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A quick manual for the CAEN Power Supply Prototype

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Abstract

A quick reference manual for the CAEN SY527 and the Power Supply prototype.

1 Introduction

This quick reference manual has been freely adapted from the original CAEN SY527 manual. In addition we report some preliminary operating instruction for the Power Supply Prototype for BaBar.

2 The SY527 control

The CAEN SY527 mainframe can be controlled either using the front panel screen and keyboard either remotely. The local control allows to set all the relevant parameters and to switch on and off the channels.

A more complete control can be performed using a VT100 terminal connected to the front panel RS232 connector. In this way it is possible to change all the parameters and to update the internal EEPROM. A password protection can be also set and there is the possibility to monitor the voltage and the current for the channels fitting in a page, while the front panel display allows to monitor only one channel at a time.

A remote control can be also performed using the high speed CAENET protocol using a PC with a A303 control card on the ISA bus or with the V288 controller in VME. Programs can be written using the protocol libraries written in C and supplied by CAEN.

2.1 RS232 control

The control performed using a VT100 is the simplest one and it offers the opportunity to have the complete control of the EEPROM information. All the settings are stored in the EEPROM on the boards, increasing its portability.

The menu on the screen is quite understandable and the chapter 5 in the CAEN manual contains all the information.

Anyway we decided to have a simple manual to speed up the non-expert user operations. In the following some simple instructions are provided. It is required a continous feedback to allow a better understanding of the problems encountered using this manual. Any comment should be reported to `benny@slac.stanford.edu`.

3 The general settings

The BaBar module can be inserted in any slot in the rear part of the mainframe. The mainframe will recognize its position and characteristics.

WARNING: *Never insert or take off a module if the mainframe is on. Once the mainframe has been switched off do not remove or insert modules until the orange led, referred to the 310 V internal supply, is switched off (fig. 1). Improper operations when the light is still on can cause serious damage to the modules.*

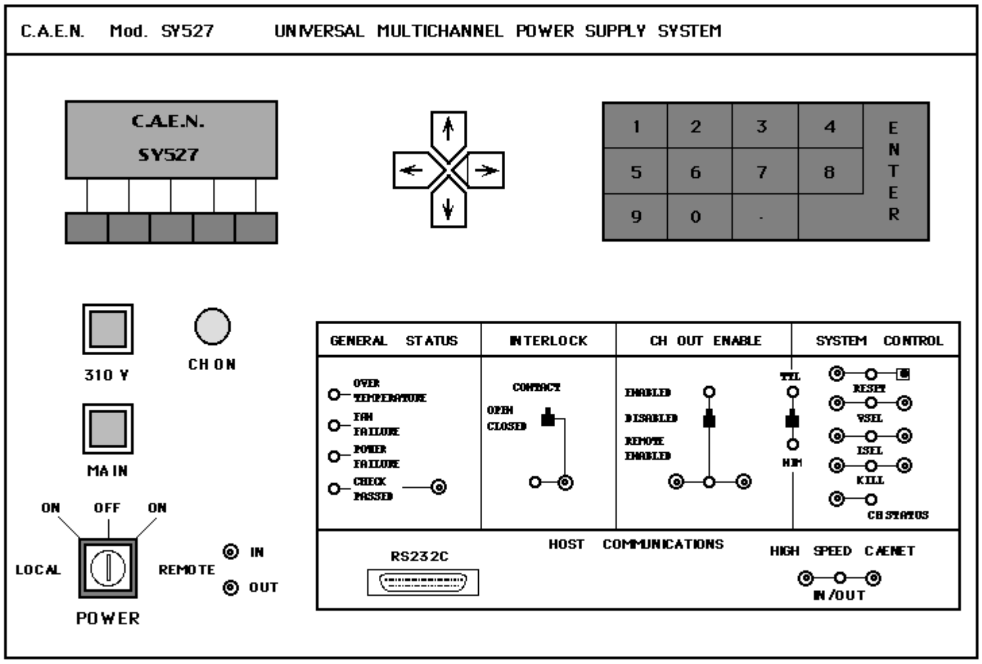


Figure 1: The mainframe front panel

To switch on the mainframe use the front panel key turning it counter-clockwise to the `LOCAL ON` position. When the mainframe is switched on, it starts a set of diagnostic checks. When the diagnostic phase is finished the green LED `CHECK PASSED` lights up. The `CHECK PASSED` connector outputs a standard TTL level on 50 Ω impedance.

