

Technical Information Manual

Revision n. 3
2 November 2009

MOD. A4602
CMS SILICON TRACKER
CCU RING PSM
MANUAL REV. 3

NPO:
00113/05:A4602.MUTx/03

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1. EASY Embedded Assembly System

1.1 Functional description

EASY (Embedded Assembly SYstem) is the new CAEN power supply solution for operation in magnetic field and radioactive environment. CAEN has been involved for more than a decade in developing different solutions for the main LHC experiments, where the electronic equipment of the experiment is dealing with high dose radiation and intense magnetic field. In order to provide safe and reliable operations in such hostile areas, CAEN started tests with rad-tolerant components and magnetic field resistant solutions, patenting the new technology that is now used in this new line of products. Moreover, though designed for harsh environment, the EASY modules can work also in normal condition with excellent performance. In the new architecture, the power supply can be located directly in the hostile area, where the EASY modules provide a wide variety of output voltages to satisfy the requirements of most detectors and front-end electronics. The control of the EASY power supply system is done remotely using a Branch Controller (Mod. A1676A) plugged in a SY1527 or SY2527 mainframe located in the control room. Each A1676A branch controller can handle up to 6 EASY crates: in this way, one SY1527 power supply system, for example, housing up to 16 A1676A boards, can handle up to 96 EASY systems. The EASY crate can house up to 10 boards, depending on the boards' width. The branch controller is the interface between the mainframe (SY1527 or SY2527) and the remote boards in the EASY crate: its role is to configure the EASY channels as if they belong to the supply unit slot in which the branch controller is located. All the channels of the EASY boards will be considered as channels of the branch control board, thus hugely increasing the number of channels the system can handle. Through the mainframe, the provided and fully reliable OPC server permits an immediate and "automatic" interfacing with the custom control software; moreover, a C-library for Windows and Linux is available as well. The EASY crate can be used with an air and/or water intercooler and its standard width fit the rack mounting. Fig. 1.1 shows the system's block diagram.

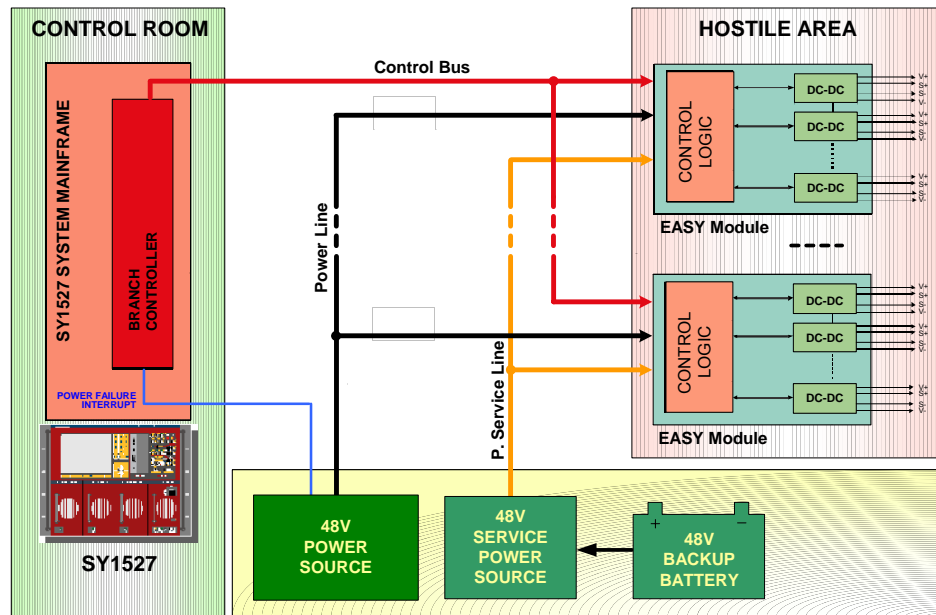


Fig. 1.1 – System's block diagram

1.2 The CAEN Multichannel Power Supply System Overview

The SY1527 system is the fully equipped experiment version of a new line of power supply systems which represent CAEN's latest proposal in the matter of High Voltage and Low Voltage Power Supplying. This system outlines a completely new approach to power generation and distribution by allowing the housing, in the same mainframe, of a wide range of boards with different functions, such as High/Low Voltage boards, generic I/O boards (temperature, pressure monitors, etc.) and branch controllers, where the latter are used to control other remote generators and distributors. Modularity, flexibility and reliability are the key-points of its design, enabling this module to meet the requirements needed in a wide range of experimental conditions, which range from those of LHC experiments, where the features of this model find prior application, to those of other less challenging, but still demanding, High Energy Physics experiments.

