

# 9U VME430 6021

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**WIENER VME 6021 crate series is the newest generation of generation CERN VME430 compliant VME crates for large size 9Ux400mm cards. Designed for applications in nuclear and high energy physics data acquisition, beam line control and test instrumentation it combines superior mechanical quality with lowest noise power supply technology.**

Featuring microprocessor controlled power supplies and fan trays it provides advanced integrated diagnostic and monitoring capabilities. For remote monitoring and control the VME 6021 crates are outfitted with Ethernet, RS232 and CAN-bus interfaces.

A unique flexibility is given by the modular packaging approach. The VME 6021 crate consists of the UEV 6021 VME bin, the UEL 6020 EX Fan Tray unit and the UEP 6021 power Supply. Different power supply configurations as well as a variety of crate options are offered.

## Main Features

- 19" x 11U enclosure for 9U x 400mm VME bus cards, modular design with removable fan tray and power supply
- Vario option with mixed 6U x 160mm and 9U x 400mm card cages
- Very rugged steel-aluminum construction features 5mm thick heavy duty side plates with zero-tolerance countersink screw positioning of all horizontal rails

- Monolithic 6U backplane (J1/Jaux/J2), 10 layer PCB, active termination, auto daisy-chain
- UEL 6020 EX Fan Tray is designed to provide superior cooling of VME modules in bottom-to-top air flow
- Equipped with 4, 6 or 9 individually controlled long-life DC fans, MFOT >60,000h/40°C
- Integrated fan speed and thermal monitoring, adjustable fan speed (1200 ... 3600 RPM)
- Microprocessor controlled with alphanumeric high-visibility LED display for all fan tray, bin and power supply parameters (voltages, currents, power, temperatures, set-up data...)
- Built in combo interface (Ethernet, RS232, CAN-bus) for remote monitoring and control
- UEP 6021 high density power supply in WIENER "Cavity-VHF" switching technology with excellent RF-shielding, optionally ultra low noise < 3mVpp (all voltages <12V), other rails <10mVpp
- Modular, expandable design. Self-ventilated power blocks, individually sensed floating outputs
- Self protected against any failure as under/over voltage, over current, over temperature...
- Micro-processor controlled, programmable voltage adjustment, current limits and over-/ under voltage trip off points, temperature limits
- 94V – 265VAC world-wide auto-range AC input, with power factor correction, CE-Conformity
- High power density, up to 3 kW/6kW output power for 3U/6U high power box

## UEV 6021 VME Bin

- 19" x 11U enclosure for 9U x 400mm VME bus cards
- Vario option with mixed 6U x 160mm and 9U x 400mm card cages
- Very rugged steel-aluminum construction features 5mm thick heavy duty side plates with zero-tolerance countersink screw positioning of all horizontal rails
- Monolithic 6U backplane (J1/Jaux/J2), 10 layer PCB, active termination, auto daisy-chain
- 2 U space for fan tray unit in front (bottom), power supply in rear top position (behind J1)
- Free rear side access of VME backplane at J2 and lower J3, optional 3U (J2) or 6U (J2/J3) rear side transition card cage 80mm/120mm/160mm/220mm deep
- Optional up to 8 temperature sensors in VME card cage above modules
- Dimensions: 19" x 11U x 720mm [whd], weight: ca. 16 – 17 kg

## UEL 6020 EX Fan Tray

- Designed to provide superior cooling of VME modules in bottom-to-top air flow
- Equipped with 4, 6 or 9 individually controlled long-life DC fans, MFOT >60,000h/40°C
- Integrated fan speed and thermal monitoring, adjustable fan speed (1200 ... 3600 RPM)
- Microprocessor controlled with alphanumeric high-visibility LED display for all fan tray, bin and power supply parameters (voltages, currents, power, temperatures, set-up data...)
- Built in combo interface (Ethernet, RS232, CAN-bus) for remote monitoring and control
- Dimensions: 430 x 2U x 415mm [whd], weight: ca. 6.8 kg - 6 DC fans

## UEP 6021 Power Supply

- High density power supply in WIENER "Cavity-VHF" switching technology with excellent RF-shielding, optionally ultra low noise < 3mVpp (all voltages <12V), other rails <10mVpp
- Modular, expandable design. Self-ventilated power blocks, individually sensed floating outputs
- Self protected against any failure as under/over voltage, over current, over temperature...
- Micro-processor controlled, programmable voltage adjustment, current limits and over / under voltage trip off points, temperature limits
- 94V – 265VAC world-wide auto-range AC input, with power factor correction, CE-Conformity
- High power density, up to 3 kW/6kW output power for 3U/6U high power box
- Dimensions: 430 x 3U or 6U x 250mm [whd], weight: from 9.6 to 20 kg depending on the number of power modules

