
# Series 6000

# VME, -64x, -64xC, -64xP, VXI

# User's Manual

## General Remarks

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## Mains Voltage and Connection

The Power supplies are equipped with a "World"- mains input, which works properly form 94VAC up to 264VAC and within a frequency range of 47 to 63Hz.

Before connecting to the mains please double-check correspondence.

The mains input connection at the power supply side is done with a 3-pin Hirschmann connector (input current max. 16 A) or power terminals.

| Hirschmann Pin No. | 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 |

## Safety

After connecting the Power box to the mains, the mains input module is powered permanently. Filter and storage capacitors of the power factor correction module are charged with about **400VDC**. The DC-On-Signal as well as a power switch at control board (if any installed) operates as a DC on/off switch only and not as a mains breaker. **Therefore it becomes dangerous if the box cover is open. In this case a lot of components on high voltage potential get touchable!**

**Before starting any kind of work inside the power box remove the unit from mains and wait a couple of minutes with your activities! Discharge the primary DC Filter-capacitors by use of a well isolated 22 ohm 10W resistor.**

**Table of contents:**

# General Information

## 1.1 6021 Crates

The VME/VXI-Crate 6021 consist of a power supply (UEP 6021), bin (UEV 6021 / 6023) and a fan tray (UEL 6020). All these components are plugable and easy to exchange. Divider sets 6U/9U can be mounted into bins for 9U format modules. For powering of 6021 and 6023 bins same UEP 6021 power supplies have to be used.

Standard crates are available for different module formats: 160, 220, 280, 340, as well as 400mm deep and 6 or 9 units high. 6021 bins are additionally two units and the 6023 bins three units higher (fan tray space). Available W-IE-NE-R VME backplanes: VME64 with J1/J2, VME430 with J1/Jaux/J2, VME64x, VME64xP, VME64xC with Jo special (Cern).

## 1.2 6020 Fan Trays

The-fan trays are plugged into the bin from the front side. For efficient cooling, controlling and monitoring of the crate various fan trays are constructed according to the slot deepness, whereas both front and bottom air supply, is possible. Fan rotation speed is shown by use of LX/EX fan trays and can be regulated; every fan is single controlled. Furthermore temperatures of the incoming air and (optionally) of the exhaust above selected slots can be displayed.

The UEL 6020 fan tray and control unit occupies two units of a 6021 crate below the VME / VXI-bus slots.
For 6023 crates an additional plenum chamber of 1 unit homogenized the cooling air flow.
Fan trays with a depth of 160 and 220mm are equipped with three axial D.C. blowers, while 280, 340 and 400mm deep fan trays have 6 blowers. To cool the rear transition area a 9 fold one is available.

Among the a. m. fan trays high performance super blower with four or six blowers can be used, too. The super blower fan tray is outfitted with a topped plenum and generates a high efficient homogenous cooling air flow through the VME modules.

The 3 fold fan-tray can operate in two different modes. Either the air is taken from the front and then pushed upwards to the modules or from bottom side, which gives full cooling efficiency.

The maximal air flow reached by a 3-fold W-IE-NE-R fan-tray with bottom inlet is greater than 540 $m^3$/h and shows a good homogeneity. Working with front air inlet only a reduced air flow of about 400 $m^3$/h is available. Due to the lower homogeneity of the air distribution in this mode only the power dissipation of about 800 W can be cooled. The static pressure is approx. 8-10 mm water column.

### 1.2.1LX Fan Trays

All DC voltages (up to 8) at backplane level and the corresponding currents among other are shown by the LX monitoring. The threshold-limits (minimum / maximum voltages and currents) can be set manually or piloted by remote control and remain stored even after lack of voltage. In case of global trip off, the fault will be displayed by the diagnostic system.

VME-signals ACFAIL and SYSRESET are generated according to VME-Specs. SYSRESET can also be released manually.

Remote-control by network (CANbus, IEC-Bus) is optionally possible.

1.2.2EX Fan Trays

Featuring the same facilities as the LX type (except IEC Bus interface) and additionally TCP/IP over Ethernet as well as RS232 connection. While the LX type can be outfitted with air intake from front side, the EX is for bottom intake only!

### 1.3 6021 Power Supplies

The VME power supply of the 6000 series is a micro-processor controlled switching power supply designed in the high density W-Ie-Ne-R - cavity technology, which provides a extremely low noise output voltage.

The mains input includes a power factor correction module which works according to EN 60 555-2/IEEE 555-2 (PFC). An external fuse or circuit breaker has to be installed (16A for C/E and 32A for H/K types). The turn-on inrush current is limited by a soft start-circuit to a maximum value of about 12 A.

The AC- input module is permanently powered after connecting the unit to the AC- mains. POWER ON/OFF activates only the DC on/off function of the power inverter modules.
The EN 50 081-1 for generic emissions as well as the EN 50 082-1 or 2 for immunity standards, in particular EN 55 011 RFI rejection (incl. VDE 0871 class B) and EN 55 022 electromagnetic compatibility is accomplished. The insulation performs the EN 60 950, ISO 380, VDE 0805 (SELV)! Furthermore are considered UL 1950, UL 1012, UL 478, C 22.2.950, C 22.2.220/234.

Therefore the UEP 6021 power supplies fulfil the CE rules comprehensively and are CE marked for use in all power nets.

Turning on the power supply all voltages reach the nominal values nearly simultaneously within 50 ± 2.5 ms (start-end-time) 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 5±2.5 ms.

The power packs are readily replaceable. The maximum output power is 700... 2000W with C input and 1400... >3000W with H input, correspondence with 92... 264VAC input voltage. For 6U power packs the output can be increased to the double if two mains input modules work in parallel (E or K suffix).

## 2 Operation, Function and Connections

### 2.1 Fan Tray Operation and Control.

All monitoring and control operations are performed by a micro-processor based alarm and control circuit placed inside the UEP 6021 power supply monitored by UEL 6020**LX / EX** fan trays. To protect both the power supply and the VME modules, a DC cut-off is started in the case of:

- **overheat**: in the power modules (each module is equipped with temperature sensors);
- **overload:** if maximal current is exceeded (trip-off due to programmed lower values is not indicated as overload)
- **overvoltage:** if voltage >125% (default, crow bar function) and if voltage >105% (default, can be changed via LX/EX fan tray or network)
- **undervoltage:** if voltage <97.5% % (default, can be changed via LX/EX fan tray or network)
- **fan failure:** if one or more fans fail

The reasons of a trip off will be displayed on the alphanumerical display.

Voltages, currents, cooling air temperatures (selectable °F - °C), fan speed, power dissipation of inserted modules, operation time of power supply and fan tray and optional net parameters, can be shown on the alphanumeric display of the fan-tray. The ADC resolution is 10 bit. The accuracy of the voltage measurement is better than 0.5%. The total accuracy of the current measurement depends on the corresponding voltage, i.e. for ±5V it is better than 2A in the range between 5A - 50A and for -2V it is better than 1A in the range between 1A - 20A. Above these current ranges the accuracy is <5% of the final value. In the case of ±12V and ±15V the accuracy is better than 0.2 in the whole current range.

### 2.1.1Function of Fan Tray Switches

| | |
|---|---|
| POWER ON /Off | main switch for ventilation and power supply |
| MODE SELECT | selection switch to choose items and values for fan-tray and power supply monitoring and control |
| SYS RES | protected located switch for VME SYSRESET circuit activation |
| FAN SPEED | push button for step wise in- or decrease of fan speed. |
| FAN AUTO OFF | 1: Switch off after fan-failure (yes/no)<br>2: Activate the "hot swap" function of the fan |
| ADDRESS | Optional if remote network is installed |
| LOCAL | Optional if remote network is installed (IEC Bus only) |

The adjusting range of fan speed is from 1200 RPM up to >3000 RPM. Pre selected reference speed and displayed value are average RPM. The display shows the fan speed in flashing mode if the selected speed is not equal to the true speed. This happens when either the fans are still accelerated to the higher turns or the selected value is not reachable (if >3000 RPM and higher density of modules inserted in the bin, etc.). After a certain time the FAN FAIL circuit will detect this status as fan fail! While the display shows average speed of all fans only, the CANbus option (or other supported remote interfaces) will transmit the turns of each blower situated inside the fan tray.

Information by Fan Tray LED's

| | |
|---|---|
| AC POWER | green large LED if *POWER* is on |
| STATUS | green LED if all voltages are within the limit |
| FAN FAIL | yellow LED if a fan failure is recognized |
| OVERHEAT | yellow LED if an overheat in the power supply occurs |
| SYS FAIL | red LED if VME-bus system generates the *SYSFAIL* signal (system failure) |
| FAN SPEED | Red LED if fan speed below 100% |
| AUTO OFF | red LED indicates DC cut off disabled, remote warning only, hot swapping of fan tray possible now |
| LOCAL | Optional if remote network is installed |

## 2.2 UEL6000 Operation and Programming

### 2.2.1 Additional temperature sensors

Optionally installed temperature sensor(s), measuring the exhaust air, allows to switch the fan to stop. That will be achieved by keeping pushed the FAN SPEED button to lower speed for about 10 seconds.

Also the sensor(s) will

- accelerate the fan speed to the maximum if the first (FanUp) programmed temperature threshold is exceeded (default: 45°C) . While the outcoming cooling air temperature is above this threshold, adjustment to lower fan speed is disabled. The downward adjustment will be automatically reenabled as soon as the exhaust temperature drops below the limit.
- switch off the power supply if the second (PsOff) programmed temperature threshold is exceeded (default: disabled) .

The sensors are placed normally above selected slots at the bin.

### 2.2.2 Hot Swapping of Fan Tray

If the "hot swap" function is activated (AUTO OFF), the crate can be fully powered during withdrawal of the fan tray.

The power supply will trip off to prevent damage of inserted modules

1. if the operating time with removed fan tray is too long (30 seconds)
2. when the programmed second limit of slot 1 temperature sensor (or of optional installed ones) is exceeded.

### 2.2.3Time lag of fan stopping

After Switch- or Trip-Off of the unit the fans continue to run for a programmable time. By means of this function overheating of critical parts after power off will be avoid.

The time lag can be programmed in submenu "Display the fan rotation speed".

Twice Off- operation of the Power switch stops the fans immediately.

This feature was implemented in 2005

### 2.2.4Programming via front panel switches

After the UEL6000 fan tray has been switched on by pushing the "Power" switch up, the main operation modes can be selected by pushing the "Mode Select" switch up or down.