The system works between two voltage and current levels called `V0` and `I0` and `V1` and `I1`. Usually `V0` and `I0` are set to 0 for all channels and `V1` and `I1` are the target voltage and current for each channel. In order to select `V1` and `I1` as output, a TTL or NIM level must be present at the `VSEL` and `ISEL` inputs on the front panel. The selection between TTL and NIM level for the input can be done using the 2-positions switch on the front panel (fig. 2).

The simplest way to do such a selection is to choose the `TTL` level using the mentioned switch and connect the `CHECK PASSED` output to both `VSEL` and `ISEL` inputs. When at least one channel is switched on the red LED `CH`

`ON` lights up.

About the other switches and LEDs present on the front panel we spend here few words. A more detailed knowledge of these features is not needed at this stage.

We can forget about the `INTERLOCK` for the moment. It can be used as an hardware protection and, if needed, all the details are well explained in the CAEN manual at the section 3.4.3 (see also the section 3.4.8 related to the `KILL` command).

The `CH OUT ENABLE SECTION` is quite important and we spend here some words. The 3-position switch is normally in the upper position. If needed putting the switch in the middle position one can shut down all the channels that will go off with the correct ramp down time. Take in mind that a `KILL` or an `INTERLOCK` condition would switch off all the active channels in ~ 300 ms and this is only an emergency procedure.

If the `CH OUT ENABLE` is in the lower position a remote signal is required. This condition is not used normally in lab test conditions while could be useful during the data taking to switch on/off remotely the system.

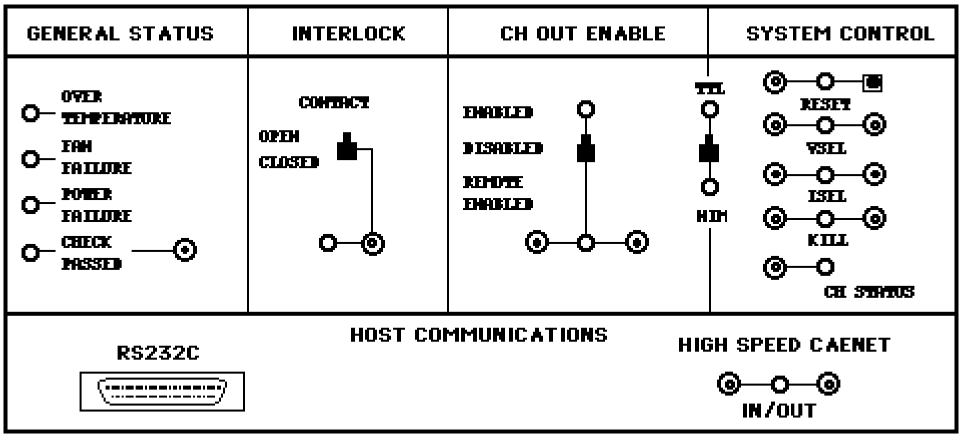


Figure 2: The front panel indicator section

4 Using the RS232 communication

A VT100 terminal or a MAC/PC with VT100 emulator should be connected to the front panel RS232 port. The diagnostic messages appear on the terminal screen (fig. 3) and in case of problems the cause will be presented. As soon as the diagnostic procedure ends, the screen in figure 3 appears and hitting return the program shows the main menu screen. The initial letters of the commands are highlighted (fig. 4).

