Rev. 2 - Sept, 30th 2022

R1472ETS

19" 1 Ch. 3kV/2mA Power Supply

CAEN
Tools for Discovery

User Manual
UM102

Register your device

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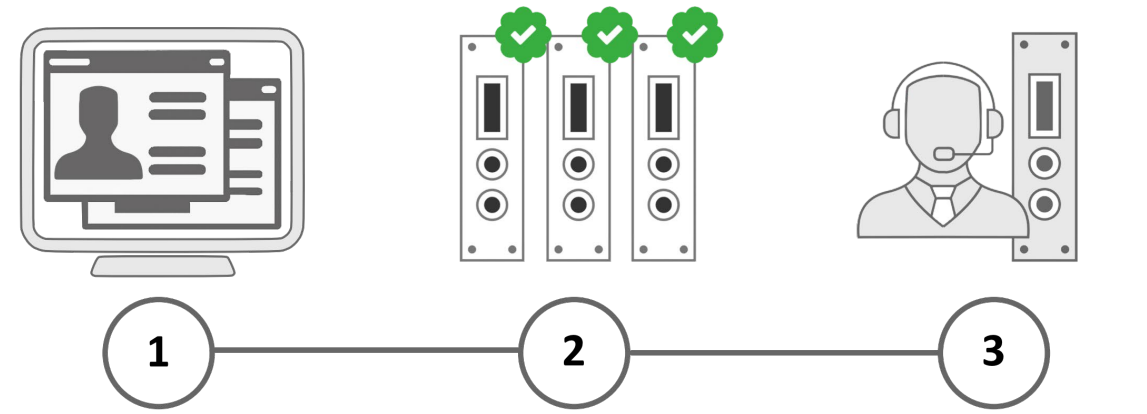
MyCAEN+ dashboard is designed to offer you a direct access to all our after sales services. Registration is totally free, to create an account go to https://www.caen.it/become-mycaenplus-user and fill the registration form with your data.



https://www.caen.it/become-mycaenplus-user/

Purpose of this Manual

This document is the **R1472ETS 19" 1 Ch. 3kV/2mA Power Supply** User's Manual; it contains information about the installation, the configuration and the use of the Unit.

Change Document Record

Date	Revision	Changes
3 July 2019	0	First release
18 November 2021	1	Updated Technical specifications table
30 September 2022	2	Updated Technical specifications table, Imon Zoom

Disclaimer

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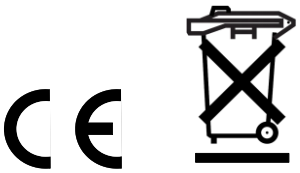
CAEN will repair or replace any product within the guarantee period if the Guarantor declares that the product is defective due to workmanship or materials and has not been caused by mishandling, negligence on behalf of the User, accident or any abnormal conditions or operations.

CAEN declines all responsibility for damages or injuries caused by an improper use of the Modules due to negligence on behalf of the User. It is strongly recommended to read thoroughly the CAEN User's Manual before any kind of operation. *CAEN reserves the right to change partially or entirely the contents of this Manual at any time and without giving any notice.*

Disposal of the Product *The product must never be dumped in the Municipal Waste. Please check your local regulations for disposal of electronics products.*

Made In Italy : We stress the fact that all the boards are made in Italy because in this globalized world, where getting the lowest possible price for products sometimes translates into poor pay and working conditions for the people who make them, at least you know that who made your board was reasonably paid and worked in a safe environment. (this obviously applies only to the boards marked "Made in Italy", we cannot attest to the manufacturing process of "third party" boards).



Index

1. General description

Overview

The N1472ETS provides 1 High Voltage positive 3kV/2mA channel in a 19” rack unit package. The unit is 110/220V AC Powered.

Module control can take place either locally, assisted by a 2.8" Touchscreen Graphic color LCD display or remotely, via USB, or Ethernet.

HV output is delivered through a SHV connector.

