Technical Information Manual

Revision n.11
14 September 2017

MOD. VME8100

VME64/64X 21 Slot 8U Crate Series

NPO:
00123/05:8100x.MUTx/11

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.

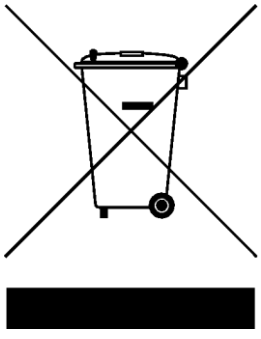
CAEN declines all responsibility for damages or injuries caused by an improper use of the Modules due to negligence on behalf of the User. It is strongly recommended to read thoroughly the CAEN User's Manual before any kind of operation.

CE

CAEN Technologies 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.



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1. General description

1.1 Overview

All VME 8100 series crates are presented into a 19" x 8U (6+2) enclosure, with 21 slot for 6U x 160mm VME modules. Pluggable Power Supplies, with different configurations, allows up to 2500 W output. Both VME64 and VME64X compliant monolithic backplanes are available. 2U tray is available for Pluggable Fan Unit.

Safety features include: short circuit protection, Over / Undervoltage protection, Over temperature protection. Remote monitoring and control take place through CAN bus, Ethernet, USB and RS232 interfaces. The crates are also SBC controlled via graphic OLED Display, provides Automatic Daisy Chain and supports Chained Block Transfers (CBLT). User-friendly control software completes the VME 8100 features.

Optionally, VME 8100 series crates can be ordered with a SNMP (Simple Network Management Protocol) agent, which allows the management of the functional parameters (such as supply voltages, fan speed and temperatures) related to the VME8100 crates. The agent provided by CAEN supports SNMP v2 and SNMP v3.

The crate is based on a modularity concept and it has been divided into three detachable parts

- The Subrack (Bin + Backplane):	Mod V8100XX (8U Bin, 21 slot monolithic backplane, (VME64, VME64X J1/J2, VME64X J1/J0/J2)
- The Power Supply:	Models V81XX VME Power supply (5V 110/220A, +/-12V 20/40A, 3.3V 110/220V)
- The ventilation and control unit (Fan Tray):	Mod A8160 Smart VME Fan Unit, 3-fold fan tray, alphanumeric display with TCP-IP, CANbus, RS232 and USB 2.0

The Unit is powered by 92 ÷264 Vac, 50 ÷ 60 Hz, power factor 0.98% (230VAC).

Fig. 1.1: The Mod. VME8100 21-slot 8U VME64 crate

Table 1.1: Mod. Model VME8100 versions

Backplane	Description	Ordering Code	+5V	+12V	-12V	+3.3V
VME64	VME64 8U crate, 21 slot J1/J2, smart fan unit	WV8100VME000	110 A	20 A	20 A	
		WV8100VME002	110 A	40 A	40 A	
		WV8100VME001	220 A	20 A	20 A	
		WV8100VME003	220 A	40 A	40 A	
VME64X J1/J2	VME64X 8U crate, 21 slot J1/J2, smart fan unit	WV8100VME004	110 A	20 A	20 A	110 A
		WV8100VME006	110 A	20 A	20 A	220 A
		WV8100VME008	110 A	40 A	40 A	110 A
		WV8100VME005	220 A	20 A	20 A	110 A
		WV8100VME010	110 A	40 A	40 A	220 A
		WV8100VME007	220 A	20 A	20 A	220 A
		WV8100VME009	220 A	40 A	40 A	110 A
VME64X J1/J0/J2	VME64X 8U crate, 21 slot J1/J0/J2, smart fan unit	WV8100VME011	110 A	20 A	20 A	110 A
		WV8100VME013	110 A	20 A	20 A	220 A
		WV8100VME015	110 A	40 A	40 A	110 A
		WV8100VME012	220 A	20 A	20 A	110 A
		WV8100VME017	110 A	40 A	40 A	220 A
		WV8100VME014	220 A	20 A	20 A	220 A
		WV8100VME016	220 A	40 A	40 A	110 A

2. Technical specifications

2.1 Technical specification table

Table 2.1: Mod. VME8100 crate family technical features

Mechanics	8U bin for 6U x 160 mm VME cards, 21 slots, 2U space for fan tray
Backplane	VME64 J1/J2, VME64X J1/J2 – J1/J0/J2 Automatic daisy chain, CBLT compliant
Mains input	Auto range: 92 ÷264 Vac, 50÷60 Hz, inrush current: <16 A @ 230 Vac power. fact. > 0.98 @ Output Power > 1 kW
Max Total Output Power	1200 W @ 100 Vac 2530 W @ 211 Vac
Interface	RS 232, USB (2.0), CAN bus, Ethernet
Fuse	External 16 A, type B/C
Output power	110/220 A @ +5 V, 20/40A @ +/-12 V, 110/220 A @ +3.3 V
Power requirements	1760W @ 100Vac at full load; 3600W @ 211Vac at full load
Isolation	CE acc. to EN 60950
Load Regulation	< 10 mV for 0-100% load change @ +5 V < 10 mV for 0-100% load change @ +3.3 V < 15 mV for 0-100% load change @ +/-12 V
Efficiency	75% ÷ 85% @ 230 Vac configuration dependent
Noise and ripple	+5 V, +3.3 V < 10 mVpp, <2 mVrms(1) Typ: 6.0 mVpp, 1.5 mVrms (1) < 5 mVpp, <1.5 mVrms (2) Typ: 2.5 mVpp, 0.5 mVrms (2) +/-12 V < 10 mVpp, <2 mVrms (1) Typ: 4.5 mVpp, 1.0 mVrms (1) < 10 mVpp, <1.5 mVrms(2) Typ: 5.5 mVpp, 0.5 mVrms (2)
Temperature sensors	Power Supply Control: nr. 1 FAN Unit: nr. 1 Backplane: nr. 8 (optional)
Over Voltage Protection	Trip Off when the output voltage > 103% ÷ 120% (programmable) of set voltage
Under Voltage Protection	Trip Off when the output voltage < 80% ÷ 97% (programmable) of set voltage
Over Current Protection	Trip Off when the current > programmable Iset value
Over Temperature Protection	Trip Off when temperature of a single Power Supply block > 90° C Signaled: – temperature FAN Unit > 50°C – temperature Power Supply Control > 65° C
Operation	0÷50°C without derating,
Cooling Airflow:	540 m³/h (at maximum fan speed)
Firmware	VME8100 firmware can be upgraded via Ethernet

(1) Measured at the Output connector (full load).
(2) Measured at load (0.5 m wire). Load conditions: full; parallel (X) 330µF and 1µF ceramic; conducting to case (Y) 100nF polyester each line.

2.2 Technical drawings

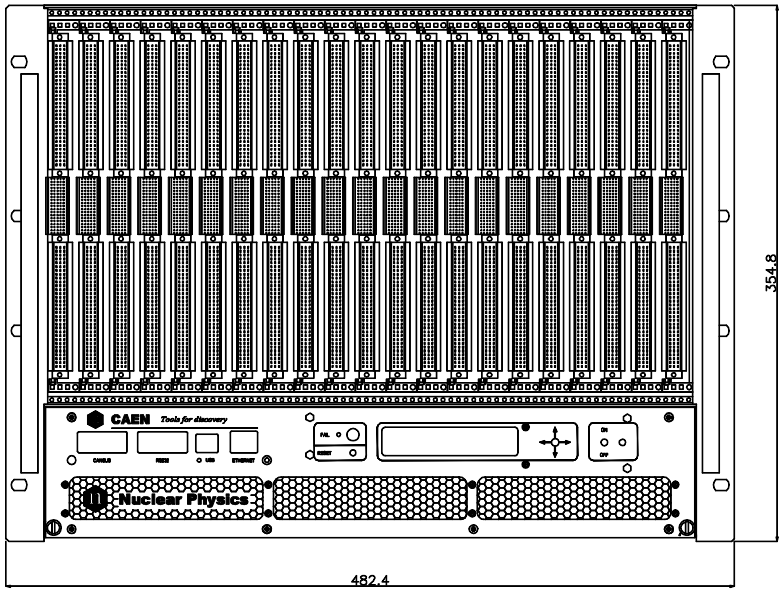


Fig. 2.1: Mod. VME8100 Front view

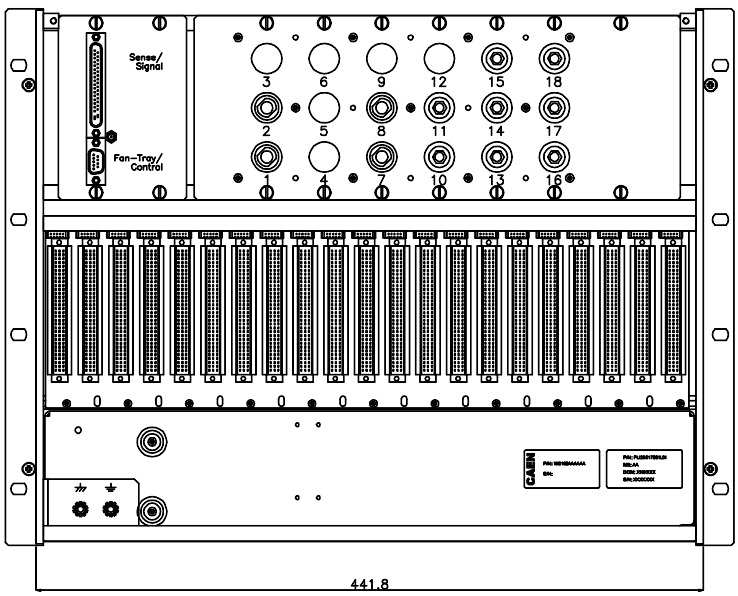


Fig. 2.2: Mod. VME8100 Rear view (Power Supply removed)

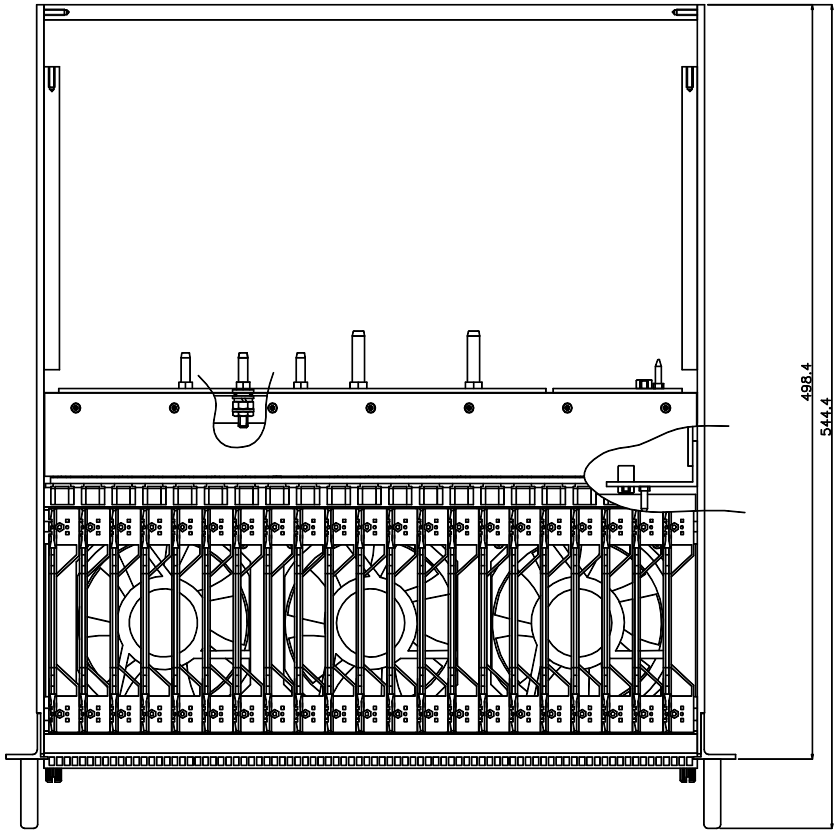


Fig. 2.3: Mod. VME8100 Top view (Power Supply removed)