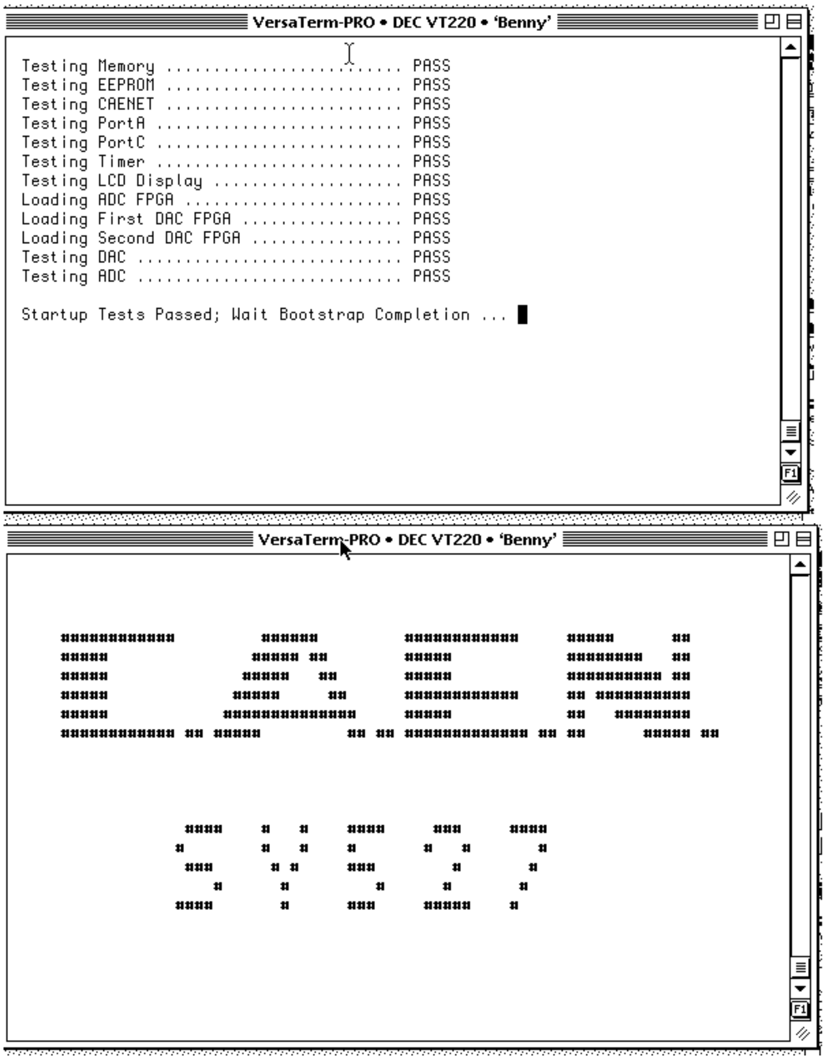


Figure 3: The diagnostic messages and the first page screens

Most of the submenu are not really needed for a normal user. In any case the **Map** command shows the position of the present modules. It can be useful to check one is driving the correct module type. From each submenu one can exit hitting **`Quit`**. If one presses **`Quit`** from the main menu will abandon the program and it is possible to return to it pressing `enter/return`.

The most interesting submenu is the **`Display`** one. By default all the channels are shown. It is possible to have up to 16 different channel groups to group only the needed channels in a special submenu. We will return on this argument in a moment. The default group is the `GROUP00` and it contains all the channels of all the modules present in the mainframe.