Safety features include:

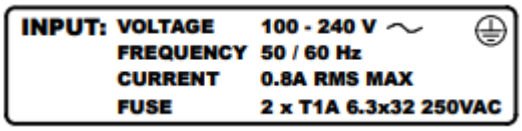
- OVERVOLTAGE and UNDERVOLTAGE warning when the output voltage differs from the programmed value by more than 2% of set value (minimum 10V).
- Programmable VMAX protection limit
- OVERCURRENT detection: if a channel tries to draw a current larger than its programmed limit, it enters TRIP status, keeping the maximum allowed value for a programmable time (TRIP), before being switched off
- Channel inhibit

2. Technical specifications

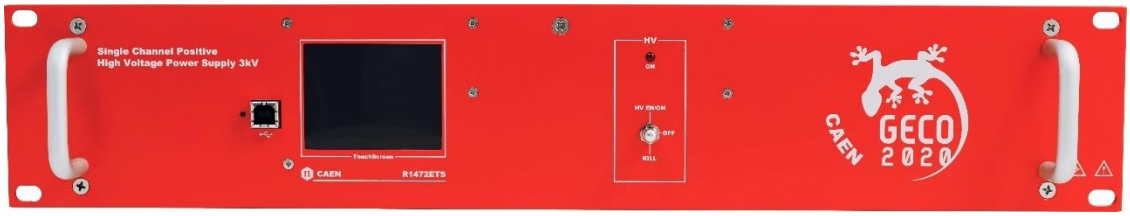
Packaging

19” rack package (height: 2U; depth: 360mm). Weight: ~8kg

Power requirements



Front panel



External connections

Local control section

NAME:	TYPE:	FUNCTION:
MONITOR	2.8” LED Touch Screen	*Parameter and Mode setting; Local settings monitoring*

Channel control and output section

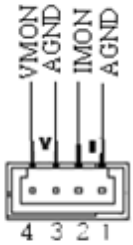
Channel control

NAME:	TYPE:	FUNCTION:
HV_EN/OFF/KILL	3 POS. SWITCH	*Channel Enable and turning OFF/KILL; when on KILL, before switching to EN/ON, it is necessary to switch to OFF. KILL disables HV output at the fastest available rate, regardless of INHIBIT (see below) setting.*
ON	RED LED	*HV On enabled*

Inhibit

BNC connector; to enable HV output, must be short circuited or terminated on 50 Ohm; when the contact is open, HV output is disabled.

HV Output



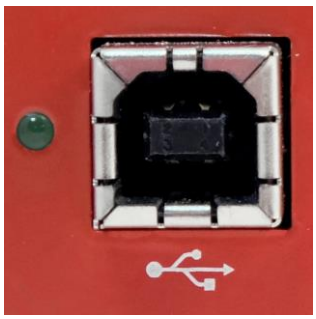
NAME:	TYPE:	FUNCTION:
MON	AMP 280371-2	*Vout/Iout Test point*
OUT	SHV RADIALL R317580	*HV Channel Output*
	Impedance: 50 Ohm; Frequency range: 0 – 2 GHz; VSWR: <1.20 + 0.3 F (GHz) – (plug and jack); Test voltage: 10kV DC – 1mn (unmated connectors); Ratings: 12kV DC – 1mn (mated pairs); Current rating: 10 A	

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

The test points allow to monitor the Channel Output Voltage and Current according to the following conversion:

VMON	1V = 1.8V ±1% readout; 0÷5 V range
IMON HI RANGE	1V = 660 µA ±3% readout; positive, 0÷5 V range
IMON LOW RANGE	1V = 66 µA ±3% readout; positive, 0÷5 V range

Remote communication



USB	B TYPE USB	*USB2.0 compliant*
ETH	10Base-T female connector	TTL signals (TCP/IP)

AC Input

IEC 60 320 Socket with switch; to be connected to Mains 100 - 240 Vac (50 - 60 Hz) via provided power cord. Two Fuses: 6.3x32 1A; Retarded 250VAC

