

# Control, Measurement and Data Logging system CML



The Control, Measurement and Data Logging system (CML) is designed to add remote control and monitoring functionality to electronic systems. Analog measurement is done with a fast & high precision 12 bit AD converter.

The 24 analog input channels are configured to measure 8 voltages, 8 current-proportional voltage signals and 8 temperature probes. If current shunt signals are not used, these inputs may be used as general purpose analog inputs.

The integrated supervision system compares all measured voltages with a minimum and maximum value and the currents, temperatures and with a maximum value. Exceeding the supervision threshold can switch off the system.

Fan speed measurement and speed control of up to 9 fans is provided. The fan supply voltage is generated on board, so no special fans with PWM input are required. Up to 3 fan groups can be regulated individually.

If the fans are supplied by a separate power supply, a follow-up time can be set and the system can be cooled down after power off.

If the CML is supplied by an external power source, it is possible to switch the main system power supply on or off with the on/off switch or via network.

All necessary functions are implemented on a small (100mm x 120mm) board. The system connections are provided on a 2mm high density connector.

## Features

- Fan Control: 9 Fans monitored, fan speed settable (no PWM signal necessary)
- Fully controlled, programmable trip thresholds (min./max. voltage, max. current, power, temperature)
- Digital inputs and outputs
- Generation and detection of VME/CPCI RESET and ACFAIL
- ON/OFF switch, VME/CPCI RESET button and up to 5 LEDs at the front panel
- Digital Signal Processor (DSP) for real-time processing of all measured data
- Powered by 5V bus voltage or separate power supply
- Ethernet connection IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX
- www-Server integrated, full control via SNMP protocol
- RS232 & I2C interface for connection of other devices in the system
- PC-Control (connected to USB) with free available software
- Firmware update possible
- Configuration permanently saved in EEPROM
- IP address settable to a fix value or configurable via DHCP
- Different security access level
- Automatic data logging on Windows/Linux computer possible

## Web Server

The CML has a built-in web-server which allows the monitoring of the power supply with a standard web browser.

Any write access to the web page (e.g. switch on/off) requires a user name and password.

The user name is "private", the default password is "private", too.

## SNMP Control

The SNMP (Simple Network Management Protocol) is generally used to monitor and control computers and network routers.

WIENER claimed a specific part of the SNMP namespace and implemented power supply specific items there. A detailed description of the SNMP functionality can be found in the corresponding MIB file (WIENER-CRATE-MIB.txt).

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## Status LED

This multi-color LED shows the global status of the system:

- YELLOW: Standby state: the system power supply is off
- GREEN: System power is on, all measurement values are in limit.
- RED: System switched off because of any failure.

## Power Switch

The power switch is used to switch the system power supply ON or OFF.

With the Alphanumeric Display Option this switch is omitted.

## Bus Reset Button

If the bus reset button is pressed, the VME/CPCI RESET signal is activated for 200 ms.

The button is sunk behind the front panel to prevent accidental activation.

## Ethernet Connector RJ45

Pin	1	2	3	4	5	6	7	8
	TX+	TX-	RX+	GND 1	GND 1	RX-	GND 2	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.

## USB Connector

Pin	1	2	3	4
	VCC	D-	D+	GND

This is the standard USB connector type B.

## Analog Inputs

The CML has 16 analog differential inputs (0-3V operating range).

The input range can be changed by adding additional precision resistors without need for re-calibration.

The inputs U0 ... U7 are intended to be used for system voltage measurement.



The inputs I0 ... I7 are intended to be used for measurement of a current-proportional voltage (e.g. 1 V = 10 A).

The voltage and current values are accessible via SNMP:

`crate.output.outputMeasurementSenseVoltage` und `crate.output.outputMeasurementCurrentOIDs`.

If no current signal is available, I0 ... I7 can be used for general purpose voltage measurement. They can be accessed via SNMP:

`crate.signal.analogMeasurementVoltageOID`. Go

to achieve optimal system protection, the measured voltages are compared with different values in real time:

- Each measured system voltage is compared with a minimum and maximum value.
- Each current is compared with a maximum value.
- The power (product of voltage and current of each channel) is compared with a maximum value.
- If enabled, the CML will switch off the main power supply if specific thresholds are exceeded.

All supervision behavior items are programmable via SNMP:

`crate.output.outputSupervisionMinSenseVoltage`, `crate.output.outputSupervisionMaxSenseVoltage`, `crate.output.outputSupervisionMaxCurrent`, `crate.output.outputSupervisionMaxPower` und `crate.output.outputSupervisionBehavior` OIDs

### Temperature Sensor Inputs

The CML has 8 temperature sensor inputs. The temperatures can be read with the SNMP network command

(`crate.sensor.sensorTemperature` OID).

Each temperature is compared with two threshold values (`crate.sensor.sensorWarningThreshold` und `crate.sensor.sensorFailureThreshold` OIDs).

If the `sensorWarningThreshold` threshold of any connected sensor is reached, all fans will be switched to their maximum speed.

If the `sensorFailureThreshold` of any connected sensor is reached, the main power supply of the system is switched off.

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## Digital Inputs and Outputs

The CML has 14 digital inputs totally.

- 12 universal TTL inputs
- 1 TTL input, predefined to detect the VME/CPCI RESET signal.
- 1 TTL input, predefined to detect the VME SYSFAIL signal.

The CML has 20 digital outputs totally.