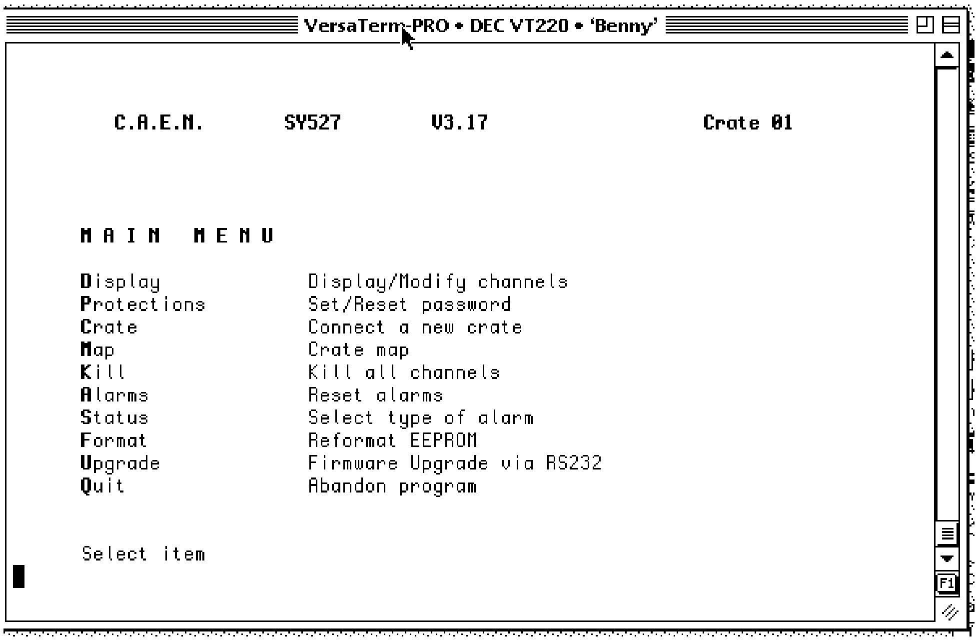


Figure 4: The main menu

For the Santa Barbara testbench setup a smaller group of channel has been created. It is the `GROUP01` called, of course, `UCSB`. The figures 5 and 6 are referred to such a group.

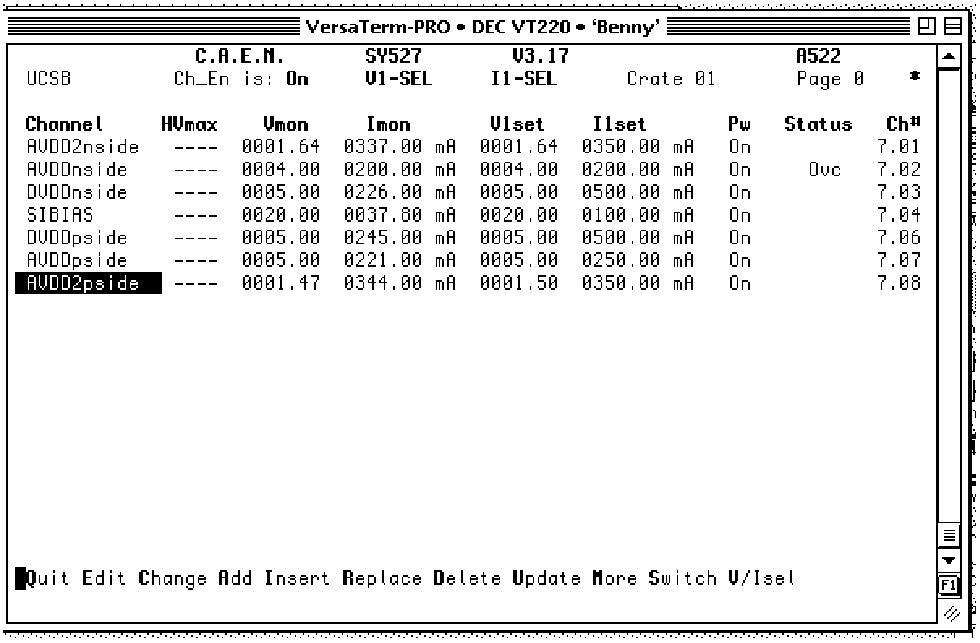
It is interesting to go through what is shown in this two figures of the display.

On the top there is the CAEN mainframe model (`SY527` in our case), the version of the software and the module number (`A522` is the BaBar SVT special module).

The next line shows the group name (`UCSB` in this case), the status of the channel enable (`On` in this case), the voltage and the current level selected (`V1-SEL` and `I1-SEL` as previously explained), the crate number (Crate 01) and the page number (Page 0). One could have several pages, but this is a small channel group and only one page is needed. Be careful: if you have several pages you can scroll them pressing **`Next`** or **`Previous`**. The option **`More`** instead shows additional parameters of the channels present in the same page.

In effect the third line contains the name of the parameters shown. In figure 5 there is the channel name (`Channel`), the hardware voltage limit

(HVmax, not yet implemented for this board in this version of the software), the monitored voltage (Vmon), the monitored current (Imon), the set voltage and the set current (V1set and I1set), the power status (Pw, On in this case), the status (Status that shows on overcurrent (Ovc) in this particular case for the second voltage level) and, finally, the physical position of the voltage level (Ch#, for example the first level, quoted as 7.01, is the first channel of the module in slot 7).


