ePCII-LOG Data logger

bmc messsysteme gmbh

Features

- ETX Geode LX800 CPU
- stand-alone (data logger) or remote operation
- sampling rate up to 1kHz per channel
- storage (max. 2GB) in DIAdem® format
- 16x Analog IN, 16 bit, ±1V, ±2V, ±5V, ±10V
- 2x Analog OUT, 12 bit, ±10V
- 32x Digital I/O (2x 16 bit, TTL)
- 4x CAN (max. 1MBit, Vektor-DBC format)
- 1x COM
- LCD operating unit with controller
- CompactFlash® slot

Features

- incl. operating software for visualization, configuration, acquisition and analysis
- direct, remote or offline configuration
- extended temperature range -25..+70°C
- power supply 10-36V, electrically isolated

Applications

- industrial controls
- supervision unit for AD, DIO
- data logger for motor vehicle applications
- automotive applications

The **ePCII-LOG** is a compact data logger

... based on ETX ...,

in a stable aluminum housing with a

… real-time operating system …,

which was developed especially for the industrial and automotive environment.
For instance a typical application is the control and supervision of automats (e.g. vending machines), machines or vehicles.

With a sampling frequency of up to 1kHz per channel the measured data of the

… 16 analog inputs (16 bit) …

within the set measuring range are written into the memory (max. 2GB possible).
In addition 2 analog outputs (12 bit) and 32 digital lines are provided for

… controlling… .

The 2x 16-bit digital lines can be set as input or output.

Via

… 4 CAN channels …

CAN signals are received or sent with a maximum baud rate of 1MBit, allowing for

.. synchronous data acquisition ..

of analog signals and signals via the CAN interface. Already existing CAN-DBC files can be processed.
The device is supplied with

... 10-36V DC ... .

At the front the **ePCII-LOG** features an

… intelligent LCD display …,

e.g. showing status information, configuration data or measured values. Basic functions of the data logger can be performed directly with four device keys or by means of an infrared remote control. This allows for

.. independent data acquisition ..

of the **ePCII-LOG** without any connected PC or external add-on devices. Of course, the connection of a keyboard, mouse or monitor is possible.

Before turning on and during operation the LCD controller

… checks the temperature … .

If the values are beyond a valid range, the logger is not booted up or is shut down.

When turned off the **ePCII-LOG** automatically shuts down.

All data are stored on a

… CompactFlash® card …,

so that it is possible to easily assign the same settings to several devices or read out measuring values directly at a PC.

In addition the internal device software is included on the CompactFlash® card, which is started when turning on the **ePCII-LOG**, as well as a

… remote version of the device software … .

If the latter is copied to a PC, the data logger can be operated and configured by a PC via a serial connection (RS232). Measuring data can be visualized and analyzed.

The signals are saved in

… DIAdem® file format … ,

the commonly-used data format for measurement data in the industrial, especially in the automotive area.

Besides that, the DIAdem® format is supported by the professional software

... NextView®4 (Analysis) ...

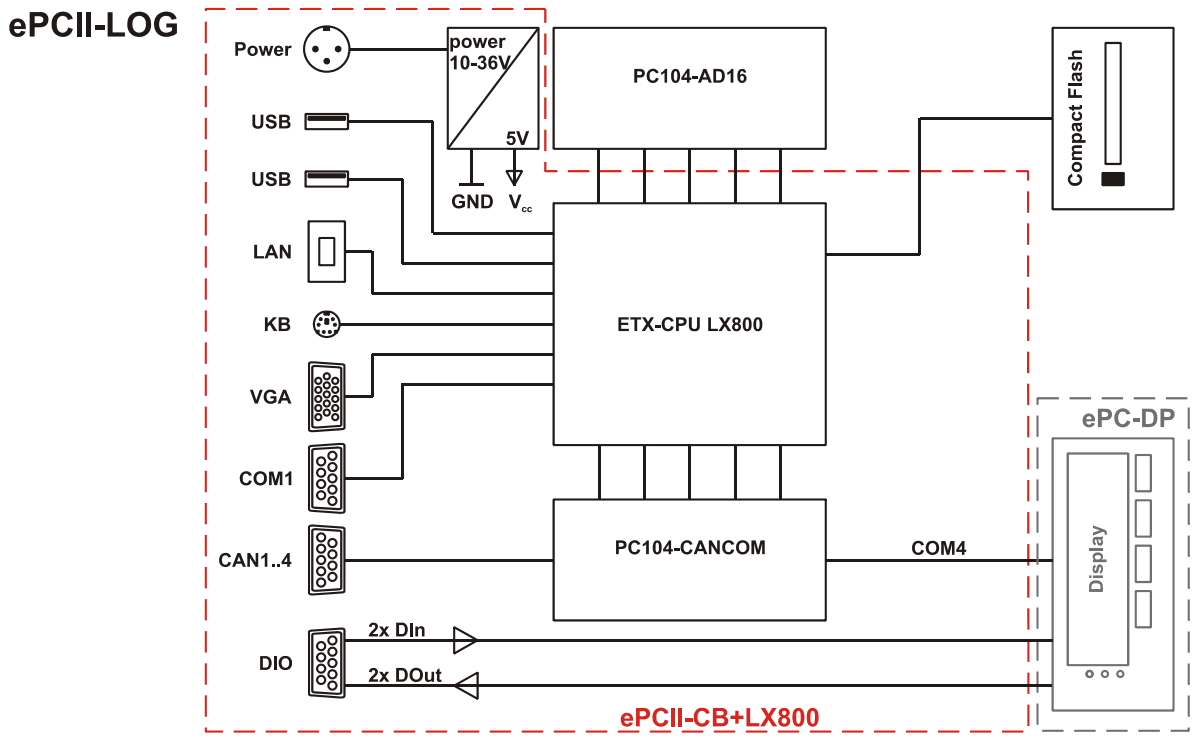
under Windows® 2000/XP/Vista for measurement data acquisition and processing. Here extensive analysis functions are provided for analyzing the measurement data.

In addition CAN signals sent by **ePCII-LOG** can be displayed online in NextView®4 (Professional or Lite version) and saved.