The mainframe is housed in a 19"-wide, 8U-high euro-mechanics rack and hosts four main sections:

- the Board Section, with 16 slots to house boards, distributors and branch controllers;
- the Fan Tray Section, housing 6 fans arranged on two rows;
- the Power Supply Section, which consists of the primary power supply and up to 3 power supply units;
- the CPU and Front Panel Section which includes all interface facilities.

The User Software Interface features the usual friendliness of the previous CAEN systems which now also includes a 7.7" colour LCD. A wide choice of interface facilities provides full communication compatibility with the previous systems and the feasibility of controlling heterogeneous external devices. Modularity has been one of the leading criteria in the design and development of the system: both the Power Supply Section and the Board Section are completely modular. The Power Supply Section allows different configurations with up to 3 power supply units per mainframe (up to 2250 W), while the Board Section can house up to 16 boards able to fulfil different functions. A complete line of power supply boards and distributors has been specially developed for this new

system. The minimum system configuration consists of the primary power supply, one Power Supply Unit and one board. The system allows also to deal with power supply solutions composed by “branch controllers” (housed in the system main frame) and on-detector “remote boards” (manufactured in order to be magnetic field and radiation tolerant). Channel trip control on other crates is performed via four external differential trip lines. A sophisticated trip handling via software allows to control and correlate trip conditions on the channels of the crate as well as of other crates connected to it. Live insertion and extraction of the boards, which reduces the down time of the global system, and easy access to the computing core and peripherals of the system complete the system flexibility. Easy interfacing is another key-point of the SY1527 system, which can be connected to SY127 and SY527 systems. The Ethernet interface (TCP/IP) allows both an easy Telnet access and the connection via OPC Server to a SCADA control system. Enhanced software programming features a unified command set independent from the interface used to communicate with the system. The Power Supply Section and Board Section can be externally synchronised via front panel connectors. Multi-layered access to the system via Intranet is foreseen through the management of several custom user profiles. In particular, three different access levels have been implemented: Guest, User and Administrator, each of which with password protection. Handy maintenance and upgrading, which constitute a major issue in the reliability of a system, are further guaranteed by the possibility of accessing and servicing the system via network facilities. Actually, the Telnet access facility allows remote debugging and technical support of the system, including future firmware upgrading. For a detailed description of the SY 1527 Universal Multichannel Power Supply System please refer to the *SY 1527 User's Manual*.

Table 1.1 – Technical specifications of the SY 1527 mainframe

Packaging	- 19"-wide, 8U-high Euro-mechanics rack; - Depth: 720 mm.
Weight	-Mainframe (*): 24 kg -Mod. A1532: 3.2 kg
Power requirements	<i>Voltage range:</i> 100/230 V <i>Frequency:</i> 50/60 Hz <i>Power:</i> 3400 W
Max. number of boards per crate	16
Max. number of power supply units per crate	3
Primary power supply output (Mod. A 1531)	± 12 V, 8 A +5 V, 20 A
Power supply unit output (Mod. A 1532)	+48 V, 15.6 A
Max. output power	2250 W
Operating temperature	From 0°C (dry atmosphere) to +40°C
Storage temperature	From -20°C (dry atmosphere) to +50°C

(*): One Primary Power Supply (Mod. A 1531) and one Power Supply Unit (Mod. A 1532) are included; boards are not included.

1.3 The Mod. A1676A Branch Controller overview

The Mod. A1676A EASY Branch Controller is implemented in a single width SY1527/SY2527 board. Once plugged in, the Branch Controller must be linked to the EASY crates (placed in the “hostile area”), via front panel connectors (Control and Power

Supply). The A1676A is the interface between the mainframe and the remote boards in the EASY crate. It configures the EASY channels as if they belong to the slot in which the branch controller is located: the channels of the EASY boards operate as channels of the A1676A. Up to six EASY crates can be controlled by one A1676A. The provided software tool allows the User to configure the A1676A to operate with any EASY crate layout.

2. A4602 CMS Si-Tracker CCU Ring PS Module

2.1 Technical description

This document shows the features of the CAEN A4602 CMS Silicon Tracker CCU Ring Power Supply Module, developed for operation in magnetic field and radioactive environment. One A4602 houses four "Power Supply Units" (PSU0..3), completely floating and handled by a microcontroller, via optoisolators.

Each channel provides a 2.5 V output on the load, adjustable within a $\pm 10\%$ range, with a 7 A maximum current; a maximum 6 V line drop can be compensated via sense wires.

Each PSU is equipped with two temperature sensors to inhibit the regulators in case of high temperature.

The LV regulators ensure the stabilisation of the voltage up to 150m distance (senses wires technique) on active loads, filtered with up to 600 μF .

The LVs are protected against senses wires exchange and shorts.

The board front panel houses LEDs and channels monitor signals, while the channel outputs are provided through a DB female connector on the board backside, which must be connected to the loads through an adapter board.

