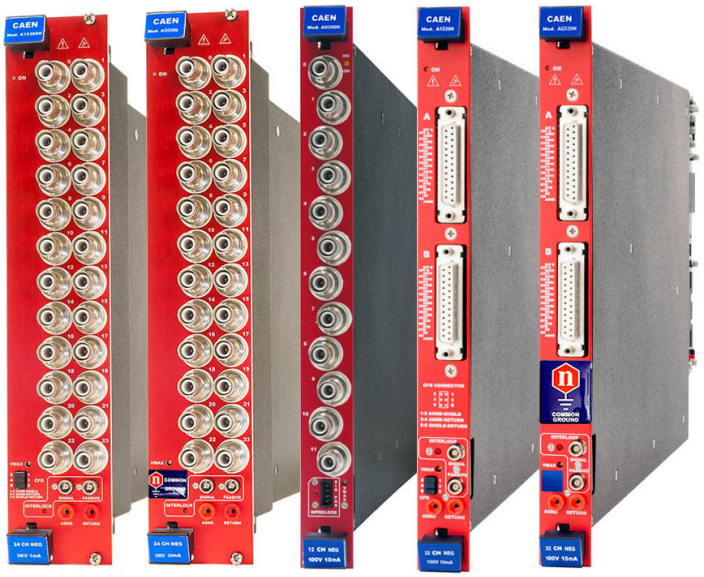
Rev. 11 - 23 February 2021

A1539, AG539, A154X, AG54X

12/24/32 Channel 100/500 V up to 10 mA
HV Power Supply Family



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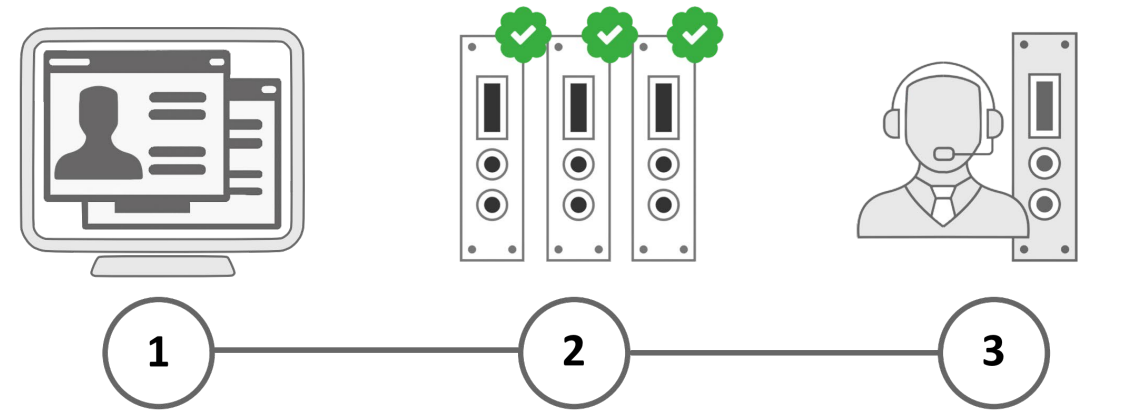

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Purpose of this Manual

This document is the A1539, AG539, A154X, AG54X Power Supply Boards manual; it contains information about the installation, the configuration and the use of the boards.

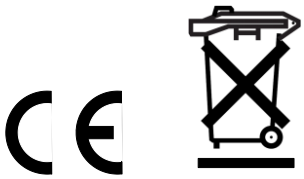
Change Document Record

Date	Revision	Changes
25 November 2013	0	PRELIMINARY Release
5 December 2014	1	Updated with dual range versions
6 May 2015	2	Updated Technical specifications
12 February 2016	3	Updated Technical specifications, figure 2
14 March 2017	4	Updated Technical specifications
10 July 2017	5	Updated with data for A1539B
20 April 2018	6	Updated with data for A1540LM
1 June 2018	7	Updated with new channel parameters
18 July 2019	8	Updated Overview
18 December 2019	9	Updated with new channel parameters
3 April 2020	10	Updated Technical specifications
23 February 2021	11	Updated with new channel parameters for Voltage Line Drop Recovery

Symbols, abbreviated terms and notation

N.A.

Reference Documents



Index

List of Figures

List of Tables

1. Overview

Functional description

The Mod. A1539, AG539, A154X, AG54X is a family of HV boards, available with either positive or negative polarity, compatible with the CAEN Universal Multichannel Power Supply System (SYx527[1]).

The A1539, A154x channels share a common floating return, which allows on-detector grounding reducing the noise level; the floating return is insulated from the crate earth up to ±50 V (with a 65 V hardware limit); the return of the AG539, AG54x channels is wired to the crate Earth reference.

12, 24 and 32 channel versions are available; 12 channel versions output voltages are provided via SHV connectors; 24 channel versions are available with either SHV connectors or DB25 connector; 32 channel boards have the DB25 connectors. 24 channel SHV versions are double width boards (10 TE); all other versions are single width (5 TE).