Many main operation modes do have one or more submenus, which can be accessed by a special procedure.

The front panel-switches of the fan tray can be used in the following way:

| *Symbol* | *Description* | *Remarks* |
|---|---|---|
| P▲ | Push "Power" switch up (ON) | **Main operation mode:**<br>Switch the crate on.<br>**Submenu:**<br>OK button. Used to enter the selected submenu, request to change a value, accept the changes. |
| P▼ | Push "Power" switch down (OFF) | **Main operation mode:**<br>Switch the crate off.<br>**Submenu:**<br>CANCEL button. Used to leave a submenu, discard the changes. |
| M▲ | Push "Mode Select" switch up | **Main operation mode:**<br>Select the next operation mode.<br>**Submenu:**<br>Change the selected item to the next possible state. |
| M▼ | Push "Mode Select" switch down | **Main operation mode:**<br>Select the previous operation mode.<br>**Submenu:**<br>Change the selected item to the previous possible state. |

### 2.2.4.1 IP Address (EX fan tray)

The following example describes the detailed steps to change the IP gateway address of the fan tray.

| ***Description*** | ***Switch*** | ***Display*** two lines: displayed alternating alternate background color: blinking |
|---|---|---|
| switch the crate on | P▲ | +5V 5.01V 1.2A |
| select the requested main operation mode | M▲ or M▼ (until right mode is displayed) | TCPIP: no link |
| enter submenu | M▲(push and hold), P▲ | Config: Wait |
| | hold both switches up | Config: Wait... |
| | after 4 seconds you can | Config: Ready ! |
| | release the switches | TCPIP Address 192.168.91.80 |
| Select submenu "TCPIP Gateway" | M▲ or M▼ (until right menu is displayed) | TCPIP Gateway 192.168.91.94 |
| Enter this menu | P▲ | 192.168.91.94 |
| Change the value | M▲ or M▼ | 196.168.91.94 |
| Accept change, to next item | P▲ | 196.168.91.94 |
| Accept change, to next item | P▲ | 196.168.91.94 |
| Accept change, to next item | P▲ | 196.168.91.94 |
| Ready, back to submenu selection | P▲ | TCPIP Gateway 196.168.91.94 |
| Ready, leave submenu | M▼ | TCPIP: no link |

2.2.5Main operation modes and associated submenus

| *Operation Mode* | *Submenu* | *Display* |
|---|---|---|
| **Display voltage and current of the selected output channel** | | +5V 5.01V 72.A |
| | Change of the current limit | +5V Ilim 115.A |
| | Fine adjustment of the output voltage | +5V Uadj +50% |
| | Change the output voltage (coarse) | +5V Unom 5.00V |
| | Change the overvoltage protection threshold (crowbar, measured at the power supply outputs) | +5V OVP 6.00V |
| | Change of the overcurrent switch-off threshold | +5V IOff 110.A |
| | Change of the undervoltage switch-off threshold | +5V Umin 4.50V |
| | Change of the overvoltage switch-off threshold | +5V Umax 5.50V |
| | | |
| **Display the total power at the load** | | |
| | Enable the automatic power on after mains connection. | Auto PowerOn No |
| | Force the PowerOff button to be pressed for one second. | SwitchOff Normal |
| | Define the time after then all LEDs are switched off. | ScreenSaver Off |
| | | |
| **Display the CANbus address** | | |
| | Define the CAN broadcast address. | CANbus Addr2 127 |
| | Define the CAN bit rate. | CANbus 1.0 MBaud |
| | | |
| **Display the TCP/IP connection state**<br>Possible values & symbols are:<br>no link (no cable connected)<br>10M (connected to 10M network)<br>100M (connected to 100M network)<br>HD (half duplex)<br>FD (full duplex)<br>↓, ↑, ↕ (Frame received, transmitted, both) | | Ethernet 100M FD |
| | Change the TCP/IP address | TCPIP Address<br>192.168.91.80 |
| | Change the TCP/IP subnet mask | TCPIP SubnetMask<br>255.255.255.224 |
| | Change the TCP/IP gateway address | TCPIP Gateway<br>192.168.91.94 |
| | Allow writes (e.g. switch on/off) via the web server | HTTP:read/write |

| *Operation Mode* | *Submenu* | *Display* |
|---|---|---|
| | Change TCP/IP negotiation settings | TCPIPnegotiation AutoNegotiation |
| | Display of the ethernet hardware address (MAC). This address is written at the type plate, too. | TCPIP MAC Addres 0050-C22D-C231 |
| | Change the TCP/IP port of the web server | HTTP Port 80 |
| | Change the TCP/IP port of the TELNET server | TELNET Port 23 |
| | Change the TCP/IP port of the SNMP server | SNMP Port 161 |
| | Restore the default SNMP settings (community strings) | SNMP Default No |
| | | |
| **Display the RS232 interface tunnel state** | | |
| | Define the RS232 baud rate | Baudrate 115.2k |
| | Define the RS232 parity | Parity: None |
| | Define the RS232 number of data bits | Data Bits: 8 |
| | Define the RS232 number of stop bits | Stop Bits: 1 |
| | Define the RS232 handshake | Handshake: none |
| | Allows the upload of new firmware via RS232. | UEL6000 Frimware 4.10 |
| | | |
| **Display the fan rotation speed** | | |
| | Change the time for which the fans will continue running after switching the power supply off. | |
| | Display the number of supervised fans | |
| | | |
| **Display the internal fan tray temperature (inlet air temperature)** | | |
| | Select the temperature unit (Celsius or Farenheit) | |
| | Functionality of the "Fan Auto Off" switch | |
| | Hide the display of the internal fan tray temperature | |
| | | |
| **Display the BIN sensor temperature** | | |
| | Change the WARNIG threshold temperature (fans will switch to full speed) | |
| | Change the ERROR threshold temperature (power supply is switched off) | |
| | | |
| **Display the fan operating time** | | |
| | | |
| **Display the power supply operating time** | | |

### 2.2.6 EX Fan Tray Remot Control Pin Description

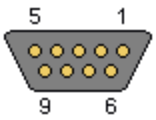
CAN-Bus (X1, X2)

| RJ45 Socket | Pin | Signal | Comment |
|---|---|---|---|
|   | 1 | CAN-H | |
| | 2 | CAN-L | |
| | 3 | GND | |
| | 4 | n.c. | |
| | 5 | n.c. | |
| | 6 | reserved | |
| | 7 | optional GND | |
| | 8 | n.c. | |

This is the standard CIA pinning. Both CANbus connectors are wired in parallel, so it's easy to connect many crates in a daisy-chain.

A CAN patch cable from the RJ45 connector to the previously used SDUB9 can be built using the following table:

| RJ45 Plug | | | | | DSUB9 Female Plug |
|---|---|---|---|---|---|
|   | Pin | Wire Color (EIA568A) | Wire Color (EIA568B) | Signal | Pin |
| | 1 | orange/white | green/white | CAN-H | 7 |
| | 2 | orange | green | CAN-L | 2 |
| | 3 | green/white | orange/white | GND | 3 |
| | 4 | blue | blue | - | - |
| | 5 | blue/white | blue/white | - | - |
| | 6 | green | orange | - | - |
| | 7 | brown/white | brown/white | GND | 6 |
| | 8 | brown | brown | - | - |

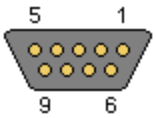


RS232 (X3)

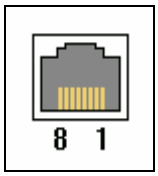
| RJ45 Socket | Pin | Signal | Comment |
|---|---|---|---|
|   | 1 | n.c. | |
| | 2 | n.c. | |
| | 3 | n.c. | |
| | 4 | GND | |
| | 5 | RXD | Output |
| | 6 | TXD | Input |
| | 7 | CTS | Output |
| | 8 | RTS | Input |

This is the standard RS232D DCE pinning. Connection to DTE (e.g. computer) with a 1:1-cable.

A RS232 patch cable from the RJ45 connector (RS232D DCE) to a computer (TIA457 DTE) can be built using the following table:

| RJ45 Plug | | | | | DSUB9 Female Plug |
|---|---|---|---|---|---|
| | Pin | Wire Color (EIA568A) | Wire Color (EIA568B) | Signal | Pin | |
|   | 1 | orange/white | green/white | n.c. | 9 |   |
| | 2 | orange | green | n.c. | 1 | |
| | 3 | green/white | orange/white | n.c. | 4 | |
| | 4 | blue | blue | GND | 5 | |
| | 5 | blue/white | blue/white | RXD | 2 | |
| | 6 | green | orange | TXD | 3 | |
| | 7 | brown/white | brown/white | CTS | 8 | |
| | 8 | brown | brown | RTS | 7 | |

Ethernet (X4)

| RJ45 Socket | Pin | Signal | Comment |
|---|---|---|---|
|   | 1 | TX+ | |
| | 2 | TX- | |
| | 3 | RX+ | |
| | 4 | GND 1 | 75 Ohm |
| | 5 | GND 1 | |
| | 6 | RX- | |
| | 7 | GND 2 | 75 Ohm |
| | 8 | GND 2 | |

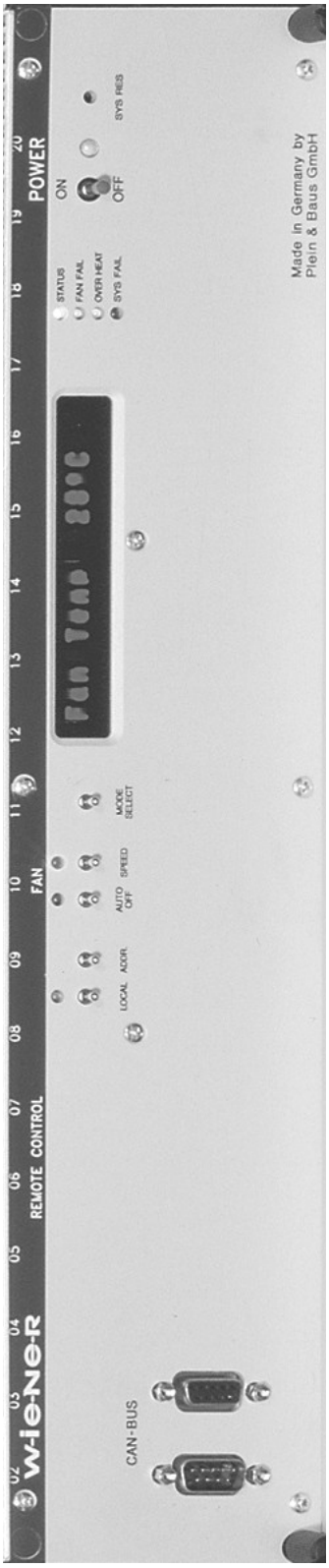
This is the standard NIC configuration. **You need a** 1:1-cable to connect a to a HUB, or a **cross-over cable to connect to** another NIC (e.g. **a computer**). *There is no automatic signal crossing like with some routers*.