The board shall be inserted in the EASY4000 crate, which provides the external 48 V power supply, the control bus and the four Interlock lines.

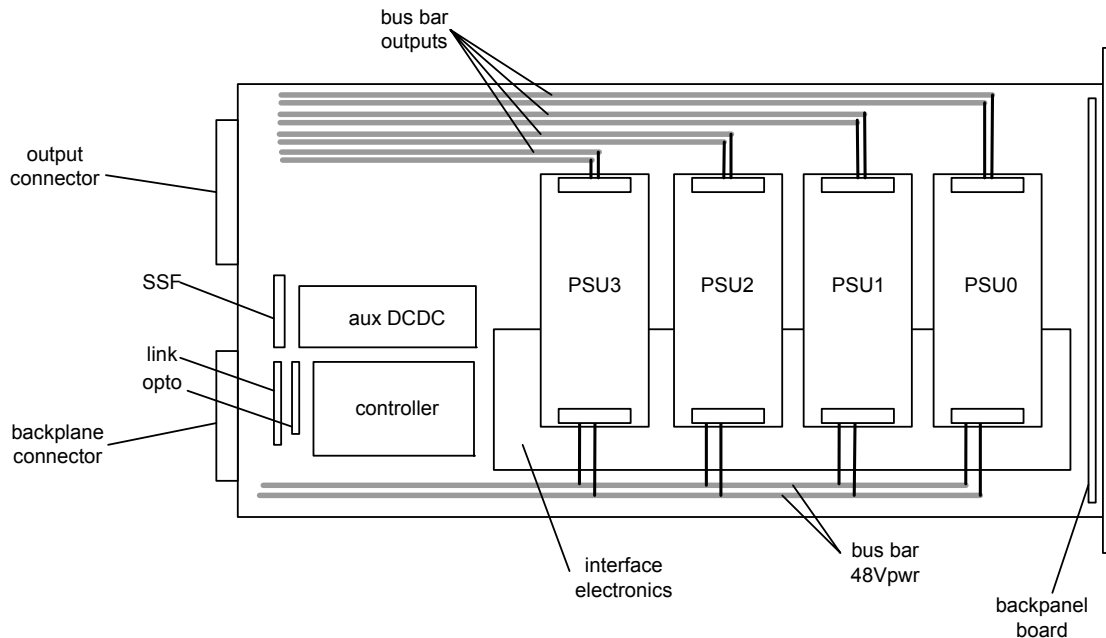


Fig. 2.1 – A4602 Block Diagram

2.2 Channel Characteristic Table

Table 2.1 – Channel characteristics of the Mod. A4602 Power Supply Units

Polarity:	Floating
Output voltage (connector):	8 V
Output voltage (load):	2.5 V
Max. Output Current:	7 A
Voltage Set/Monitor Resolution:	5 mV
Current Set/Monitor Resolution:	10 mA
VMAX software:	2.75 V
VMAX software resolution:	5 m V
Voltage Ripple: ¹	< 20 mV pp
Voltage Monitor vs. Output Voltage Accuracy: ²	typical: $\pm 0.3\% \pm 30$ mV maximum: $\pm 0.3\% \pm 50$ mV
Voltage Set vs. Output Voltage Accuracy: ⁵	typical: $\pm 0.3\% \pm 30$ mV maximum: $\pm 0.3\% \pm 50$ mV
Current Monitor vs. Output Current Accuracy: ⁵	typical: $\pm 2\% \pm 0.05$ A maximum: $\pm 2\% \pm 0.1$ A
Current Set vs. Output Current Accuracy: ⁵	typical: $\pm 2\% \pm 0.05$ A maximum: $\pm 2\% \pm 0.1$ A
Load Regulation: ⁵	± 0.3 % (with sense wires) ± 2 % (without sense wires)
Output power:	56 W per channel
48Vin (Power & Service)	45+51Vdc

¹ From 10 Hz to 15 MHz at full load; measured with the line terminated on a 10 μ F capacitance and a 100 nF ceramic capacitance in parallel to the load

² From 10% to 90% of Full Scale Range

2.3 Front panel components

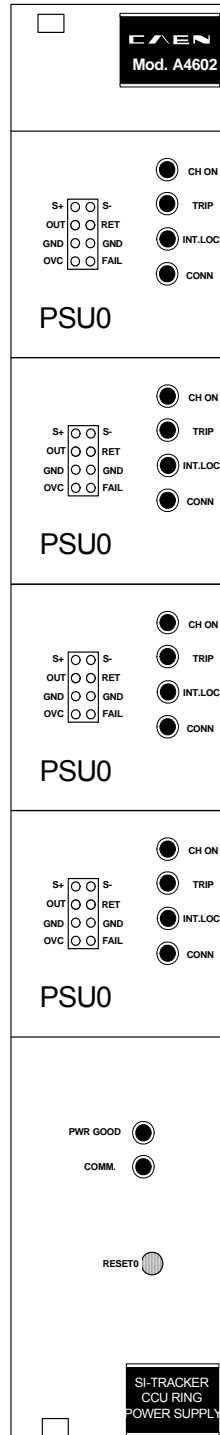


Fig. 2.2 – A4602 Front Panel

2.4 Technical Specifications

2.4.1 Packaging

The module is housed in a 8 TE wide, 6U-high mechanics.