Technical specifications table

Packaging			19” rack (h: 2U; d: 360mm). Weight: ~8kg
Power requirements			100–240V ~ 50/60Hz; 0.6A RMS; fuse 2xT1A 6.3x32 250VAC
Polarity			Positive
Output range			3 kV / 2 mA
Max. Ch. Output Power			6 W
Vset / Vmon Resolution			100 mV
Iset Resolution			50 nA
Imon Resolution	IMON RNG H		50 nA
	IMON RNG L		5 nA
Vmax			0 ÷ 3100 V
			Absolute maximum HV level that the channel can reach, independently from the preset value Vset. Output voltage cannot exceed the preset value Vmax. The accuracy is 1 % ± 5 V
Vmax resolution			± 1 V
Ramp Up/Down			1÷500 Volt/s, 1 Volt/s step
Trip			Max. time an "overcurrent" is allowed to last (seconds). A channel in "overcurrent" works as a current generator; output voltage varies in order to keep the output current lower than the programmed value. "Overcurrent" lasting more than set value (1 to 9999) causes the channel to "trip". Output voltage will drop to zero either at the Ramp-down rate or at the fastest available rate, depending on Power Down setting; in both cases the channel is put in the off state. If trip= INFINITE, "overcurrent" lasts indefinitely. TRIP range: 0 ÷ 999.9 s; 1000 s = Infinite. Step = 0.1 s
Accuracy[1]	Vmon vs. Vout		±0.02% of read value ±2V
	Vset vs. Vout		±0.02% of set value ±2V
	Imon vs. Iout	IMON RNG H	±2% of read ±2µA
		IMON RNG L	±2% of read ±200nA
	Iset vs. Imon	IMON RNG H	±2% of read ±2µA
		IMON RNG L	±2% of read ±200nA
Voltage Ripple	10 ÷ 1000 Hz	Typical	5mVpp
		Maximum	20mVpp
	1 ÷ 20000 kHz	Typical	3mVpp
		Maximum	10mVpp
Ventilation Fan			50x50 24V; 62 dBA maximum noise level
Humidity range			0 ÷ 80%
Operating temperature			0 ÷ 45°C
Storage temperature			-10 ÷ 70°C
Vout / Temp. coefficient			max. 50ppm / °C
Imon / Temp. coefficient			max 100ppm/C°; max 300ppm/C° with Imon zoom
Longterm stability Vout vs. Vset			± 0.02% (after one week @ constant temperature)

Imon Zoom

Imon Zoom is a feature that allows to monitor the channel current with an increased resolution in the 0 ÷ 200 µA range: by selecting Imon Range = LOW, the output current is monitored with 5 nA resolution (instead of 50 nA). It is important to notice that, if Imon Range = LOW is selected, and the channel draws a current larger than 200 µA then Overcurrent is reported.

[1] Accuracy values are measured from 10% to 90% of Full Scale Range

3. Operating modes

Safety requirements

N.B. read carefully the "Precautions for Handling, Storage and Installation" document provided with the product before starting any operation!

The following HAZARD SYMBOLS are reported on the unit:

CAUTION: indicates the need to consult the "Precautions for Handling, Storage and Installation" document provided with the product. **A potential risk exists if the operating instructions are not followed**

HIGH VOLTAGE: indicates the presence of electric shock hazards. Enclosures marked with these symbols should only be opened by CAEN authorized personnel.

To avoid risk of injury from electric shock, do not open this enclosure

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.

Initial inspection and installation

Prior to shipment, these units are inspected and found free of mechanical or electrical defects. Upon unpacking of the unit, inspect for any damage, which may have occurred in transport. The inspection should confirm that there is no exterior damage to the unit, such as broken knobs or connectors, and that the panels are not scratched or cracked. Keep all packing material until the inspection has been completed. If damage is detected, file a claim with carrier immediately and notify CAEN. Before installing the unit, make sure you have read thoroughly the safety rules and installation requirements, then place the package content onto your bench; you shall find the following parts:

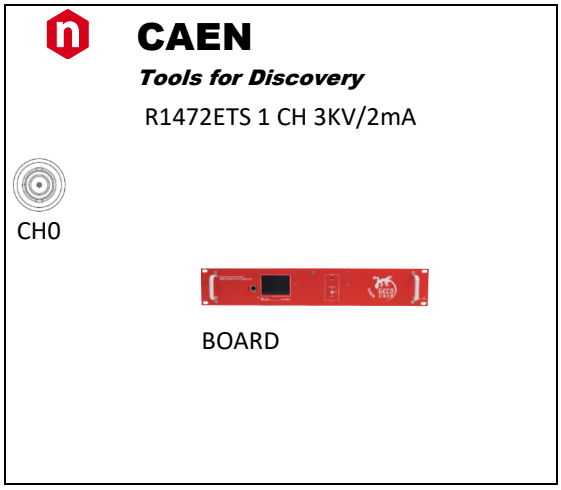
- R1472ETS Rack 19" Power Supply
- AC/DC power supply
- USB cable
- 10 BASE-T Ethernet cable

The Unit is housed in 19" rack package and is an equipment for BUILDING-IN: it must be installed in a 19" EIA compliant equipment rack. Use the front panel rack-mount brackets to install the unit in the rack, using standard screws; leave at least one rack unit of free space above and below the Unit.

Unit control can take place either locally, assisted by a 2.8" Touchscreen LCD or remotely, via USB, or Ethernet (see p. 12).