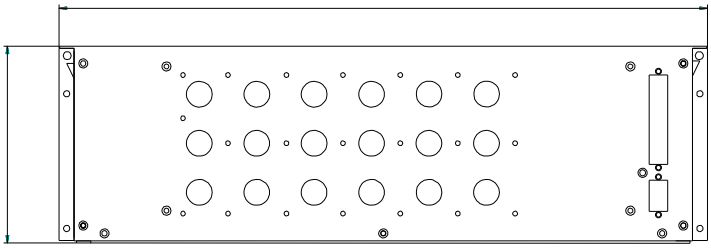


Fig. 2.4: Mod. V81XX Power Supply Front view

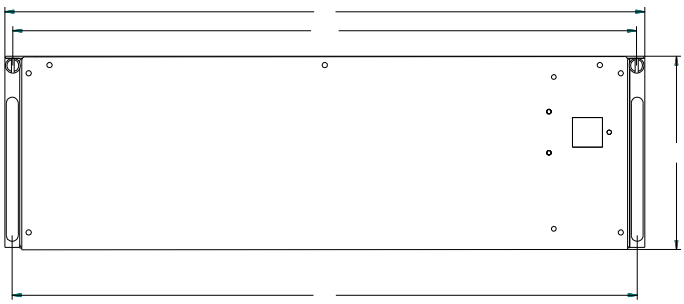


Fig. 2.5 Mod. V81XX Power Supply Rear view

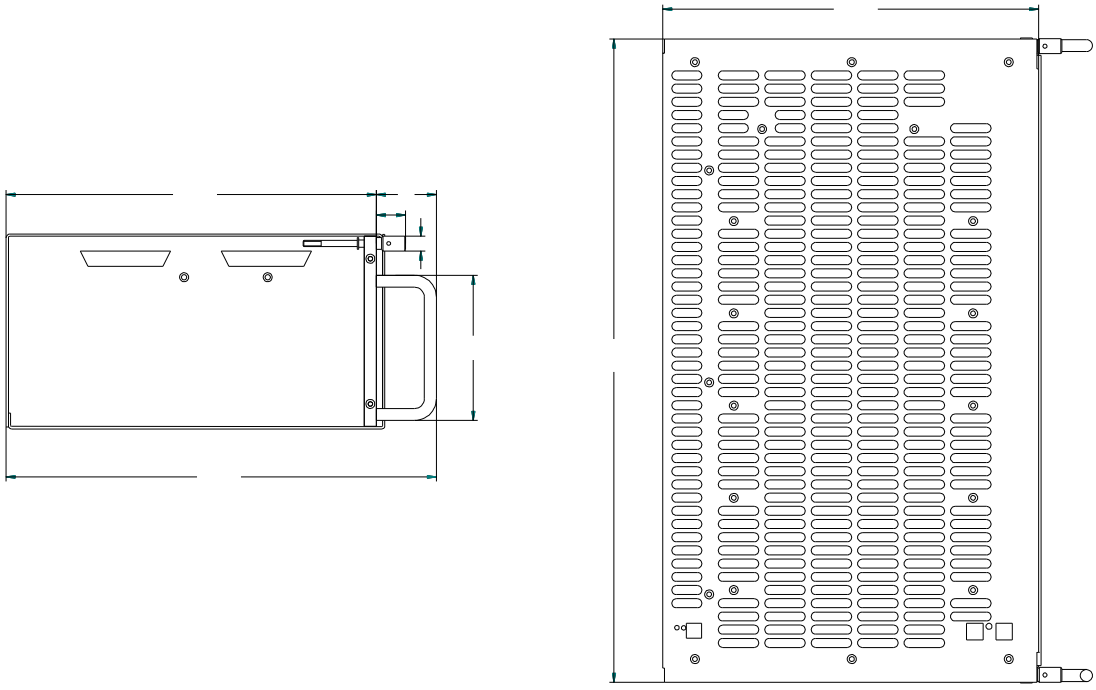


Fig. 2.6: Mod. V81XX Power Supply Left and Top view

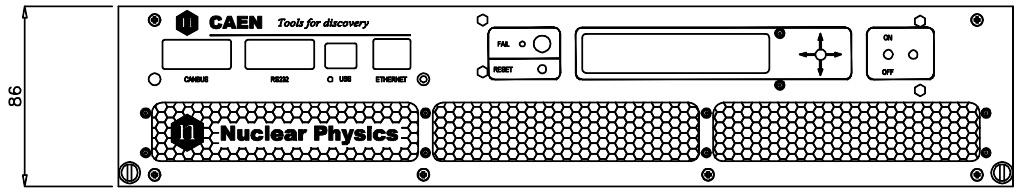


Fig. 2.7: Mod A8160 Smart VME Fan Unit Front view

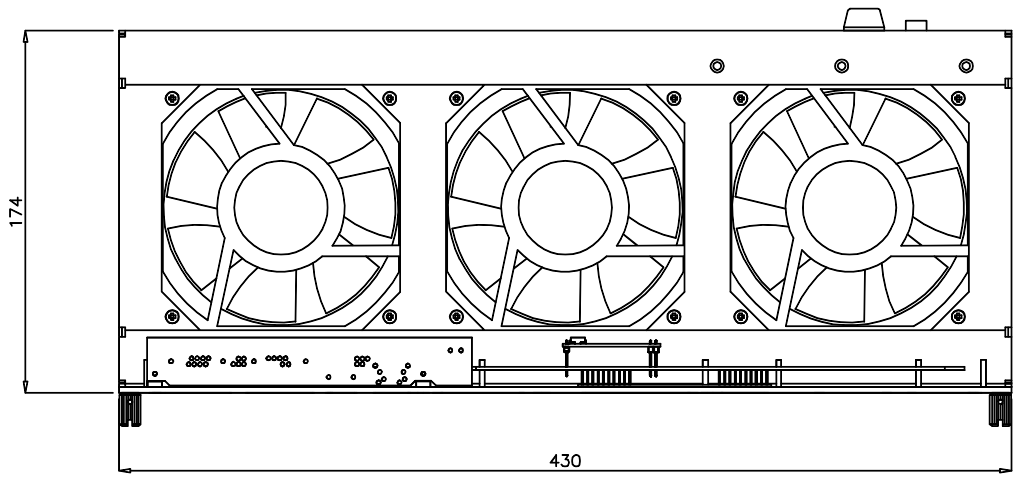


Fig. 2.8: Mod A8160 Smart VME Fan Unit Top view

3. VME8100 Subrack (Bin + Backplane):

3.1 Mechanical Design

The VMEbus is designed for 19-inch rack technology and supports bus lengths of up to 21 slots. In this system, slot 1 is the leftmost, with the rest of the bus extending to the right.

3 Subrack versions are available:

VME64:

VME64 8U Bin, 21 slot monolithic backplane, J1/J2,, ADC CBLT compatible (Ordering code WV8100MV64AA)

VME64X:

VME64X 8U Bin, 21 slot monolithic backplane, J1/J2, ADC CBLT compatible (Ordering code WV8100MV64XN)

VME64X 8U Bin, 21 slot monolithic backplane, J1/J0/J2, ADC CBLT compatible (Ordering code WV8100MV64XP)

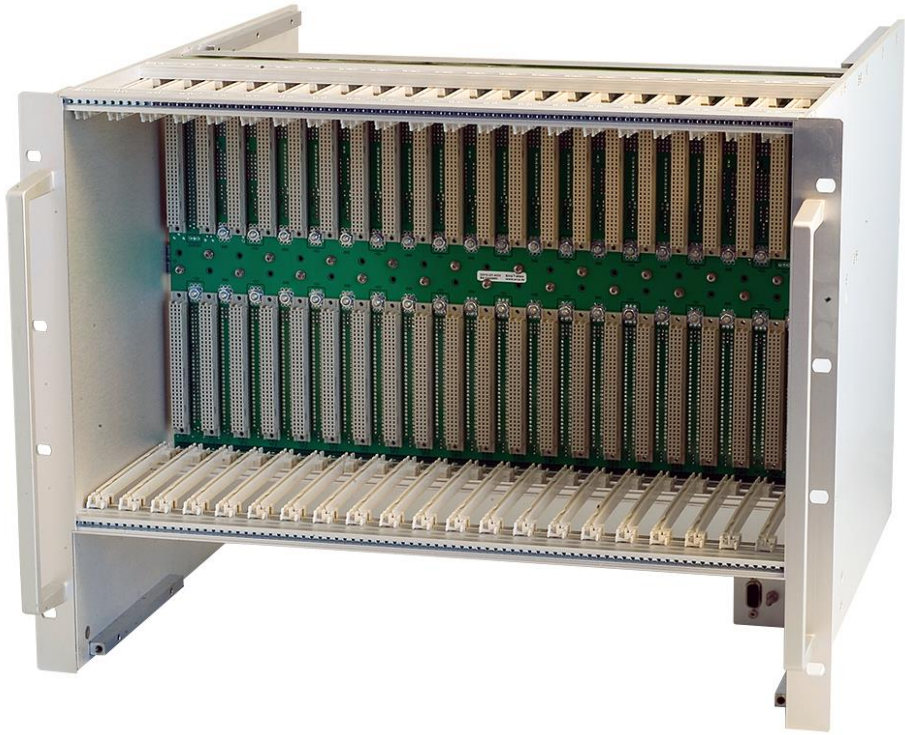


Fig. 3.1: Mod VME8100 Subrack (Bin + Backplane) front view

3.2 VME8100 Backplane

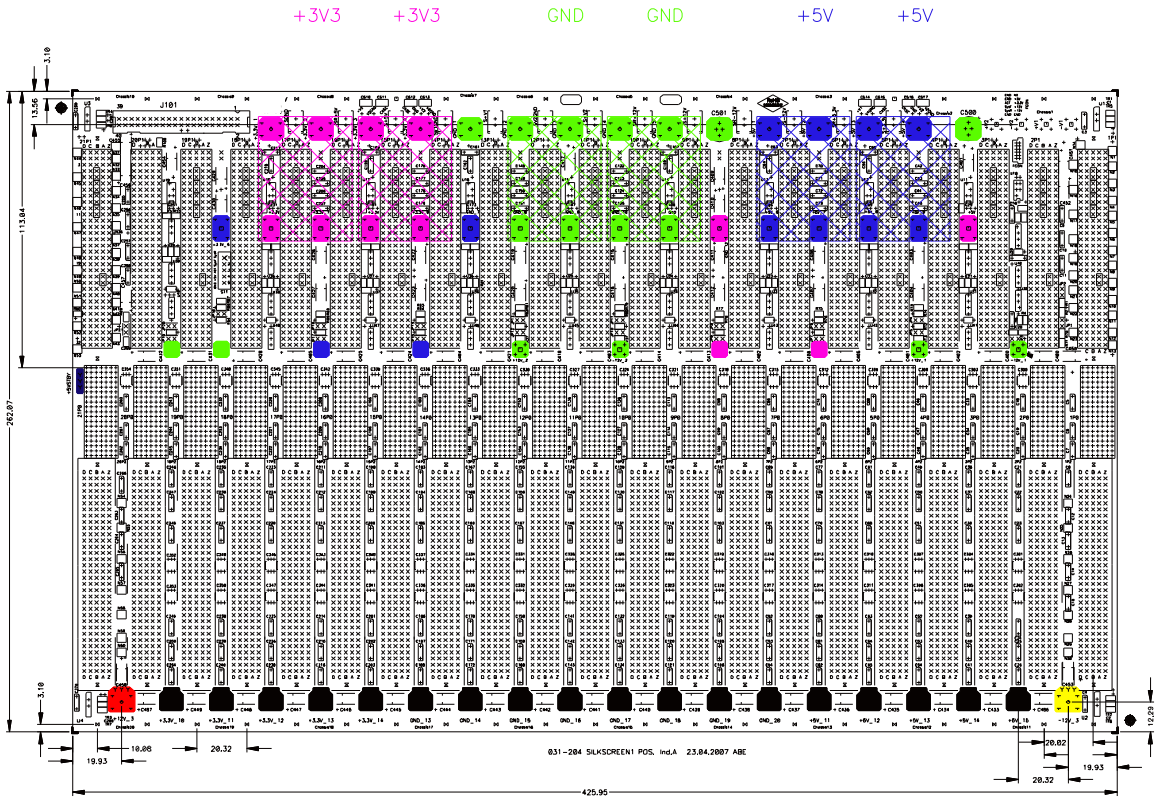


Fig. 3.2: Mod VME8100 Backplane view from SMD components side

VME8100 Backplane technical features

- monolithic
  - VME64 J1/J2,
  - VME64X J1/J2
  - VME64X J1/J0/J2
- 21 slot
- 10 layers (see Fig. 3.3)
- Strip line technology for maximum data rates (320Mbyte/s, 64bit)
- Actively terminated
- Electrical automatic daisy chain
- CBLT Compliant
- Equipped with 8 temperature sensors (optional)

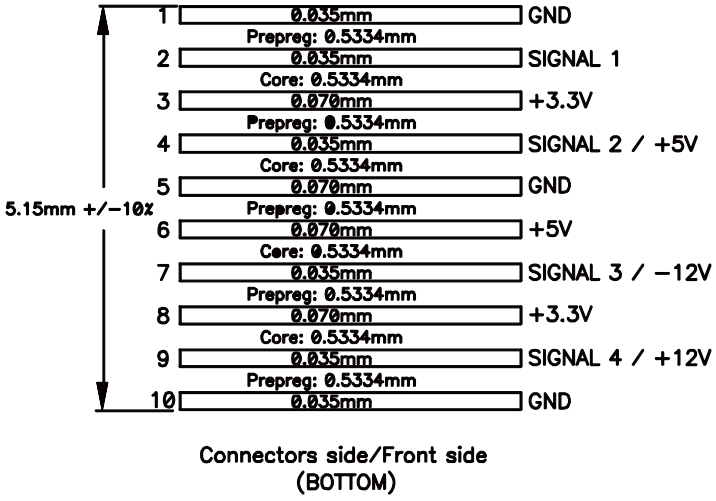


Fig. 3.3: Mod VME8100 Backplane Layer stack-up

3.3 VME8100 Bin Power connector

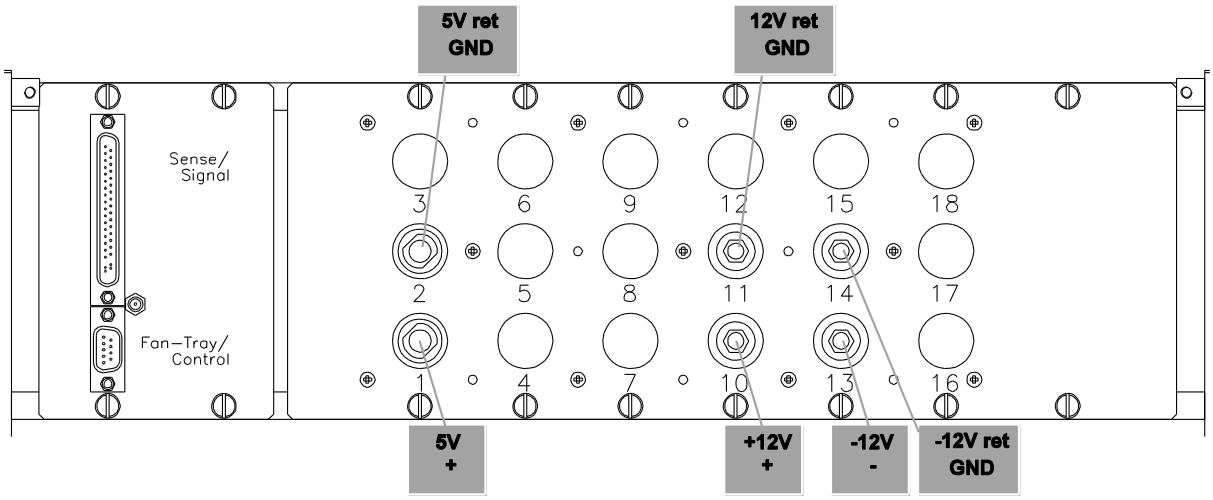


Fig. 3.4: Mod VME8100 Bin power connectors VME64

Pin	Specification
10, 11, 13, 14, 15	6mm, 100A max
1,2,	8mm, 230A max

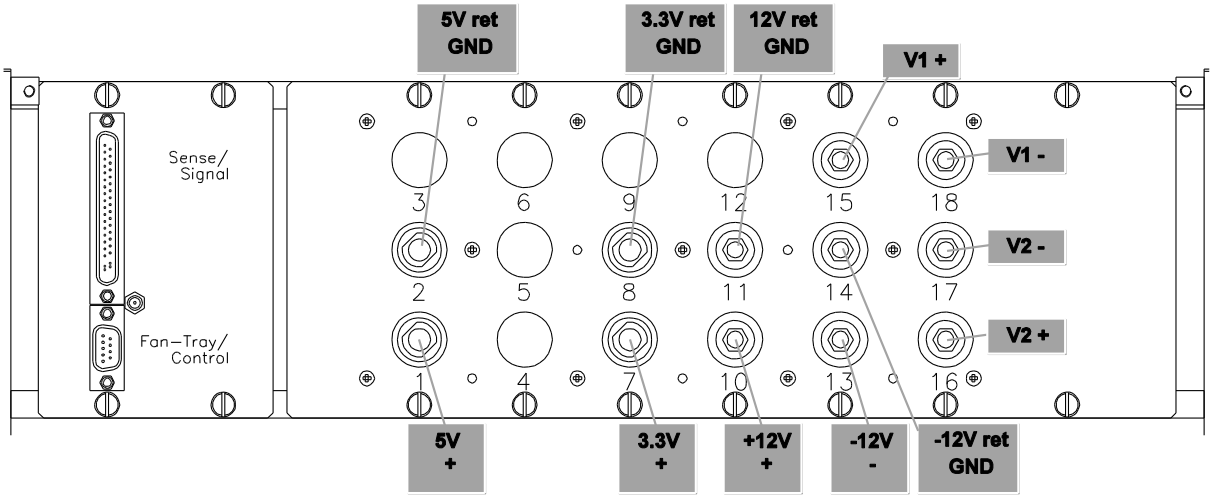


Fig. 3.5: Mod VME8100 Bin power connectors VME64X

Pin	Specification
10, 11, 13, 14, 15, 16, 17,18	6mm, 100A max
1,2,7,8	8mm, 230A max

4. Power Supply section

The CAEN VME Power Supply Models. V81XX (see Fig. 4.1 and Table 4.1) are micro-processor controlled switching power supplies, which provides extremely low noise output voltage.