2.4.2 Front panel connections

The board front panel houses four 8 pin female strips (one per PSU) which provide the following monitor signals:

OVC:	Channel in overcurrent
RET:	Channel power return
OUT:	Channel test point
GND:	Channel Ground
S±:	LV sense Test Point

2.4.3 Front Panel Displays

CH ON LEDs:	<i>Function:</i> light up as one channel at least in the relevant Power Supply Unit is on. <i>Type:</i> red LEDs, one per PSU
PWGOOD LED:	<i>Function:</i> light up as the external +48 V power and internal +/-12V and +17V supplies are present. <i>Type:</i> green LEDs, one per PSU
COMM LEDs:	<i>Function:</i> light up as the communications take place. <i>Type:</i> green LEDs, one per PSU
CONN LEDs:	<i>Function:</i> light up according to User's settings. <i>Type:</i> green LEDs, one per PSU
TRIP LEDs:	<i>Function:</i> light up when at least one channel of the PSU is turned off due to trip. <i>Type:</i> red LEDs, one per PSU
INTERLOCK LEDs:	<i>Function:</i> light up as the interlock signal is active. <i>Type:</i> green LEDs, one per PSU

2.4.4 *Other components*

RESET pushbuttons:

Function: it allows to reset the PSU (one pushbutton per Unit).

2.4.5 *Backside connections*

OUTPUT connectors:

Mechanical specifications:
4 DBV17W2S500G30 15+2pin female connector;
4 DB15 type female connector.

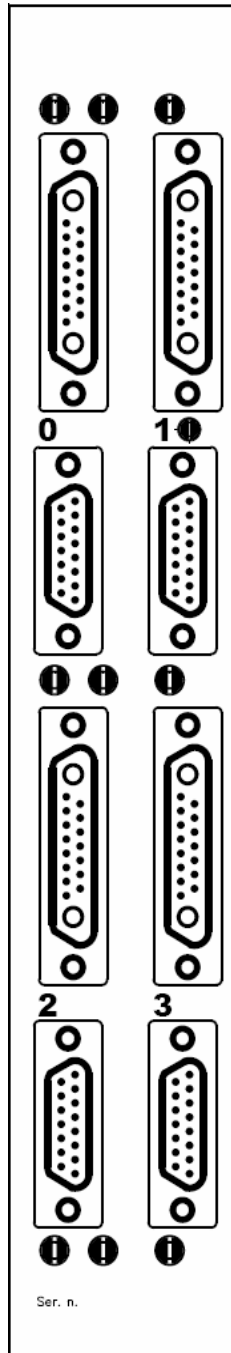


Fig. 2.3 – A4602 Connection board

2.5 Interlock jumpers

Each PSU has four interlock lines (ILK0÷3). Each line can be enabled (i.e. the PSU can be put in Interlock via the enabled ILK line) by inserting the jumpers on the board side:

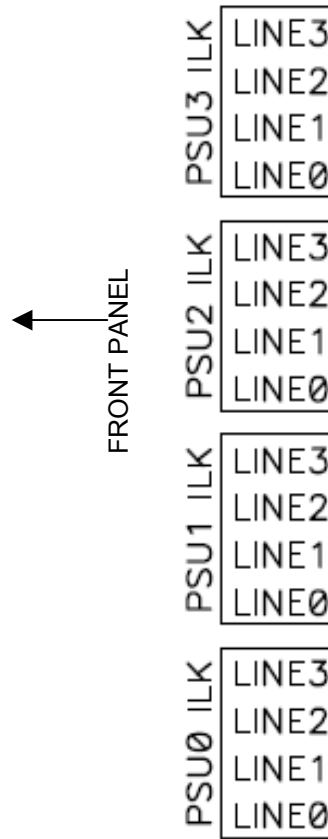


Fig. 2.4 – A4602 Interlock jumpers

3. Safety information and installation requirements

3.1 General safety information

This section contains the fundamental safety rules for the installation and operation of the boards. Read thoroughly this section before starting any procedure of installation or operation of the product.

3.1.1 *Injury Precautions*

Review the following precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use the product only as specified. Only qualified personnel should perform service procedures.

Avoid Electric Overload.

To avoid electric shock or fire hazard, do not apply a voltage to a load that is outside the range specified for that load.