**Standard Crate configurations (other possible on request)**

Crate Version	Backplane	+5V	+12V	-12V	-5.2	-2V	+/-15V
VME 6021-931	VME430	115A	23A	23A	115A	115A	-
VME 6021-934	VME430	115A	23A	23A	115A	115A	11.5A
VME 6021-935	VME430	115A	45A	45A	115A	115A	11.5A
VME 6021-941	VME430	230A	23A	23A	115A	115A	-
VME 6021-942	VME430	230A	23A	23A	115A	115A	11.5A
VME 6021-943	VME430	115A	23A	23A	115A	115A	35A
VME 6021-944	VME430	230A	23A	23A	115A	115A	35A
VME 6021-950	VME430	115A	45A	45A	115A	115A	-
VME 6021-970	VME430	345A	23A	23A	115A	-	-
VME 6021-971	VME430	115A	23A	23A	230A	-	-
VME 6021-972	VME430	230A	23A	23A	115A	-	-

**6U VME430 J1/Jaux/J2 backplane (CERN spec.)**

Monolithic multi-layer backplane with active automatic daisy chain and active termination outfitted with 96pin DIN connectors J1/J2 as per IEEE-1014-1987 and 30 pin Jaux. Meets VITA VME and CERN V430 specifications entirely. Available with 9 or 21 slots. VME64x style 5 row 160-pin connector version are optionally offered:

- Strip line technology suitable for data rates of 320Mbyte/s (64bit)
- High power distribution by current multiplayer / bus bar system
- Excellent RF shielding
- Optimized filtering (electrolytic and ceramic filter-capacitors)
- Minimized ground shift and cross talk
- Automatic daisy chain
- flat cable connector for sense and control
- Provision for up to 8 temperature sensors (module temp. checking)
- Sense circuit protection by PTC- resistors (Optionally)
- Geographical address, bussed and terminated differential signals: clock, start/stop gate, and clear
- ECL voltages -2V and -5V, +/-15V (Optional), clean earth

Power per slot	VME 430	VME 64x-V430
(20°C / 70°C)	J1-Jaux-J2	J1-Jaux-J2 /spec. V 430
3,3V		17A / 12A
5V	19A / 15A	15,3A / 10,8A
+/-12V	3,2A / 2,5A	1,7A / 1,2A
+/-15V	3,2A / 2,5A	3,2A / 2,5A
-5,2V	19A / 15A	19A / 15A
-2V	9,5A / 7,5A	9,5A / 7,5A

V1, V2		1,7A / 1,2A
Layers	10	10

## UEV 6021 VME bin

The 6021 bin has a 2U high fan tray space below the front and optional rear card cages for the UEL6020 fan tray. The total height of the 6021 bin is either 8U (6U VME/VXI/PCI) or 11U (9U VME/VXI).

The power supply is plugged into the top rear position. For this purpose the DC power terminal is located behind the backplane / top connector row. For a 3U power supply, this blocks the rear of J1 but leaves J2 and J3 (for 9U cards) freely accessible. A 6U high power supply will occupy the space behind both J1 and J2.

Standard sizes 3U, 6U or 9U with depth: **6U format 80mm / 120mm / 160mm / 220mm / 250mm**

WIENER UEV bins can be outfitted with a rear side card cage. The bin side panels have all provisions to take a transition card cage in any of the offered sizes. Transition card cages can be ordered as an option for a new crate or separately for upgrading of existing crates. The UEV 6021 bin with the power supply in rear top position allows rear side card cages only to J2 (3U), or to J2 and J3 (6U) for 9U VME format.

Common and / or isolated backplane ground connections can be user selected.

The 6000 series crates offer excellent electrical safety, i.e. no AC mains wiring is inside the bin and fan tray. All power comes from well-isolated DC low voltages (EN60950, UL1950). A Power Protect Memory (PPM) further protects the crate by preventing incompatible power supplies from powering up.

### Dimensions of 6021 standard crates (depth: +25mm for inserted power supply)

For 6U/160mm boards: 19" (483mm) x 8U (356mm) x 480mm [whd]

For 9U/400mm boards: 19" (483mm) x 11U (489mm) x 720mm [whd]

### Options:

- S-Bin option (IEEE 1101.10 compliant)
- E-Bin option (IEEE 1101.10 compatible)
- Top cover option
- J3 backplane cover option
- Transition cage option
- VARIO-Divider option (mixed 6U/9U)
- Temperature sensors option
- Dust Filter options
- Easy Lever option

## UEL6020 Fan Tray

### Fan trays UEL 6020 / Control & Interface

The UEL6020 is the plug in fan and control unit for all crates of the 6000 family. Matching the crate card cage size fan trays are available in 160mm, 220mm, 340mm, 400mm and 600mm depth. In addition to providing a cooling airflow through the front card cage optionally rear side transition board cooling is possible.