CAN Transmission Speed Index

| Index | Max. Distance | Bit Rate | Type |
|---|---|---|---|
| 0 | 10 m | 1.6 Mbit/s | high- speed |
| 1 | 40 m | 1.0 Mbit/s | |
| 2 | 130 m | 500 kbit/s | (needs termination) |
| 3 | 270 m | 250 kbit/s | |
| 4 | 530 m | 125 kbit/s | |
| 5 | 620 m | 100 kbit/s | low-speed |
| 6 | 1.300m | 50 kbit/s | |
| 7 | 3.300 m | 20 kbit/s | |
| 8 | 6.700 m | 10 kbit/s | |
| 9 | 10.000 m | 5 kbit/s | |

**For software protocol see separate manual No. *00183**

## 2.2.7LX / EX fan-tray front panel view




SYS Reset Switch (protected )

Power On LED
Main Switch **ON/OFF**; Trip off Rest

Status LEDs:

| | |
|---|---|
| Green | Status |
| Yellow | Fan Fail |
| Yellow | Over Heat |
| Red | SYS Fail |

Alphanumeric Display

**MODE SELECT** Switch

Fan **SPEED** Switch and LED

**AUTO OFF** Switch and LED

Network **ADDR**ess Switch

**LOCAL** Switch and LED

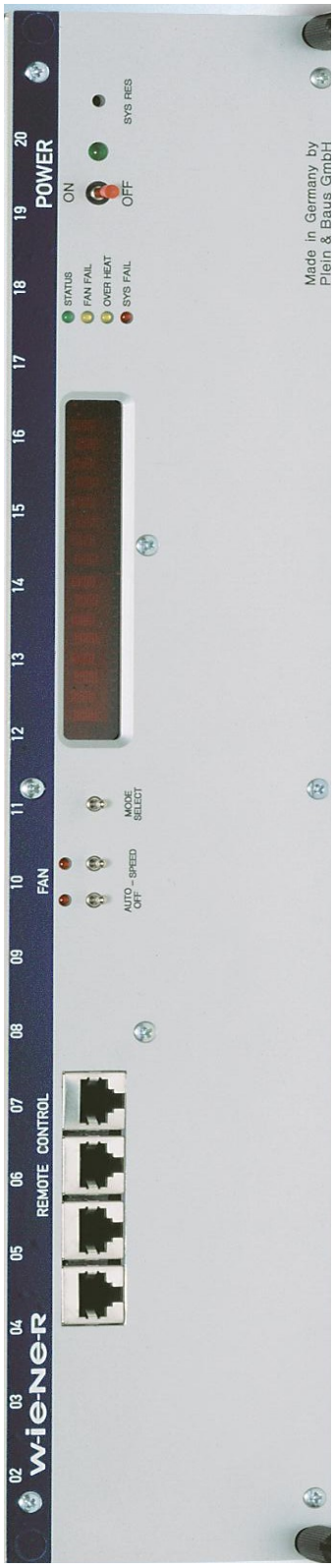
**EX** RJ45 (standard)

- Ethernet
- RS232
- CANbus
- CANbus

CANbus connector 1 female

**LX** Sub D (optional)

CANbus connector 2 male



Standard Measurement Ranges

| Available Modes and Display Examples | | | |
|---|---|---|---|
| Mode | Monitored | Values | Description |
| +5V | 5.00 V | 115A.... 230A (460) | +5V channel |
| +12V | 12.0 V | 11.5 / 46.0A (92) | +12V channel |
| +15V [1] | 15.0 V | 11.5 / 35.0A (70) | +15V channel |
| +24V 1 | 24.0 V | 11.5 / 23,0 A (66) | +15V channel |
| +3,3V | 3.30 V | 115.... 230A (460) | 3,3V channel |
| +48V 1 | 48,0 V | 13,5... 67A | |
| -5V | 5.20 V | 100A.... 400A | -5.2V channel |
| -12V | 12.0 V | 6.0 / 10.0 / 40.0A (80) | -12V channel |
| -15V 1 | 15.0 V | 6.0 / 10.0 / 30.0A (80) | -15V channel |
| -24V 1 | 24.0 V | 6.5 / 20,0A (80) | -24V channel |
| -2V | 2.00 V | 100.0A.... 200A | -2V channel |
| POWER | 135 | W | output power |
| FANS | 3000 | RPM | fan rotation speed |
| FAN TEMP | 25 | ° C or °F | fan air inlet temp. |
| FAN TIME | 82000,6 | h | Operating hours Fan tray |
| P.S. TIME | 150000,0 | h | Operating hours Power Supply |
| **Options** | | | |
| BIN TEMP 1 | 35°C | ° C or °F | bin slot 1 (?) temp. |
| BIN TEMP 2 | | ° C or °F | bin slot 2 (?) temp. |
| ..... up to | | | |
| BIN TEMP 8 | | ° C or °F | bin slot 8 (?) temp. |
| Networks * | | | |
| CAEN* | ADDR | 99 | CAENET address |
| BAUD* | RATE | 1 MBAUD | CANbus bit rate |
| CANbus* | ADDR | 127 | CANbus address |
| IEC* | ADDR | 25 | IECbus address |
| TCP/IP | ADDR | | Details see 2.2 ++ |

[1] Either the 15V-, the 24V- or the 48V- output will be in use, depending on the application (VME, VME64x, VXI)

# 3 6021-6023 Bin Technical details

3.1.1VME-Bus Terminology, Signal Identification

| | |
|---|---|
| **BR0*-BR3*** | **Bus request (0-3).** Open-collector driven signals generated by requesters. A low level on one of these lines indicates that some master need to use the DTB |
| **D00-D31** | **Data bus.** Three-state driven bi-directional lines used to transfer data between masters an slaves, and status/ID information from interrupters to interrupt handlers. |
| **DS0*, DS1*** | **Data strobe zero, one.** Three-state driven signals used in conjunction with LWORD* and A01 to indicate how many byte locations are being accessed (1, 2, 3, or 4). In addition, during a write cycle, the falling edge of the first data strobe indicates that valid data is available on the data bus. On a read cycle, the rising edge of the first data strobe indicates that data has been accepted from the data bus. |
| **DTACK*** | **Data transfer acknowledge.** An open-collector driven signal generated by a SLAVE. The falling edge of this signal indicates that valid data is available on the data bus during a read cycle, or that data has been accepted from the data bus during a write cycle. The rising edge indicates when the slave has released the data bus at the end of a read cycle. |
| **GND** | the dc voltage reference for the system |
| **IACK*** | **interrupt acknowledge.** An open-collector or three-state driven signal used by an interrupt handler to acknowledge an interrupt request. It is routed, by way of a backplane signal trace, to the IACKIN* pin of slot 1, where it is monitored by the IACK daisy-chain driver. |
| **IACKIN*** | **interrupt acknowledge in.** A totem-pole driven signal. The IACKIN* and IACKOUT* signal indicates to the board receiving it that it is allowed to respond to the interrupt acknowledge cycle that is in progress. |
| **IACKOUT*** | **Interrupt acknowledge out.** A totem-pole driven signal. The IACKIN* and IACKOUT* signal is sent by a board to indicate to the next board in the daisy-chain that it is allowed to respond the interrupt acknowledge cycle that is in progress. |
| **IRQ1*-IRQ7*** | **Interrupt request (1-7).** Open-collector driven signals, that are driven low by interrupters to request an interrupt. When several lines are monitored by a single handler the highest numbered line is given the highest priority. |
| **LWORD*** | **Longword.** A three-state driven signal used in conjunction with DS0*, DS1*, and A01 to select which byte location(s) within the 4-byte group are accessed during the data transfer. |
| **RESERVED** | **Reserved.** A signal line reserved for future enhancements. |
| **SERCLK** | **Serial clock.** A totem-pole driven signal that is used to synchronize the data transmission on the VMSbus. |

| | |
|---|---|
| **SERDAT*** | **Serial data.** An open collector driven signal that is used for VMEbus data transmission. |
| **SYSCLK** | **System clock.** A totem-pole driven signal that provides a constant 16 MHz clock signal that is independent of any other bus timing. |
| **SYSFAIL*** | **System reset.** An open-collector driven signal that indicates when a failure has occurred in the system. This signal can be generated by any board in the system. |
| **SYSRESET*** | **System reset.** An open-collector driven signal, which when low, causes the system to be reset. |
| **WRITE*** | **Write.** A three-state driven signal generated by the master to indicate whether the data transfer cycle is a read or write. A high level indicates a read operation; a low level indicates a write operation. |
| **+ 5 V STDBY** | **+ 5V dc standby.** This line supplies 5 V dc to devices requiring battery backup. |
| **+ 5 V** | **+ 5 V dc power.** Used by system logic circuits. |
| **+ 12 V** | **+ 12 V dc power.** Used by system logic circuits. |
| **- 12 V** | **- 12 V dc power**. Used by system logic circuits. |

3.1.2Backplane Current Ratings

| Power distribution | **VME** | **VME** | **VME** | **VME 430** | **VME 64x** |
|---|---|---|---|---|---|
| **each slot (20°C / 70°C)** | J1 | J2 | J1-J2 | J1-Jaux-J2 | J1 |
| 3,3V | | | | | 17/12A |
| 5V | 9,5/7,5A | 9,5/7,5A | 19/15A | 19/15A | 8,5/6A |
| +/-12V | 3,2/2,5A | | 3,2/2,5A | 3,2/2,5A | 1,7/1,2A |
| +/-15V | | | | 3,2/2,5A | |
| -5,2V | | | | 19/15A | |
| -2V | | | | 9,5/7,5A | |
| Vw, Vx, Vy, Vz | | | | | |
| V1, V2 | | | | | 1,7/1,2A |
| Layers | 8 | 4 | 8 | 8 | 10 |
| Type of ADC | mech | | mech | mech | active |
| Termination on board | passive | passive | passive | passive | active |
| J2 with 160pin | | optional | optional | optional | |
| Power Connections | Studs | Studs | Studs | Studs | Bugs |