Local Control

Connect the HV Channel Output to the load, then to turn ON the unit, connect the unit to the Mains through the power cord, provided with the kit, and switch it ON. At power ON the Display shows the Main Menu:



At this point the module is ready to be operated locally. Tap on:

- BOARD icon to access BOARD parameters
- CH0 icon to access CHANNEL parameters
- Default settings:
  - VSet = 2000V
  - ISet = 1000 µA
  - Mode = Local

BOARD Settings

Board Parameters	←
Power	√
HV Clock	√
Control	**Remote**

Fig. 1: Board Parameters

General board parameters (CONTROL can be operated both in LOCAL and REMOTE mode; other settings are allowed in LOCAL mode only; monitor options are available also with remote control) include:

Parameter:	**Type:**	**Function:**
Power	Monitor	Module power supply status
Termination	Monitor	Local Bus termination status (ON/OFF)
HV Clock	Monitor	Sync clock frequency (200±10 kHz correct value)
CONTROL	Monitor/Set	REMOTE: the module is controlled remotely; local monitor is allowed; *LOCAL/REMOTE* switch is enabled
		LOCAL: the module is controlled locally; remote monitor is allowed

To set one parameter, set Control to “Local”, then tap on the relevant name, and change and/or enter the desired value; confirm with “Enter”.
Tapping the red arrow, allows to go back.
Tapping “Network” Icon allows to access Ethernet configuration menu:

Ethernet configuration

Ethernet Config. Menu <
IPAddress
010.000.007.061
Mask
255.000.000.000
Gateway
255.255.255.255
√ >

MAC Address
010.000.000.000
DHCP
Disabled
√ >

This option allows to configure the Ethernet settings; once they are done, tap Mark icon to Save, but changes will only become effective at next power ON. Tap the red arrows to go forward and back.

If a DHCP Server is available, then the module can be enabled or disabled as DHCP client; tap green button to save the new setting and go back to Main Menu: the DHCP server will automatically assign a new IP to the module at next Power On. Tap the backward red arrow to go back without changes.

Channel settings

CH0 MENU ←	
VMon	0000.0V
IMon	0000.00µA
Status	Kill !
VSet	2000.0
ISet	1000.00
	1/2

CH0 MENU ←	
MaxV	3100
RampUp	500
RampDown	400
Trip	INF
PowerDown	Kill
IMonRange	High
	2/2

For the HV channel, the following parameters can be programmed and monitored either locally or remotely (see p.12):

Parameter:	Function:	Unit:
Vmon	High Voltage Monitored value	Volt
Imon	Current Monitored value	µA
Status	ON/OFF; Ramp UP/DOWN; OVV; UNV; OVC; OVP; MAXV; TRIP; OVT; OFF; KILL; CAL_ERR	
Vset	High Voltage programmed value	Volt
Iset	Current Limit programmed value	µA
MaxV	Absolute maximum High Voltage level that the channel can reach (see p. 8)	V
Ramp-Up	Maximum High Voltage increase rate	V/s
Ramp-Down	Maximum High Voltage decrease rate	V/s
Power Down	Power Down mode after channel TRIP	KILL or RAMP
Trip	Max time "overcurrent" allowed to last (1000 = ∞)	s
Imon Range	Current Monitor Zoom	H or L

To set one parameter, tap on the relevant name, and change and/or enter the desired value through the "virtual keypad" (see below); confirm with "Enter". Tap the red arrow to go back to Main Menu.

1	**2**	**3**
4	**5**	**6**
7	**8**	**9**
.	**0**	**Del**
Enter		

Status Icon

Three types of Icon in the display status area indicate:

OK status

WARNING status

ALARM status

Remote Control

Unit installation

USB installation

Connect the HV Channel Output to the load
Connect the unit to Mains (AC) via the separate power cord
Connect the unit to the PC via the USB cable
Power up the unit through the ON/OFF rear switch
Download and install the USB driver for your OS, available at the unit page on the www.caen.it site
Now the unit is ready for operation, upon installation of one of the available software tools

Ethernet installation

Connect the HV Channel Output to the load
Connect the unit to Mains (AC) via the separate power cord
Connect the Ethernet port of the unit to the relevant port of the PC, using the 10BASE-T Ethernet cable
Power up the unit through the ON/OFF rear switch
Now the unit is ready for operation, upon installation of one of the available software tools

Software tools

GECO2020

CAEN GECO2020 is a graphical application that allows to control the Unit (and all other CAEN Power Supplies). Once the Unit is correctly installed, download and install the GECO2020 software package related to your OS; follow the instructions in the GECO2020 User manual and the Unit will be ready to be operated. For more info please visit www.caen.it (products>firmware/software section).