Table 4.1: Model V8101 – V8111

Ordering Code	Description
WV8101AAAAAA	VME Power supply (5V 110A, +/-12V 20A)
WV8102AAAAAA	VME Power supply (5V 220A, +/-12V 20A)
WV8103AAAAAA	VME Power supply (5V 110A, +/-12V 40A)
WV8104AAAAAA	VME Power supply (5V 220A, +/-12V 40A)
WV8105AAAAAA	VME Power supply (5V 110A, +/-12V 20A, 3.3V 110A)
WV8106AAAAAA	VME Power supply (5V 220A, +/-12V 20A, 3.3V 110A)
WV8107AAAAAA	VME Power supply (5V 110A, +/-12V 20A, 3.3V 220A)
WV8108AAAAAA	VME Power supply (5V 220A, +/-12V 20A, 3.3V 220A)
WV8109AAAAAA	VME Power supply (5V 110A, +/-12V 40A, 3.3V 110A)
WV8110AAAAAA	VME Power supply (5V 220A, +/-12V 40A, 3.3V 110A)
WV8111AAAAAA	VME Power supply (5V 110A, +/-12V 40A, 3.3V 220V)

Fig. 4.1: Mod. V81XX Power Supplies Front and Rear view

the VME8100 power supplies are composed of the following modules (see Fig. 4.2.)

- Power Factor Correction module (PFC)
- Power modules
- Power supply controller

The power modules are readily replaceable. The maximum output power is 1200÷2530W with 92 ÷ 264 V input voltage.

Table 4.2: Available Power Modules:

Type	Vout	Current (max)	Power
Single / 2V ÷ 7V	+(2V ÷ 7V)	115 A	550W
Twin / ±7V ÷ 16V	+(7V ÷ 16V)	23 A	550W
	-(7V ÷ 16V)	23 A	550W

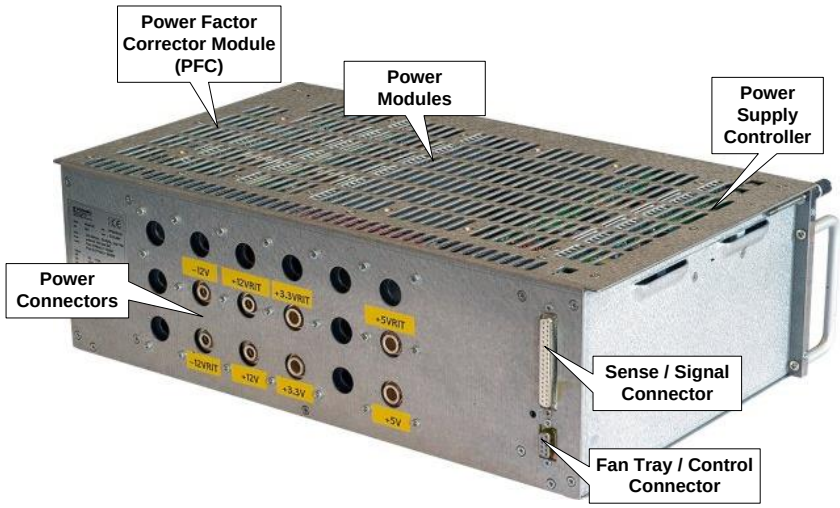


Fig. 4.2: Mod. V81XX Power Supplies components

4.1 Power Connector section

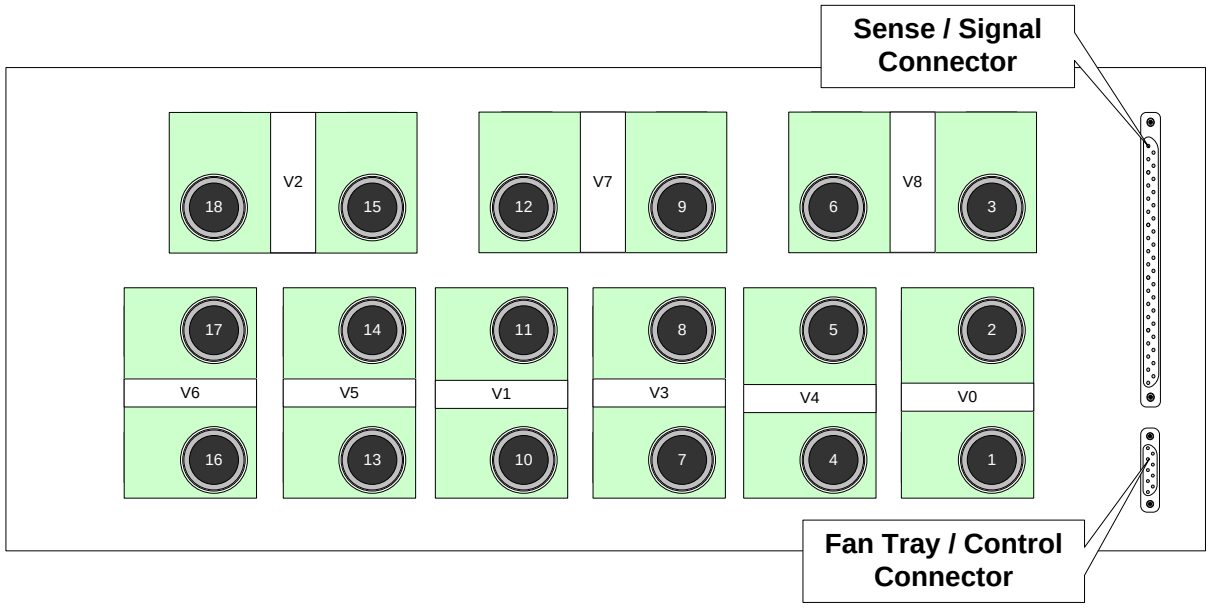


Fig. 4.3: Mod. V81XX Power connector

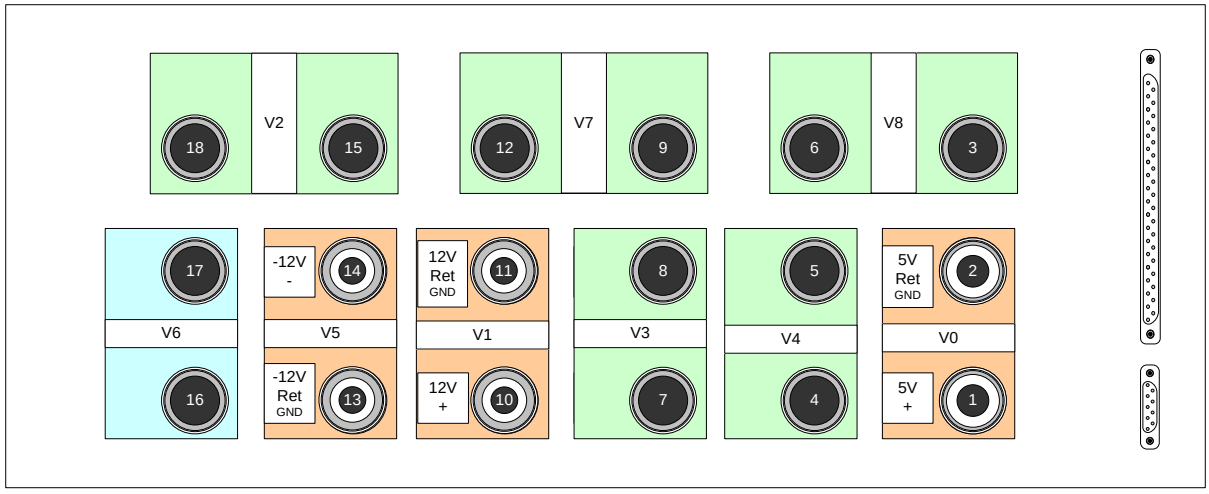


Fig. 4.4: Mod. V81XX VME64 configuration

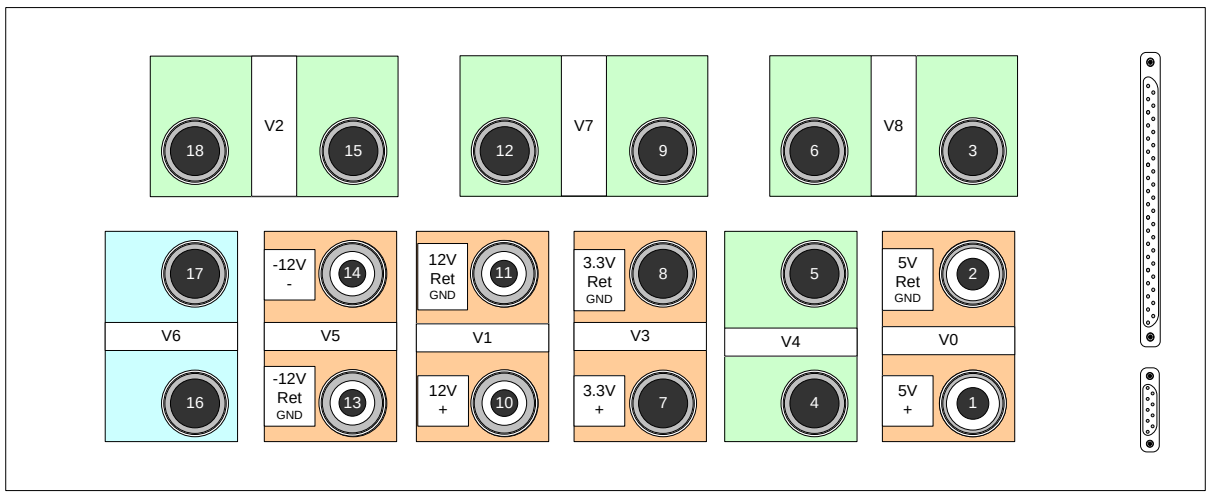


Fig. 4.5: Mod. V81XX VME64X configuration

Table 4.3: Mod. V81XX Voltages and power modules configurations

Location	VME64			VME64X		
	Voltage	Power Module	Max Current	Voltage	Power Module	Max Current
V0	+ 5 V	2V ÷ 7V	220 A	+ 5 V	2V ÷ 7V	220 A
V1	+12 V	±7V ÷ 16V	40 A	+12 V	±7V ÷ 16V	40 A
V2						
V3				+ 3.3 V	2V ÷ 7V	220 A
V4						
V5	-12	±7V ÷ 16V	40 A	-12	±7V ÷ 16V	40 A
V6						
V7						
V8						

4.2 VME8100 Power distribution

Table 4.4: Mod. VME8100 Max current per slot

Voltage	Max Current per slot				
	VME64 J1/J2	VME64X J1/J2		VME64XJ1/J0/J2	
+5V	10.5 A	10.5 A	10.5 A	10.5 A	10.5 A
+12V	1.9 A	0.95 A	1.9 A	0.95 A	1.9 A
-12V	1.9 A	0.95 A	1.9 A	0.95 A	1.9 A
+3.3V		10.5 A	5.2 A	10.5 A	5.2 A

4.3 Power Factor Correction Module (PFC)

The mains input includes a Power Factor Correction Module (PFC) with main filters, soft start- circuit and fuses. If an external fuse or circuit breaker has to be installed, it shall have a capability of 16A.

The AC input module is permanently powered after connecting the unit to the AC- mains. Switch ON/OFF activates only the DC on/off function of the power inverter modules.

Turning on the power supply all voltages reach the nominal values nearly simultaneously within 50 ms whereby the voltage versus time curve shows a monotonic behavior. The start-off-time which corresponds to a value of 10% of the nominal voltages is reached after 50 ms. The turn-on inrush current is limited by a soft start-circuit to a maximum value of 16 A.

The power modules are readily replaceable. The maximum output power is 1200÷2530W with 92 ÷ 264 Vac input voltage.

4.4 Mains Voltage and Connection

The Power supplies are equipped with a “World”- mains input, which works properly from 92Vac up to 264Vac and within a frequency range of 50 to 60Hz. Before connecting to the mains please double-check correspondence. Mains input connection at the power supply side is done with a 3-pin “**Hirschmann**” 16 A connector or power terminals.