Backplane Current ratings cont.

| Power distribution | VME 64x | VME64xP | VXI C size | VXI D size |
|---|---|---|---|---|
| **each slot (20°C / 70°C)** | J1-Jo-J2 | J1-Jo-J2 **Slot 2- 21[2])[1]** | J1-J2 | J1-J2-J3 |
| 3,3V | 17/12A | 17/12A | | |
| 5V | 15,3/10,8A | 27/19A | 14/10,5A | 24/18A |
| +/-12V | 1,7/1,2A | 1,7/1,2A | 2/1,5A | 4/3A |
| +/-15V | | | | |
| -5,2V | | | 10/7,5A | 20/15A |
| -2V | | | 4/3A | 10/7,5A |
| +/-24V | | | 2/1,5A | 4/3A |
| Vw, Vx, Vy, Vz | 4/3A | 4/3A | | |
| V1, V2 | 1,7/1,2A | 1,7/1,2A | | |
| Layers | 10 | 18 | 10 | 10 |
| Type of ADC | active | active | active | active |
| Termination on board | active | active | active | active |
| Power Connections | Bugs | Bugs | Studs | Studs |

## 3.1.3Pin Assignment Jaux of VME 430-Bus (CERN)

| Pin Number | Row A | Row B | Row C |
|---|---|---|---|
| 01 | SN1 | GND | SN2 |
| 02 | SN3 | GND | SN4 |
| 03 | SN5 | GND | GND |
| 04 | CK* | GND | CK |
| 05 | SG* | GND | SG |
| 06 | CL* | GND | CL |
| 07 | -2 V | -2 V | -2 V |
| 08 | - 15 V | CE | + 15 V |
| 09 | - 5,2 V | -5,2 V | - 5,2V |
| 10 | - 5,2 V | - 5,2 V | - 5,2V |

### 3.1.3.1 Terminology and Signal Identification of Jaux

[2] **On slot 1 of the 64xP** backplane the Jo is not feeding additional 5V pins. Therefore the current capability for +5V is only **15,3/10,8A.**

SN1... SN5, Binary coded slot No. lines, Geographical address

| Slot Number | SN1 | SN2 | SN3 | SN4 | SN5 |
|---|---|---|---|---|---|
| 01 | NC | GND | GND | GND | GND |
| 02 | GND | NC | GND | GND | GND |
| 03 | NC | NC | GND | GND | GND |
| 04 | GND | GND | NC | GND | GND |
| 05 | NC* | GND | NC | GND | GND |
| 06 | GND | NC | NC | GND | GND |
| | | | | | |
| 19 | NC | NC | GND | GND | NC |
| 20 | GND | GND | NC | GND | NC |
| 21 | NC | GND | NC | GND | NC |

NC = No Connection (represents H- level, generated by 5k6 resistor on VME modul for TTL, e.g.)

**CK, SG and CL signals, Clean Earth**

**CK**, Clock signal, bussed differential line terminated on both sides of the backplane (2 resistors to ground and 1 resistor in between the two lines according to the impedance .

CK positive logic
CK* negative logic

**SG**, Start / Stop Gate, bussed differential line terminated like CK lines.

SG positive logic
SG* negative logic

**CL**, Clear, bussed differential line terminated like CK lines.

CL positive logic
CL* negative logic

**CE**, Clean Earth , unbussed line without termination.

3.1.4Pin Assignments of J1 and J2 VME Bus

| | J1 | | | J2 | | |
|---|---|---|---|---|---|---|
| Pin No. | Row A | Row B | Row C | Row A | Row B | Row C |
| 01 | D00 | BBSY* | D08 | User defined | +5 V | User defined |
| 02 | D01 | BCLR | D09 | User defined | GND | User defined |
| 03 | D02 | ACFAIL* | D10 | User defined | Reserved | User defined |
| 04 | D03 | BG0IN* | D11 | User defined | A24 | User defined |
| 05 | D04 | BG0OUT* | D12 | User defined | A25 | User defined |
| 06 | D05 | BG1IN* | D13 | User defined | A26 | User defined |
| 07 | D06 | BG1OUT* | D14 | User defined | A27 | User defined |
| 08 | D07 | BG2IN* | D15 | User defined | A28 | User defined |
| 09 | GND | BG2OUT* | GND | User defined | A29 | User defined |
| 10 | SYSCLK | BG3IN* | SYSFAIL* | User defined | A30 | User defined |
| 11 | GND | BG3OUT* | BERR* | User defined | A31 | User defined |
| 12 | DS1* | BR0* | SYSRESET* | User defined | GND | User defined |
| 13 | DS0* | BR1* | LWORD* | User defined | +5 V | User defined |
| 14 | WRITE* | BR2* | AM5 | User defined | D16 | User defined |
| 15 | GND | BR3* | A23 | User defined | D17 | User defined |
| 16 | DTACK* | AM0 | A22 | User defined | D18 | User defined |
| 17 | GND | AM1 | A21 | User defined | D19 | User defined |
| 18 | AS* | AM2 | A20 | User defined | D20 | User defined |
| 19 | GND | AM3 | A19 | User defined | D21 | User defined |
| 20 | IACK* | GND | A18 | User defined | D22 | User defined |
| 21 | IACKIN* | SERCLK | A17 | User defined | D23 | User defined |
| 22 | IAOUT* | SERDAT | A16 | User defined | GND | User defined |
| 23 | AM4 | GND | A15 | User defined | D24 | User defined |
| 24 | A07 | IRQ7* | A14 | User defined | D25 | User defined |
| 25 | A06 | IRQ6* | A13 | User defined | D26 | User defined |
| 26 | A05 | IRQ5* | A12 | User defined | D27 | User defined |
| 27 | A04 | IRQ4* | A11 | User defined | D28 | User defined |
| 28 | A03 | IRQ3* | A10 | User defined | D29 | User defined |
| 29 | A02 | IRQ2* | A09 | User defined | D30 | User defined |
| 30 | A01 | IRQ1* | A08 | User defined | D31 | User defined |
| 31 | -12 V | +5V STDBY | + 12 V | User defined | GND | User defined |
| 32 | +5 V | + 5 V | + 5 V | User defined | + 5 V | User defined |

3.1.5Pin Assignments of VME 64x-Bus

**J1 (extended)**

| Pin No. | Row Z | Row A | Row B | Row C | Row D |
|---|---|---|---|---|---|
| 01 | MPR | D00 | BBSY* | D08 | VPC (1) |
| 02 | GND | D01 | BCLR* | D09 | GND (1) |
| 03 | MCLK | D02 | ACFAIL* | D10 | +V1 |
| 04 | GND | D03 | BG0IN* | D11 | +V2 |
| 05 | MSD | D04 | BG0OUT* | D12 | RsvU |
| 06 | GND | D05 | BG1IN* | D13 | -V1 |
| 07 | MMD | D06 | BG1OUT | D14 | -V2 |
| 08 | GND | D07 | BG2IN* | D15 | RsvU |
| 09 | MCTC | GND | BG2OUT* | GND | GAP* |
| 10 | GND | SYSCLK | BG3IN* | SYSFAIL* | GAO* |
| 11 | RESP* | GND | BG3OUT* | BERR* | GA1* |
| 12 | GND | DS1* | BR0* | SYSRESET* | +3.3V |
| 13 | RsvBus | DS0* | BR1* | LWORD | GA2* |
| 14 | GND | WRITE* | BR2* | AM5 | +3.3V |
| 15 | RsvBus | GND | BR3* | A23 | GA3* |
| 16 | GND | DTACK* | AM0 | A22 | +3.3V |
| 17 | RsvBus | GND | AM1 | A21 | GA4* |
| 18 | GND | AS* | AM2 | A20 | +3.3V |
| 19 | RsvBus | GND | AM3 | A19 | RsvBus |
| 20 | GND | IACK* | GND | A18 | +3.3V |
| 21 | RsvBus | IACKIN* | SERCLK | A17 | RsvBus |
| 22 | GND | IAOUT* | SERDAT | A16 | 3.3V |
| 23 | RsvBus | AM4 | GND | A15 | RsvBus |
| 24 | GND | A07 | IRQ7* | A14 | +3.3V |
| 25 | RsvBus | A06 | IRQ6* | A13 | RsvBus |
| 26 | GND | A05 | IRQ5* | A12 | +3.3V |
| 27 | RsvBus | A04 | IRQ4* | A11 | LI/I* |
| 28 | GND | A03 | IRQ3* | A10 | +3.3V |
| 29 | RsvBus | A02 | IRQ2* | A09 | LI/O* |
| 30 | GND | A01 | IRQ1* | A08 | +3.3V |
| 31 | RsvBus | -12 V | +5V STDBY | +12 V | GND (1) |
| 32 | GND | +5 V | +5V | + 5 V | VPC (1) |

## J2 (extended)

| Pin No. | Row Z | Row A | Row B | Row C | Row D |
|---|---|---|---|---|---|
| 01 | User defined | User defined | +5 VAC | User defined | User defined(1) |
| 02 | GND | User defined | GND | User defined | User defined(1) |
| 03 | User defined | User defined | RESERVED | User defined | User defined |
| 04 | GND | User defined | A24 | User defined | User defined |
| 05 | User defined | User defined | A25 | User defined | User defined |
| 06 | GND | User defined | A26 | User defined | User defined |
| 07 | User defined | User defined | A27 | User defined | User defined |
| 08 | GND | User defined | A28 | User defined | User defined |
| 09 | User defined | User defined | A29 | User defined | User defined |
| 10 | GND | User defined | A30 | User defined | User defined |
| 11 | User defined | User defined | A31 | User defined | User defined |
| 12 | GND | User defined | GND | User defined | User defined |
| 13 | User defined | User defined | +5 V | User defined | User defined |
| 14 | GND | User defined | D16 | User defined | User defined |
| 15 | User defined | User defined | D17 | User defined | User defined |
| 16 | GND | User defined | D18 | User defined | User defined |
| 17 | User defined | User defined | D19 | User defined | User defined |
| 18 | GND | User defined | D20 | User defined | User defined |
| 19 | User defined | User defined | D21 | User defined | User defined |
| 20 | GND | User defined | D22 | User defined | User defined |
| 21 | User defined | User defined | D23 | User defined | User defined |
| 22 | GND | User defined | GND | User defined | User defined |
| 23 | User defined | User defined | D24 | User defined | User defined |
| 24 | GND | User defined | D25 | User defined | User defined |
| 25 | User defined | User defined | D26 | User defined | User defined |
| 26 | GND | User defined | D27 | User defined | User defined |
| 27 | User defined | User defined | D28 | User defined | User defined |
| 28 | GND | User defined | D29 | User defined | User defined |
| 29 | User defined | User defined | D30 | User defined | User defined |
| 30 | GND | User defined | D31 | User defined | User defined |
| 31 | User defined | User defined | GND | User defined | GND (1) |
| 32 | GND | User defined | +5 V | User defined | VPC (1) |
| | | | | | |