For **ePCII-LOG** various PC accessories are available.
For further information please visit our website at:

www.bmcm.de

1 Block diagram



There are several hardware components integrated in the device, which are available as single products. For further information please see the relevant data sheet.

- Extended carrier board **ePCII-CB+LX800**: ETX-Geode LX800 CPU, power supply with electrical isolation, PC/104 slot for measuring cards, various interfaces, components for basic PC functions
- Intelligent LCD display **ePC-DP**: backlit display, 4 keys, 3 LEDs, infrared receiver, temperature sensor, command set for programming
- PC/104 measuring card **PC104-AD12/16**: 16x Analog IN (±10V, ±5V, ±2V, ±1V), 12/16 bit; 2x Analog OUT (±10V), 12 bit; 32x Digital I/O (2x 16 bit)
- PC/104 digital I/O card **PC104-PIO48**: 48 (6x 8 bit) Digital I/O

- PC/104 interface card **PC104-CANCOM**: 4x CAN, 2x COM
- PC/104 interface card **PC104-CAN**: 4x CAN
- PC/104 interface card **PC104-COM**: 2x COM
- PC/104 backplane **BP104**: backplane for 8x MAL miniature amplifiers

2 Start-up procedure

2.1 Installation and start

According to your demands connect the external standard hardware (e.g. monitor, keyboard, mouse) to the appropriate connectors of the **ePCII-LOG** (see chapter 4.7 - 4.9). Serial mouse operation must be activated in the device software (see chapter 5.5.6).

Depending on the interfaces (e.g. analog, digital, CAN, COM) you use, attach the cables to the respective connectors (e. g. 2x I/O, COM1, DIO, CAN) of the **ePCII-LOG**. For remote operation (see chapter 2.2.2) a serial null modem cable is included with delivery.

Apply power (10-36V DC) at the 3-pole DIN plug or at the pin plug with the labeling "DC IN". A 70W power supply (*ZU-PW70W*) is available as accessory. After turning on (with "ON"-switch or via Z_{on} line, see chapter 4.6) the display is lit and the **ePCII-LOG** boots up.

The device software is integrated on the CompactFlash® card included with delivery and is started automatically when booting up the data logger after successfully checking the temperature (see. chapter 2.1.3).

- **To start the internal device software the CompactFlash® card including the bootable operating system and the device software must be plugged in the CF card slot!**
- **Various connecting cables and PC components are available as accessories.**

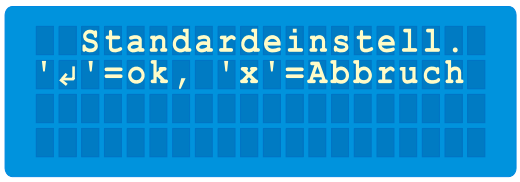
2.1.1 Offline configuration

If starting the device software *ModuLab* (see chapter 5) on the CompactFlash® card directly at a laptop or PC, the entire configuration (see chapter 5.2) of the **ePCII-LOG** and the measurement application can be done independently from the data logger. Quickly the same settings can be made available to several devices.

2.1.2 Default configuration

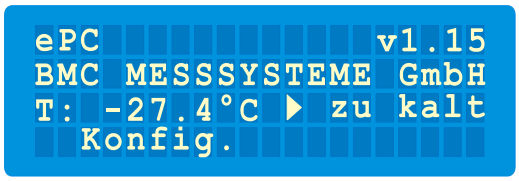
To reset **ePCII-LOG** to its default settings simultaneously press the two left device keys (△/▽, see chapter 3.3) while turning on or booting up the data logger.

The ↵ key restores the standard settings, the **X** key aborts the dialog. The default settings are listed in the following table:



Setting	Standard
brightness of the LCD display	100%
baud rate (transmission rate) of the RS232 interface (COM4)	38.4kB
used temperature sensor	onboard
lower / upper limit of the start-up temperature range	-25°C / 70°C
high temperature → signalized by warning on the display	65°C
power -down temperature	70°C
time to boot up **ePCII-LOG**	15s
time to shut down **ePCII-LOG** (timeout)	5s

2.1.3 Temperature check



An integrated temperature sensor supervises the current device temperature at start and during operation. Only if the values are within the range of -25°C..70°C the data logger is booted up. Otherwise the display indicates, if it is too warm or cold.

An integrated fan is turned off at temperatures below 5°C and above 50°C.

If the device temperature reaches 65°C or more **ePCII-LOG** shows a warning. At 70°C the data logger is shut down. It reboots automatically if the temperature is down to max. 65°C at least (see chapter 2.1.2). In case of a running scan there is no loss of data up to the point of turning off.

- **Please observe the permitted temperature ranges for storage (-25°C..85°C) and during operation (-25°C..70°C) to avoid damages at the data logger!**
- **If ePCII-LOG is rebooted finally after having exceeded the temperature limits, a previous scan restarts automatically only if this options has been selected in the device software before (see chapter 5.5.2).**

2.2 Operation modes

A fundamental characteristic of the **ePCII-LOG** is its autonomy. Measurement data acquisition is done completely independently from a Windows® PC, synchronously and with real-time calculation directly in the device. The measuring data are written on the CompactFlash® card. There are several possibilities to connect and use the data logger.

The following basic functions can be selected at the device by using the operation keys (see chapter 3.3) or an IR remote control (see chapter 3.6) after the device software has been started (see chapter 5):

Entry	Function
`Channel-Display`	display digital values of the selected channels (see chapter 5.1)
`Messung Start/Stop`	start/stop scan of the selected channels (see chapter 5.3)
`Temperatur`	show current device temperature (see chapter 2.1.3)
`Signatur`	display device signature of the data logger (see chapter 5.5.6)

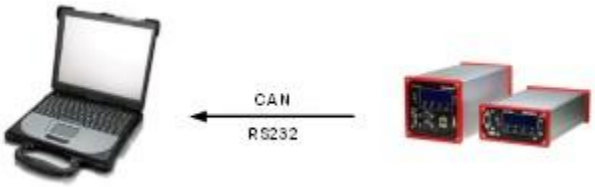
2.2.1 Standalone operation (data logger)

In this operating mode **ePCII-LOG** does not have a direct connection to a PC, it operates completely self-sufficiently like a typical data logger. In addition it can be supplemented by a monitor, keyboard or serial mouse.