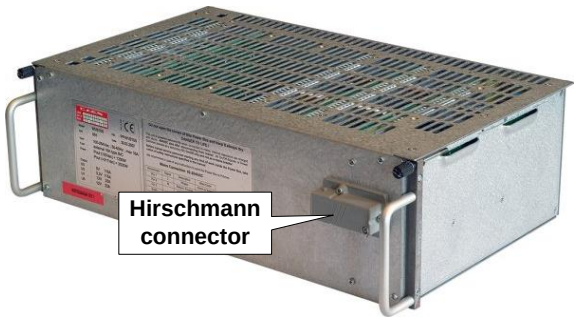


Fig. 4.6: Mod. V81XX Hirschmann connector

Table 4.5: Hirschmann connector cabling

Hirschmann pin nr.	Signal	Description	Color of the Wire
Pin 1	L	Phase	black or brown
Pin 2	N	Return, Neutral	blue
Pin 3		not connected	
Earth	PE	Protective Earth	green/yellow

4.5 Power Supply specifications

4.5.1 Power Factor Correction Module

Table 4.6: Mod. VME8100 4.1 Power Factor Correction Module specifications

Input	
Voltage Range	92 ÷ 264 Vac Frequency 50 ÷ 60 Hz
Inrush Current	<16 A @ 230 Vac
Fuse	External 16A type B/C
Power Factor	> 0.98 @ Output Power > 1 kW
Output	
Maximum Total Output Power	1200 W @ 100 Vac 2530 W @ 211 Vac
Turn on Delay	50 ms to 100% of voltage, monotonic rise
Efficiency	75% ÷ 85% @ 230 Vac configuration dependent
Isolation CE EN 60950	
Input to Output	3000 Vac
Input to GND	1500 Vac

4.5.2 - Power Modules

The power modules are readily replaceable.

Each module is equipped with temperature sensors for Over Temperature Protection.

Table 4.7: Mod. VME8100 Power Module (+5V +3.3V) technical specifications

Voltage	2V ÷ 7V
Current	115 A
Rise Time	<50 ms to 100% of voltage, monotonic rise
Ripple	< 10 mVpp(1) Typ: 6.0 mVpp(1) (see Fig. 4.7) < 5 mVpp(2) Typ: 2.5 mVpp(2) (see Fig. 4.8)
Noise	<2 mVrms(1) Typ: 1.5 mVrms(1) (see Fig. 4.7) <1.5 mVrms(2) Typ: 0.5 mVrms(2) (see Fig. 4.8)
Voltage Accuracy	± 20 mV
Minimum Load	No
Load Regulation	< 10 mV (sense) for 0-100% load change
Transient Response Recovery	< 100 mV @ ±25A current step change 6 ms for recovery to ±1% of set voltage @ 25A to 0A current step change 0.5 ms for recovery to ± 1% of set voltage @ ±25A current step change 0.7 ms for recovery to ± 0.1% of set voltage @ ±25A current step change
Over Voltage Protection	When the output voltage > 103% ÷ 120% (programmable) of set voltage
Under Voltge Protection	When the output voltage < 80% ÷ 97% (programmable) of set voltage
Over Current Protection	When the current > programmable Iset value
Short Circuit Protection	<125 A @ 7 Vout
Over Temperature Protection	When the Power module temperature > 90° C
flicker immunity	< 50 ms
Environment Temperature	0° to 50° Operational

Table 4.8: Mod. VME8100 Power Module (+12V -12V) technical specifications

Voltage	±7V ÷ ±16V
Current	23 A
Rise Time	<50 ms to 100% of voltage, monotonic rise
Ripple	< 10 mVpp(1) Typ: 4.5 mVpp(1) (see Fig. 4.9) < 10 mVpp(2) Typ: 5.5 mVpp(2) (see Fig. 4.10)
Noise	< 2 mVrms(1) Typ: 1.0 mVrms(1) (see Fig. 4.9) < 1.5 mVrms(2) Typ: 0.5 mVrms(2) (see Fig. 4.10)
Voltage Accuracy	± 20 mV
Minimum Load	No
Load Regulation	< 15 mV for 0-100% load change
Transient Response Recovery	< 100 mV @ ±5A current step change 8 ms for recovery to ±1% of set voltage @ 5A to 0A current step change 1.0 ms for recovery to ± 1% of set voltage @ ±5A current step change 1.8 ms for recovery to ± 0.1% of set voltage @ ±5A current step change
Over Voltage Protection	When the output voltage > 103% ÷ 120% (programmable) of set voltage
Under Voltge Protection	When the output voltage < 80% ÷ 97% (programmable) of set voltage
Over Current Protection	When the current > programmable Iset value
Short Circuit Protection	< 26 A @ 16 Vout
Over Temperature Protection	When the Power module temperature > 90° C
flicker immunity	< 30 ms
Environment Temperature	0° to 50° Operational

(1) Measured at the Output connector (full load).
(2) Measured at load (0.5 m wire). Load conditions: full; parallel (X) 330µF and 1µF ceramic; conducting to case (Y) 100nF polyester each line.

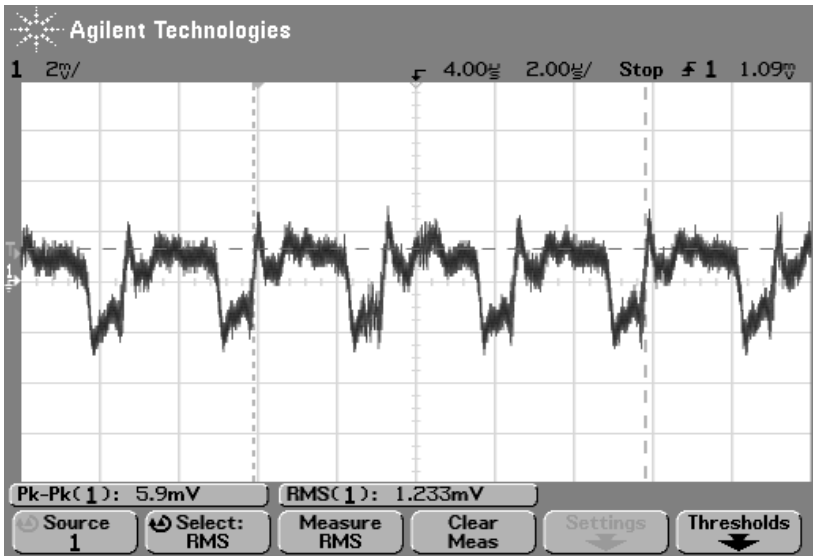
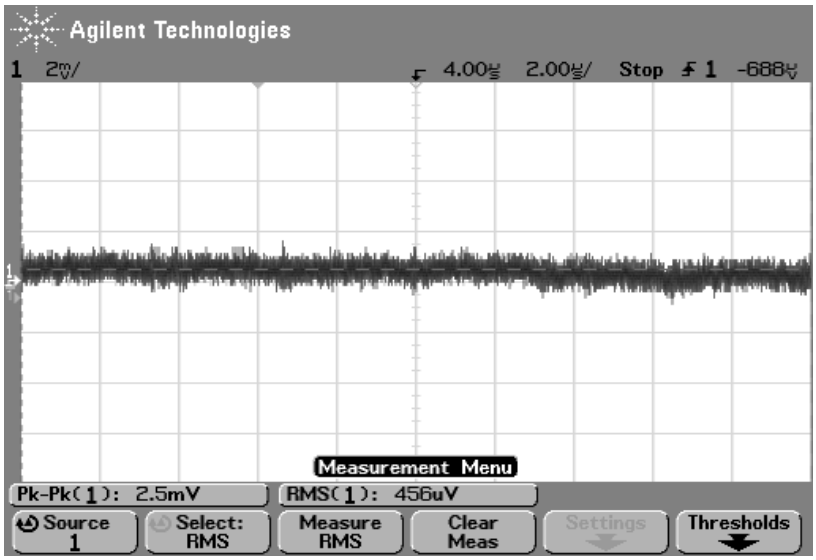


Fig. 4.7: Power Module ripple and noise measured at the output connector (@ 5V, 110A)



Measured at load (0.5 m wire). Load conditions: full; parallel (X) 330µF and 1µF ceramic; conducting to case (Y) 100nF polyester each line. Voltage: 5V, Current: 110A.

Fig. 4.8: Power Module ripple and noise Measured at load 0.5 m wire (@ 5V, 110A)

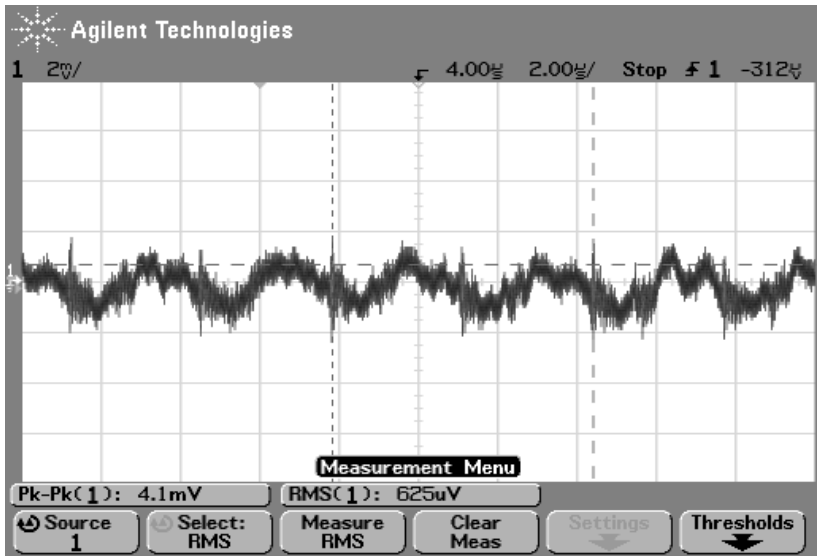
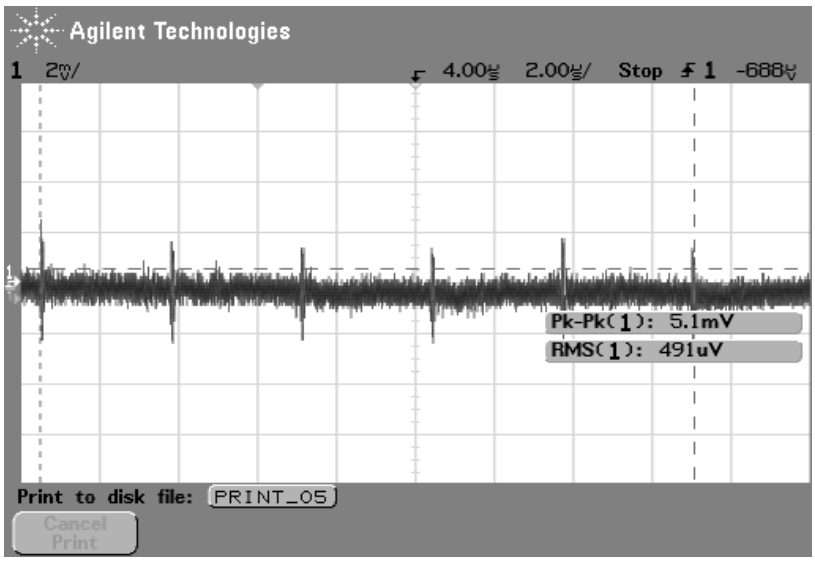


Fig. 4.9: Power Module ripple and noise measured at the output connector (@ 12V, 20A)



Measured at load (0.5 m wire). Load conditions: full; parallel (X) 330µF and 1µF ceramic; conducting to case (Y) 100nF polyester each line. Voltage: 12V, Current: 20A.

Fig. 4.10: : Power Module ripple and noise Measured at load 0.5 m wire (@ 12V, 20A)

4.6 Fan Tray / Control Connector Specifications

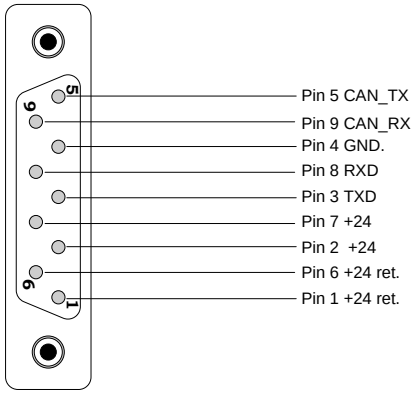


Fig. 4.11: Fan Tray / Control Connector (9-pin DSUB female)

4.7 Sense / Signal Connector Specifications

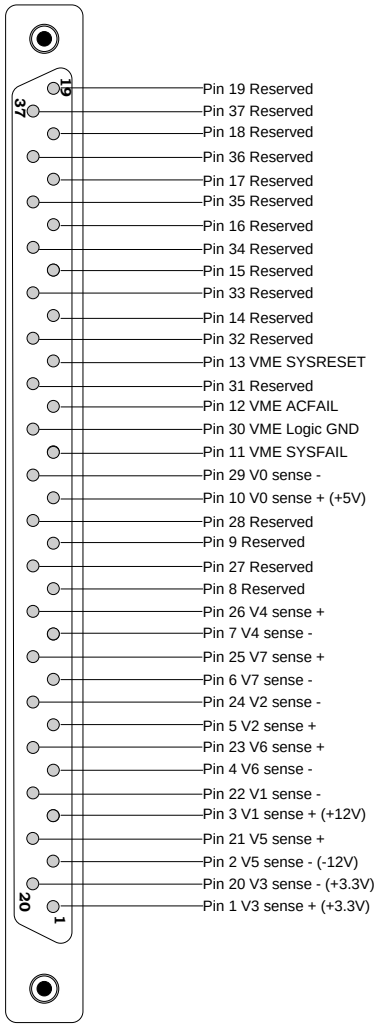


Fig. 4.12: Sense / Signal Connector (37-pin DSUB female)

5. FAN Tray Section

5.1 FAN Tray front panel

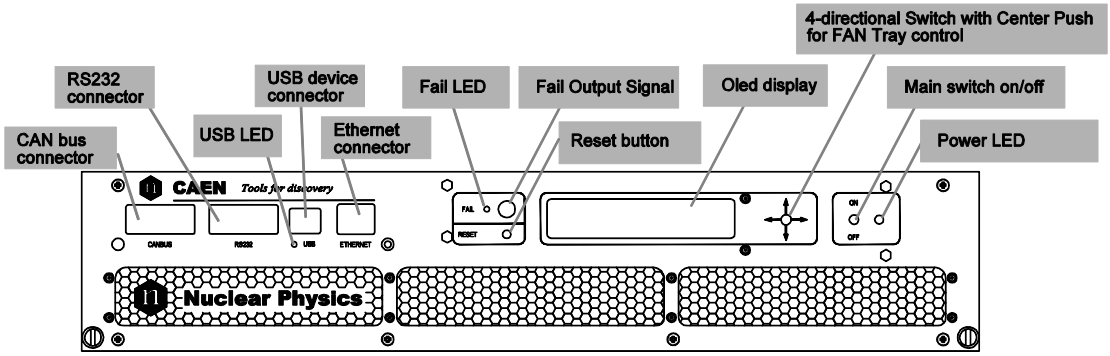


Fig. 5.1: Mod. VME8100 FAN Tray Front view

The Fan Tray housed a buzzer for Alarm signalling.

