see Fig. 33);

Log files look like this:

```
[2012-09-26T17:52:50]: [sy4527] live inserted/removed board;
[2012-09-26T17:53:23]: [sy4527] live inserted/removed board;
[2012-09-26T18:02:31]: [sy4527] live inserted/removed board;
```

If, for example, we monitor V0set parameter of channel 0 of board slot 11, log file will be:

```
[2012-12-05T11:26:25]: [sy4527] bd [11] ch [0] par [V0Set] val [1000];
[2012-12-05T11:30:02]: [sy4527] bd [11] ch [0] par [V0Set] val [900];
```

Boards Panel

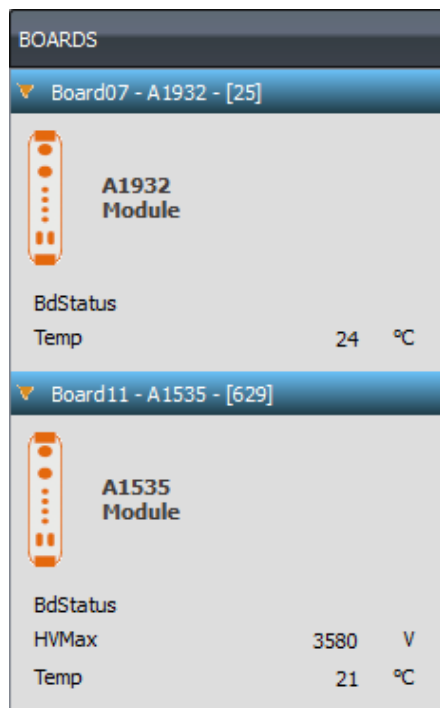


Fig. 36 – Boards panel

The rightmost panel of the main tab houses the list of the Boards in the system and the board parameters; board serial number is between [].

Groups configuration

The Groups Menu allows to create custom groups of channels, containing a subset of the channels available. In order to create a new group, follow this procedure:

Select Groups (Groups entry on Menu bar) > New group

- Enter new Group Name,
- Select parameter
 - the channels tab will show boards and channels to add
- Add board and channels

Selected items are listed in black, de-selected ones are gray

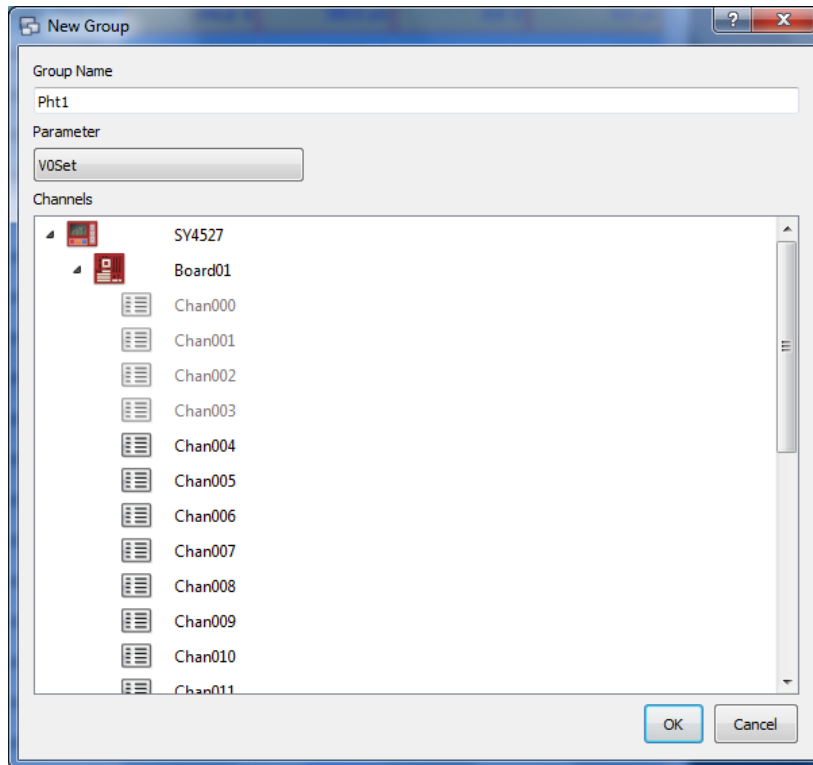


Fig. 37 – Group selection

In order to edit one settable parameter value, select it (for example V0Set) then click OK; the parameter value will be boxed in red

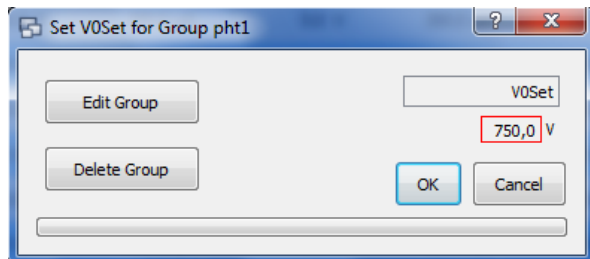


Fig. 38 – Group parameter setting

Type the parameter value (within the allowed range) then click OK, the value will be updated on all group channels (unless V0Set in some channels would exceed Software Max value; in that case the parameter will be set equal to the programmed maximum on those channels).

Existing Groups can be retrieved and edited by clicking the Groups entry on menu bar (select by group name); see figure below:

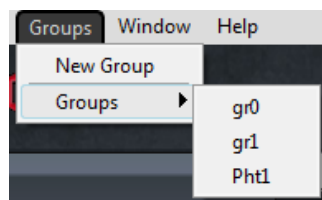


Fig. 39 – Open Existing Group

Window settings

Allows to set the visualization of the channels tab, by selecting “Window” in the upper Menu bar; three options are available (Tabbed, Tiled or Floated).



Fig. 40 – Window “floated” view



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.



CAEN S.p.A.
Via Vetraria, 11
55049 Viareggio
Italy
Tel. +39.0584.388.398
Fax +39.0584.388.959
info@caen.it
www.caen.it

CAEN GmbH
Klingenstraße 108
D-42651 Solingen - Germany
Phone +49 (0)212 254 4077
Fax +49 (0)212 25 44079
Mobile +49 (0)151 16 548 484
info@caen-de.com
www.caen-de.com
CAEN GmbH

CAEN Technologies, Inc.
1140 Bay Street - Suite 2 C
Staten Island, NY 10305
USA
Tel. +1.718.981.0401
Fax +1.718.556.9185
info@caentechnologies.com
www.caentechnologies.com