If connecting a VGA monitor, the user-interface of the device software (see chapter 5.1) is displayed. The entire operation of the program and the configuration of the measurement application can be done just with four keys.

By reading out the CompactFlash® card the stored measurement data can be transmitted directly to the PC for analysis and processing purposes.

2.2.2 Remote operation



In this case the operation and visualization is done at the PC via a serial connection (RS232). Data can be synchronized automatically between the **ePCII-LOG** and the Windows® PC.

As the PC only acts for visualization and operation it does not have to satisfy any special demands.

The data connection is hot-pluggable, i.e. it is recognized automatically when attached to a PC. If the connection is interrupted the **ePCII-LOG** changes into stand-alone operation (see chapter 2.2.1) without any data loss or scan stop.

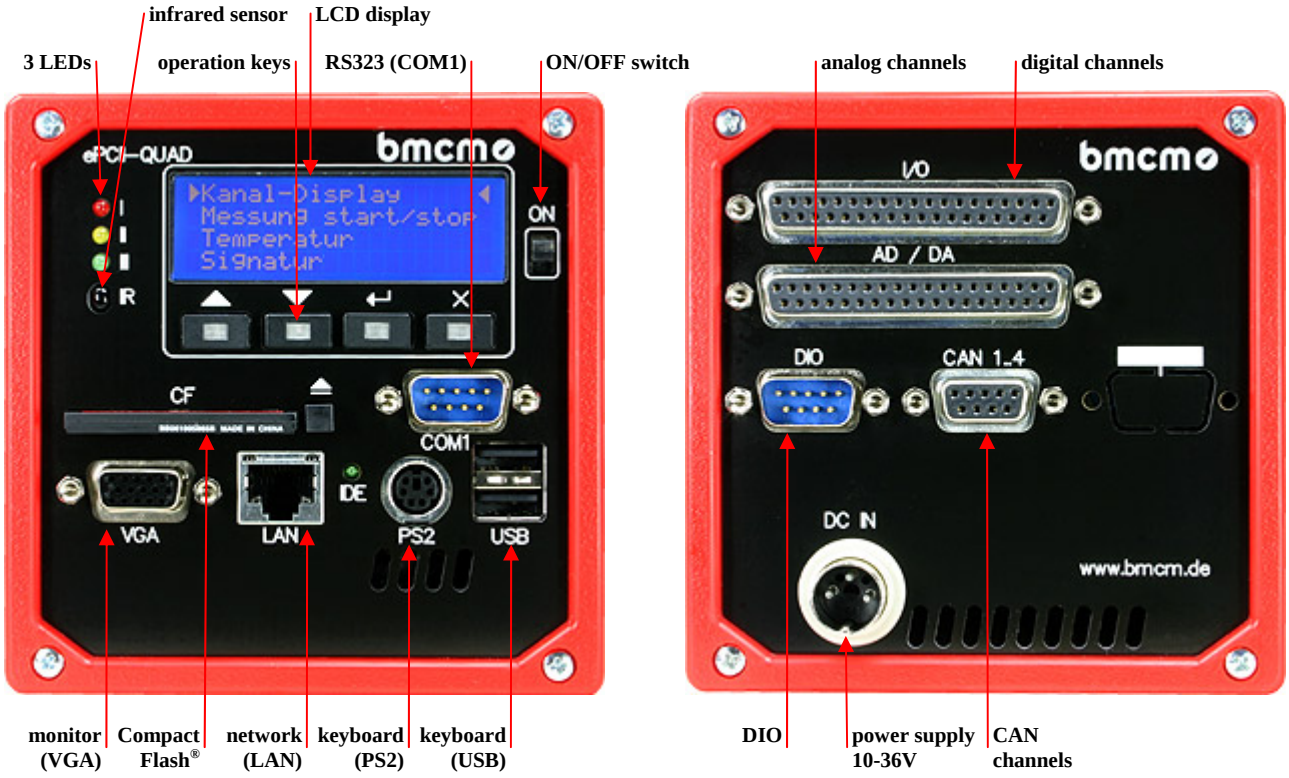
In CAN networks the **ePCII-LOG** is particularly suitable. Here a laptop with CAN card does the visualization. For Windows® PCs the *PCI-BASE1000* and in combination *MCAN* by bmcm is an ideal solution.

2.2.3 Standby operation

The alternative to power down the **ePCII-LOG** is to switch into standby mode. In this case the data logger has a minimum wattage of app. 1W, if no additional consumers, like heater or fan, are connected.

You can change to standby operation (and back) by an IR remote control (see chapter 3.6), by simultaneously pressing the device keys ↵ and **X** or by setting pin 1 of the "DIO" connector to *low*. All options for the standby mode must be activated in the device software (see chapter 5.5.6).

3 Connections and operating controls



3.1 CompactFlash® unit

The integrated CompactFlash® technology plays an important role to increase the compactness, mobility and flexibility of the **ePCII-LOG**.

The CompactFlash® card included with delivery serves as a storage medium for configuration data and measurement files, so that measuring results can be read out at any PC. The same configuration can be assigned easily to several devices. For high amounts of data CompactFlash® cards with a storage capacity of 2GB at the maximum can be used. Those are available as accessory (z. B. *ZU-CF2GB*).

The folder "MODULAB" on the card contains the internal device software *ModuLab* which opens automatically when booting up the data logger, as well as the remote version *MLRemote* (see chapter 5.1).

- **Avoid any loss of data or damage of the memory card by inserting or removing the CompactFlash® card only at power-off.**
- **To be protected against data loss we strongly recommend to backup the contents of the CompactFlash® card on a PC!**

3.2 LCD display

The 4-line LCD display field contains 20 characters per line at the maximum. Status information as well as configuration data (see chapter 2.1.2) or measuring values are shown. The brightness of the display is adjustable (see chapter 5.5.6).