3.1.5.1 Pin Assignment Jo of VME 64x-Bus

**J0 (extended)**

| Pos | Row f | Row e | Row d | Row c | Row b | Row a | Row z |
|---|---|---|---|---|---|---|---|
| 1 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 2 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 3 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 4 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 5 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 6 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 7 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 8 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 9 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 10 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 11 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 12 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 13 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 14 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 15 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 16 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 17 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 18 | GND | User defined | User defined | User defined | User defined | User defined | GND |
| 19 | GND | User defined | User defined | User defined | User defined | User defined | GND |

### 3.1.6Pin Assignment J0 of VME 64xC –Bus

The VME64xC Bus consists of a monolythic VME64x J1/J2 bus with a special J0 high power distribution bus. The J0 connector is built out of three 10-pin connectors MP2-HP10-51P1-TR (Robinson Nugent) for each slot (Reference Numbers: J0.1A, J0.1B and J0.1C for slot 1, and so on). A Current of up to 26A/slot could be supplied with each of the six UAUX lines.

| Connector | Pin | | | | | Signal |
|---|---|---|---|---|---|---|
| J0.A | A1 | B1 | C1 | D1 | E1 | UAUX1 (3.3V) |
| | A2 | B2 | C2 | D2 | E2 | UAUX1 Return |
| J0.B | A1 | B1 | C1 | D1 | E1 | UAUX2 (2.5V) |
| | A2 | B2 | C2 | D2 | E2 | UAUX2 Return |
| J0.C | A1 | B1 | C1 | D1 | E1 | UAUX3 (1.8V) |
| | A2 | B2 | C2 | D2 | E2 | UAUX3 Return |

### 3.1.7Special Pin Assignment J0 of VME 64xP - Bus (VIPA)

Some user defined pins of the 64x- Jo connector have been specified in the 64xP (VIPA) document to get available additional voltages and signals on the backplane. The slot 1 pin out is identical to those of the Jo of the 64x pin assignment. Slot 2 to 21 are outfitted with the following pin out:

**Jo Slot 2-21**

| Pin No. | Row z | Row a | Row b | Row c | Row d | Row e | Row f |
|---|---|---|---|---|---|---|---|
| 01 | COM | +5V | +5V | +5V | +5V | +5V | COM |
| 02 | COM | RET_WX | Reserved | +5V | TBUS1+ | TBUS1- | COM |
| 03 | COM | RET_WX | Reserved | Reserved | TBUS2+ | TBUS2- | COM |
| 04 | COM | Vw | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 05 | COM | Vw | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 06 | COM | RET_WX | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 07 | COM | AREF_WX | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 08 | COM | RET_WX | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 09 | COM | Vx | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 10 | COM | Vx | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 11 | COM | Vy | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 12 | COM | Vy | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 13 | COM | RET_YZ | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 14 | COM | AREF_YZ | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 15 | COM | RET_YZ | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 16 | COM | Vz | Reserved | USER I/O | USER I/O | USER I/O | COM |
| 17 | COM | Vz | Reserved | Reserved | TBUS3+ | TBUS3- | COM |
| 18 | COM | RET_YZ | Reserved | Reserved | TBUS4+ | TBUS4- | COM |
| 19 | COM | RET_YZ | Reserved | Reserved | TBUS_OC1 | TBUS_OC2 | COM |

### 3.1.8Pin Assignments of VXI-Bus

VXIbus J1/J2 Connector, Slot 1-13, C- and D- size

| | J1 | | | J2 | | |
|---|---|---|---|---|---|---|
| Pin No. | Row A | Row B | Row C | Row A | Row B | Row C |
| 01 | D00 | BBSY* | D08 | ECLTRG0 | + 5 V | CLK10+ |
| 02 | D01 | BCLR | D09 | - 2V | GND | CLK10- |
| 03 | D02 | ACFAIL* | D10 | ECLTRG1 | RSV1 | GND |
| 04 | D03 | BG0IN* | D11 | GND | A24 | -5.2V |
| 05 | D04 | BG0OUT* | D12 | LBUSA00 | A25 | LBUSC00 |
| 06 | D05 | BG1IN* | D13 | LBUSA01 | A26 | LBUSC01 |
| 07 | D06 | BG1OUT* | D14 | -5.2V | A27 | GND |
| 08 | D07 | BG2IN* | D15 | LBUSA02 | A28 | LBUSC02 |
| 09 | GND | BG2OUT* | GND | LBUSA03 | A29 | LBUSC03 |
| 10 | SYSCLK | BG3IN* | SYSFAIL* | GND | A30 | GND |
| 11 | GND | BG3OUT* | BERR* | LBUSA04 | A31 | LBUSC04 |
| 12 | DS1* | BR0* | SYSRESET* | LBUSA05 | GND | LBUSC05 |
| 13 | DS0* | BR1* | LWORD* | -5.2V | + 5V | -2V |
| 14 | WRITE* | BR2* | AM5 | LBUSA06 | D16 | LBUSC06 |
| 15 | GND | BR3* | A23 | LBUSA07 | D17 | LBUSC07 |
| 16 | DTACK* | AM0 | A22 | GND | D18 | GND |
| 17 | GND | AM1 | A21 | LBUSA08 | D19 | LBUSC08 |
| 18 | AS* | AM2 | A20 | LBUSA09 | D20 | LBUSC09 |
| 19 | GND | AM3 | A19 | -5.2V | D21 | -5.2V |
| 20 | IACK* | GND | A18 | LBUSA10 | D22 | LBUSC10 |
| 21 | IACKIN* | SERCLK | A17 | LBUSA11 | D23 | LBUSC11 |
| 22 | IAOUT* | SERDAT | A16 | GND | GND | GND |
| 23 | AM4 | GND | A15 | TTLTRG0* | D24 | TTLTRG1* |
| 24 | A07 | IRQ7* | A14 | TTLTRG2* | D25 | TTLTRG3* |
| 25 | A06 | IRQ6* | A13 | +5V | D26 | GND |
| 26 | A05 | IRQ5* | A12 | TTLTRG4* | D27 | TTLTRG5* |
| 27 | A04 | IRQ4* | A11 | TTLTRG6* | D28 | TTLTRG7* |
| 28 | A03 | IRQ3* | A10 | GND | D29 | GND |
| **29** | A02 | IRQ2* | A09 | RSV2 | D30 | RSV3 |
| 30 | A01 | IRQ1* | A08 | MODID | D31 | GND |
| 31 | -12 V | 5V STDBY | + 12 V | GND | GND | +24V |
| 32 | +5 V | + 5 V | + 5 V | SUMBUS | + 5V | -24V |

VXIbus J2 Connector, Slot 1, C- and D- size

| Pin Number | Row A | Row B | Row C |
|---|---|---|---|
| 01 | ECLTRG0 | + 5 VDC | CLK10+ |
| 02 | - 2V | GND | CLK10- |
| 03 | ECLTRG1 | RSV1 | GND |
| 04 | GND | A24 | -5.2V |
| 05 | MODID12 | A25 | LBUSC00 |
| 06 | MODID11 | A26 | LBUSC01 |
| 07 | -5.2V | A27 | GND |
| 08 | MODID10 | A28 | LBUSC02 |
| 09 | MODID09 | A29 | LBUSC03 |
| 10 | GND | A30 | GND |
| 11 | MODID08 | A31 | LBUSC04 |
| 12 | MODID07 | GND | LBUSC05 |
| 13 | -5.2V | + VDC | -2V |
| 14 | MODID06 | D16 | LBUSC06 |
| 15 | MODID05 | D17 | LBUSC07 |
| 16 | GND | D18 | GND |
| 17 | MODID04 | D19 | LBUSC08 |
| 18 | MODID03 | D20 | LBUSC09 |
| 19 | -5.2V | D21 | -5.2V |
| 20 | MODID02 | D22 | LBUSC10 |
| 21 | MODID01 | D23 | LBUSC11 |
| 22 | GND | GND | GND |
| 23 | TTLTRG0* | D24 | TTLTRG1* |
| 24 | TTLTRG2* | D25 | TTLTRG3* |
| 25 | +5V | D26 | GND |
| 26 | TTLTRG4* | D27 | TTLTRG5* |
| 27 | TTLTRG6* | D28 | TTLTRG7* |
| 28 | GND | D29 | GND |
| 29 | RSV2 | D30 | RSV3 |
| 30 | MODID | D31 | GND |
| 31 | GND | GND | +24V |
| 32 | SUMBUS | + 5VDC | -24V |