All boards are provided with both current and voltage protections. If over-current occurs, the relevant channel can be programmed either to turn off after a programmable trip time or to keep on providing the maximum allowed current: this particular feature allows the modules to work as current generator (TRIP range: 0 ÷ 999 s; 1000 s = Infinite, current generator mode. Step = 1 s). The maximum output voltage can be fixed, through a potentiometer located on the front panel, at the same common value for all the board channels and this value can be read out via software.

The HV RAMP-UP and RAMP-DOWN rates may be selected independently for each channel.

Some models offer dual current range, selectable via software, with increased monitor resolution for the lower range.

The boards have also the safety board interlock: this protection allows to disable the primary HV generation when the HV outputs are not connected to their loads.

Tab. 1 – Available versions

Version	Polarity	Voltage Range	Current Range	Return	Channels	Connectors	Width
A1539DN	Negative	100V	10 mA	Common floating	12	SHV	5 TE
A1539DM	Mixed	100V	10 mA	Common floating	12	SHV	5 TE
A1539DP	Positive	100V	10 mA	Common floating	12	SHV	5 TE
A1539LN	Negative	100V	10 mA	Common floating	24	DB25	5 TE
A1539LP	Positive	100V	10 mA	Common floating	24	DB25	5 TE
A1539SN	Negative	100V	10 mA	Common floating	24	SHV	10 TE
A1539SM	Mixed	100V	10 mA	Common floating	24	SHV	10 TE
A1539SP	Positive	100V	10 mA	Common floating	24	SHV	10 TE
A1539N	Negative	100V	10 mA	Common floating	32	DB25	5 TE
A1539P	Positive	100V	10 mA	Common floating	32	DB25	5 TE
A1539BN	Negative	100V	20 mA	Common floating	32	DB25	5 TE
A1539BP	Positive	100V	20 mA	Common floating	32	DB25	5 TE
AG539DN	Negative	100V	10 mA	Earth	12	SHV	5 TE
AG539DM	Mixed	100V	10 mA	Earth	12	SHV	5 TE
AG539DP	Positive	100V	10 mA	Earth	12	SHV	5 TE
AG539LN	Negative	100V	10 mA	Earth	24	DB25	5 TE
AG539LP	Positive	100V	10 mA	Earth	24	DB25	5 TE
AG539SN	Negative	100V	10 mA	Earth	24	SHV	10 TE
AG539SM	Mixed	100V	10 mA	Earth	24	SHV	10 TE
AG539SP	Positive	100V	10 mA	Earth	24	SHV	10 TE
AG539N	Negative	100V	10 mA	Earth	32	DB25	5 TE

[1] SYx527 shall run the most recent firmware release; SY3527 is not supported

Version	Polarity	Voltage Range	Current Range	Return	Channels	Connectors	Width
AG539P	Positive	100V	10 mA	Earth	32	DB25	5 TE
A1540DN	Negative	100V	1 mA	Common floating	12	SHV	5 TE
A1540DM	Mixed	100V	1 mA	Common floating	12	SHV	5 TE
A1540DP	Positive	100V	1 mA	Common floating	12	SHV	5 TE
A1540LN	Negative	100V	1 mA	Common floating	24	DB25	5 TE
A1540LP	Positive	100V	1 mA	Common floating	24	DB25	5 TE
A1540LM	Mixed	100V	1 mA	Common floating	24	DB25	5 TE
A1540SN	Negative	100V	1 mA	Common floating	24	SHV	10 TE
A1540SM	Mixed	100V	1 mA	Common floating	24	SHV	10 TE
A1540SP	Positive	100V	1 mA	Common floating	24	SHV	10 TE
A1540N	Negative	100V	1 mA	Common floating	32	DB25	5 TE
A1540P	Positive	100V	1 mA	Common floating	32	DB25	5 TE
AG540DN	Negative	100V	1 mA	Earth	12	SHV	5 TE
AG540DM	Mixed	100V	1 mA	Earth	12	SHV	5 TE
AG540DP	Positive	100V	1 mA	Earth	12	SHV	5 TE
AG540LN	Negative	100V	1 mA	Earth	24	DB25	5 TE
AG540LP	Positive	100V	1 mA	Earth	24	DB25	5 TE
AG540SN	Negative	100V	1 mA	Earth	24	SHV	10 TE
AG540SM	Mixed	100V	1 mA	Earth	24	SHV	10 TE
AG540SP	Positive	100V	1 mA	Earth	24	SHV	10 TE
AG540N	Negative	100V	1 mA	Earth	32	DB25	5 TE
AG540P	Positive	100V	1 mA	Earth	32	DB25	5 TE
A1541DN	Negative	500V	10 mA	Common floating	12	SHV	5 TE
A1541DM	Mixed	500V	10 mA	Common floating	12	SHV	5 TE
A1541DP	Positive	500V	10 mA	Common floating	12	SHV	5 TE
A1541LN	Negative	500V	10 mA	Common floating	24	DB25	5 TE
A1541LP	Positive	500V	10 mA	Common floating	24	DB25	5 TE
A1541SN	Negative	500V	10 mA	Common floating	24	SHV	10 TE
A1541SM	Mixed	500V	10 mA	Common floating	24	SHV	10 TE
A1541SP	Positive	500V	10 mA	Common floating	24	SHV	10 TE
A1541N	Negative	500V	10 mA	Common floating	32	DB25	5 TE
A1541P	Positive	500V	10 mA	Common floating	32	DB25	5 TE
AG541DN	Negative	500V	10 mA	Earth	12	SHV	5 TE
AG541DM	Mixed	500V	10 mA	Earth	12	SHV	5 TE
AG541DP	Positive	500V	10 mA	Earth	12	SHV	5 TE
AG541LN	Negative	500V	10 mA	Earth	24	DB25	5 TE
AG541LP	Positive	500V	10 mA	Earth	24	DB25	5 TE
AG541SN	Negative	500V	10 mA	Earth	24	SHV	10 TE
AG541SM	Mixed	500V	10 mA	Earth	24	SHV	10 TE
AG541SP	Positive	500V	10 mA	Earth	24	SHV	10 TE
AG541N	Negative	500V	10 mA	Earth	32	DB25	5 TE
AG541P	Positive	500V	10 mA	Earth	32	DB25	5 TE
A1542DN	Negative	500V	1 mA	Common floating	12	SHV	5 TE
A1542DM	Mixed	500V	1 mA	Common floating	12	SHV	5 TE
A1542DP	Positive	500V	1 mA	Common floating	12	SHV	5 TE
A1542LN	Negative	500V	1 mA	Common floating	24	DB25	5 TE
A1542LP	Positive	500V	1 mA	Common floating	24	DB25	5 TE
A1542SN	Negative	500V	1 mA	Common floating	24	SHV	10 TE
A1542SM	Mixed	500V	1 mA	Common floating	24	SHV	10 TE
A1542SP	Positive	500V	1 mA	Common floating	24	SHV	10 TE
A1542N	Negative	500V	1 mA	Common floating	32	DB25	5 TE
A1542P	Positive	500V	1 mA	Common floating	32	DB25	5 TE
A1542HN	Negative	500V	10mA/20µA	Common floating	32	DB25	5 TE