3.3 Operation keys

There are four backlit keys at the bottom of the display to operate the **ePCII-LOG**. The following table shows the key functions:

Key	Menu function	Other functions
△ / ▽	move cursor one menu item up/down	Simultaneously pressing both keys when turning on the **ePCII-LOG** allows for restoring the default settings (see chapter 2.1.2).
↵	<RETURN> key: confirm command/entry, open/close menu item	By simultaneously pressing both keys the data logger changes into standby mode (see chapter 2.2.3), if this option has been activated in the device software.
X	<ESC> key: cancel command/entry, close menu item	

3.4 ON/OFF switch

To turn on the **ePCII-LOG** push up the switch on the right of the device front. Before starting the internal device software the power supply and the current device temperature is checked (see chapter 2.1.3). If a value is beyond the valid range, it will be indicated on the display. The data logger is not booted before the problem is solved.

Push the switch down to turn off the data logger. A timeout guarantees for the definite disconnection of the power supply.

Alternatively the ePCII-LOG can be switched on by setting the Z_{on} line at the 3-pole power supply plug (see chapter 4.6).

3.5 LEDs

The LEDs I-III on the left side of the **ePCII-LOG** indicate different states of the device. In addition the LED labeled "IDE" signalizes the access to the CompactFlash® card.

State	State of LEDs	Function
while booting up:	• red LED: ON	error → problem is displayed, boot up only after solving the problem
	• green LED: ON	error-free operation → start of the internal device software
during operation:	• all LEDs: OFF	analysis mode, no measurements
	• green LED: flashing	measuring mode: display of measuring values
	• red/green LED: alternately flashing	scan mode: measurement data are written on CompactFlash® card

3.6 Infrared sensor

The **ePCII-LOG** can be operated by an infrared remote control. In this case the signals are received by the infrared sensor. Remote controls using the Phillips RC5 code are recognized correctly. The use of an IR remote control must be activated in the device software (see chapter 5.5.6).

Two types of IR remote controls in a simple (URC-6010) or an extended (URC-8201) version are supported and are available as accessories (*ZU-IRS* and *ZU-IRX*).

The following table shows the key functions:

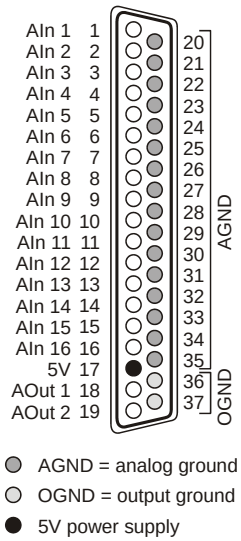
URC-8201 (ZU-IRX)	URC-6010 (ZU-IRS)	Function
red or **MUTE**		start scan (see chapter 5.3)
green		turn down (5%) LCD display lighting (see chapter 5.5.6)
yellow		turn up (5%) LCD display lighting (see chapter 5.5.6)
blue		stop scan
+	**+**	move cursor in the LCD display one menu item up
-	**-**	move cursor in the LCD display one menu item down
◢ or **OK**	◢	<RETURN> key: confirm command/entry, open/close menu item
◣	◣	<ESC> key cancel command/entry, close menu item
⏻	⏻	change into standby mode (or back to full operation), if activated in the device software (see chapter 5.5.6), stops running scan

- **The Power ON/OFF key ⏻ stops a running scan!**
- **With the IR remote control only device functions are performed. It does not control the device software.**
- **Close open dialogs in the device software to receive IR signals correctly.**
- **If using the remote control together with the ePCII-LOG, please make sure that the correct set-up code (ZU-IRS: Phillips 31341; ZU-IRX: Phillips 0556) is used by the remote control. For further information about how to set up the code, please see the included directions for use.**

4 Connections and pin assignment

4.1 Analog channels

All analog connections can be reached at the lower 37-pole Sub-D socket "AD/DA" on the back of the device. The measuring range of the analog inputs is adjustable in the software between ±10V, ±5V, ±2V and ±1V. The two analog outputs feature a ±10V output range. For the pin assignment of the 37-pole Sub-D socket please see the following figure and table:



Pin	Analog I/O
1..16	Analog IN 1..16
17	5V, max. 200mA
18..19	Analog OUT 1..2
20..35	AGND
36..37	OGND

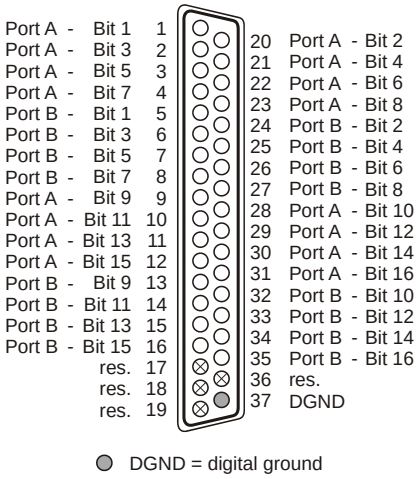
The voltage difference between any two analog input channels and ground must not exceed ±10V. Any channel overload may influence measurements of other channels and may lead to wrong values.

4.2 Digital channels

The **ePCII-LOG** features 2 digital ports with 16 digital lines (TTL) each. The interfaces are bidirectional, i.e. the input and output direction can be set via the software. Always the direction of the whole port is changed.

- **To avoid damages at the card, please see for correct connection. The digital in- and outputs are not protected!**
- **Open inputs are not defined.**

The digital interfaces are connected at the upper 37-pole Sub-D socket "I/O" on the back of the data logger. Their pin assignment is shown in the following table and figure on the right. Please note, that pin 17-19 and pin 36 are reserved.



Pin	Dig. I/O (port/bit)	
1	A/1	
20	A/2	
2	A/3	
21	A/4	
3	A/5	
22	A/6	
4	A/7	
23	A/8	
37	DGND	
17, 18, 19, 36		reserved

Pin	Dig. I/O (port/bit)
5	B/1
24	B/2
6	B/3
25	B/4
7	B/5
26	B/6
8	B/7
27	B/8

Pin	Dig. I/O (port/bit)
9	A/9
28	A/10
10	A/11
29	A/12
11	A/13
30	A/14
12	A/15
31	A/16

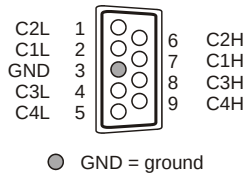
Pin	Dig. I/O (port/bit)
13	B/9
32	B/10
14	B/11
33	B/12
15	B/13
34	B/14
16	B/15
35	B/16

4.3 CAN

4 CAN channels can be connected at the 9-pole Sub-D socket labeled "CAN 1..4" on the back of the **ePCII-LOG**. The baud rate is max. 1MBit. The measuring channels are defined by the loaded CAN data base in Vector DBC file format.