VXIbus J3 Connector, Slot 2-13, **D- size only**

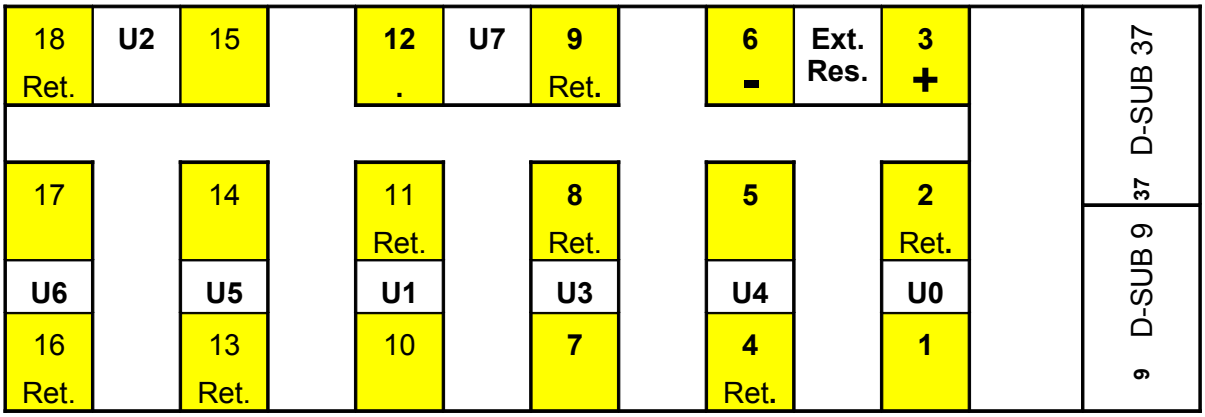
| **Pin Number** | Row A | Row B | Row C |
|---|---|---|---|
| 01 | ECLTRG2 | +24V | +12V |
| 02 | GND | -24V | -12V |
| 03 | ECLTRG3 | GND | RSV4 |
| 04 | -2V | RSV5 | +5V |
| 05 | ECLTRG4 | -5.2V | RSV6 |
| 06 | GND | RSV7 | GND |
| 07 | ECLTRG5 | +5V | -5.2V |
| 08 | -2V | GND | GND |
| 09 | LBUSA12 | +5V | LBUSC12 |
| 10 | LBUSA13 | LBUSC15 | LBUSC13 |
| 11 | LBUSA14 | LBUSA15 | LBUSC14 |
| 12 | LBUSA16 | GND | LBUSC16 |
| 13 | LBUSA17 | LBUSC19 | LBUSC17 |
| 14 | LBUSA18 | LBUSA19 | LBUSC18 |
| 15 | LBUSA20 | +5V | LBUSC20 |
| 16 | LBUSA21 | LBUSC23 | LBUSC21 |
| 17 | LBUSA22 | LBUSA23 | LBUSC22 |
| 18 | LBUSA24 | -2V | LBUSC24 |
| 19 | LBUSA25 | LBUSC27 | LBUSC25 |
| 20 | LBUSA26 | LBUSA27 | LBUSC26 |
| 21 | LBUSA28 | GND | LBUSC28 |
| 22 | LBUSA29 | LBUSC31 | LBUSC29 |
| 23 | LBUSA30 | LBUSA31 | LBUSC30 |
| 24 | LBUSA32 | +5V | LBUSC32 |
| 25 | LBUSA33 | LBUSC35 | LBUSC33 |
| 26 | LBUSA34 | LBUSA35 | LBUSC34 |
| 27 | GND | GND | GND |
| 28 | STARX+ | -5.2V | STARY+ |
| 29 | STARX- | GND | STARY- |
| 30 | GND | -5.2V | -5.2V |
| 31 | CLK100+ | -2V | SYNC100+ |
| 32 | CLK100- | GND | SYNC100- |

VXIbus J3 Connector, Slot 1, **D- size only**

| Pin Number | Row A | Row B | Row C |
|---|---|---|---|
| 01 | ECLTRG2 | +24V | +12V |
| 02 | GND | -24V | -12V |
| 03 | ECLTRG3 | GND | RSV4 |
| 04 | -2V | RSV5 | +5V |
| 05 | ECLTRG4 | -5.2V | RSV6 |
| 06 | GND | RSV7 | GND |
| 07 | ECLTRG5 | +5V | -5.2V |
| 08 | -2V | GND | GND |
| 09 | STARY12+ | +5V | STARX01+ |
| 10 | STARY12- | STARY01- | STARX01- |
| 11 | STARX12+ | StARX12- | STARY01+ |
| 12 | STARY11+ | GND | STARX02+ |
| 13 | STARY11- | STARY02- | STARX02- |
| 14 | STARX11+ | STARX11- | STARY02+ |
| 15 | STARY10+ | +5V | STARX03+ |
| 16 | STARY10- | STARY03- | STARX03- |
| 17 | STARX10+ | STARX10- | STARY03+ |
| 18 | STARY09+ | -2V | STARX04+ |
| 19 | STARY09- | STARY04- | STARX04- |
| 20 | STARX09+ | STARX09- | STARY04+ |
| 21 | STARY08+ | GND | STARX05+ |
| 22 | STARY08- | STARY05- | STARX05- |
| 23 | STARX08+ | STARX08- | STARY05+ |
| 24 | STARY07+ | +5V | STARX06+ |
| 25 | STARY07- | STARY06- | STARX06- |
| 26 | STARX07+ | STARY07- | STARY06+ |
| 27 | GND | GND | GND |
| 28 | STARX+ | -5.2V | STARY+ |
| 29 | STARX- | GND | STARY- |
| 30 | GND | -5.2V | -5.2V |
| 31 | CLK100+ | -2V | SYNC100+ |
| 32 | CLK100- | GND | SYNC100- |

# 4 Power Supply UEP6021

## 4.1 Power Connector Board (Round Contacts)




Pin 10,11,13...18: 6mm, 120A max.
**Pin 1...9+12:** **8mm, 240A max**
Ret. Return from common ground rail at backplane

Voltages and Pin outs in Standard VME application

| | | | |
|---|---|---|---|
| U0 | **5V (2... 7V) ≤ 230A** | U1 | +12V (7... 24V) < 92A |
| U2 | +15V (7... 24V) < 92A | U3 | **3,3V (2... 7V) ≤ 230A** |
| U4 | -5,2V (2... 7V) ≤ 230A | U5 | -12V (7... 24V) < 92A |
| U6 | -15V (7... 24V) < 92A | U7 | -2V (2... 7V) < 115A |

Voltages and Pin outs in Standard VME64x application

| | | | |
|---|---|---|---|
| U0 | **5V (2... 7V) ≤ 230A** | U1 | +12V (7... 24V) < 92A |
| U2 | +48V (30... 60V) < 92A | U3 | **3,3V (2... 7V) ≤ 230A** |
| U4 | | U5 | -12V (7... 24V) < 92A |
| U6 | -15V (7... 24V) < 92A | U7 | |

Voltages and Pin outs in Standard VXI application

| | | | |
|---|---|---|---|
| U0 | **5V (2... 7V) ≤ 230A** | U1 | +12V (7... 24V) < 92A |
| U2 | +24V (12... 30V) < 92A | U3 | |
| U4 | -5,2V (2... 7V) ≤ 230A | U5 | -12V (7... 24V) < 92A |
| U6 | -24V (12... 30V) < 92A | U7 | -2V (2... 7V) < 115A |

### 4.1.1Sense and Signal Connector-SUB D 37

| | | | |
|---|---|---|---|
| | | 19 | TEMP RETURN |
| 37 | TEMP 0 | 18 | TEMP 1 |
| 36 | TEMP 2 | 17 | TEMP 3 |
| 35 | TEMP 4 | 16 | TEMP 5 |
| 34 | TEMP 6 | 15 | TEMP 7 |
| 33 | BIN EEPROM: IIC SDA | 14 | BIN EEPROM: IIC SCL |
| 32 | BIN EEPROM:+5V | 13 | VME LOGIC: SYSRESET |
| 31 | BIN EEPROM: GND | 12 | VME LOGIC: ACFAIL |
| 30 | VME LOGIC GND | 11 | VME LOGIC: SYSFAIL |
| 29 | U0 SENSE - | 10 | U0 SENSE + (VME: +5V) |
| 28 | VW SENSE (reserved) | 9 | VW SENSE (reserved) |
| 27 | VX SENSE (reserved) | 8 | VX SENSE (reserved) |
| 26 | U4 SENSE + | 7 | U4 SENSE - |
| 25 | U7 SENSE + | 6 | U7 SENSE - |
| 24 | U2 SENSE - | 5 | U2 SENSE + (VME: 48V) |
| 23 | U6 SENSE + | 4 | U6 SENSE - |
| 22 | U1 SENSE - | 3 | U1 SENSE + (VME: +12V) |
| 21 | U5 SENSE + | 2 | U5 SENSE – (VME: -12V) |
| 20 | U3 SENSE - | 1 | U3 SENSE + (VME: +3.3V) |

### 4.1.2Fan tray and Control Connector SUB D9

| | | | |
|---|---|---|---|
| | | 5 | CAN_H |
| 9 | CAN_L | 4 | CAN GND |
| 8 | RXD | 3 | TXD |
| 7 | +15V (for fan only) | 2 | +15V (for fan only) |
| 6 | -15V (for fan only) | 1 | -15V (for fan only) |

The CANbus Logic is an option. Data exchange between fan tray and power supply has been done by use of serial connection via RXD and TXD.

## 4.2 Control and Adjustment of 6021 Power Supply

### Control of the Power Supply 6021 via CAN-Bus (optional)

The CAN Bus Signals are provided on the 9 Pin DSUB **situated at the power box:**

CAN_H: Pin 5

CAN_L: Pin 9

CAN_GND: Pin 4

The software protocol is described in a separate document (Part No *00183)

CANbus is an independent port. It may be used to operate the power supply separately or in combination with the fan tray inside the bin

### Control of the Power Supply 6021 without PC or Control panel (display)

There is a on/off input and a status output function .

Remote On: 9 Pin DSUB: Close a "make" contact or switch between Pin 8 (Serial Data In, RXD) and Pin 2 or 7.

Status Output: 9 Pin DSUB: Connect a LED between Pin 3 (Serial Data Out, TXD) and Pin 1 or 6.

### Control of the Power Supply 6021 via Fan tray

Many power supply parameters may be changed via the alphanumeric control of the connected fan tray.

The general procedure is:

- Hold the POWER and MODE switches up simultaneously until the display shows „Config: Wait....“ and „Config: Ready !“. Then release both switches.
- Follow the instructions given above below 2.2.4
- After finishing the parameter programming, leave the submenu or configuration menu (POWER switch down).