- 16 channel push/pull 5 V CMOS TTL outputs
- 1 open collector transistor, predefined to generate a main relay on/off signal.
- 2 open collector transistors, predefined to generate power supply interlock signals.
- 1 open collector transistor, predefined to generate a VME/CPCI SYSRESET signal.

If any of the outputs is not used for his predefined function, it can be set/reset by SNMP network commands:

`crate.signal.digitalInput` OID, `crate.signal.digitalOutput` OID.

## Fans

Fan Speed Measurement:

The CML can measure the rotation speed of up to 9 fans simultaneously.

The standard fan speed signal is the open collector pulse output provided by many fans. If such signal is not available, the fan current (measured at a small shunt resistor) can used and the CML calculates the rotation speed by analyzing this current signal.

The fan rotation speed is accessible with SNMP network commands `crate.fantray.fanSpeed` OID.

Fan Speed Regulation:

The CML provides 3 independent fan supply outputs. The output voltage is regulated by the CML to achieve the requested rotation speed.

The nominal fan speed is changeable with the SNMP network commands (`crate.signal.digitalInput` OID).



An automatic fan speed regulation depending on the temperature sensors is also possible.

### CML Setup via USB

The CML can be controlled with the MUSEcontrol software. The USB interface is primarily intended to be used to configure the power supply. The Ethernet connection is designated for remote control and monitoring.

### Requirements

- X86-Computer with USB connection (USB2 recommended)
- Microsoft Windows XP

### Features

- Setup of the TCP/IP network parameters
- Global overview of all power supply channels
- Detailed configuration of the power supply channels
- Save and reload of configuration data

### Installation

The installation software (MUSEcontrol-x.x.x.x.exe) is free available at: [www.wiener-d.com](http://www.wiener-d.com) → Support → Downloads

Please install the software before connecting the power supply to the USB. The necessary USB-driver is included in the installation.

After downloading and executing the software Windows may complain that the supplier of the software could not be verified. Ignore this warning and select "Execute".

Next the MUSEcontrol Setup Wizard welcome screen is displayed. Click "Next", accept the license agreement and take a look at the ReadMe notes. Now you may change the default installation folder and start the installation.

Now connect the system with your mains supply and use an USB cable to connect the computer with the CML.

The computer will detect the new connected hardware and ask to connect to Windows Update. Select "No" and click "Continue".

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Then accept the "Automatic install the software" selection by clicking "continue".

Now the USB driver software be installed. To access your power supply, execute the "WIENER USB Power Supply Control" application via your start menu.

### The Main Window

After starting the application the main window shows a crate overview.

The measured sense voltage at the backplane (Usense) and a global status of each channel is displayed.

Clicking with the right mouse button opens the output configuration menu of this channel. Below the voltage channels the fan rotation speed (revolutions per second) and the temperature of connected sensors is shown.

### Description of the Menu items

Menu items	Description
File → Read Power Supply Configuration from File	Opens the Read Power Supply Data From File Dialog.
File → Save Power Supply Configuration to File	Saves the complete power supply configuration to disk.
Switch → All On	Switches the main power supply of the crate on.
Switch → All Off	Switches the main power supply of the crate off.
SelectOutput	Select the next existing channel for the other dialogs. The current channel is displayed at the title bar.
DVM	Opens a large window showing the measurement data of one channel.
OutputConfiguration	Opens the Output Configuration Dialog.
System → Configuration	Opens the Global and Network Configuration Dialog.
System → Firmware Update	Allows to update the firmware of the main processor.
Stop	Allow to interrupt the communication with the CML.
Start	Allow to resume the communication with the CML.
Read Power Supply Data From File Dialog	This dialog can be used to copy a XML configuration file from disk to the CML. It is possible to copy each configuration file channel to its corresponding or to multiple power supply channels.

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Menu items	Description
Output Configuration Dialog	<p>This dialog allows the detailed configuration of each power supply channel.</p> <p>The Measurement group shows the measured sense voltage. The sense voltage is the voltage at the sense lines, which are connected to the backplane.</p> <p>In case of any errors they are displayed here, too.</p> <p>The Supervision group contains all items which the DSP can observe. In case of exceeding a limit, a dedicated action can be assigned to each item.</p> <p>It is possible to ignore the failure switch all channels of the power supply off</p>
Global and Network Configuration Dialog	<p>In the Network group box you enter the TCP/IP network settings. You have to use the parameters of your local network here.</p> <p>If you set the IP address to 0.0.0.0, the CML will get it's address automatically via DHCP or BOOTP protocol.</p> <p>The MAC address can be read here. It is written on the name plate of the CML, too.</p>

### Technical data

Logic Supply	
• Voltage	5 V ± 5%
• Current	< 1 A
Fan	
• Fan Supply Voltage	12 V – 30 V
• Fan Output Voltage	12 V – 30 V not higher than supply voltage
• Fan Output Current	max 1 A/3 fans
• Pulse Output for speed measurement	TTL or OC
Analog Measurement	
• Analog Input Range	0 ... 3 V unipolar
• Impedance	10 kOhm ± 0.1 %
• common mode range	input to differential amplifier
• accuracy	0 ... 4 V
• resolution	0.1 % typical, full scale
	12-bit
Temperature Measurement	
• Measurement Range	-25 °C ... +125 °C
• accuracy	± 1 K typical
Communication	Ethernet 10/100M USB 2

### Order numbers

1H00004110	CPCI shelf manager 6 U
1H00004120	VME64x shelf manager 6 U