Version	Polarity	Voltage Range	Current Range	Return	Channels	Connectors	Width
A1542HP	Positive	500V	10mA/20µA	Common floating	32	DB25	5 TE
AG542DN	Negative	500V	1 mA	Earth	12	SHV	5 TE
AG542DM	Mixed	500V	1 mA	Earth	12	SHV	5 TE
AG542DP	Positive	500V	1 mA	Earth	12	SHV	5 TE
AG542LN	Negative	500V	1 mA	Earth	24	DB25	5 TE
AG542LP	Positive	500V	1 mA	Earth	24	DB25	5 TE
AG542SN	Negative	500V	1 mA	Earth	24	SHV	10 TE
AG542SM	Mixed	500V	1 mA	Earth	24	SHV	10 TE
AG542SP	Positive	500V	1 mA	Earth	24	SHV	10 TE
AG542N	Negative	500V	1 mA	Earth	32	DB25	5 TE
AG542P	Positive	500V	1 mA	Earth	32	DB25	5 TE
A1540HDN	Negative	100V	1mA/100µA	Common floating	12	SHV	5 TE
A1540HDM	Mixed	100V	1mA/100µA	Common floating	12	SHV	5 TE
A1540HDP	Positive	100V	1mA/100µA	Common floating	12	SHV	5 TE
A1540HLN	Negative	100V	1mA/100µA	Common floating	24	DB25	5 TE
A1540HLP	Positive	100V	1mA/100µA	Common floating	24	DB25	5 TE
A1540HSN	Negative	100V	1mA/100µA	Common floating	24	SHV	10 TE
A1540HSM	Mixed	100V	1mA/100µA	Common floating	24	SHV	10 TE
A1540HSP	Positive	100V	1mA/100µA	Common floating	24	SHV	10 TE
A1540HN	Negative	100V	1mA/100µA	Common floating	32	DB25	5 TE
A1540HP	Positive	100V	1mA/100µA	Common floating	32	DB25	5 TE

2. Technical Specifications

Channel Characteristic Table

Table 1 – Channel characteristics of the Mod. A1539, AG539, A154X, AG54X HV Boards