Avoid Electric Shock.

To avoid injury or loss of life, do not connect or disconnect cables while they are connected to a voltage source.

Do Not Operate Without Covers.

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Do Not Operate in Wet/Damp Conditions.

To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere.

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Do Not Operate With Suspected Failures.

If you suspect there is damage to this product, have it inspected by qualified service personnel.

3.2 Safety Terms and Symbols on the Product

These terms may appear on the product:

- **DANGER** indicates an injury hazard immediately accessible as you read the marking.
- **WARNING** indicates an injury hazard not immediately accessible as you read the marking.
- **CAUTION** indicates a hazard to property including the product.

The following symbols may appear on the product:



DANGER
High Voltage



ATTENTION
Refer to Manual

3.3 Installation

The Mod. A1676A is a single-width board for the SY1527/2527/3527 systems. At power ON the SY1527 system processor will scan all the slots in the crate to find out where the module is plugged and what kind of module it is.

The A1676A must be connected to the EASYremote crates through the control lines. The control connectors are placed on the A1676A front panel and on the EASY back or front panel respectively.

3.4 Ventilation

It is necessary to provide the unit the proper ventilation by using for example the CAEN Mod. A34FU Fan Unit. Ventilation is necessary even when channels and 48VPwS are off (see § 4.1).



Fig. 3.1 – Ventilation-warning Label

4. Operating modes

The EASY4000 System boards can be controlled, either locally or remotely, through the SY 1527 software interface.

For details on the EASY4000 System, please refer to the User's Manual of the A1676A Branch Controller. For details on SY 1527 system operation, please refer to the User's Manual of this product.



ATTENTION

**THE MOD. A1676A and A4602 BOARDS REQUIRE
SY 1527 FIRMWARE VERSION 2.01.00 OR LATER**

4.1 Output control and monitoring

It is possible, through the SY 1527 system, to handle the following items:
OVER THE A1676A BOARD:

Name	Description	Value
Reset	Resets all remote channels controlled by Branch Controller (channels are turned off)	
Recovery	Recovers all remote channels controlled by Branch Controller (only communications are reset, not the channels status)	
A1676A 48V	Enables / Disables 48 V output of Branch Controller	
Upgrade	Selects destination of software downloading	<i>Remote</i> on remote board <i>Local</i> on A1676A controller
Rel	Monitors board firmware release	
GlobalON	Turns on all the enabled channels	
GlobalOFF	Turns off all the enabled channels	

OVER THE A4602 PSU:

Name	Description	Value
Name	Assigns to the PSU symbolic name	String
12VPwS	Monitors 12V auxiliary low voltages	<i>OK</i> if present, <i>FAIL</i> if absent
MainPwS	Monitors 48PWR supply status; in case of failure, 48V service is maintained by back up battery and channels can be shut down	<i>OK</i> if present, <i>FAIL</i> if absent
48VPwS	Monitors main power supply	<i>OK</i> if both present, <i>FAIL</i> if one absent
Sync	Monitors 50 Hz synchronisation	<i>OK</i> if present, <i>FAIL</i> if absent
HVSync	Monitors 625 Hz synchronisation	<i>OK</i> if present, <i>FAIL</i> if absent
Rel	Monitors the firmware release number	
SerNum	Monitors the board serial number	
RemBdName	Monitors board name	String

Name	allows to assign a symbolic name to the PSU
12VPwS	allows to readout the status of the +/-12V voltages generated inside the module. N.B.: If 12VPwS = Fail all channels are turned OFF.
MainPwS	allows to readout the status of the 48V STATUS Power and Service signals on the back panel of the EASY4000 crate N.B.: if MainPwS = Fail all the channels are turned OFF.
48VPwS	allows to readout the status of the external +48V Power voltage. N.B.: If 48VPwS = Fail all channels are turned OFF.
Sync	allows to readout the status of the 50Hz synchronisation signal (EASY BUS) provided by the A1676A Branch Controller . N.B.: If Sync = Fail all channels are turned OFF.
HVSync	allows to readout the status of the 625KHz EASY BUS clock signal provided by the A1676A N.B.: If HVSync = Fail the 625KHz signal is generated by the board itself.
Rel	allows to readout the module firmware release.
SerNum	allows to readout the module serial number.
RemBdName	allows to readout the module name.