5.1.1 Fan tray Front panel connectors

The location of the connectors is shown in Fig. 5.1. Their electromechanical specifications are listed here below.

USB DEVICE PORT:

Mechanical specifications:
USB B female connector
Electrical specifications:
USB 2.0 compliant

RS232 INTERFACE CONNECTOR:

Mechanical specifications:
9 pin D type female connector

ETHERNET INTERFACE CONNECTOR:

Mechanical specifications:
10Base-T female connector (RJ 145)

CAN BUS INTERFACE CONNECTOR:

Mechanical specifications:
9 pin D type male connector

FAIL Output Connector

Mechanical specifications:
LEMO connector
Electrical specifications:
See Fig. 5.5)

5.1.2 CAN bus connector Specifications

CAN BUS interface features are as follows:

- CAN protocol 2.0B
- Transceiver PCA82C250
- 110 nodes at least guaranteed by the transceiver
- CAN connector 9-pin DSUB male
- TX/RX of standard frames with 11 bit identifier

Pinout of CAN bus connector is as follows:

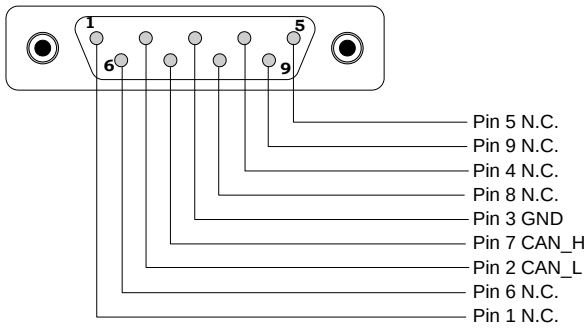


Fig. 5.2: CAN BUS connector

If the Bit Rate is higher than 100 Kbit/s it is necessary to terminate the CAN BUS line on 120 Ohm (inserted between CAN_H and CAN_L)

5.1.3 RS-232 Connector Specifications

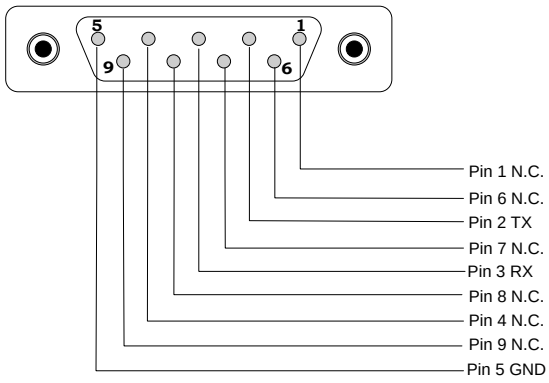


Fig. 5.3: RS-232 Connector (connector 9-pin DSUB female)

5.1.4 Ethernet LAN Connector Specifications

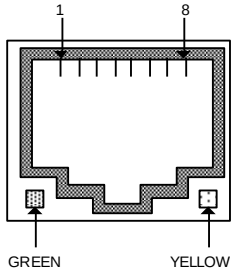


Fig. 5.4: Ethernet LAN Connector

Pin 1: TXD+ (Transmit Data +)
Pin 2: TXD- (Transmit Data -)
Pin 3: RXD+ (Receive Data +)
Pin 4: EPWR+ (Power from switch +)
Pin 5: EPWR+ (Power from switch +)
Pin 6: RXD- (Receive Data -)
Pin 7: EPWR- (Power from switch -)
Pin 8: EPWR- (Power from switch -)
Network Link LED: Yellow LED indicates network link is operational
Netwowrk Activity LED: Green LED indicates network traffic detected

5.1.5 FAIL Connector Specifications

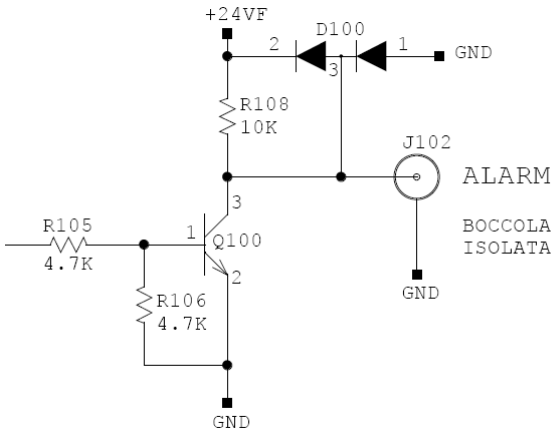


Fig. 5.5: FAIL output circuit

- Transistor model:: 2N3904
- max Current: 30 mA
- stand by: pull-up 24V;
- ALARM: 0.3V

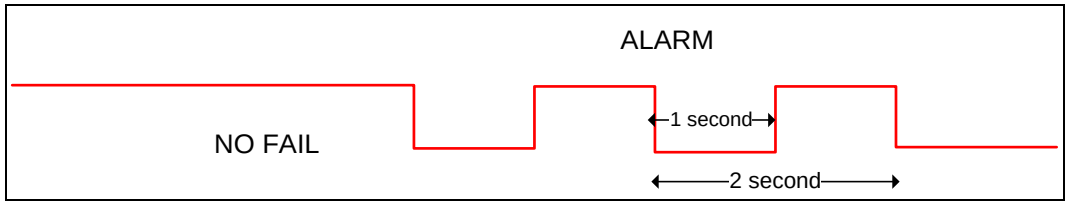


Fig. 5.6: FAIL signal timing

Fail LED and buzzer work like FAIL Connector

6. V8100 Operating

6.1 Turning ON/OFF

In order to turn ON the crate, it is necessary to perform the following operations:

- Check that the power supply module connectors are correctly inserted (see figure below): slide the power supply unit until the connectors are fully and firmly plugged, then fix it with the screws

Fig. 6.1: Power supply insertion

- Plug the power cord into the Vac mains power supply connector
- As the CAEN logo fades, the power supply outputs can be turned On by keeping up for a couple of seconds the on-off switch on the Fan Unit panel.
- In order to turn OFF the crate, the switch must be kept down for a couple of seconds as well.

6.2 Alarm and Trip off

When the Crate Alarm is ON:

- FAIL LED lamps (timing described in Fig. 5.6)
- FAIL Output signal is active (see § 5.1.5)
- Buzzer is active (if enabled)
- The Alarm reason is displayed on the FAN Unit OLED display end managed via remote control

The Crate DC voltages are tripped off and ALARM is ON in the case of:

- **Over Voltage Protection**: when the output voltage > 103% ÷ 120% (programmable) of set voltage (OVP parameter).
- **Under Voltage Protection:** when the output voltage < 80% ÷ 97% (programmable) of set voltage (UVP parameter)
- **Over Current Protection:** when the current > programmable Iset value

- **Over Temperature Protection:** when temperature of a single Power module > 90° C
- **AC FAIL:** Problems On Power Factor Correction Module
- **VCC SUPPLY FAIL:** problems on Power Supply Controller module or on power Modules

The Crate ALARM is ON in the case of:

- temperature FAN Unit > 50°C
- temperature Power Supply Control module > 65° C
- FAN fail
- SYS Fail

6.3 FAN Tray Local programming

The Crate can be controlled via various menu on the OLED display, which is enabled via:

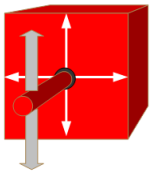
- Crate turning on via local switch
- Crate turning on via remote interface

The display is disabled only via local switch crate off.

6.3.1 List of menu functions

The following menu are available:

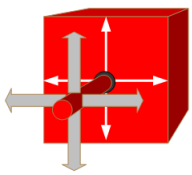
1. **+5 V Monitor**
   - +5 V SET allows to set: Vset, Iset, UVP (% Vset), OVP (% Vset),
2. **+12 V Monitor**
   - +12 V SET allows to set: Vset, Iset, UVP (% Vset), OVP (% Vset),
3. **+3.3 V Monitor**
   - +3.3 V SET allows to set: Vset, Iset, UVP (% Vset), OVP (% Vset),
4. **-12 V Monitor**
   - -12 V SET allows to set: Vset, Iset, UVP (% Vset), OVP (% Vset),
5. **FAN Status**
   - SET FAN speed
6. **ALARM**
7. **GENERAL**
   - Power Supply
   - VME
   - COMM
     - *RS 232*
     - *CAN bus*
     - *ETHERNET*



Menu 1..7 are displayed by pulling UP/DOWN the 4-directional Switch with Center Push and are the following:

Table 6.1: Mod. VME8100 FAN Tray Menu

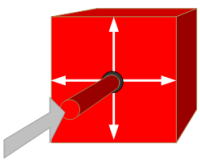
Nr.	Display	Description	Parameters displayed
1.		**+5 V Monitor**	– Vout Value – Current Value
2.		**+12 V Monitor**	– Vout Value – Current Value
3.		**+3.3 V Monitor**	– Vout Value – Current Value
4.		**- 12 V Monitor**	– Vout Value – Current Value
5.		**FAN status**	– FAN speed – FAN unit firmware release – Serial Number FAN Unit – Temperature of FAN Unit
6.		**ALARM**	– Power Supply Status – FAN Status – INT Comm PS & FAN Unit – VME status – Clear Alarm – Buzzer ON/OFF
7.		**GENERAL**	– VME Sub Menu – PS Sub menu – COM Sub Menu



In the above described menu, by pulling the switch RIGHT/LEFT and UP/DOWN, it is possible to shift between the available sub-menu/command. The selectable command/menu is high lit.

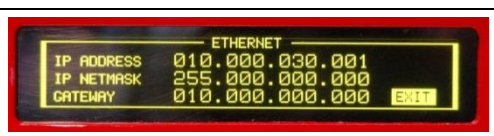
On Menu 7 it is possible only to move RIGHT/LEFT

NOTE: ! before any value signal anomalous value.



In order to enter a Sub-menu or launch a command, it is necessary to push the button.

Table 6.2: Mod. VME8100 FAN Tray Sub Menu

Nr.	Display	Description
8.		**+5 V Set**
9.		**+12 V Set**
10.		**+3.3 V Set**
11.		**- 12 V Set**
12.		**FAN Set**
13.		**VME Status**
14.		**Power Supply Status**
15.		**Communication**
16.		**Communication** RS232
17.		**Communication** CAN bus
18.		**Communication** Ethernet Mac Address (show 5 sec)
19.		**Communication** Ethernet status and set value

6.4 FAN Tray remote connection

Connections available

- Ethernet connection via:
  - Program “VME8100 Manager”
  - Telnet (terminal emulator)
- RS232 via terminal
- USB managed as RS232 requires driver for USB RS232 converter. (The Mod. VME8100 FAN Tray control board housed a FT232BM chip which allows to manage the Mod. VME8100 FAN Tray via USB. Drivers for this device are freely available at: http://www.ftdichip.com/Drivers/VCP.htm)

NOTE:

- **RS232 and USB cannot be operated at the same time**
- **Maximum of 3 Ethernet connection are allowed**

6.4.1 Configure Ethernet connection On a Local Area Network with DHCP Server

In order to Obtain Configuration From Dynamic Host Configuration Protocol (DHCP) Server, the user must write Ethernet IP address = all 0 and reset the Crate. In this case, the server automatically assigns the IP address for the Crate VME8100.

6.4.2 TCP/IP Connection

In order to connect with VME8100 via TCP/IP, follow these steps:

- Verify VME8100 address (Tab.6.2 of this manual)
- Check that host pc IP settings allow to connect to such address
- Open the terminal emulator
- Enter IP address
- Enter port nr. 8100
- Type CAEN

7. Software overview

7.1 FAN Tray Ethernet connection

The provided program is:

- VME8100_Manager.jar

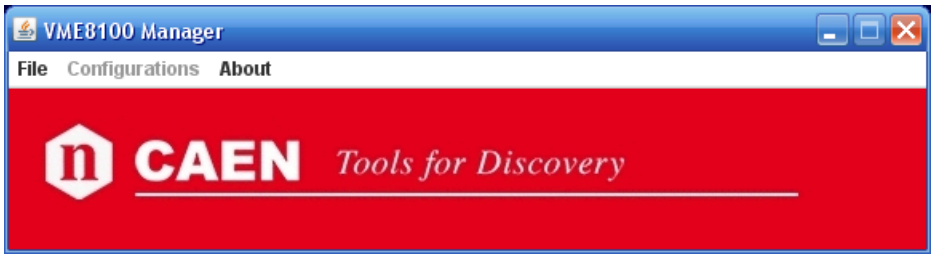


Fig. 7.1: Mod. VME8100_Manager Open window

7.2 Connection configuration

Click on

File > connect

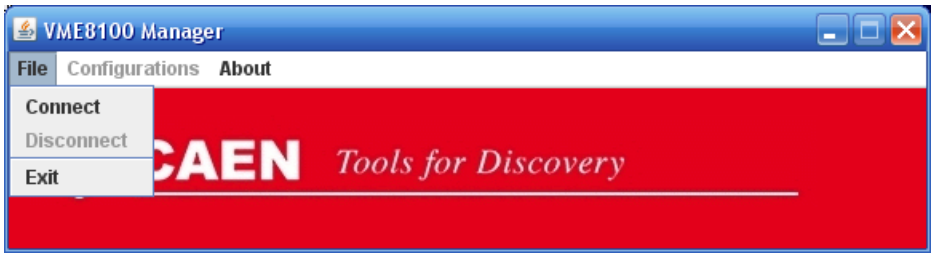


Fig. 7.2: Mod. VME8100_Manager Coonection menu

The following pop-up window will open:

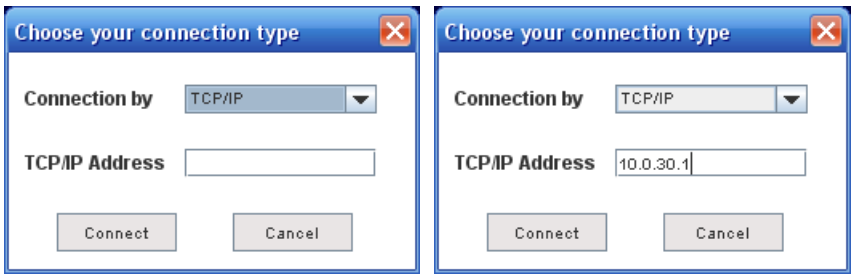


Fig. 7.3: Mod. VME8100_Manager Connection window

Choose the connection type; if you are using TCP-IP enter the IP address then click on Connect.