VersaTerm-PRO • DEC VT220 • 'Benny'

C.A.E.N. SY527 V3.17 A522

UCSB Ch_En is: On V1-SEL I1-SEL Crate 01 Page 0 *

Channel	HVmax	Vmon	Imon	V1set	I1set	Pw	Status	Ch#
AVDD2nside	----	0001.64	0337.00 mA	0001.64	0350.00 mA	On		7.01
AVDDnside	----	0004.00	0200.00 mA	0004.00	0200.00 mA	On	Ovc	7.02
DVDDnside	----	0005.00	0226.00 mA	0005.00	0500.00 mA	On		7.03
SIBIAS	----	0020.00	0037.80 mA	0020.00	0100.00 mA	On		7.04
DVDDpside	----	0005.00	0245.00 mA	0005.00	0500.00 mA	On		7.06
AVDDpside	----	0005.00	0221.00 mA	0005.00	0250.00 mA	On		7.07
AVDD2pside	----	0001.47	0344.00 mA	0001.50	0350.00 mA	On		7.08

Quit Edit Change Add Insert Replace Delete Update More Switch V/Isel

Figure 5: The display submenu: the first set of parameters

Pressing **More** one has access to the second set of parameters, less used but not less important. Going through we skip the first two lines that have been already processed. The third line starts again with the channel name and ends again with the physical channel position. In this way one has the complete control of what he is doing at every time.

Then the third line contains the software voltage limit (SVmax, in Volts), the Ramp-up time (Rup) and the Ramp-down time (Rdwn), the trip time setting (Trip), the trip execution enabling (TripEx), the priority to switch on (PrOn) and off (PrOff) the voltages (the sequence starts from the channel with the higher priority number).

The line continues with the power-on enable (Pon that is off in our case that means that in case of power fail at the system restart the voltages are left off and not restored to the previous conditions), the power down condition in case of reset of the system (Pdwn, set to kill in our case), the password

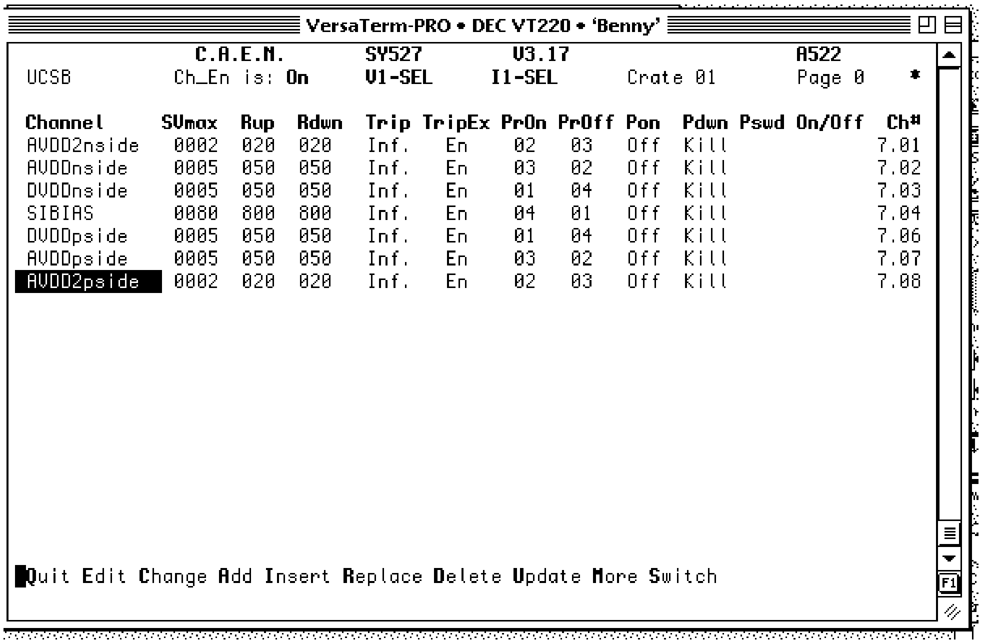


Figure 6: The display submenu: the second set of parameters

protection status(`Pswd`, in our case it is not required) and on/off permission in case of password enabled (`On/Off`, if enabled and with password enabled it is always possible to switch on/off the channels while having not the permission to change any other channel parameter).

When a field is highlighted it can be modified using the keyboard and respecting the format. Using the up and down arrow keys it is possible to modify the voltage and current values by the minimum allowed step.

References

[1] C.A.E.N., The SY527 high voltage system manual, software version 3.04, March 1995.