Series	539B	539	540	540H	541	542	542H
Polarity	Positive / Negative / Mixed[2] depending on purchased version						
Output Voltage	0÷100 V				0÷500 V		
Max. Output Current[3] – High power	20 mA	10 mA	1 mA	1mA	10 mA	1 mA	1 mA
Max. Output Current[3] – High Resolution				100 µA			100 µA
Voltage Set Resolution	10 mV						
Voltage Monitor Resolution	1 mV						
Current Set Resolution	500 nA	200 nA	20 nA	20nA	200 nA	20 nA	20 nA
Current Monitor Resolution – High power	40 nA	10 nA	1 nA	1nA	10 nA	1 nA	1nA
Current Monitor Resolution – High Resolution				100 pA			100 pA
VMAX hardware	0÷100 V Common to all board channels				0÷500 V Common to all board channels		
VMAX hardware accuracy	1 V						
VMAX software	0÷100 V settable for each channel				0÷500 V settable for each channel		
VMAX software resolution	1 V						
Ramp Up/Down	1÷50 Volt/sec, 1 Volt/sec step				1÷100 Volt/sec, 1 Volt/sec step		
Voltage Ripple – Typical	<10mVpp	<3mVpp					
Voltage Ripple – Maximum	<15mVpp	<5mVpp					
Vmon vs. Vout accuracy Vset Vs. Vout accuracy	±0.05%±50mV	±0.02%±50mV					
Imon vs. Iout accuracy Iset vs. Iout accuracy	±2%±20µA	±2%±10µA	±2%±1µA	Hi Pwr ±2%±1µA Hi Res ±2%±0.1µA	±2%±10µA	±2%±1µA	Hi Pwr ±2%±1µA Hi Res ±2%±0.1µA
Maximum output power	2 W/ch	1 W/ch	0.1 W/ch	0.1 W/ch	5 W/ch	0.5 W/ch	0.5 W/ch
Consumption @ full power	32 ch: 180 W	32 ch: 64 W 24 ch: 48 W 12 ch: 24 W	32 ch: 6.4 W 24 ch: 4.8 W 12 ch: 2.4 W	32 ch: 6.4 W 24 ch: 4.8 W 12 ch: 2.4 W	32 ch: 320 W 24 ch: 240 W 12 ch: 120 W	32 ch: 32 W 24 ch: 24 W 12 ch: 12 W	32 ch: 32 W 24 ch: 24 W 12 ch: 12 W

[2] *Mixed* boards have half of the channels with positive polarity and half with negative
[3] Dual current range selectable via channel parameter ImRange (see p.12)