The socket has the following pin assignment:

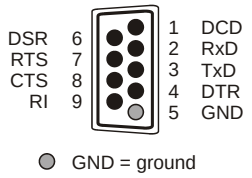
Pin	CAN
1	C2L
2	C1L
3	GND
4	C3L
5	C4L
6	C2H
7	C1H
8	C3H
9	C4H



4.4 COM1

The COM1 interface can be reached at the 9-pole Sub-D plug on the front side of the **ePCII-LOG**. Here measuring values can be sent to a Windows® PC for online visualization. The pin assignment corresponds to the standard of serial RS232 interfaces. Other COM interfaces are for internal use only. A cross-wired null modem cable is included with delivery.

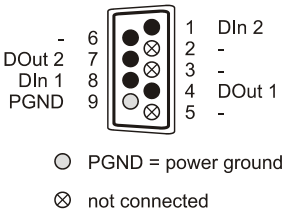
Pin	COM1
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



4.5 DIO

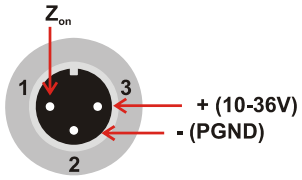
Two digital channels are lead out at the 9-pole Sub-D plug labeled "DIO". Here for example a USV or an external device can be connected. In case of extreme temperatures an additional fan or heater can be installed at the outputs.

Pin	DIO
1	DIn 2 (digital input 2)
2, 3	-
4	DOut 1 (digital output 1)
5, 6	-
7	DOut 2 (digital output 2)
8	DIn 1 (digital input 1)
9	PGND (GND for DIn / DOut)



If pin 1 of the "DIO" plug is reset to *low* during operation, the data logger switches into standby mode (see chapter 2.2.3), if this option has been activated.

4.6 Power supply (10-36V) DC IN

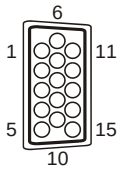


The **ePCII-LOG** requires a power supply within the range of 10-36V. Connect the power (e.g. *ZU-PW70W*) to the phone jack or to the 3-pole DIN plug with the marking "DC IN" at the back of the device.

In addition the Z_{on} line is lead out to pin 1 of the 3-pole DIN plug. Via the Z_{on} line the logger can be booted up.

For the Z_{on} line at pin 1 9-36V DC with at least 100mA are needed.

4.7 VGA



The monitor is connected at the 15-pole Sub-D socket placed at the device front. It is a VGA connection with standard assignment.

4.8 PS2

The connector of the keyboard is designed as a PS2 connection. The PS2 socket with standard assignment is located on the front side of the **ePCII-LOG**.

4.9 USB

Two USB sockets are lead out to the front of the device for keyboard connection.

Other USB devices are not supported by the internal device software!

4.10 LAN

The **ePCII-LOG** is provided with a network connector (Ethernet 10/100MBit), which is a Twisted Pair connection (RJ45) at a LAN socket with standard assignment.

The LAN connection is not supported by the internal device software!

5 Software

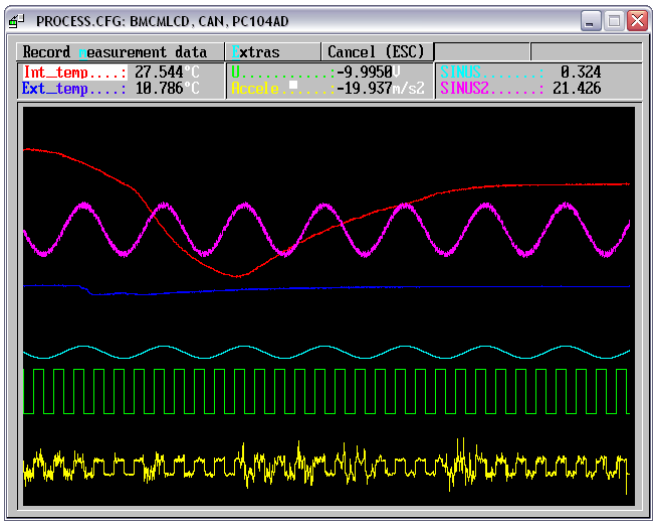
If the CompactFlash® card included with delivery is plugged in the CF slot, the device software *ModuLab* (`MODULAB.exe`, folder "MODULAB") is started after turning on the **ePCII-LOG**. To use the different software components on a Windows® PC, just copy the folder "MODULAB" on its hard disc. For remote operation (see chapter 2.2.2) via a serial connection start the software `MLRemote.exe`. With the remote version the entire operation, visualization, configuration and analysis can be done at a Windows® PC.

- **A program installation on the PC is not necessary. The software can be started directly after being copied to the PC.**
- **In the device software an online help can be accessed with F1!**
- **The serial mouse operation must be activated in the device software (command "System / User interface").**
- **To reset the software to its default settings, we recommend to backup the folder "MODULAB".**

5.1 Visualization

There are three ways of visualizing the signals:

1. Stand-alone operation: visualization at connected VGA monitor
2. Remote operation: visualization via *MLRemote* at a PC connected at the COM1 (default)
3. Visualization as numerical values at LCD display of the **ePCII-LOG**



5.1.1 Channel selection

The channel selection is done in the menu "Measure" listing all functional modules, like the AD board or the CAN unit, in the lower section. The analog and digital channels to be sampled are checked. For displaying a CAN channel an appropriate DBC file has to be loaded first.

5.1.2 Measuring mode

To display signals switch to the measuring mode with the command "Measure / Start measurement". All previously selected channels are listed on top of the graphical display showing the currently incoming signals as numerical values. The settings for signal representation can be adopted from the last analysis or be defined individually.