OVER A4602 PSU CHANNELS:

Name	Description	Value
ChName	Assigns to channel a symbolic name	String
V0Set	Allows to set the output voltage	4-byte real
I0Set	Allows to set the maximum output current	4-byte real
SVMax	Allows to set the software voltage limit	4-byte real
Pw	Allows to switch channel On/Off	boolean
VMon	Allows to monitor output voltage	4-byte real
VCon	Allows to monitor connector LV	4-byte real
IMon	Allows to monitor output current	4-byte real
Status	Allows to monitor channel status (see below)	
RemIlk	Monitors interlock status	
RemIlkLn	Interlock line identifier	Real
GlbOnEn	Allows to respond to A1676A "Global On"	boolean
GlbOffEn	Allows to respond to A1676A "Global Off"	boolean
Trip	Allows to set the Trip time.	4-byte real
Temp	Monitors heatsink temperature	4-byte real
CustomCon	Monitors backpanel connectors insertion	boolean
PwEn	Allows to enable the channels turning On	boolean

N.B.: the A4602 PSU0..3 parameters are actually referred to the first channel (CH0); the A4602 Channel parameters are referred to Channels [1..4].

The following messages may be returned by the SY 1527 when monitoring the channel status:

Name	allows to assign a symbolic name to the channel
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V0Set	allows to set the output voltage.
I0Set	allows to set the current threshold value.
SVmax	allows to set the upper limit of V0Set. (V0Set cannot exceed SVMax).
Pw	allows to send the ON/OFF command to the channel.
VMon	allows to readout the voltage on the load.
VCon	allows to readout the voltage on the output connector. N.B.: if VCon > 7.5V the channel is turned OFF.
IMon	allows to readout the current value delivered by the channel.
Status	allows to readout the channel status value.

Table 4.1 – Status word significant bits

Status	Name	Meaning
Bit 0	ON/OFF	
Bit 3	OVC	Over Current : IMon > I0set
Bit 4	OVV	Over Voltage : VMon > V0set + 0.25V
Bit 5	UNV	Under Voltage : VMon < V0set - 0.25V
Bit 7	HVMAX	Hardware Vmax : Output voltage > 8V
Bit 9	TRIP	Channel in OVC for a duration > TRIP
Bit 10	CALERR	Calibration error
Bit 11	UNPLUGGED	Fail in communication with A1676A Branch Controller
Bit 13	OVP	Over Voltage Protection : Output voltage > 7.5V
Bit 14	PWF	Power Fail : output power > 40W
Bit 15	TERR	Temperature Error : temperature > 70°C

N.B.: If a channel is in 'TRIP', 'HVMAX', 'OVP', 'PWF' or 'TERR', (i.e. the corresponding bits are set) it is turned OFF.

Remllk	allows to readout the status of the Interlock signal on the front panel. N.B.: If Remllk = Yes all the channels are turned OFF.
RemllkLn	item returns the Interlock line identifier
GlbOnEn	allows to enable the channel to respond to a GlobalOn command provided by the A1676A. N.B.: All the channels with GlbOnEn = En are turned ON any time the A1676A broadcasts a GlobalOn command.
GlbOffEn	allows to enable the channel to respond to a GlobalOff command provided by the A1676A. N.B.: All the channels with GlbOffEn = En are turned OFF any time the A1676A broadcasts a GlobalOff command.

Trip	allows to set the Trip time. N.B.: If the channel Over Current ($I_{mon} \geq I_{0set}$) lasts more than the Trip time, the channel is turned OFF. TRIP = 1000 s means <i>infinite</i> : in case of TRIP <i>infinite</i> the output current is permitted to keep the programmed limit; if the maximum output current value is reached the channel behaves like a constant current generator. In case of TRIP < 1000 s, the output current is permitted to keep the limit only for programmed time interval and then is switched off.
Temp	allows to readout the Temperature value.
CustomCon:	allows to detect the backplane connectors insertion
PwEn	allows to enable the channel turning ON (<u>prior to Pw item setting</u>). As this parameter is set to ON, the Output Channel is allowed to be turned On; as long as Pw parameter is set to OFF, the Output Voltage is 0.

Before turning one channel ON, every fail cause must be removed via the 'Clear Alarm' command, sent by the Sy1527/Sy2527 system.

- Up (HV channel ramping up)
- Down (HV channel ramping down)
- Ovc (channel in OVERCURRENT condition, $I_{Mon} > I_{0Set}$)
- Ovv (channel in OVERVOLTAGE condition, $V_{Mon} > V_{0Set} + 3\%$)
- Unv (channel in UNDERVOLTAGE condition, $V_{Mon} < V_{0Set} - 3\%$)
- HVMax (channel VMon exceeding max voltage hardware limit)
- I –Tripped (channel Ovc lasting more than Trip time, see § 4.1.1)
- Cal-Err (channel not calibrated)
- Unplugg (board not present)
- Ovv Prot. (VCon exceeding maximum VCon limit)
- Temp Err. (board temperature > 70°C)

If a Temp Error occurs the PSU is turned off; if HVMax, I –Tripped or Ovv Protection is monitored on a LV channel, the relevant PSU is turned off; these conditions are kept, although the alarm cause might be removed, unless a **Clear Alarm** operation is performed. To clear all alarms it's necessary to select menu "UTILITY" in SY1527, then "CLEAR ALARM".