Front Panel

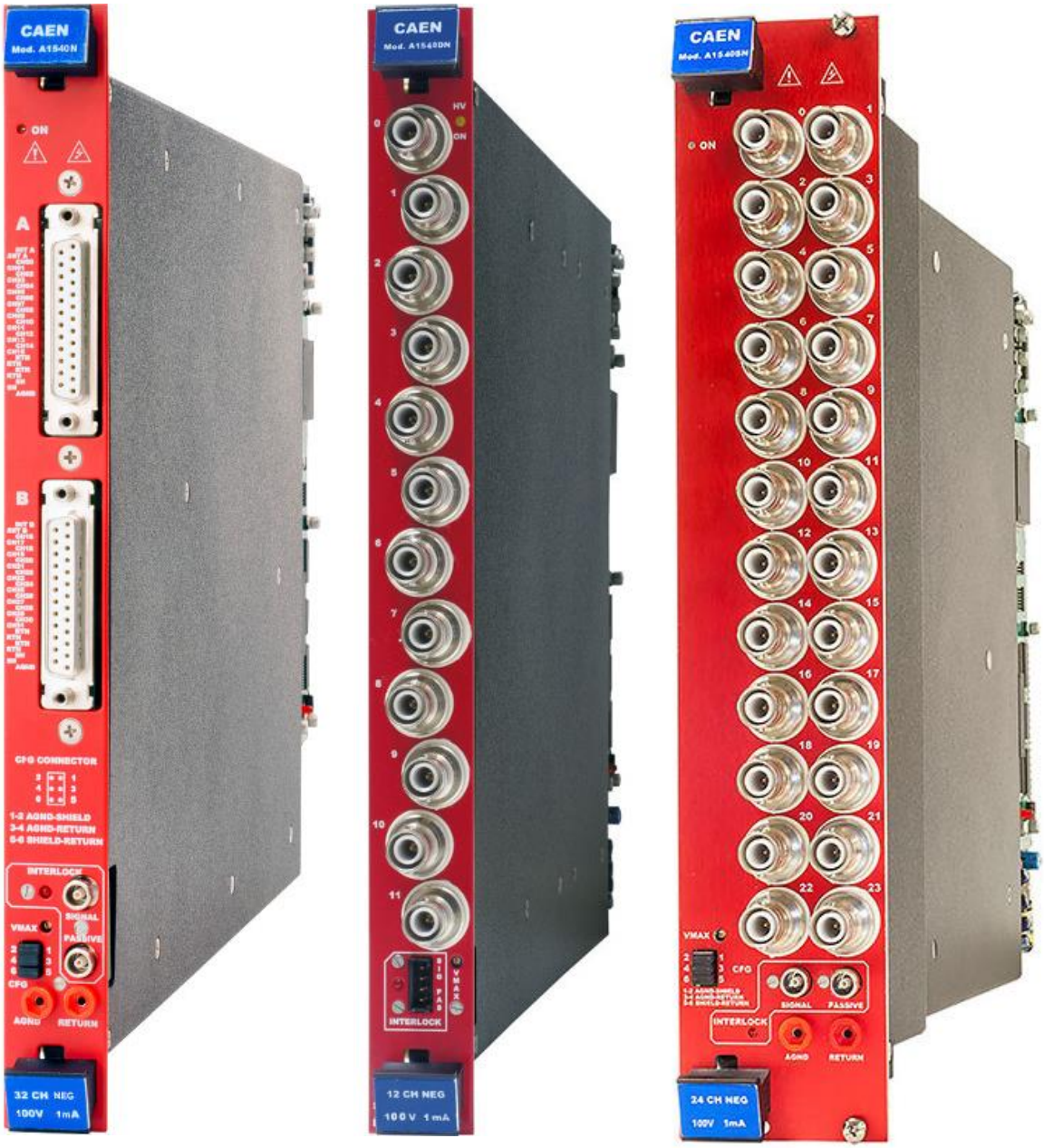


Fig. 1 – Mod. A15xx 32, 12, 24 Channel boards

Packaging

24 channel SHV versions are double width boards (10 TE); all other versions are single width (5 TE); height is 6U.

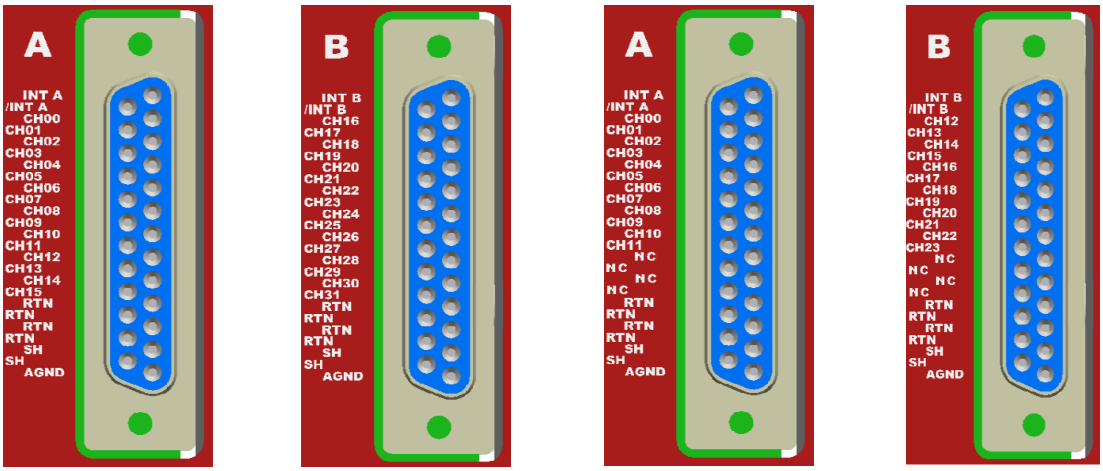
External connections

WARNING! HV output connectors produce extremely hazardous high voltages at a potentially lethal current level; never connect or disconnect the HV OUT connector with the SYx527 power ON/OFF switch ON; always switch SYx527 power power OFF and wait at least 30s before connecting or disconnecting HV cables.

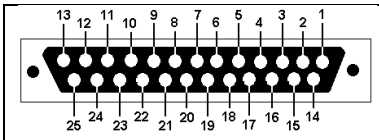
The function and electro-mechanical specifications of the external connectors are listed in the following subsections.

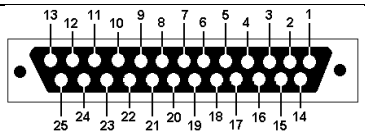
Version:	24, 32 channel DB25	12, 24 channel SHV
Output Channels:	FCI DBPV25S365GTLF; see below	HV coaxial connectors Radiall SHVR317580
Return & AGND:	Radiall R921921 socket, Ø 2mm (floating)	
PASSIVE & SIGNAL ILK:	00-type LEMO connector	AMP 280371-2 (12 channel)

DB25 connector pin assignment



INT - /INT: interlock; RTN: channel return; AGND: earth; SH: connector shield; NC: not connected





PIN	A	B	PIN	A	B
1	AGND	AGND	1	AGND	AGND
2	SHIELD	SHIELD	2	SHIELD	SHIELD
3	RETURN	RETURN	3	RETURN	RETURN
4	RETURN	RETURN	4	RETURN	RETURN
5	CH 14	CH 30	5	NC	NC
6	CH 12	CH 28	6	NC	NC
7	CH 10	CH 26	7	CH 10	CH 22
8	CH 8	CH 24	8	CH 8	CH 20
9	CH 6	CH 22	9	CH 6	CH 18
10	CH 4	CH 20	10	CH 4	CH 16
11	CH 2	CH 18	11	CH 2	CH 14
12	CH 0	CH 16	12	CH 0	CH 12
13	INT A	INT B	13	INT A	INT B
14	SHIELD	SHIELD	14	SHIELD	SHIELD
15	RETURN	RETURN	15	RETURN	RETURN
16	RETURN	RETURN	16	RETURN	RETURN
17	CH 15	CH 31	17	NC	NC
18	CH 13	CH 29	18	NC	NC
19	CH 11	CH 27	19	CH 11	CH 23
20	CH 9	CH 25	20	CH 9	CH 21
21	CH 7	CH 23	21	CH 7	CH 19
22	CH 5	CH 21	22	CH 5	CH 17
23	CH 3	CH 19	23	CH 3	CH 15
24	CH 1	CH 17	24	CH 1	CH 13
25	INT A	INT B	25	INT A	INT B

Fig. 2 – DB25 connector pin assignment (32 and 24 channel version)

Displays

HV ON LED: *Function:* lights up as at least one channel is on
Type: red LEDs for positive polarity; yellow green LEDs for negative polarity.