7.3 VME8100_Manager Status/Set window

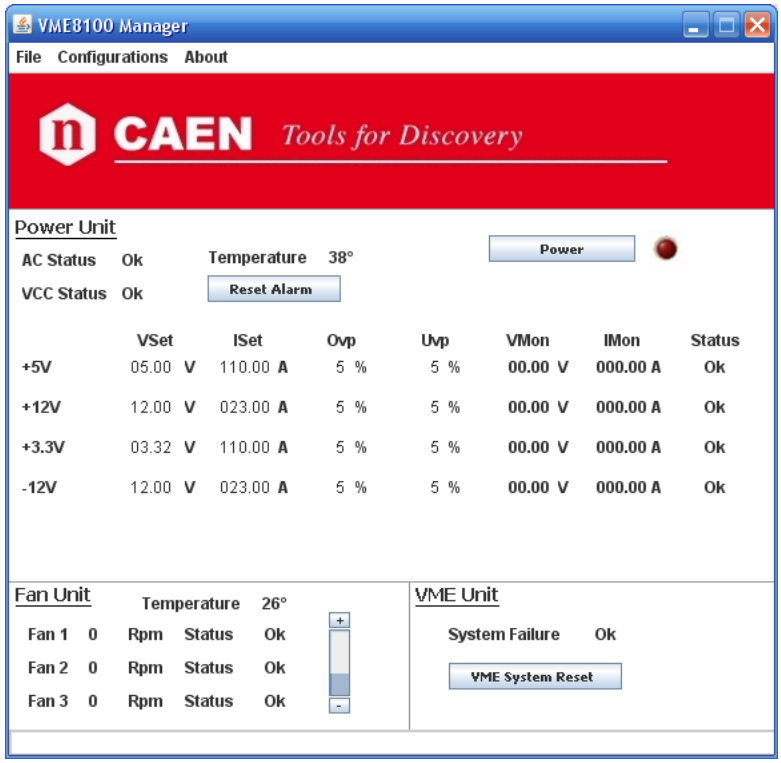


Fig. 7.4: Mod. VME8100_Manager Status/Set window (power off)

Click on Power to switch ON the Crate

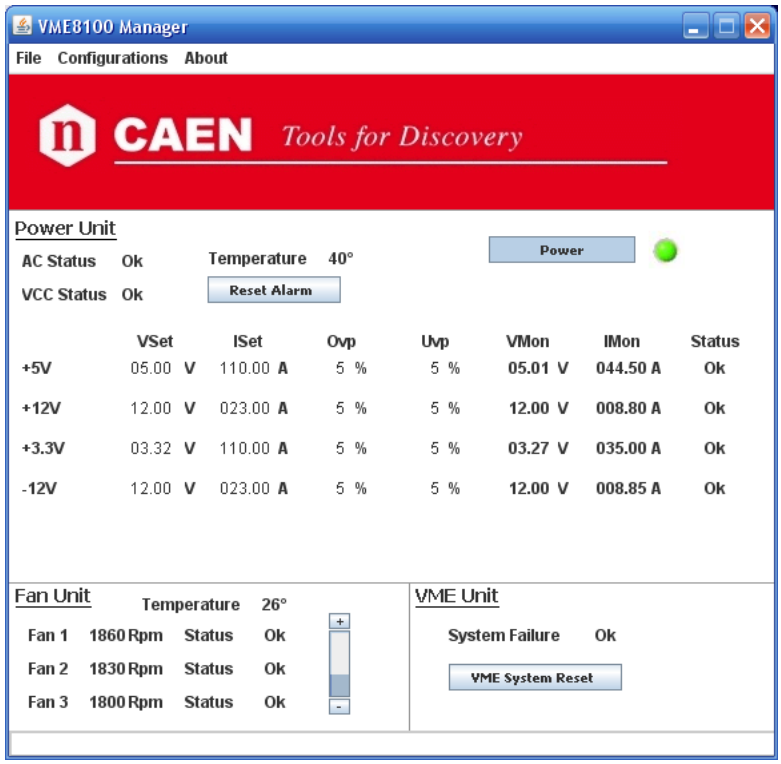
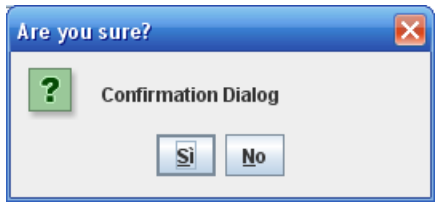


Fig. 7.5: Mod. VME8100_Manager Status/Set window (power ON)

Values can be over written and confirmed by pressing <enter>

7.3.1 VME8100_Manager VME System Reset operation

Click on VME System Reset: the following window asks for confirmation:

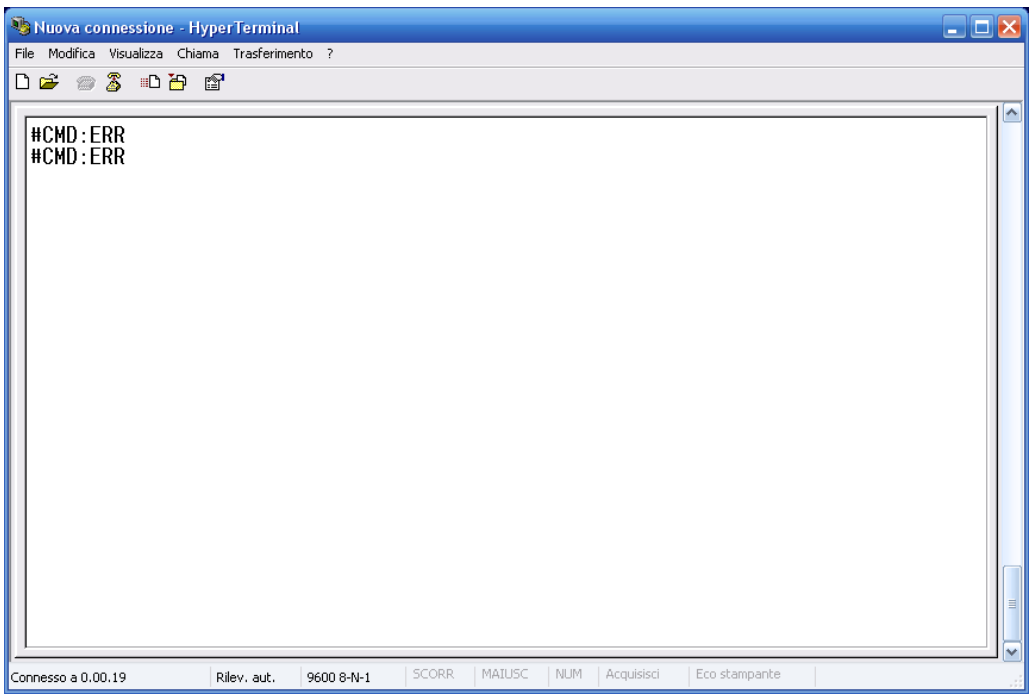


7.4 FAN Tray RS232 /USB connection

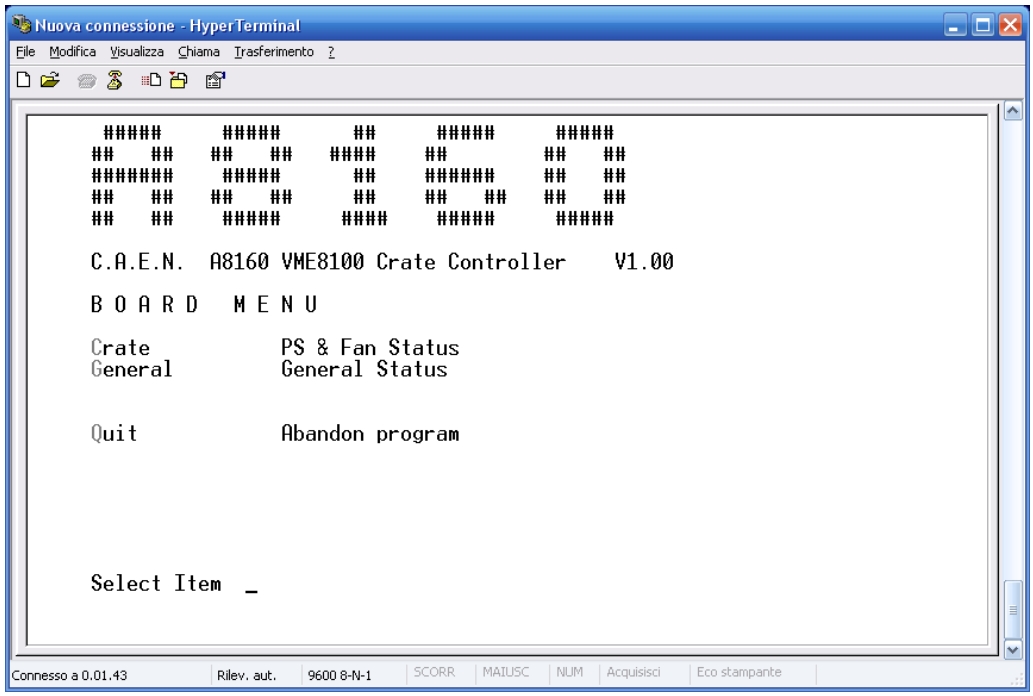
7.4.1 FAN Tray USB connection

The Mod. VME8100 FAN Tray control board housed a FT232BM chip which allows to manage the Mod. VME8100 FAN Tray via USB.
Drivers for this device are freely available at: http://www.ftdichip.com/Drivers/VCP.htm
Connection is made via HyperTerminal configured as follows:

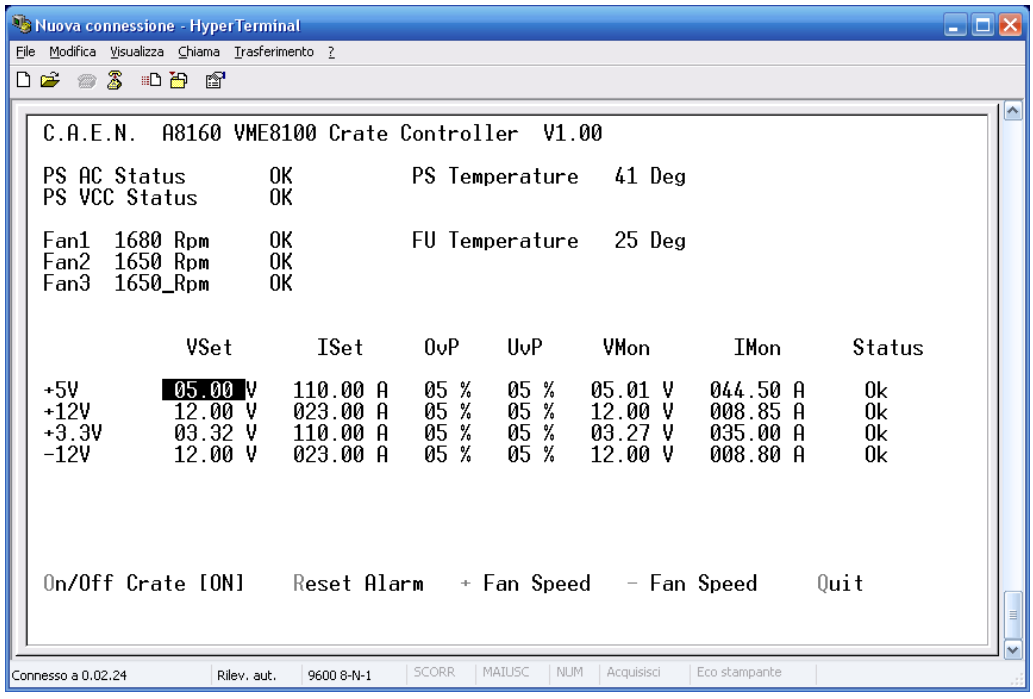
- baud rate 9600
- Data bits: 8
- Parity: none
- stop bit: 1
- Flow control: Xon Xoff



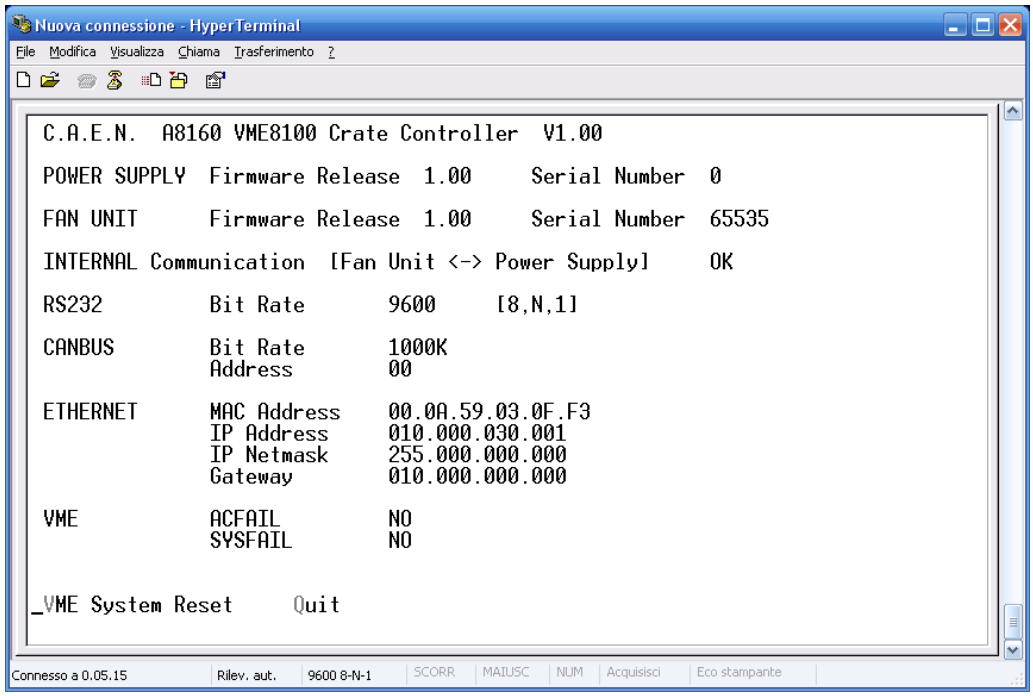
Digit CAEN + **<Cr>** the following menu opens:



by pressing "C", it opens:



by pressing "G", it opens:


Nuova connessione - HyperTerminal
File Modifica Visualizza Chiama Trasferimento ?
C.A.E.N. A8160 VME8100 Crate Controller V1.00
POWER SUPPLY Firmware Release 1.00 Serial Number 0
FAN UNIT Firmware Release 1.00 Serial Number 65535
INTERNAL Communication [Fan Unit <-> Power Supply] OK
RS232 Bit Rate 9600 [8,N,1]
CANBUS Bit Rate 1000K
Address 00
ETHERNET MAC Address 00.0A.59.03.0F.F3
IP Address 010.000.030.001
IP Netmask 255.000.000.000
Gateway 010.000.000.000
VME ACFAIL NO
SYSFAIL NO
_VME System Reset Quit
Connesso a 0.05.15
Rilev. aut.
9600 8-N-1
SCORR
MAIUSC
NUM
Acquisisci
Eco stampante

8. Communication Protocol

This protocol is based on commands made of sequences of ASCII characters. The format of one command is the following :

$CMD:*,CH*,PAR:***,VAL:***.**<Cr>**

field 'CH' is:

- 0..7 for commands related to one of possible channels
- 8 for commands related to the Crate.