All UEL 6020 fan trays are outfitted with long life individually controlled DC fans for bottom to top air flow operation. Depending on the required air flow and crate size either "standard" or "super blower" fans are used.

All fan trays (except the 6U / 160mm fan tray for frontal entry) are equipped with a topped plenum pressure chamber, 25mm high, for optimized air flow homogenization through all slots as well as for mixed module depths.

UEL 6020 fan trays have a built-in microprocessor for fan control, communication with the power supply and display / networking. Default version is the EX type which has a high visibility alphanumeric display and combo interface (Ethernet, CAN-bus, RS232) for remote monitoring and control. This interface allows the crate, including power supply, fan tray and bin temperature sensors, to be controlled and monitored remotely using either Ethernet or CAN-bus.

A built in web server allows the crate health to be monitored via a web browser on a PC attached to the appropriate network, while SNMP provides a convenient way to tailor a control system to a given application. All network connectors are RJ45 type.

	<b>Standard 118mmx118mm</b>	<b>Super Blower 150mm</b>	<b>HRPM 118mm x 118mm</b>
<b>Static pressure at 3000 RPM:</b>	8 mm H <sub>2</sub> O column	14 mm H <sub>2</sub> O column	28 mm H <sub>2</sub> O column
<b>Max. Speed of Rotation:</b>	>3000 RPM	>3000 RPM	>6000 RPM
<b>Power Consumption</b>	6-8W typical	12-15W Typical	20W
<b>Start up Current:</b>	Limited by soft start circuit		
<b>Operating Voltage:</b>	Fan tray 30VDC, internal Blowers 0-24VDC,		
<b>Optimum operating range:</b>	2- 3,8mm H <sub>2</sub> O	4- 5,5mm H <sub>2</sub> O	10- 15mm H <sub>2</sub> O
<b>Operating Temperature:</b>	0... 70°C		
<b>MFOT (Maintenance Free Operation Time)</b>	>65 000 h at 40°C ambient, > 85 000 h at 25°C ambient		

**Variable fan speed** is manually or remotely selectable from 1200 to >3000rpm. In case optional bin temperature probes are installed the fan can run in temperature-controlled mode. Running with lower fan speed all temperatures are monitored. Exceeding the first limit (user defined, default 45°C) all fans run with maximum speed in order to provide full cooling. In case the temperature passes the second limit the power supply switches off.

Adjustable "after-running" of fans guarantees further cooling after power off.

The intelligent EX- fan trays are prepared for **hot swapping**.

**Front panel outfitted with 4 status LED** showing:

<b>Status</b>	Green:	all values inside tolerance
<b>Fan fail</b>	Yellow:	one or more fans fail
<b>Overheat</b>	Yellow:	power supply overheated
<b>Sys fail</b>	Red:	VMEbus generates sysfail

A manual SysRest button on the front panel is recessed to avoid it being pressed accidentally.

All EX- fan tray monitoring can be set to Programming Mode. This feature allows all key functions and values of the power supply, like current limits and other trip off points, to be programmed. The programming can be done either locally via the front panel, or remotely via the Ethernet or CANbus interface.

## UEP 6021 Power Supplies

High density, highly sophisticated modular power supplies designed with WIENER's "Low-Noise-Cavity-VHF-switching technology" which features **extremely low ripple and noise** (PARD) figures. This technology prevents uncontrolled RF

emissions by proper internal shielding and containing of switching parts as well as an efficient deflection of magnetically induced RF currents. A well-balanced thermal design secures excellent long term stability and high MTBF.

Up to eight independent regulated DC outputs. For higher current capability, power modules can work in parallel. All **outputs are floating**. Therefore common- or separated grounds can be realized at backplane level (for example analog- and digital- grounds isolated). Wide compatibility ranges become possible by automatic programming of voltage levels and current limits to reference-values that are stored in a bin-memory (Power Protection Memory, PPM system). Incompatibility between bin/backplane and power supply prompts the PPM to keep the power supply off.

Two types of power boxes are available: **3U box** with 92-265VAC input for 1kW-3kW DC-output. **6U boxes** offer space for a second A/C mains input (PFC) to utilize up to 6kW DC performance (230VAC mains input!). Power boxes include:

- Mains filter in connection with a power factor corrected mains input module (PFC) and soft start circuit,
- auxiliary power supply to provide monitoring and control logic as well as provide power for the fan tray,
- Monitoring and alarm circuit supported by a self-calibrating microprocessor system.
- Five, six (3U box) or 10 slots (6U box) for power modules (DC-to-DC converters)
- CAN-bus interface, processing all power supply, fan tray, and bin data
- Power modules and mains inputs are equipped with long life cooling fans.

Serial connections between power supply, fan tray and bin (plug & play) allows communication and exchange of data between all crate.