4.1.1 **Internal Trip**

The regulators are equipped with hardware current limiters which maintain the current at the software current limit (Iset) value, when necessary . The Iset value is software settable from a minimum (> 0 A) to the maximum current foreseen for the regulator (Imax). The suggested default value of Iset is 1/4 of Imax.

4.1.2 **PSU OPC Items**

This chapter describes the items available for the A4602 Power Supply units control.

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

A read access to the **Rel** item returns the board firmware release.

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

A read access to the **RemBdName** item returns a string with the board name.

A read access to the **12VPwS** item returns the internal ± 12 V status.

A read access to the **12VPwS#CoOpen** item returns back the label "Off" associated to 12VPwS=FAIL.

A read access to the **12VPwS#CoClose** item returns back the label "On" associated to 12VPwS=OK.

A read access to the **48VPwS** item returns the external +48 V status.

A read access to the **48VPwS#CoOpen** item returns back the label "Off" associated to 48VPwS=FAIL.

A read access to the **48VPwS#CoClose** item returns back the label "On" associated to 48VPwS=OK.

A read access to the **MainPwS** item returns the +48 V PWR status.

A read access to the **MainPwS#CoOpen** item returns back the label "Off" associated to MainPwS=FAIL.

A read access to the **MainPwS#CoClose** item returns back the label "On" associated to MainPwS=OK.

A read access to the **Sync** item returns the external 50 Hz status.

A read access to the **Sync#CoOpen** item returns back the label "Off" associated to Sync=FAIL.

A read access to the **Sync#CoClose** item returns back the label "On" associated to Sync=OK.

A read access to the **HVSync** item returns the external 625 Hz status.

A read access to the **HVSync#CoOpen** item returns back the label "Off" associated to HVSync=FAIL.

A read access to the **HVSync#CoClose** item returns back the label "On" associated to HVSync=OK.

Table 4.2 – A4602 PSU items

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Chan0.Name	String	R/W	Channel name
PowerSupplyName.BoardXX.Chan0.Rel	2-byte int.	R	Board firmware release
PowerSupplyName.BoardXX.Chan0.SerNum	2-byte int.	R	Board serial number
PowerSupplyName.BoardXX.Chan0.RemBdName	String	R	Board name
PowerSupplyName.BoardXX.Chan0.12VPwS	boolean	R	12VPwS status
PowerSupplyName.BoardXX.Chan0.12VPwS#CoOpen	string	R	12VPwS open label
PowerSupplyName.BoardXX.Chan0.12VPwS#CoClose	string	R	12VPwS close label

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.Chan0.48VPwS	boolean	R	48VPwS status
PowerSupplyName.BoardXX.Chan0.48VPwS#CoOpen	string	R	48VPwS open label
PowerSupplyName.BoardXX.Chan0.48VPwS#CoClose	string	R	48VPwS close label
PowerSupplyName.BoardXX.Chan0.MainPwS	boolean	R	MainPwS status
PowerSupplyName.BoardXX.Chan0.MainPwS#CoOpen	string	R	MainPwS open label
PowerSupplyName.BoardXX.Chan0.MainPwS#CoClose	string	R	MainPwS close label
PowerSupplyName.BoardXX.Chan0.Sync	boolean	R	Sync status
PowerSupplyName.BoardXX.Chan0.Sync#CoOpen	string	R	Sync open label
PowerSupplyName.BoardXX.Chan0.Sync#CoClose	string	R	Sync close label
PowerSupplyName.BoardXX.Chan0.HVSync	boolean	R	HVSync status
PowerSupplyName.BoardXX.Chan0.HVSync#CoOpen	string	R	HVSync open label
PowerSupplyName.BoardXX.Chan0.HVSync#CoClose	string	R	HVSync close label

4.1.3 Output Channel OPC Items

This chapter describes the items which are available for the control of the power supply channel.

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

The **V0set** item allows to set output voltage.

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

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

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

The **I0set** item allows to set max output current.

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 **SVMax** item allows to set the software voltage limit.

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

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

A read access to the **SVMax#LowEU** item returns the lowest possible SVMMax 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 **VCon** item returns back the VMon value.

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

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

A read access to the **VCon#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:

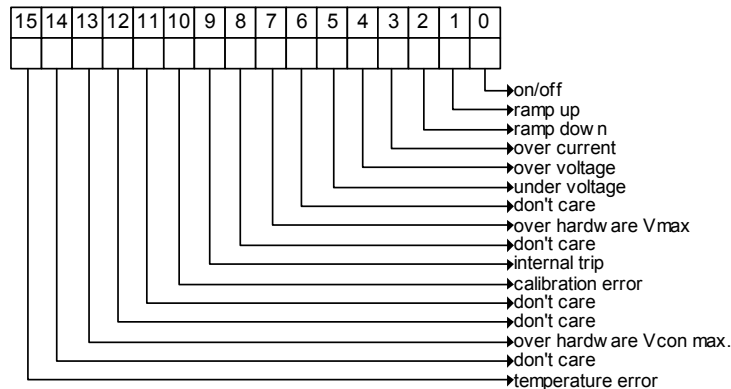


Fig. 4.1 – Status word

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** returns back the label “On” associated to Pw=1.