CAEN HV Wrapper

CAEN HV Wrapper is a library, available either as a set of ANSI C functions or LabVIEW™ VI's. Such set provides the software developer a unified software interface for the control of CAEN Power Supplies. This is a low level application in which the writing of the Control SW is assigned to the user. It contains a generic software interface independent by the Power Supply models and by the communication path used to exchange data with them.

CAEN HV Wrapper is logically located between a higher level application, such as GECO2020, and the lower layer software libraries. For more info please visit www.caen.it (products>firmware/software section).

Power Supply Modules LabVIEW Instrument Driver

Power Supply Modules LabVIEW Instrument Driver is a set of VI'S, developed for LabVIEW 2009 and later releases (LabVIEW™ is a Trademark of National Instruments Corp.), that allow to configure and monitor all parameters of remotely controlled CAEN Programmable HV Power Supply modules. Host PC shall run LabVIEW 2009 or later releases and NI-VISA Run-Time Engine 5.3.

To install the Power Supply Modules LabVIEW Instrument Driver, go to CAEN web site in the "Software" area, download the Power Supply Modules LabVIEW Instrument Driver installation package and follow the Set Up instructions.

Module access

The module is provided with a USB2.0 compliant interface and Ethernet Port (TCP/IP).
CAEN provides the CAEN GECO2020 Control Software that allows a friendly remote management of all Unit's functional parameters (see www.caen.it software support page); anyway, the connection can be performed also via VT emulators; we suggest to use Tera Term (see https://ttssh2.osdn.jp/index.html.en)

USB
Launch the terminal emulator (we suggest using Tera Term), select the serial communication link and set the virtual communication port associated to the module. Select USB connection and the used port number; set port as follows

baud rate 9600

Data bits: 8

Parity: none

stop bit: 1

Flow control: none

Launch communication

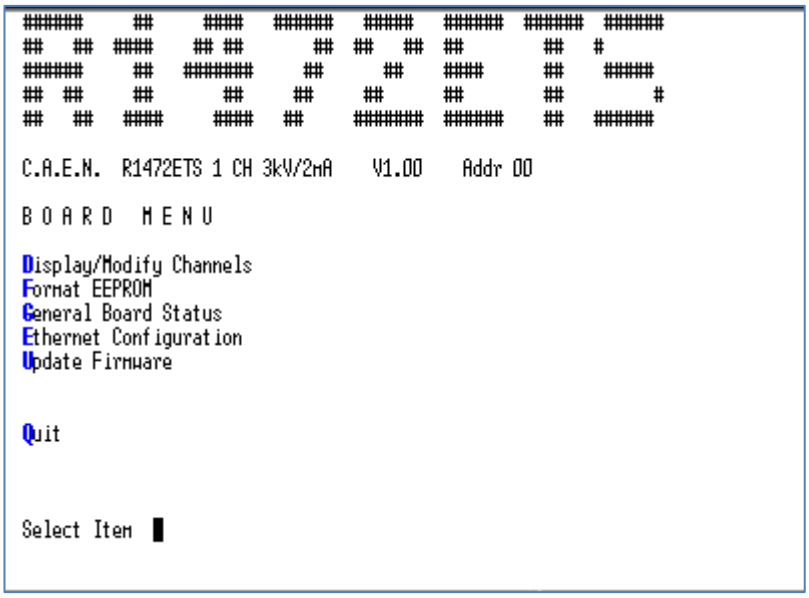
Type caen then <enter>;

Ethernet
Launch the terminal emulator (we suggest using Tera Term), select port number **1470**
Please note that line editing must be disabled prior to Ethernet access (EnableLineMode=off in the Teraterm.ini configuration file).
Default settings are:

IP address	192.168.0.1
Subnet mask	255.255.255.0
Gateway	255.255.255.0

Launch communication
Type caen then <enter>;