<b>Rated mains input range</b>	106- 230VAC $\pm$ 15% (90...265VAC)
<b>Rated input current</b>	Sinusoidal 16A for suffix H input, 32A for suffix K input
<b>Inrush current:</b>	limited to rated input current (cold unit)
<b>Input fuse:</b>	external, intern on special request
<b>Isolation (Inp.- outp.)</b>	CE EN 60950, ISO 380, VDE 0805, UL 1950, C22.2.950
<b>DC output power:</b>	<b>H</b> for 1000... <3000W (92 ...265VAC) <b>K</b> for 2000... <6000W (92 ...265VAC)

**H** input outfitted with removable power cord (3\*1,5mm<sup>2</sup>) for 16A nominal input current,

**K** input (6U power box) is equipped with 2m fixed power cord for up to 32A nominal.

## Regulation

Regulation			
<b>Regulation static:</b>	MEH 550W/650W	<15mV	(+/-100% load, +/- full mains range)
	MDH (20A):	<0,05%	(+/-100% load, +/- full mains range)
	MDL / MDH	<0,1%	(+/-100% load, +/- full mains range)
<b>Regulation dynamic:</b>	MEH, MDH	<100mV	(+/-25% load)
	MDL / MDH	<0,7%	(+/-25% load)
<b>Recovery time</b>	+/-25% load:		within +-1%    within +-0,1%
	Modules 550W	0,2ms	0,5ms,
	Modules 650W	0,5ms	1,0ms

MDL / MDH

0,0ms

1,0ms

(Conditions: Current slope  $\leq 1000\text{A/ms}$ ,  $21\text{mF}$  per  $100\text{A}$   $\triangleq 1\text{mF}$  per slot)

**Sense compensation range:** difference between min. and max. output voltage

## Available modules

Type	Channels	Voltage range	Peak output / power	Noise and ripple
MEH	1	2... 7,0V	115A / 550W	10mVpp, (0-20MHz), <2mVrms (0-30MHz)
MEH	1	7...16V	46A / 550W	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)
MEH	1	12...30V	23A / 550W	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)
MEH	1	30...60V	13,5A / 650W	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)
MDH	2	2...7,0V	(+/-) 30A / 210W (420W)	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)
MDH	2	7...16V	(+/-) 20A / 250W (500W)	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)
MDL	2	7...24V	(+/-) 11,5A / 275W. (550W)	<15mVpp, (0-20MHz), <2mVrms (0-30MHz)

## EMC Compatibility

EMA.	EN 61 000-6-3:2001	[RF emission]
	EN 55 022:1998 + Corr:2001 + A1:2000 Class B	conducted noise
	EN 55 022:1998+ Corr:2001 + A1:2000 Class B	radiated noise
	EN 61 000-3-2:2001	harmonics
	EN 61 000-3-3:1995 +Corr:1997 +A1:2001	flicker
EMB	EN 61 000-6-2:2001	[immunity]
	EN 61 000-4-6:1996 + A1:2001	injected HF currents
	EN 61 000-4-3:1996 + A1:1998 + A2:2001	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	voltage variations
	EN 61 000-4-2:1995 + A1:1998 + A2:2001	ESD

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

**Temperature coefficient:** < 0,2% / 10K

<b>Stability:</b>	10mV or 0,1% / 24 hours, 25mV or 0,3% / 6 month (under constant conditions)
<b>Current limits:</b>	adjustable to any lower level
<b>Voltage rise characteristics:</b>	monotonic 50ms, processor controlled.
<b>Overvoltage protection:</b>	crow bar protection trip off adjusted to 125% of nominal voltage each output
<b>DC Off (trip off):</b>	within 5ms if >5% deviation from adjusted nominal values, after overload, overheat, overvoltage, undervoltage (bad status), and fan fail, if temperatures exceed 125°C at heat sinks Limits programmable. Outputs discharged by crow bars, when power supply tripped- or switched Off.
<b>Efficiency:</b>	75% ... 85%, depends on used modules
<b>M F O T</b>	(Maintenance Free Operation Time):
<i>internal blowers:</i>	40°C ambient >65 000 h
	25°C ambient 100 000 h
<i>electronics:</i>	40°C ambient >100 000 h
<i>Water cooled power supplies:</i>	40°C water >100 000 h

## Product Data Sheet

9U VME430 6021: [Print Product Data Sheet](#)

## Documentation

Manual and Tech-Notes : [Crates\\_6000](#)

Introduction in to VME: [WIENER VME VXI VXS introduction](#)

## Downloads

SYScontrol : [Download](#)

SNMP: [Download](#)

OPC-Server: [Download](#)

UEP6Control: [Download](#)

Firmware UEL: [UEL6](#)

[UEL6-Ethernet](#)

Firmware UEP : [Download](#)



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