The **GlbOnEn** item enables the channel to respond to the A1676A Global On command.

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

A read access to **GlbOnEn#CoClose** returns back the label “On” associated to GlbOn=1.

The **GlbOffEn** item enables the channel to respond to the A1676A Global Off command.

A read access to **GlbOffEn#CoOpen** returns back the label “On” associated to GlbOff=0.

A read access to **GlbOffEn#CoClose** returns back the label “Off” associated to GlbOff=1.

A read access to the **Remllk** item returns the remote Interlock status.

A read access to the **Remllk#CoOpen** item returns back the label “Off” associated to PSU=unlocked

A read access to the **Remllk#CoClose** item returns back the label “On” associated to PSU=locked

A read access to the **RemllkLn** item returns the Interlock line identifier

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

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

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

The **PwEn** item allows to enable the channel turning ON (prior to PW item setting).

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

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

A read access to the **Temp** item returns the channel 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.

A read access to the **CustomCon** item returns the CustomCon status.

A read access to the **CustomCon#CoOpen** item returns back the label "Off" associated to CustomCon=disconnected

A read access to the **CustomCon#CoClose** item returns back the label "On" associated to CustomCon=connected

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.

Table 4.3 – A4602 Output Channel items

ItemID	Data Type	Access Rights	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.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.VCon	4-byte real	R	VConn
PowerSupplyName.BoardXX.ChanYYY.VCon#EU	string	R	VConn EU

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.ChanYYY.VCon#HighU	8-byte real	R	VConn upper limit
PowerSupplyName.BoardXX.ChanYYY.VCon#LowEU	8-byte real	R	VConn 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 int.	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.GlbOn	boolean	R/W	Enable global ON
PowerSupplyName.BoardXX.ChanYYY.GlbOn#CoClose	string	R	GlbOn close label
PowerSupplyName.BoardXX.ChanYYY.GlbOn#CoOpen	string	R	GlbOn open label
PowerSupplyName.BoardXX.ChanYYY.GlbOff	boolean	R/W	Enable global OFF
PowerSupplyName.BoardXX.ChanYYY.GlbOff#CoClose	string	R	GlbOff close label
PowerSupplyName.BoardXX.ChanYYY.GlbOff#CoOpen	string	R	GlbOff open label
PowerSupplyName.BoardXX.ChanYYY.RemIlk	boolean	R	RemIlk status
PowerSupplyName.BoardXX.ChanYYY.RemIlk#CoOpen	string	R	RemIlk open label
PowerSupplyName.BoardXX.ChanYYY.RemIlk#CoClose	string	R	RemIlk close label
PowerSupplyName.BoardXX.ChanYYY.RemIlkLn	4-byte real	R	Interlock line identifier
PowerSupplyName.BoardXX.ChanYYY.RemIlkLn#EU	String	R	RemIlkLn EU
PowerSupplyName.BoardXX.ChanYYY.RemIlkLn#HighEU	8-byte real	R	RemIlkLn upper limit
PowerSupplyName.BoardXX.ChanYYY.RemIlkLn#LowEU	8-byte real	R	RemIlkLn lower limit
PowerSupplyName.BoardXX.ChanYYY.Temp	4-byte real	R	Board temperature
PowerSupplyName.BoardXX.ChanYYY.Temp#EU	String	R	Temperature EU
PowerSupplyName.BoardXX.ChanYYY.Temp#HighEU	8-byte real	R	Temp upper limit
PowerSupplyName.BoardXX.ChanYYY.Temp#LowEU	8-byte real	R	Temp lower limit
PowerSupplyName.BoardXX.ChanYYY.PwEn	boolean	R/W	Power ON/OFF
PowerSupplyName.BoardXX.ChanYYY.PwEn#CoClose	string	R	Pw close label
PowerSupplyName.BoardXX.ChanYYY.PwEn#CoOpen	string	R	Pw open label
PowerSupplyName.BoardXX.ChanYYY.CustomCon	boolean	R	CustomCon status

ItemID	Data Type	Access Rights	Description
PowerSupplyName.BoardXX.ChanYYY.CustomCon#CoOpen	string	R	CustomCon open label
PowerSupplyName.BoardXX.ChanYYY.CustomCon #CoClose	string	R	CustomCon close label
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