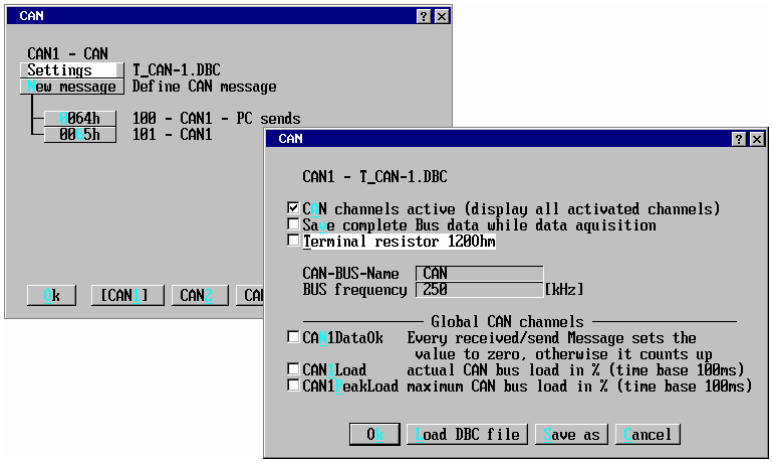
The notation (decimal, binary, hexadecimal etc.) of the displayed measuring values can be selected. To display a channel as a curve, it has to be highlighted and selected with the <RETURN> key to open a dialog for channel selection and color adjustment. For display settings choose the button "Extras".

- **In measuring mode the data logger scans the channels and shows their values, but saves measurement data only if the recording of measurement data has been activated (see chapter 5.3)!**
- **With a measuring card PCI-BASE1000 and a CAN module MCAN CAN signals created by ePCII-LOG can directly be visualized and processed online in NextView®4 at a PC connected via CAN.**
- **The 2x 16 bit digital channels are represented as a decimal number of the 16 bit value.**

5.2 Configuration

Setting up a measuring application can be done in three ways:

1. Stand-alone operation: direct configuration with connected VGA monitor, keyboard and serial mouse (optional)
2. Remote operation: configuration in *MLRemote* at a PC connected at COM1 (default) with monitor, keyboard and mouse (optional)
3. Separate configuration at a laptop/PC in *ModuLab* without connection to the data logger



The commands to configure the data logger and the individual channels are included in the menu "Measure". General parameters, like e.g. the measurement frequency, can be entered under "Setup measurement".

Analog and digital channels are configured in the dialog of the AD board under "Settings". The parameters for the measuring card are defined in the "Board settings", the settings of an individual channel (name, measuring range, calibration etc.) by selecting its channel number.

The configuration of the CAN channels, as well as loading a DBC file is done in the menu "Measure" under "CAN". The parameters of the currently selected CAN channel are displayed. The active CAN channel is pointed out by square brackets. Choose "Settings" to load an already existing DBC file.

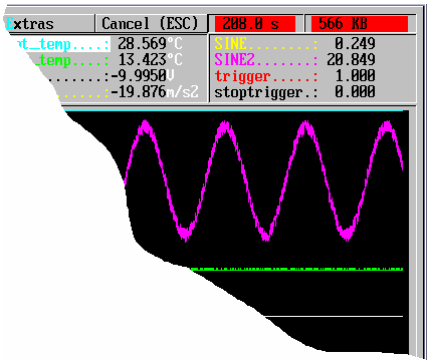
Configuration settings for the data logger controlled by the intelligent LCD display unit are defined under "Measure / ePC-DP".

For offline configuration (see chapter 2.1.1) the CompactFlash® card is connected to a PC and the device software *ModuLab* is started without connection to **ePCII-LOG**. All settings can be done. When closing *ModuLab* the configuration settings are saved and made available to the data logger when booted with this card.

5.3 Acquisition

The recording of measurement data is done completely self-sufficiently. To write measuring data on the CompactFlash® card, the data logger has to be in measuring mode (see chapter 5.1.2). A scan can be started as follows:

1. Choose command "Measure / Start measurement / Record measurement data" in *ModuLab* or *MLRemote* (keyboard: "M" key or <SPACE> key)
2. Choose command "Start/stop scan" at the LCD display of the **ePCII-LOG** and confirm "Start scan?" with the ↵key (or IR remote control, see chapter 3.6)



All channels listed on top of the graph display are recorded irrespective

of being displayed as curves. The channel selection is done in the menu "Measure" (see chapter 5.1.1).

In scan mode there are red flashing fields in the top right corner indicating the current size of the measuring file and the time since scan start.

The scan is stopped by the <ESC> key. When leaving the measuring mode (<ESC> key), the measuring results can be displayed and processed (see chapter 5.4).

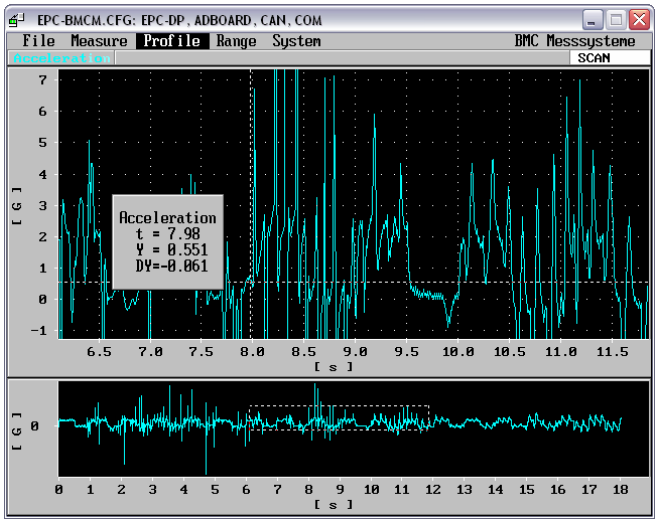
The measuring data are written in a temporary measuring file, which usually will be overwritten by the next scan. With the command "File / Save as" another name or directory can be assigned to the measuring file. The storage is done locally onto the CompactFlash® card.

When saving in DIAdem® format always two files are created: one file (`*.dat`) containing channel information (Header), the other one (`*.i1`) with the measuring values itselves.