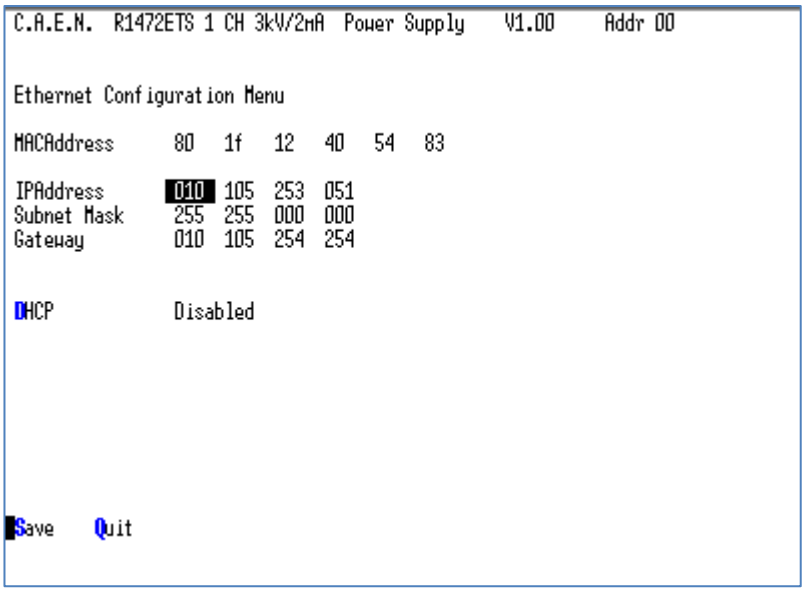
as the communication is established, the Main Menu will be displayed:



N.B.: Ethernet Configuration and Update Firmware are available only with USB connection

Ethernet Configuration

Type E; the following screen will open:



At first Power On the module is configured with default static IP (factory setting); such IP can be updated using the “arrows” to select the fields, typing the new values and confirming with <Enter>.

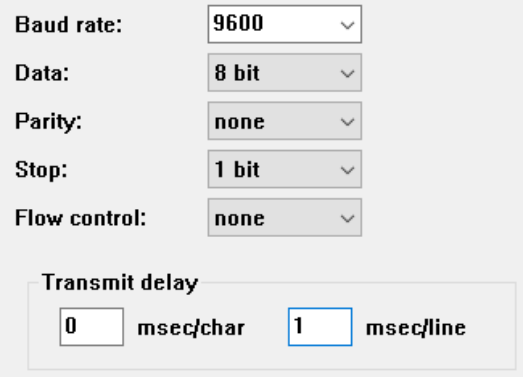
Type S to save the new setting in the EEPROM and go back to Main Menu, Q to go back without changes.

The new setting will become active at next Power On; if a DHCP Server is available, then the module can be enabled or disabled as DHCP client; type S to save the new setting in the EEPROM and go back to Main Menu: the DHCP server will automatically assign a new IP to the module at next Power On.

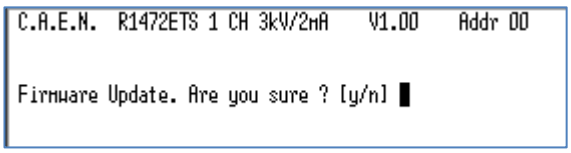
Firmware upgrade

To upgrade the firmware:

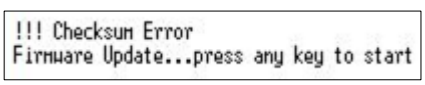
- download from www.caen.it product page the most recent firmware revision for your module
- connect to the module via USB using Tera Term VT Emulator
- in the Tera Term options, select “set up” > “serial port” and enter the following settings



- click OK to confirm
- go to Terminal Board Menu (see p.13)
- type U to upgrade the firmware:



- Type y
- the following message will be shown:



- Press any key
- Wait until the following message is shown:

```
Flash Erased!!!

Send file to upload
```

- Select “File” > send file
- Browse the image file
- Select “open”
- Wait the upload to complete
- turn OFF and then ON the module

now the unit is ready to operate running the upgraded firmware

Format EEPROM

By typing F on Terminal Board Menu it is possible to access the format EEPROM menu.

```
C.A.E.N.  R1472ETS 1 CH 3kV/2mA    V1.00    Addr 00

Format EEPROM. Are you sure ? [y/n] 
```

Channel settings

By typing D on Terminal Board Menu it is possible to access channel settings

```
C.A.E.N.  R1472ETS 1 CH 3kV/2mA  Power Supply    V1.00     Addr 00

                  Ch0

Polarity            +
Vmon           0000.0 V
Imon          0000.00 uA
Status           Kill

Power            Off
Vset           2000.0 V
Iset          1000.00 uA
Maxv             3100 V
Ramp Up           500 V/S
Ramp Down         500 V/S
Trip             Inf. S
Power Down       Kill
Imon Range       High



Reset Alarm     Quit
```

Board Status

By typing G on Terminal Board Menu it is possible to monitor the General Board Status

```
C.A.E.N.  R1472ETS 1 CH 3kV/2mA    V1.00    Addr 00

Serial Number          :  20

Internal Supply        :  OK

Over Power             :  NO

HV Clock Status        :  OK

Quit
```

Communication Protocol

The Protocol is based on commands made of ASCII characters strings.