INTERLOCK LED: *Function:* lights up as the board is in INTERLOCK (channel are disabled).
Type: red LED

Other components

VMAX trimmer: *Function:* it allows to adjust the hardware maximum voltage VMAX Common to all the channels. Its value can be read out via software.

Shield CFG jumpers (24, 32 ch floating): *Function:* see table below

Table 2 – Configuration jumpers

	1-2	Agnd -shield	Connects Agnd (Earth) to HV cable shield
	3-4	Agnd - Return	Connects Agnd (Earth) to HV channels return
	5-6	Shield - Return	Connects Shield to HV channels return

JA (A15xxD): Jumper connector; short circuit: connect FAGND (Earth) and AGND (CH rtn). See below for JA location.

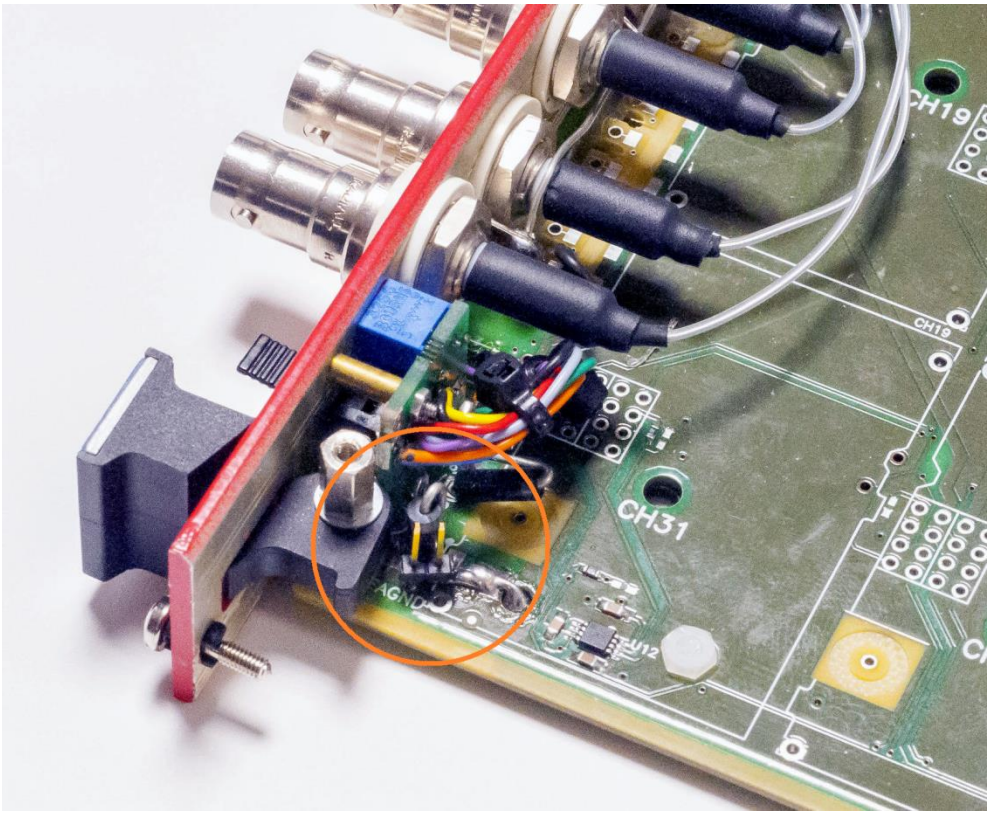


Fig. 3 – JA jumper location

3. Safety and installation requirements

General safety information

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

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 power a load outside of its specified range.

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 this product to be damaged, have it inspected by qualified service personnel.

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

WARNING

Refer to Manual

Installation

The Mod. A1539, AG539, A154X, AG54X are SYx527 boards. At power ON the SYSTEM, the processor will scan all the slots in the crate to find out where the module is plugged and what kind of module it is.

4. Operating modes

The Mod. A1539, AG539, A154X, AG54X boards can be controlled, either locally or remotely, through the SYSTEM software interface. For details on SYSTEM operation, please refer to the User's Manual of this product. The following sections contain a description of commands available for the board control and status monitoring.