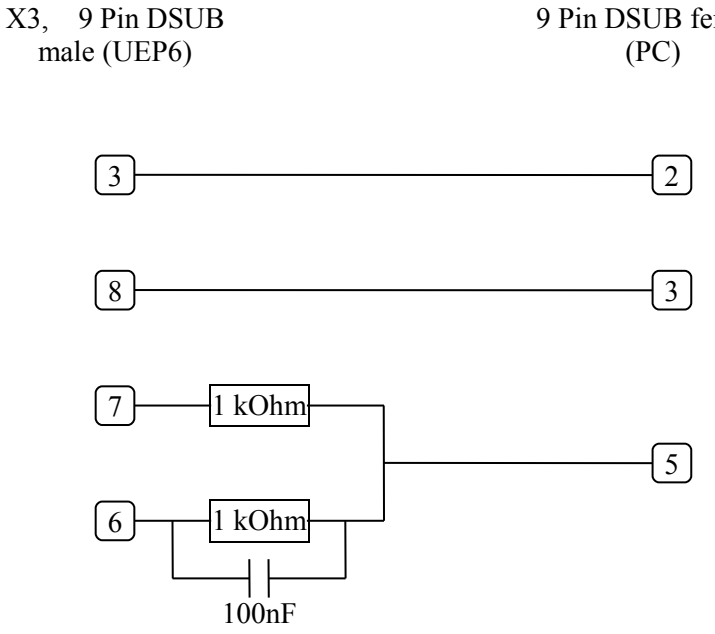
**Table 1** List of manual Programming Features

| Mode | associated parameter submenu | Description |
|---|---|---|
| Any Voltage (e.g. +5V or U0) | Ilim | Output Current limit |
| | Uadj | Output voltage fine adjustment. The same function as the switches in the power supply |
| | Unom | Output voltage coarse adjustment. |
| | Imax | Monitoring: Maximum current for good status. |
| | Umin | Monitoring: Minimum voltage for good status. |
| | Umax: | Monitoring: Maximum voltage for good status. |
| Power | Auto Power On<br>No Auto Power On | Automatic switch on of the power supply after come back of the mains |
| | Switch Off Normal<br>Switch Off Delay | Delayed switch off: You have to push the POWER switch down for 5 seconds until the power supply switches off |

### 4.2.1 Connection of a Personal Computer to the Power Supply UEP6021

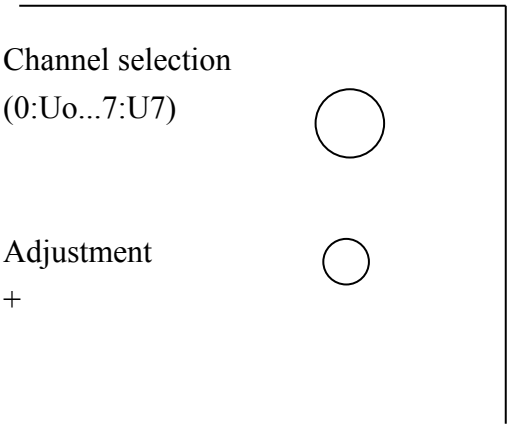
This connection is intended to service functions only. Because of the direct connection between the PC and the power supply, the ripple and noise of the outputs will increase!

Requirements are a PC running Windows, the control program UEP6 and a simple adapter ("Dongle"). The power supply is connected to the COM port of the PC. For more details, view the document *00461.A0.



### 4.2.2Output Voltage Adjustments

All output voltages can be adjusted manually via the two rotary switches situated on the power supply top. Note that the status window with the programmed $U_{max}$ and $U_{min}$ level should be set accordingly. Otherwise the unit will trip off if one of these levels exceed. Normally this procedure is used if some fine adjustments becomes necessary, otherwise it is recommended to use the fan tray switches or the remote control.




| Mode Selection | Function |
|---|---|
| 0-7 | Adjust Voltage of U0-U7 |
| A | CAN Address (low, Bit 0-3) |
| B | CAN Address (high, Bit 4-6) |
| C | CAN General Call Address (low, Bit 0-3) |
| D | CAN General Call Address (high, Bit 4-6) |
| E | CAN Transmission Speed Index |

### 4.2.3CANbus

**For software protocol see separate manual No. *00183**

## 4.3 Technical Details of 6021 Power Supplies

**Mains input**
**H/K** Sinusoidal: **CE** EN 61000, pow. fact. 0,98 (230VAC), 92...264VAC, 16/32A
Inrush current: limited to nominal input current, max.

**Isolation** Inp.- outp. **CE** EN 60950, ISO 380, VDE 0805, UL 1950, C22.2.950

**H** 1000... 3000W, **K** 2100... 6000W DC output power

| **Available modules** | | min. to max. | range | max. output |
|---|---|---|---|---|
| Type | MEH | 2... | 7V | 115A / 550W |
| Type | MEH | 7... | 16V | 46A / 550W |
| Type | MEH | 12... | 30V | 23A / 550W |
| Type | MEH | 30... | 60V | 13,5A / 650W |
| Type | MDH | 2... | 7V (+/-) | 30A / 210W (420W) |
| Type | MDH | 6... | 16V (+/-) | 23A / 300W (600W) |
| Type | MDH | 7... | 30V (+/-) | 11,5A / 300W.(600W) |

3U box with H input, 6U box suitable for all inputs., above 16A AC input terminals with 2m power cord, fixed . Available output power depends on input voltage

**Regulation**

| | | | |
|---|---|---|---|
| static: | MEH 550W/650W | <15mV | (+/-100% load, +/- full mains range) |
| | MDH | <0,05% | (+/-100% load, +/- full mains range) |
| | MDH 30V: | <0,1% | (+/-100% load, +/- full mains range) |
| dyn.: | MEH, MDH | <100mV | (+/-25% load) |
| | MDL 30V : | <0,7% | (+/-25% load) |
| Recovery time +/-25% load: | | within +-1% | within +-0,1% |
| | MEH / MDH | 0,2ms | 0,5ms, |
| | MEH 30-60V | 0,5ms | 1,0ms |
| | MDH (11,5A): | 0,0ms | 1,0ms |

Sense compens. range: difference between min. and max. output voltage

**Noise and ripple** MEH: <10mVpp, (0-20MHz ) <2mVrms (0-30MHz)
MDH (30V): <15mVpp, (0-20MHz ) <2mVrms (0-30MHz)

Operation temperature: 0....50°C without derating, Storage:-30°C ... +85°C

Temp.-coefficient: < 0,2% / 10K
Stability (conditions const.): 10mV or 0,1% / 24 hours, 25mV or 0,3% / 6 month

Current limits: adjustable to any lower level

Voltage rise characteristics: monotonic 50ms, processor controlled.

**Protective equipment**
Overvoltage crow bar : trip off adjusted to 125% of nominal voltage each output

DC Off (trip off): within 5ms if >2% deviation from adjusted nominal values, by reason of overload, overheat, overvoltage, undervoltage (bad status) and fan fail
if temperatures exceed 110°C heat sink, 70°C ambient

Trip off points adjustable, processor controlled. Output capacitors will be discharged by the crow bars if the power supply trips or when switched off.

**Efficiency**: 75% ... 85%, depends on used modules

**Life time:**
- Fans: 25°C ambient >85 000h 40°C >65 000 h
- Power Supply electronics: 3U Box 40°C >130 000 h

4.3.1EC Declaration of Conformity

**EC-Declaration of Conformity acc. to Article 10.1 of the Directive 89/336/EEC (EMC-Directive)**

**EG-Konformitätserklärung nach Artikel 10.1 der Richtlinie 89/336/EWG (EMV-Richtlinie)**
**Déclaration de conformité CEE selon l'article 10.1 de la directive 89/336/CEE (Directive EMC)**

Wir, **W-IE-NE-R Plein & Baus GmbH**
We, Müllersbaum 20
Nous, 51399 Burscheid-Hilgen

Name und Anschrift des Herstellers oder des in der EU niedergelassenen Inverkehrbringers
Name and address of the manufacturer or of the introducer of the product who is established in the EU
Nom et adresse du fabricant ou le la personne résidant dans la CEE qui introduit le sous-dit produit de la CEE

erklären in alleiniger Verantwortung, daß das Produkt
herewith take the sole responsibility to confirm that the product
soussignés déclarons de notre seule responsabilité que ce produit

## Series 6000 LHC VME64x-Crate

Typenbezeichnung und ggf. Artikel-Nummer
Type designation and, if applicable, article no.
Type, nom et - si nécessaire - n° d'article du produit

mit den folgenden Normen bzw. normativen Dokumenten übereinstimmt
is in accordance with the following standards or standardized documents
est conforme aux normes ou spécifications Européennes suivantes

| | | |
|---|---|---|
| **1.** | **EN 61 000-6-3:2001** | **Störaussendung EMA [RF emission]** |
| | EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B | Störspannung [conducted noise] |
| | EN 55 022:1998 + Corr:2001 + A1:2000 Kl. B | Störfeldstärke [radiated noise] |
| | EN 61 000-3-2:2001 | Oberschwingungen [harmonics] |
| | EN 61 000-3-3:1995 +Corr:1997 +A1:2001 | Spannungsschwankungen [flicker] |
| **2.** | **EN 61 000-6-2:2001** | **Störfestigkeit EMB [immunity]** |
| | EN 61 000-4-6:1996 + A1:2001 | HF-Einströmung [injected HF currents] |
| | EN 61 000-4-3:1996 + A1:1998 + A2:2001 | HF-Felder [radiated HF fields] incl. "900MHz" |
| | EN 61 000-4-4:1995 + A1:2001 | Burst |
| | EN 61 000-4-5:1995 + A1:2001 | Surge |
| | EN 61 000-4-11:1994 + A1:2000 | Spannungs-Variationen [voltage variations] |
| | EN 61 000-4-2:1995 + A1:1998 + A2:2001 | ESD |

Folgende Betriebsbedingungen und Einsatzumgebungen sind vorauszusetzen
The following operating conditions and installation arrangements have to be presumed
Les conditions d'opération et d'installation suivantes sont à respecter

Dieser Erklärung liegt zugrunde der Prüfbericht
This confirmation is based on testreport
Cette confirmation est basée sur report de test

21106924_001 TÜV Rheinland Product Safety GmbH, 51101 Köln, Allemagne

Jürgen Baus, Techn. Director

Name, Anschrift, Datum und Unterschrift des rechtsverbindlich Verantwortlichen
Name, address, date and legally binding signature of the person being responsible
Nom, adresse, date et signature de la personne responsable

# CERTIFICATE

TÜV

of Conformity
Low Voltage Directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC

Registration No.: AN 60005031 0001

Report No.: 21106169 001

Holder:
Plein & Baus GmbH
Wiener Elektronik
Müllersbaum 20
51399 Burscheid
Deutschland

Product:
Schaltnetzteil
(Switching Power Supply)

Identification:

| | | | | | |
|---|---|---|---|---|---|
| Type designation | : UEP 6021 - LHC9U | | | | |
| Input voltage | : 100-240 V AC 50-60 Hz | | | | |
| Output voltages | : +5 V | +3.3 V | +12 V | -12 V | 48 V |
| Output current | : 300 A | 100 A | 10 A | 10 A | 12 A |
| Protection class | : I | | | | |
| Serial No. | : Engin. sample | | | | |

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the Licence Holder's disposal. This is to certify that the tested sample is in conformity with all revision of Annex I of Council Directive 73/23/EEC, in its latest amended version, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex III of the Directive.