Command Format

The Format of a command string is the following:

$BD:,CMD:***,CH*,PAR:***,VAL:***.**<CR, LF >**

The fields that form the command are :

BD : module address (to send the command); set to 00
CMD : **MON, SET**
CH : set to **0**
PAR : (see parameters tables)
VAL : (numerical value must have a Format compatible with resolution and range)

Format of response string

Format response in case of error

String	Function (Units)
#BD:**,CMD:ERR	Wrong command Format or command not recognized
#BD:**,CH:ERR	Channel Field not present or wrong Channel value
#BD:**,PAR:ERR	Field parameter not present or parameter not recognized
#BD:**,VAL:ERR	Wrong set value (<Min or >Max)
#BD:**,LOC:ERR	Command SET with module in LOCAL mode

Each string is terminated by **< CR, LF >**

Format response in case of correct command

String	Function (Units)
#BD:**,CMD:OK	command Ok
#BD:**,CMD:OK,VAL:*	command Ok * = value for command to individual Channel
#BD:**,CMD:OK,VAL:*;*;*;*	command Ok *;*;*;* = values Ch0

Numerical value Field **'VAL'** has Format compatible (comma and decimal part) with the resolution and the range related to the parameter. Each string is terminated by **< CR, LF >**

MONITOR commands related to the Channels

The following table contains the strings to be used to handle monitor commands related to the Channel.

String	Function (Units)
$BD:00,CMD:MON,CH:0,PAR:VSET	Read out VSET value
$BD:00,CMD:MON,CH:0,PAR:VMIN	Read out VSET minimum value
$BD:00,CMD:MON,CH:0,PAR:VMAX	Read out VSET maximum value
$BD:00,CMD:MON,CH:0,PAR:VDEC	Read out VSET number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:VMON	Read out VMON value
$BD:00,CMD:MON,CH:0,PAR:ISET	Read out ISET value (µA)
$BD:00,CMD:MON,CH:0,PAR:IMIN	Read out ISET minimum value (µA)
$BD:00,CMD:MON,CH:0,PAR:IMAX	Read out ISET max value
$BD:00,CMD:MON,CH:0,PAR:ISDEC	Read out ISET number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:IMON	Read out IMON value (µA)
$BD:00,CMD:MON,CH:0,PAR:IMRANGE	Read out IMON RANGE value (HIGH / LOW)
$BD:00,CMD:MON,CH:0,PAR:IMDEC	Read out IMON number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:MAXV	Read out MAXVSET value
$BD:00,CMD:MON,CH:0,PAR:MVMIN	Read out MAXVSET minimum value (0 V)
$BD:00,CMD:MON,CH:0,PAR:MVMAX	Read out MAXVSET maximum value
$BD:00,CMD:MON,CH:0,PAR:MVDEC	Read out MAXVSET number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:RUP	Read out RAMP UP value (V/S)

String	Function (Units)
$BD:00,CMD:MON,CH:0,PAR:RUPMIN	Read out RAMP UP minimum value (V/S)
$BD:00,CMD:MON,CH:0,PAR:RUPMAX	Read out RAMP UP maximum value
$BD:00,CMD:MON,CH:0,PAR:RUPDEC	Read out RAMP UP number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:RDW	Read out RAMP DOWN value (V/S)
$BD:00,CMD:MON,CH:0,PAR:RDWMIN	Read out RAMP DOWN minimum value (V/S)
$BD:00,CMD:MON,CH:0,PAR:RDWMAX	Read out RAMP DOWN maximum value
$BD:00,CMD:MON,CH:0,PAR:RDWDEC	Read out RAMP DOWN number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:TRIP	Read out TRIP time value (S)
$BD:00,CMD:MON,CH:0,PAR:TRIPMIN	Read out TRIP time minimum value (S)
$BD:00,CMD:MON,CH:0,PAR:TRIPMAX	Read out TRIP time maximum value (S)
$BD:00,CMD:MON,CH:0,PAR:TRIPDEC	Read out TRIP time number of decimal digits
$BD:00,CMD:MON,CH:0,PAR:PDWN	Read out POWER DOWN value (RAMP / KILL)
$BD:00,CMD:MON,CH:0,PAR:STAT	Read out Channel status value (XXXXX)