5.4 Analysis

The following possibilities are provided for processing recorded measuring data:

1. Stand-alone or remote operation: direct analysis in *ModuLab* or *MLRemote*
2. Analysis at the PC with *ModuLab* (copied to PC)
3. Professional analysis in NextView®4 (no freeware) by importing the DIAdem® measuring files



To show the stored signals in the device software the appropriate measuring file must be opened (command "File / Load)"). After a scan stop the software automatically changes into analysis mode displaying the screen for data processing and analysis.

On top of the display all visualized signals are listed. The selection of signals to be displayed is done with the command "Profile / Activate".

All display settings (e.g. size, zoom, number of windows etc.) are provided in the menu "Range". To show just a part of a signal, choose the command "Partial range". First select one corner as a fixed point and then draw a rectangle over the designated signal section (click&drag). Furthermore, signals can be displayed in several windows ("Range / Window"). For example the representation "Window partial range/overview" contains a signal part in one window and in the other the complete signal with a marking of the signal part shown above.

Settings and functions affecting the signals are contained in the menu "Profile". Here several possibilities for representation are provided. If you select the panorama display e.g., all activated signals are displayed one upon the other without overlapping.

5.5 Summary of the most important software functions

The following chapters provide a short overview of the basic functions and commands of the device software. For further information please open the online manual in the program with F1.

5.5.1 Scan configuration

Function	Command	Notes
enter frequency	menu "Measure / Setup measurement": entry "Measurement frequency"	valid range 0.1Hz .. 1000Hz (depending of measuring card used)
select analog/digital channels for recording	menu "Measure / A/D-Board"	channels to be sampled are checked
settings for analog/digital channels	menu "Measure / A/D-Board / Settings": select channel number	name, unit, measuring range, PT1 filter, linearization (type K)
calibration of analog channels	menu "Measure / A/D-Board / Settings": select channel number • gain: "Factor" or "two point input" • offset: "Offset" or "zero point adjustment"	
CAN settings	menu "Measure / CAN"	
load DBC file	menu "Measure / CAN": commands "Settings" and "Load DBC file"	
create CAN message	menu "Measure / CAN": command "New message"	
define trigger condition	menu "Measure / Formula channel"	define trigger condition as a formula called "trigger"
prehistory	menu "Measure / Setup measurement": entry "Minimal prehistory"	value in seconds
set up formula channel	menu "Measure / Formula channel"	
save configuration	menu "System / Save system"	
load other configuration	menu "System / Load system"	select `*.cfg` file from the list of existing configurations

5.5.2 Commands for measurement data acquisition

Function	Command	Notes
change to measuring mode	menu "Measure / Start measurement"	keyboard: "M" key
start scan	menu "Measure / Start measurement / Record measurement data"	in measuring mode: direct start with "M" key or <SPACE> key
automatic scan start at program start	menu "Measure / Setup measurement"	
continuous recording	menu "Measure / Setup measurement": select option "start/stop mode active"	all further scans continue directly at the signal end of the previous recording
continuous numbering of measurement files	menu "Measure / Setup measurement": select command "automatically create measurement sequence"	e.g. TEST.I1, TEST02.I1; → measurement file is created automatically at each scan, "Save as" not necessary
automate storage	menu "File / Save as": file name as date with format dd-mm-yy (d: day; m: month; y: year)	new measurement file is created daily, e.g. 01-07-06, 02-07-06 etc.
save serial number	menu "Measure / ePC-DP / Advanced options": activate "ePC SN into daq header file"	
save device temperature	menu "Measure / ePC-DP": activate option "ePC_TEMP Temperature channel"	

5.5.3 Settings in measuring mode

To change into measuring mode select the command "Measure / Start measurement".

Function	Command	Notes
assign settings of analysis display	menu " Measure / Start measurement / Extras": activate entry "use signal settings of the analysis"	
visualize channel	select signal (arrow keys + <RETURN>); activate entry "Display channel as a profile"	only channels to be sampled can be displayed
channel color	select signal (arrow keys + <RETURN>) to open dialog with settings	
range of y-axis	menu " Measure / Start measurement / Extras"	
notation of numbers	menu " Measure / Start measurement / Extras"	
character size	menu " Measure / Start measurement / Extras"	
display color	menu " Measure / Start measurement / Extras": entry "Background"	

5.5.4 Settings in analysis mode

open measurement file	menu "File / Load	
display signal	menu "Profile / Select profile"	Activated signals are checked. The order of the signals in the graph display depends on the order of their activation.
numeric signal representation	menu "Profile / List of numbers"	
signal color	analysis display: menu "Profile / Channel color"	
character size	menu "File / Other / Settings"	
legend of y-axis	menu "File / Other / Settings"	
grid settings	menu "File / Other / Settings": entry "Grid points" or "Grid spacing"	
show cursor values	menu "Profile / Values" (mouse: click on the graph)	displays x- and y-coordinates, DY
show 2. cursor	press <SPACE> key	first cursor is displayed already, additionally shows Dt (distance to 1. cursor)
show cursor values of another signal	use arrow keys ↑ ↓ or mouse wheel	cursor values of different signals can be distinguished by the signal name
position cursor	keyboard: • to the right: → • to the left: ← • to start of signal: <Pos 1> • to end of signal: <End>	
integrate individual cursor values in display	position cursor, confirm with <RETURN> key	insertion of additional text possible
display signals one upon the other	menu "Profile / Panorama display" → ranges of y-axis independent from each other	The y-scaling is related to the 1. graph listed on top of the display. Other signals activated afterwards use the same scaling.
show y-axis of another signal	menu "Profile / Rescaling"	only makes sense for panorama display
cancel previous scrolling or zooming	menu "Profile / Reset scaling"	panorama display is closed, too
display complete signals	menu "Range / Full range"	Show full range of x-axis or y-axis by mouse click on the relevant axis.
open measurement file	menu "File / Load	
show signal part	• mouse: click-and-drag a rectangle over the designated signal section • keyboard: Menu "Range / Partial range" • enter range of x- and y-axis: menu "Range / Manual select"	if using command "Partial range" first select top left-hand corner, then corner down to the right (positioning with arrow keys, fixing with <RETURN> key)
zoom out	menu "Range / Zoom out"	visualization of twice the signal range