Output control and monitoring

For each output channel, it is possible, through the system, to access the following parameters:

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; both positive and negative values monitored (only on some versions, please contact CAEN)
ZCDetect (settable):	(ON/OFF) If ON, it stores the present IMON value into memory for "zero current compensation" purposes, see *ZCAdjust* parameter (this parameter is available only for some versions, please contact CAEN)
ZCAdjust (settable):	(EN/DIS) If enabled, the stored IMON value via *ZCDetect* option is subtracted from the measured, "non compensated" IMON value. The returned "compensated" IMON value will be then the difference between measured and stored values; if disabled, the returned IMON value is not compensated (this parameter is available only for some versions, please contact CAEN)
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) highlighted in green when channel ON; onstate = ON; offstate = OFF
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 ; onstate = Enabled; offstate = Disabled
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; onstate = Ramp; offstate = Kill
ImRange (Low/High)	Current Monitor Zoom for dual range boards; onstate = Low; offstate = High
TripInt:	2N-bit word (hexadecimal) maximum 16 lines, 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).
TripExt:	Must be set in the 0÷255 range (hexadecimal). 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).
RLine:	Resistance of HV cable (only Ch0 and Ch16 of A1539B); see p. 13
RRet:	Resistance of Return cable (only Ch0 and Ch16 of A1539B); see p. 13

If the POWER ON option is enabled, as the module is turned ON, the channel is restored to the same condition it was before the POWER OFF or RESET; if this option is disabled, at POWER ON or after a RESET, the channel is kept OFF independently from its previous condition.

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

OFF	(channel turned OFF)
RUP	(channel ramping up)
RDWN	(channel ramping down)
OVC	(channel in OVERCURRENT condition)
OVV	(channel in OVERVOLTAGE condition)
UNV	(channel in UNDERVOLTAGE condition)4
E-TRIPPED	(channel OFF due to external TRIP line signal)5
I-TRIPPED	(channel OFF due to internal OVERCURRENT condition)
EXT_DIS	(channel disabled by board INTERLOCK protection)

Moreover it is possible to monitor board parameters, such as measured Temperature and HVMax, and to check board status; the following messages may be returned by the POWER SUPPLY SYSTEM when monitoring the board status:

UNDER_TEMP (board temperature < 5°C)
OVER_TEMP 0. (board temperature > 65°C)

Board Clear Alarm “Clr Alarm” set command is also available: it removes alarm status present on the board (available only for some versions, please contact CAEN)

⚠ **N.B.: Ax539; Ax541 and Ax542H must be operated with SYx527 ventilation fan speed set to “Middle” or “High”**

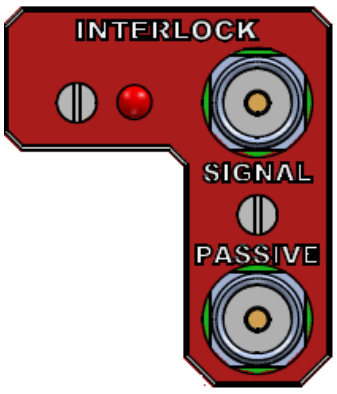
Voltage Line Drop Recovery

The A1539B allows to compensate the Voltage Line Drop over the cables; in fact, it is possible to set the measured resistance of the HV Channel (RLine) and Channel Return (RRet) cables, and the resulting voltage drop will be automatically compensated. Please note that resistance parameters are available only on Channel 0 and Channel 16; the values set on Channel 0 are used to compensate the Voltage Line Drop on Channel 0 through 15, the values set on Channel 16 are used to compensate the Voltage Line Drop on Channel 16 through 31. This works if the resistances of the cables on Channel 0 through 15 and Channel 16 through 31 are almost the same. The units of RLine and RRet are in Ohm’s.

Output Enable

In order to enable the HV output channels, on boards with DB25 connectors, it is necessary that pin INT and /INT are short circuited (see p.9).
Then the enable procedure is completed in one of the following ways:

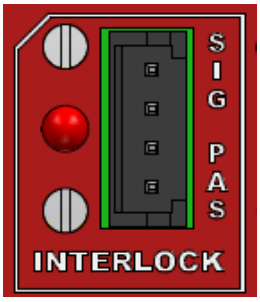
- Boards with LEMO interlock connectors



- terminating the PASSIVE INTERLOCK (see p.9) connector on 50 Ohm.
- supplying the SIGNAL INTERLOCK (see p.9) connector with a +5 V (3-4mA) signal.

[4] UNV is also reported when Hvmax limit is reached, it is up to the User to verify that VMON value does not exceed HVMAX.
[5] EXTTRIP and INTTRIP parameters are expressed in Hexadecimal format

- Boards with AMP interlock connectors



  - Short circuit pin 3 and 4 [the lower ones]. Leave contact open between pin 1 (+) and 2 (-) [upper ones]
  - Apply +5 V (3-4mA) differential signal between pin 1 (+) and 2 (-); pin 1 is the upper one. Leave contact open between pin 3 and 4.

The INTERLOCK LED (red) is turned off as one of the actions above is performed.
When the channels are disabled the voltage outputs drop to zero at the maximum rate available; when the output disable cause is removed (see above), the channels remain OFF until the User turns them ON via software..