Certification Body

TÜV Rheinland Product Safety GmbH – Zertifizierungsstelle – TÜV Rheinland

Cologne, 22.05.2003

Dipl.-Ing. H.-P. Pape

TÜV Rheinland Product Safety GmbH - Am Grauen Stein - D-51105 Köln

CE The CE marking may be used if all relevant and effective EC Directives are complied with. CE

## APPENDIX A: Technical Details of Fan Trays

| Fan Tray Type | Facilities | No. of Blowers | Depth | Max. Air Flow |
|---|---|---|---|---|
| 6020LX/3 | Alphanum. display, CANbus, IEC | 3 x DC | 160 mm | >540m $^3$ / h |
| 6020LX/3 | Alphanum. display, IEC | 3 x DC | 160 mm [1]) | >540m $^3$ / h |
| 6020LX/6 | Alphanum. display, CANbus, IEC | 6 x DC | 340 mm [1]) | >1000m $^3$ / h |
| 6020LX/6 | Alphanum. display, CANbus, IEC | 6 x DC | 400 mm [1]) | >1000m $^3$ / h |
| 6020 LX/4s | **Alphanum. display, CANbus, IEC** | 4 x DC-Super | 400 mm [1]) | >1500m $^3$ / h |
| 6020 LX/6s | Alphanum. display, CANbus, IEC | 6 x DC-Super | 600 mm [1]) | >2200m $^3$ / h |
| 6020 LX/9 | Alphanum. display, CANbus, IEC | 9 x DC | 600 mm [1]) | >1600m $^3$ / h |
| | **EX Series: Standard Fan Trays:** | | | |
| 6020 EX/3 | A.-display, CANbus/TSP/IP/RS 232 | 3 x DC | 160 mm [1]) | >540m $^3$ / h |
| 6020 EX/6 | A.-display, CANbus/TSP/IP/RS 232 | 6 x DC | 340 mm [1]) | >1000m $^3$ / h |
| 6020 EX/6 | A.-display, CANbus/TSP/IP/RS 232 | 6 x DC | 400 mm [1]) | >1000m $^3$ / h |
| 6020 EX4s | A.-display, CANbus/TSP/IP/RS 232 | 4 x DC-Super | 400 mm [1]) | >1500m $^3$ / h |
| 6020 EX/6s | A.-display, CANbus/TSP/IP/RS 232 | 6 x DC-Super | 600 mm [1]) | >2200m $^3$ / h |
| 6020 EX/9 | A.-display, CANbus/TSP/IP/RS 232 | 9 x DC | 600 mm [1]) | >1600m $^3$ / h |

1) fan trays for bottom air inlet only. Equipped with topped plenum chamber, 25mm high.

| | Fan type 1134 574 | Fan type 1450352 (Super Blower) |
|---|---|---|
| Static pressure at 3000rpm | 8 mm $H_2O$ column | 14 mm $H_2O$ column |
| Max. Speed | >3000 RPM | >3000 RPM |
| Power Consumption per fan | 6-8W typical | 12-15W Typical |
| Most gainful Operating Range: | 2- 3,8mm$H_2O$ column<br>100-160m$^3$/h | 4- 5mm$H_2O$ column<br>180-320m$^3$/h |
| Life time | >65 000h at 40°C | >80 000h at 40°C |

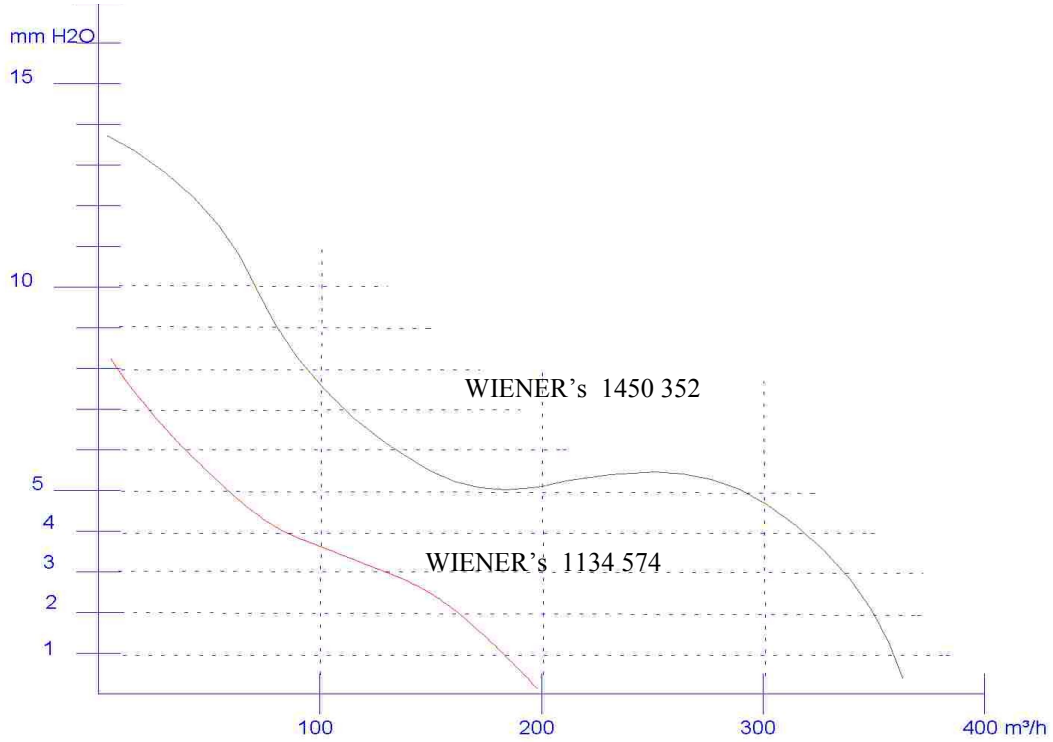
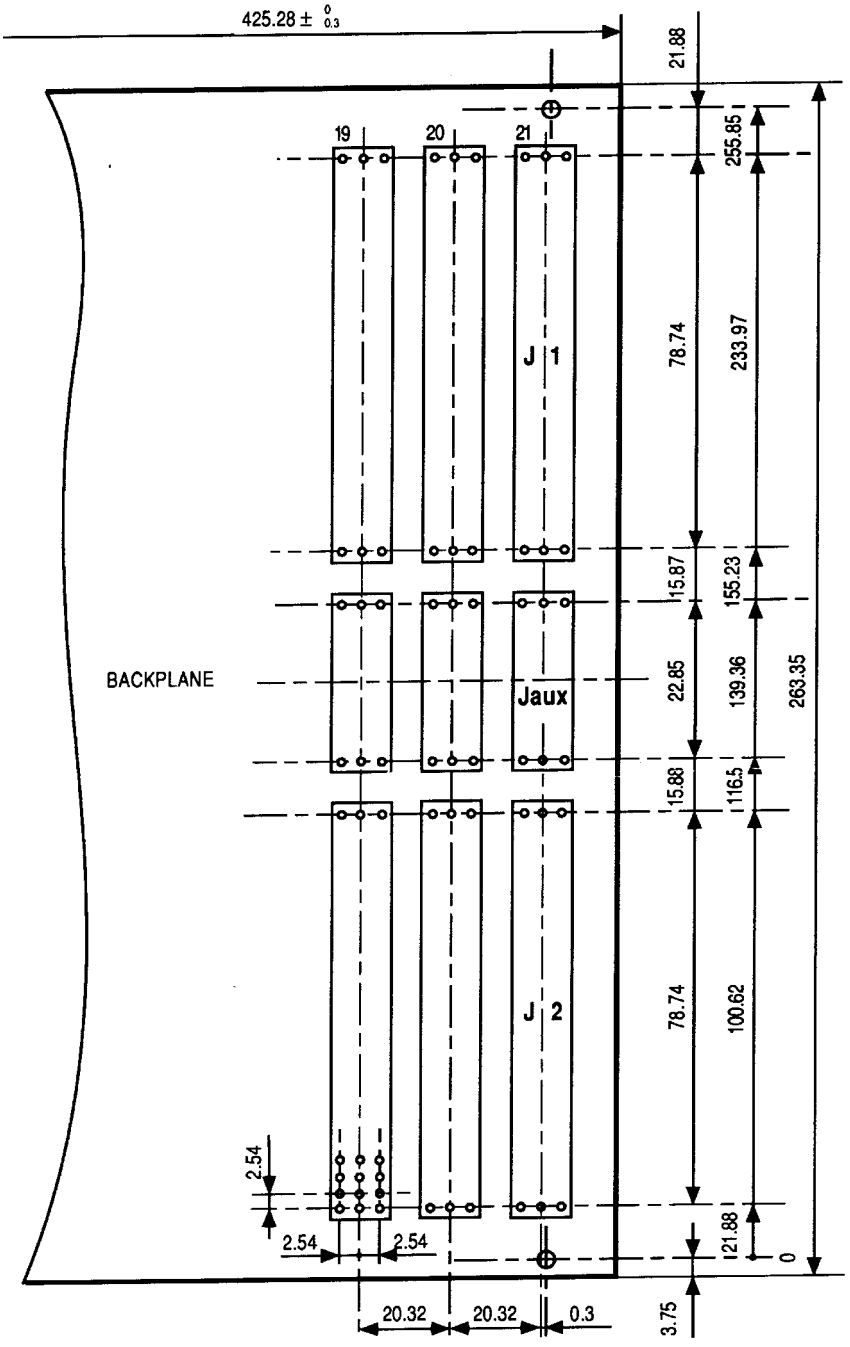



Diagram of different fan type efficiencies (refers to a single fan)

## APPENDIX B: VME 430 Backplane, Situation of Jaux connector




**Backplane Dimensions Front view**

VMEbus Bin Type V 431

CERN - ECP
V 431 -
1992 . 12 . 03
E.Buchschacher

## APPENDIX C: Power Bugs detailed, Customized Backplane

If for special customer designs more than the 64X standard voltages become necessary, the preferred dimensions of additional power bugs are shown below.

WIENER's Power Bug, item 1436 103.A0, is a press in type with 60A capability and outfitted with M3 thread.

While the connections for GND, +5V and +3 (3,3)V, counted from right to left, are in standard 64x position, the VY, VZ, VX, and VW with their returns offers the possibility to feed in additional potential free voltages (isolated from VME Ground, if necessary).

When the Jo or a special type of Jo have been foreseen to provide additional voltages to the modules, there should not be rear connector pins for I/O options (due to horizontal current rails) and the power bugs have to be placed between the Jo connectors.