The format of the response string is one of the following:

#CMD:ERR<Cr>	Command Format wrong or command not recognised
#CH:ERR<Cr>	Channel Field not present or channel value wrong
#PAR:ERR<Cr>	Field parameter not present or parameter not recognised
#VAL:ERR<Cr>	Set Value wrong (<Min or >Max)
#CMD:OK,VAL:***<Cr>**	Command Ok ***** = value

8.1 Monitor Commands related to channel 'X' :

$CMD:MON,CH:X,PAR:NAME<Cr>	Readout channel name (ex. +5V..)
$CMD:MON,CH:X,PAR:VSET<Cr>	Readout value of the voltage Set
$CMD:MON,CH:X,PAR:VMIN<Cr>	Readout minimum value of the voltage Set
$CMD:MON,CH:X,PAR:VMAX<Cr>	Readout maximum value of the voltage Set
$CMD:MON,CH:X,PAR:VRES<Cr>	Readout resolution value of the voltage Set
$CMD:MON,CH:X,PAR:OVP<Cr>	Readout value Over Voltage Protection
$CMD:MON,CH:X,PAR:UVP<Cr>	Readout value Under Voltage Protection
$CMD:MON,CH:X,PAR:VMON<Cr>	Readout value of the voltage Monitor
$CMD:MON,CH:X,PAR:ISET<Cr>	Readout value of current limit
$CMD:MON,CH:X,PAR:IMIN<Cr>	Readout minimum value of current limit
$CMD:MON,CH:X,PAR:IMAX<Cr>	Readout maximum value of current limit
$CMD:MON,CH:X,PAR:IRES<Cr>	Readout value resolution of current limit
$CMD:MON,CH:X,PAR:IMON<Cr>	Readout value of the current Monitor
$CMD:MON,CH:X,PAR:STAT<Cr>	Readout value of channel status

Values read are reported in correct format (comma and decimal where necessary).

Meaning of STATUS bits

Bit 0 -> ON/OFF	1 : ON 0 : OFF
Bit 1 -> Over Current	1 : Current provided > Iset
Bit 2 -> Over Voltage Protection	1 : Vout > (Vset * (100 + OVP)) / 100
Bit 3 ->Under Voltage Protection	1 : VMON < (Vset * (100 – UVP)) / 100
Bit 4 -> Over Temperature	1 : Temperature channel > 90°C
Bit 5 ..7-> N.C.	0
Bit 8 -> Calibration Error	1 : Error on coefficient of calibration

8.2 Set Commands related to channel 'X' :

$CMD:SET,CH:X,PAR:VSET,VAL:XX.XX<Cr>	Set voltage Value
$CMD:SET,CH:X,PAR:ISET,VAL:XXX.X<Cr>	Set Value of current limit

$CMD:SET,CH:X,PAR:OVP,VAL:XX<Cr>	Set Value OVP (in % di Vset)
$CMD:SET,CH:X,PAR:UVP,VAL:XX<Cr>	Set Value UVP (in % di Vset)

Values of VSET and ISET must be passed with correct format (comma and decimal).

8.3 Monitor Commands related to CRATE (channel 8) :

$CMD:MON,CH:8,PAR:CRNAME<Cr>	Readout Crate name : 'VME8100'
$CMD:MON,CH:8,PAR:NUMCH<Cr>	Readout number of channels present
$CMD:MON,CH:8,PAR:PSFREL<Cr>	Readout of the PS Release Firmware
$CMD:MON,CH:8,PAR:PSTEMP<Cr>	Readout value of the PS Temperature
$CMD:MON,CH:8,PAR:PSSNUM<Cr>	Readout value PS serial number
$CMD:MON,CH:8,PAR:FANSP<Cr>	Readout Set value of FAN SPEED (0..6)
$CMD:MON,CH:8,PAR:FAN1<Cr>	Readout value Fan Speed 1 (RPM)
$CMD:MON,CH:8,PAR:FAN2<Cr>	Readout value Fan Speed 2 (RPM)
$CMD:MON,CH:8,PAR:FAN3<Cr>	Readout value Fan Speed 3 (RPM)
$CMD:MON,CH:8,PAR:FUFREL<Cr>	Readout of the FAN UNIT Release Firmware
$CMD:MON,CH:8,PAR:FUTEMP<Cr>	Readout value of the FAN UNIT Temperature
$CMD:MON,CH:8,PAR:FUSNUM<Cr>	Readout value FAN UNIT serial number
$CMD:MON,CH:8,PAR:CRST<Cr>	Readout value Crate status
$CMD:MON,CH:8,PAR:VPMAX<Cr>	Readout value maximum of OVP/UVP
$CMD:MON,CH:8,PAR:VPMIN<Cr>	Readout value minimum of OVP/UVP
$CMD:MON,CH:8,PAR:RS232BR<Cr>	Readout Bit Rate RS232 : 0..4
$CMD:MON,CH:8,PAR:CANBR<Cr>	Readout Bit Rate CANBUS : 0..5
$CMD:MON,CH:8,PAR:CANADD<Cr>	Readout Address CANBUS : 0..255
$CMD:MON,CH:8,PAR:IPADD<Cr>	Readout Address IP : xxx.xxx.xxx.xxx
$CMD:MON,CH:8,PAR:IPMSK<Cr>	Readout IP Netmask : xxx.xxx.xxx.xxx
$CMD:MON,CH:8,PAR:IPGTW<Cr>	Readout Gateway : xxx.xxx.xxx.xxx
$CMD:MON,CH:8,PAR:MACADD<Cr>	Readout Mac Address : xx.xx.xx.xx.xx.xx

RS232 Bitrate :	0	->	9600
	1	->	19200
	2	->	38400
	3	->	57600
	4	->	115200
CanBus Bitrate :	0	->	1M
	1	->	500K
	2	->	250K
	3	->	100K
	4	->	50K
	5	->	10K
Fan Speed Set :	0	->	Fan Off
	1	->	~1500 Rpm
	2	->	~1800 Rpm
	3	->	~2000 Rpm
	4	->	~2300 Rpm
	5	->	~2600 Rpm
	4	->	~3000 Rpm

Meaning of Crate STATUS bits:

Bit 0 -> ON/OFF	1 : Crate ON 0 : Crate OFF
Bit 1 -> VCC Supply Fail	1 : Problems on local power supplies
Bit 2 -> Temperature Fail	1 : Temperature on PS < 5°C or > 65°C
Bit 4 -> AC Fail	1 : Problems on MAIN POWER SUPPLY
Bit 5 -> VME System Fail	1 : System Fail VME active
Bit 6..8 -> N.C.	
Bit 9 -> FAN ON/OFF	1 : FAN ON 0 : FAN OFF
Bit 10 -> Fan Fail	1 : Fan Speed < 10% or > 10% nominal value
Bit 11 -> Temperature Fail	1 : Temperature FAN < 5°C or > 65°C

8.4 Set Commands related to CRATE (channel 8) :

$CMD:SET,CH:8,PAR:ON<Cr>	Crate ON
$CMD:SET,CH:8,PAR:OFF<Cr>	Crate OFF
$CMD:SET,CH:8,PAR:SYSR<Cr>	Sends VME System Reset
$CMD:SET,CH:8,PAR:CLR<Cr>	Clear Alarm
$CMD:SET,CH:8,PAR:FANSP,VAL:X<Cr>	Set Fan Speed. Values 0..6

for Fan Speed Set see above.

9. CAEN SNMP Agent

9.1 Introduction

Optionally, CAEN provides a SNMP (Simple Network Management Protocol) agent, which allows the management of the functional parameters (such as supply voltages, fan speed and temperatures) related to the VME8x00 crates (CAEN provides also the relevant MIB file).

The agent provided by CAEN supports SNMP v2 and SNMP v3.

SNMP version 1 (SNMPv1) is the initial implementation of the SNMP protocol. SNMPv1 operates over protocols such as User Datagram Protocol (UDP), Internet Protocol (IP), OSI Connectionless Network Service (CLNS), AppleTalk Datagram-Delivery Protocol (DDP), and Novell Internet Packet Exchange (IPX).

SNMPv2 provides several advantages over SNMPv1:

- Expanded data types: 64 bit counter
- Improved efficiency and performance: get-bulk operator
- Confirmed event notification: inform operator
- Richer error handling: errors and exceptions
- Improved sets: especially row creation and deletion
- Fine tuned data definition language

SNMPv3 is SNMPv2 plus security and administration. The new features of SNMPv3 (in addition to those of SNMPv2 listed above) include:

- Security
- authentication and privacy
- authorization and access control
- Administrative Framework
- naming of entities
- people and policies
- usernames and key management
- notification destinations
- proxy relationships
- remotely configurable via SNMP operations

In order to start configuring the VME8x00 for SNMP usage, it is necessary to run a web browser on the host PC, connected to the crate via the Ethernet port.

The host PC shall also run Net-SNMP, a suite of applications used to implement SNMP v1, SNMP v2c and SNMP v3 using both IPv4 and IPv6.

In order to use SNMP with VME8x00 crates, we suggest to install on the host PC, a SNMP client, which can be used for SNMP communication, providing a simple GUI and allowing SNMP calls.

Experienced Users may also use command line strings to forward set and monitor commands to the VME8x00.

For more information about SNMP Protocol and to download Net-SNMP refer to the www.net-snmp.org website.

9.2 System requirements

Host PC shall feature:

- Windows, Linux or OS X.
- Net-SNMP, applications suite, implementing SNMP v2c and SNMP v3, using both IPv4 and IPv6
- MIB file related to V8x00 crates (CAENVME8100)
  - It can be found at the V8x00 product page on www.caen.it (software section)
  - It shall be loaded into the host PC and browsed by Net-SNMP application
- OPTIONAL (recommended): SNMP client, suitable for SNMP communication

9.3 Web Configuration Interface

9.3.1 Crate Log In

As your set up meets the System requirements, launch a web browser then type the VME8x00 crate IP address; the Log in menu will be shown:

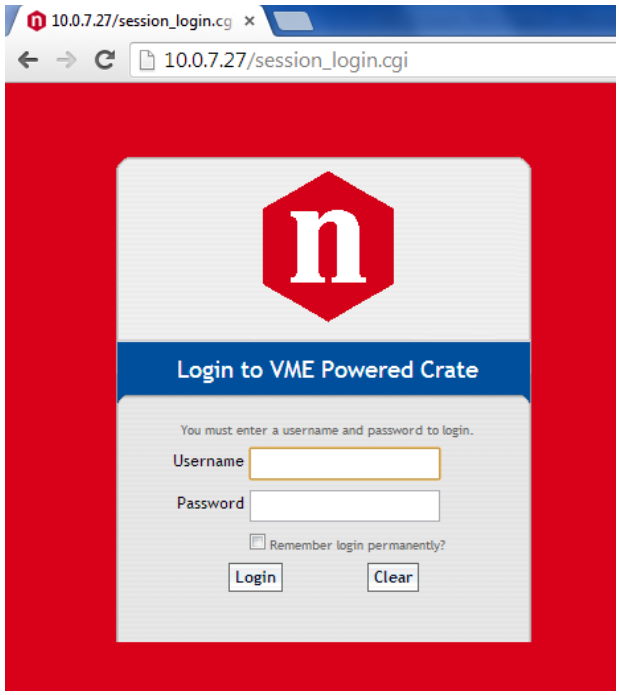


Fig. 9.1: Log in window

At this point, type

- Username: admin
- Password: admin

N.B. these are the keys to log in to the crate and are not related with SNMPv3 communication (see p. 46)

9.3.2 Main Menu

After logging, the configurator will offer the following options:

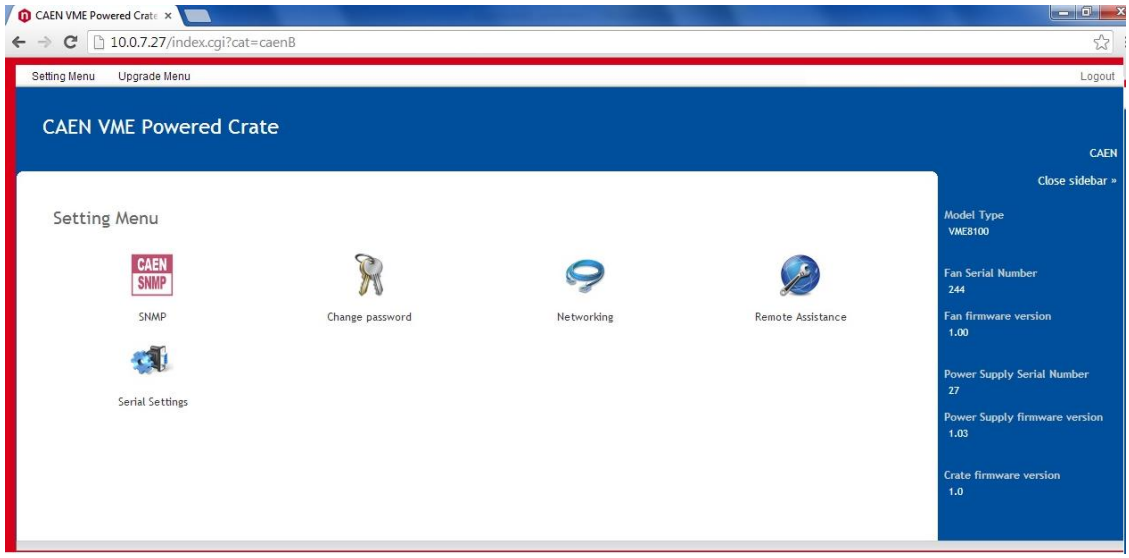


Fig. 9.2: Main menu

The side bar shows the Crate features (type, version, s/n, etc.)