Meaning of STATUS bits (value read in decimal Format)

Bit	Function
Bit 0 → ON	1 : ON 0 : OFF
Bit 1 → RUP	1 : Channel Ramp UP
Bit 2 → RDW	1 : Channel Ramp DOWN
Bit 3 → OVC	1 : IMON >= ISET
Bit 4 → OVV	1 : VMON > VSET + 2.5 V
Bit 5 → UNV	1 : VMON < VSET – 2.5 V
Bit 6 → MAXV	1 : VOUT in MAXV protection
Bit 7 → TRIP	1 : Ch OFF via TRIP (Imon >= Iset during TRIP)
Bit 8 → OVP	1 : Output Power > Max
Bit 9 → OVT	1: TEMP > 105°C
Bit 10 → DIS	1 : Ch disabled (REMOTE Mode and Switch on OFF position)
Bit 11 → KILL	1 : Ch in KILL via front panel
Bit 13 → NOCAL	1 : Calibration Error
Bit 12, 14, 15 → N.C.	

MONITOR commands related to the module

The following table shows the strings to be used to handle monitor commands related to the module.

String	Function (Units)
$BD:00,CMD:MON,PAR:BDNAME	Read out module name
$BD:00,CMD:MON,PAR:BDFREL	Read out Firmware Release
$BD:00,CMD:MON,PAR:BDSNUM	Read out module serial number
$BD:00,CMD:MON,PAR:BDCTR	Read out Control Mode (LOCAL / REMOTE)
$BD:00,CMD:MON,PAR:BDALARM	Read out Board Alarm status value (XXXXX)

Meaning of Board Alarm bits

Bit	Function
Bit 0 → CH0	1 : Ch0 in Alarm status
Bit 4 → PWFAIL	1 : Board in POWER FAIL
Bit 5 → OVP	1 : Board in OVER POWER
Bit 6 → HVCKFAIL	1 : Internal HV Clock FAIL (≠ 200±10kHz)

SET commands related to the Channel

The following table contains the strings to be used to handle set commands related to the Channel.

String	Function (Units)
$BD:00,CMD:SET,CH:0,PAR:VSET,VAL:value	Set VSET value
$BD:00,CMD:SET,CH:0,PAR:ISET,VAL:value	Set ISET value
$BD:00,CMD:SET,CH:0,PAR:MAXV,VAL:value	Set MAXVSET value

$BD:00,CMD:SET,CH:0,PAR:RUP,VAL:value	Set RAMP UP value
$BD:00,CMD:SET,CH:0,PAR:RDW,VAL:value	Set RAMP DOWN value
$BD:00,CMD:SET,CH:0,PAR:TRIP,VAL:value	Set TRIP time value
$BD:00,CMD:SET,CH:0,PAR:PDWN,VAL:RAMP/KILL	Set POWER DOWN mode
$BD:00,CMD:SET,CH:0,PAR:IMRANGE,VAL:HIGH/LOW	Set IMON RANGE
$BD:00,CMD:SET,CH:0,PAR:ON	Set Ch ON
$BD:00,CMD:SET,CH:0,PAR:OFF	Set Ch OFF

SET commands related to the module

String	Function (Units)
$BD:00,CMD:SET,PAR:BDCLR	Clear alarm signal

EPICS Service

EPICS (Experimental Physics and Industrial Control System) is a set of software tools and applications which provide a software infrastructure for use in building distributed control systems, widely used to control experimental Physics and industrial electronics.
CAEN provides EPICS Input/Output Controller (IOC) for 19" and DeskTop HV Power Supplies, that allows access to a Process Variable using the Channel Access Protocol. Process Variable is a named piece of data associated with the module (e.g. status, readback, setpoint, parameter).
Client software (EPICS Channel Access Client), which requests access to a Process Variable, runs on the Host PC and is connected to the modules via either TCP/IP or USB.
The EPICS IOC is available for free download on www.caen.it website (Power Supply Software section)
More information about EPICS and a list of available client applications can be found at:
http://www.aps.anl.gov/epics/.

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