Grounding specifications

The Mod. A1539 - A154X channels share a Common floating return (FAGND, see p.9), available on the front panel multipin connector, insulated from the crate ground (AGND, see p.9), which is available as front panel 2mm socket connector. This feature allows on-detector grounding, thus avoiding loops which may increase noise level. FAGND and AGND may be coupled in several ways, according to environment requirements. Examples refer to 32 channel version.

Safety Earth connection

The connection of shield and return to Earth is fundamental for User safety.
The connection must always be at the level of detector or power supply system.
Return and Shield connections even if not present or performed incorrectly, due to protection circuits implemented on the A1539 - A154X are bound to Earth; in this case the voltage difference between return and Earth (System), shield and Earth is limited to approximately 50V. Please note that this is a status of emergency-protection, not a working one. The Connector Configurator allows to optimize the connection of the shield, of the return and of AGND (Earth). The best configuration must be determined by the user upon application, the optimal connection depends on many characteristics of the related experiment.

The following diagrams show four examples of configuration, namely:

1. The “closed loop “ Earth configuration
2. The “closed loop “ Earth configuration, with protection stage on the load grounding
3. The “semi-open loop” Earth configuration
4. The “open loop” Earth configuration

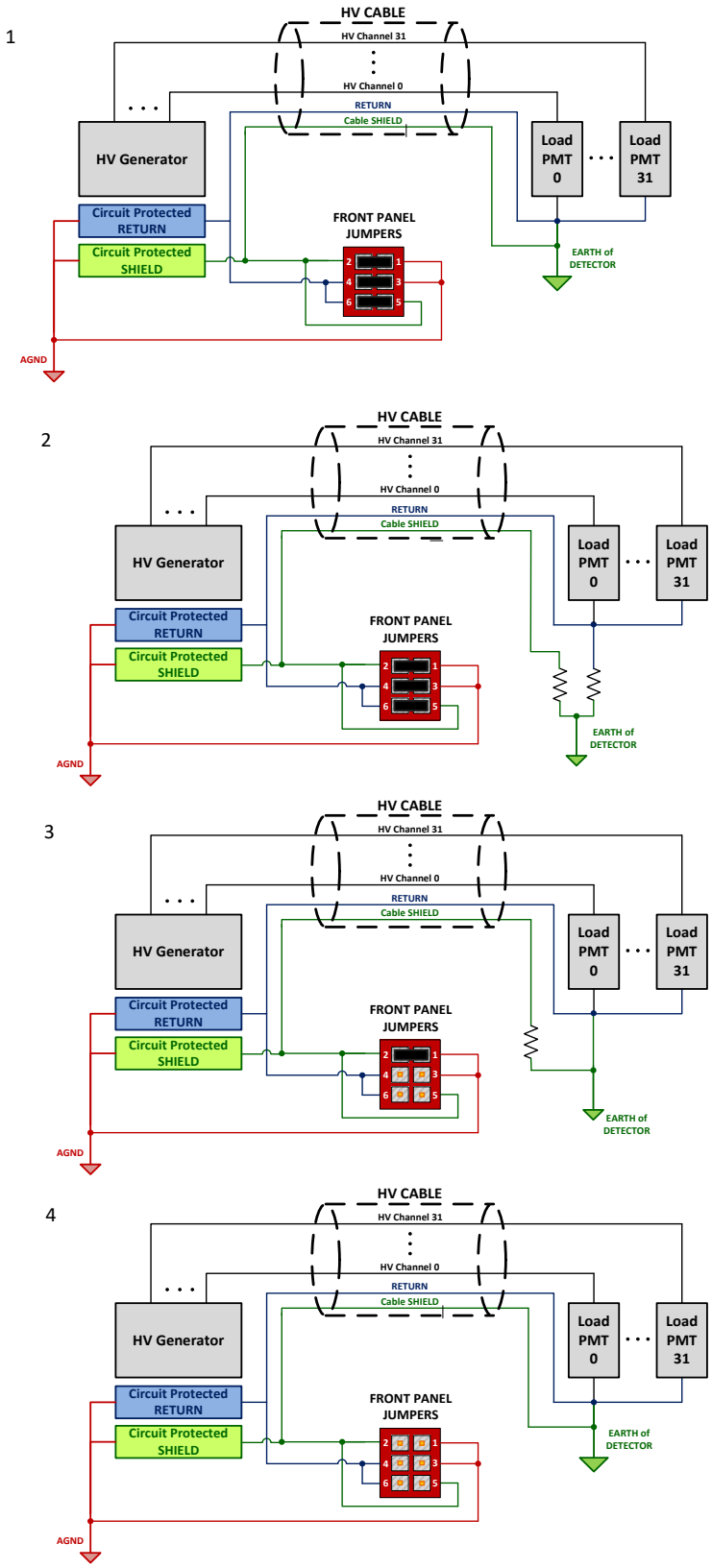


Fig. 4 – Earth configuration connection examples

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