9.3.3 SNMP

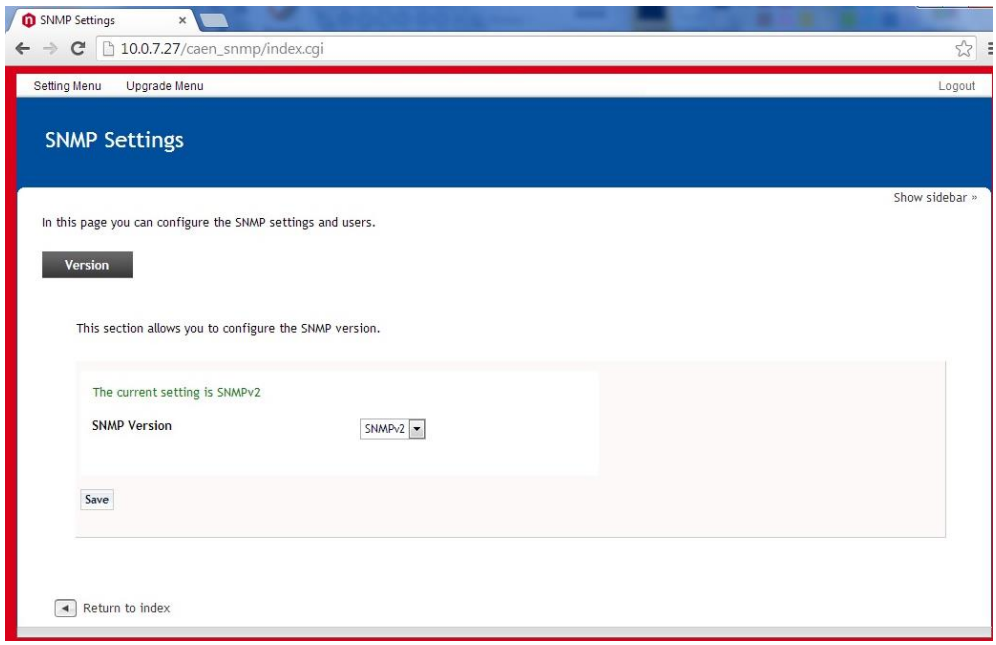


Fig. 9.3: SNMP settings

The SNMP option allows to configure protocol settings, choosing between SNMPv2 and SNMPv3.

If SNMPv3 is selected, then the Create User option can be accessed; SNMPv3 can be used only upon User authentication.

N.B.: No default SNMPv3 User does exist, therefore, in order to use SNMPv3 it is mandatory to create one!

Log in User (admin) and Password (admin) are not related with SNMPv3 communication (see p. 44)

9.3.3.1 Create User

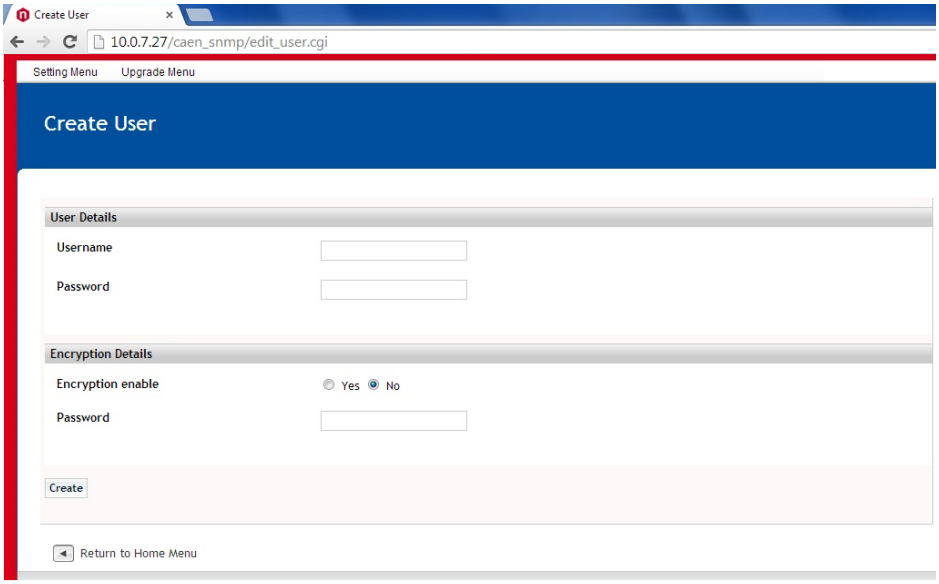


Fig. 9.4: SNMP User options

This option allows to:

- create SNMP users (username and password) for SNMP authentication,
- enable/disable SNMP Encrytpion
- create a password for SNMP Encrytpion

When using CAEN SNMPv3 agent it is necessary to authenticate via Username and Password, and, if the communication is Encrypted, also to enter the relevant Password.

9.3.4 Networking

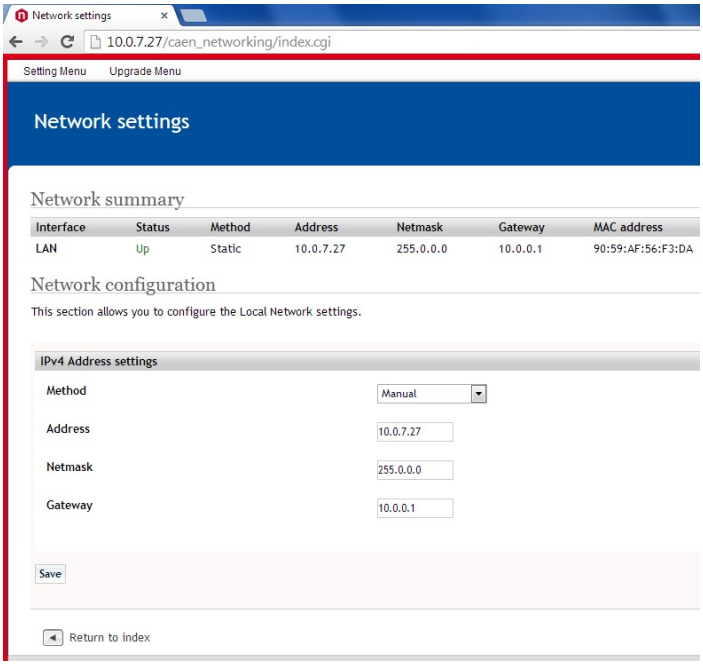


Fig. 9.5: Network settings

The Networking option allows to configure the VME8x00 for network connection.

The Ethernet connector provided with the system is a 10/100baseT connector and can be used to interface the VME8x00 crate to an Ethernet LAN. This allows the system control via an external standard PC connected to a TCP/IP network and running a web browser.

Before establishing a connection to a TCP/IP network, a specific IP Address, IP Net Mask must be assigned by the local Network Administrator to the VME8x00.

If the User needs to connect to the VME8x00 from outside the local network, a Gateway address has to be specified in the TCP/IP settings.

9.3.5 Serial settings

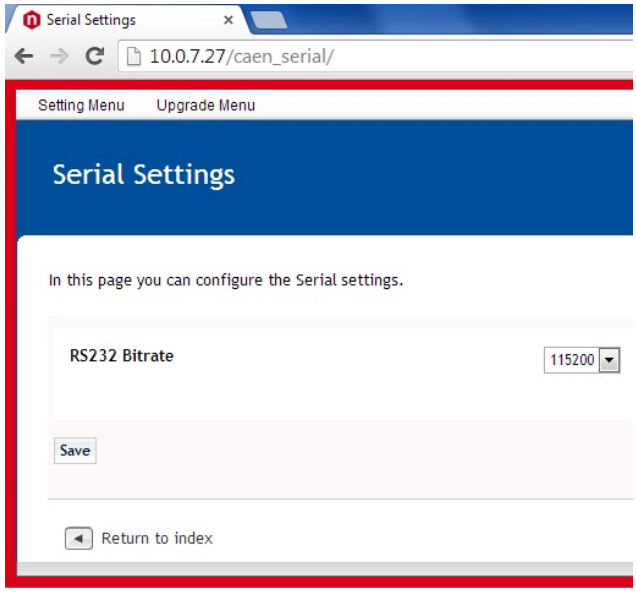


Fig. 9.6: RS232 settings

This option allows to configure the RS232 port bit rate.

9.3.6 Change Password

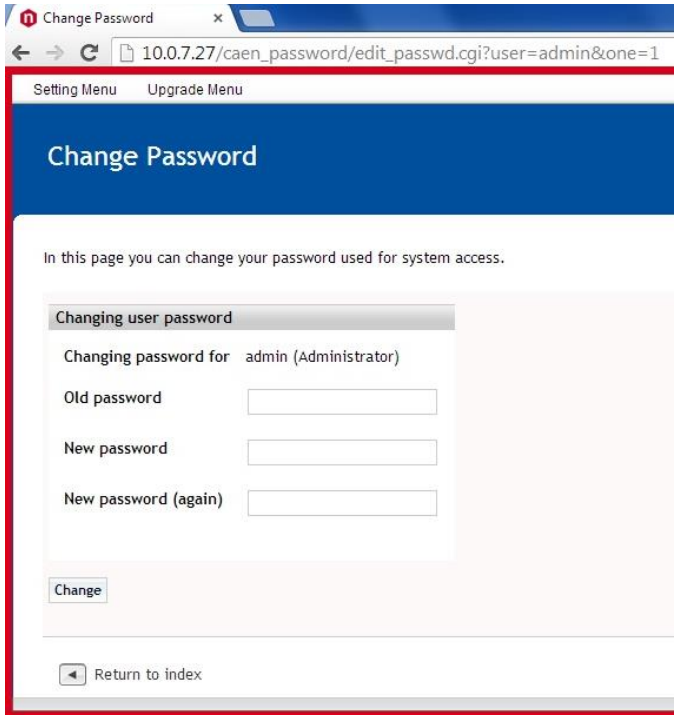


Fig. 9.7: Access password change

The Change Password option allows to change the Log in password, used for Crate access; username “admin” cannot be changed.

N.B. this is not the SNMPv3 password (see p. 46).

9.3.7 Upgrade menu

The Upgrade menu allows to update the firmware version of VME8x00 crate.

The files can be retrieved from a computer connected to the crate via TCP/IP protocol by using a TFTP (Trivial File Transfer Protocol) Server Software[1].

In order to add a file in the system flash memory via TFTP, follow this procedure:

- check if the system is connected via TCP/IP protocol to a computer able to run a TFTP (Trivial File Transfer Protocol) Server Software and configured properly;
- run the TFTP Server Software and select the directory containing the file you want to add;
- enter the Update Menu by pressing “U” in the Mod. VME8x00 Terminal Menu window.

[1] The TFTP Server is usually available on Unix workstations. In case of PCs with Windows, there are various shareware programs available on Internet, e.g. the program Pumpkin by the KLEVER GROUP INC. (www.klever.net).

9.3.7.1 Fan Unit firmware update

In order to update the Fan Unit firmware, go to the Update Menu (figure below):

Fig. 9.8: Firmware Update window 1

by pressing “Y”, it opens:

Fig. 9.9: Firmware Update window 2

In order to update the Fan Unit firmware, press “F”; the next menu will be as follows:

Fig. 9.10: Fan Unit Firmware Update window

Type the IP Address of the computer where the image file is.
Type the Filename you want to load in the flash memory (the filename must be the real filename of the file you want to add),

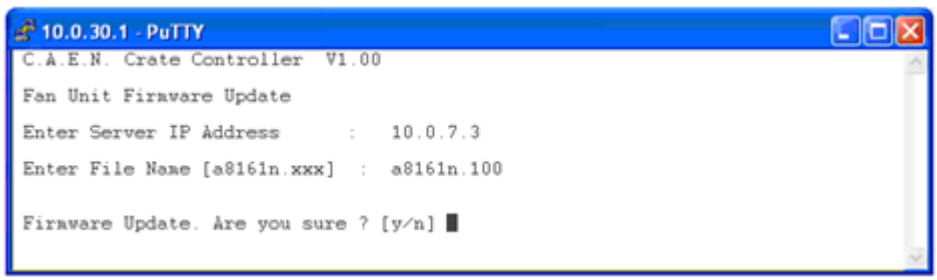


Fig. 9.11: Fan Unit Firmware Update window 2

By pressing “Y”, the new file is loaded into the flash memory and the procedure completed.
In order to update the Power Supply firmware, if available, return to the Update Menu, choose “Power Supply Firmware Update” <P>, then repeat the same procedure as above.

10. Support

Our Software Support Group is available for questions, support and any other software related issue concerning CAEN Power Supplies. Moreover, a newsletter on CAEN Software issues (CAEN SOFTWARE NEWS) will be periodically sent via e-mail to all subscribers to our mailing list. For software support and subscription to the free newsletter send an e-mail to **support.computing@caen.it**.

Don't forget to visit our Web site: **http://www.caen.it/** for the latest news