Function	Command	Notes
show last display ranges	switch between last 4 settings with command "Range / Last image"	
scroll display	• menu "Range / Browse" • keyboard: 1: scroll to the right in x-direction to end of signal 2: scroll down in y-direction 4: scroll to the left in x-direction (back) 6: scroll to the right in x-direction (forward) 7: scroll to the left in x-direction to start of signal 8: scroll up in y-direction	only makes sense when displaying a signal part, "Back", "Forward", "Up", "Down" scrolls the display for ½ window If using the numeric keypad on the keyboard, the <NUM-Lock> key on the keyboard and in the program must be turned on ("System / User interface").
use several display windows (max. 4)	menu "Range / Window"	The view "Partial range/overview" shows a signal part in one window, which is marked in the second window displaying the overall view.
activate another window	• keyboard: menu "Range / Window", select button of the relevant window • mouse: click on the window	
use settings of measuring display	menu "Measure / Setup measurement": select entry "use measurement display in the analysis"	
copy snapshot to clipboard	keyboard: <ALT>+F1	creates a screenshot of the user interface and saves it in the folder "MODULAB" with the format `*.pcx`

5.5.5 Commands for analysis and processing of measurement data

Function	Command	Notes
open measurement file	menu "File / Load	
show minimum/maximum	menu "Profile / Extreme values"	values of activated signals are displayed
x/y-representation on/off	menu "Profile / Plot X/Y": command "Switch on"/"Switch off"	
calculation of signals	menu "Profile / Select profile": command "Formula input (Offline)"	calculation of signals with each other possible, too The created signal is displayed in addition to the source signals. for detailed description press F1
convert signal	menu "Profile / Conversion"	Only the converted signal is displayed.
apply filter	menu "Profile / Conversion": command "Filter"	
save signal part	menu "File / Save as": save partial range	show signal part by the partial range view ("Range / Partial range") before
data reduction	menu "File / Other / Process data": command "Reduce data (average)"	reduction possible at a ratio of 1:2 .. 1:100
ASCII export	menu "File / Other / Process data": command "Create text file (ASCII)"	
delete individual signals of measurement file	menu "File / Other / Process data": command "Delete deactivated signals" or "Delete activated signals"	before: deactivate or activate all signals to be removed ("Profile / Select profile")
put signals of different files together (overlay)	menu "File / Other / Process data": command "Add file (overlay)"	condition: same measurement frequency
attach signal file	menu "File / Other / Process data": command "Append file (in sequence)"	condition: same measurement frequency and number of signals
header settings	menu ""File / Other": commands "Load header", "Save header", "Reset header", "Change header"	with "Change header" change of e.g. signal names, units, frequency, comment, x-axis offset possible

5.5.6 Program and device settings

Function	Command	Notes
settings regarding the user-interface	• menu structure: menu "System / Change system" • language: menu "System / User interface"	
activate remote operation with MLRemote	menu "System / User interface": entry "Remote control"	also with function key F4; default: activated at COM1
automatic storage of data/ configuration	menu "Measure / Setup measurement"	
password protection for system changes	menu "System / Change system": command "Password protection"	without authorization no changes in the menu "System" possible
call HTML help	menu "System / Help"	also with function key F1 • *ModuLab*: context-sensitive help • *MLRemote*: HTML help
enter signature	menu "Measure / ePC-DP": command "Signature"	
brightness of LCD display	menu "Measure / ePC-DP": command "Advanced options", entry "Display Back-light"	valid range: 0% -100% with IR remote control *ZU-IRX* (see chapter 3.6): green (5% darker) and yellow (5% brighter) key
standby mode	menu "Measure / ePC-DP": command "Advanced options", section "Standby mode"	optionally change into standby mode (see chapter 2.2.3) with device keys, IR remote control or via Dig IN 2 of the "DIO" connector (see chapter 4.5)
activate serial mouse	menu "System / User interface": entry "Mouse (RS232)"	
activate infrared remote control	menu "Measure / ePC-DP": command "Advanced options", option "Allow IR control"	
show temperature settings	menu "Measure / ePC-DP"	

5.6 Special keyboard functions

Apart from text input the entire operation and navigation can be performed with the arrow keys, the <SPACE> key, the <RETURN> key and the <ESC> key. Frequently required menu commands can be called by function keys. An entry or menu item can directly be selected by pressing the underlined, colored letter.

Key	Function
← → ↑ ↓	navigation to the left, right, up, down
<RETURN>	confirm selection / open dialog
<ESC>	cancel
<SPACE>	(de-)activate option; in measuring mode: start scan
M	start measuring mode and scan mode
F1	context-sensitive help (*ModuLab*) or HTML help (*MLRemote*)
F2, F3, F10	update, load, change system
F4	modify user interface
1, 2, 4, 6, 7, 8	scroll display in analysis mode

6 Important notes for using the ePCII-LOG

- The **ePCII-LOG** is only suitable for extra-low voltages – please observe the relevant regulations!
- For reasons relating to EMC, the device must only be operated with housing closed.
- ESD voltages at open lines may cause malfunction during operation.
- The device produces much heat. Therefore provide for a good dissipation at the outside.
- For cleaning use water and mild detergent only. The device is designed to be maintenance-free.
- The signals are connected at the analog connection. Therefore use screened cables. For a good elimination of interferences connect the screen only to one end of the cable. Open inputs should be closed.
- The device must not be used for safety-relevant tasks. With the use of the product the customer becomes manufacturer by law and is therefore fully responsible for the proper installation and use of the product. In the case of improper use and/or unauthorized interference our warranty ceases and any warranty claim is excluded.

Do not dispose of the product in the domestic waste or at any waste collection places. It has to be either duly disposed according to the WEEE directive or can be returned to bmcm at your own expense.

7 Technical data ePCII-LOG (typical at 25°C)

• Analog channels

Analog inputs:	16x single-ended, measuring range ±10V, ±5V, ±2V, ±1V programmable for each channel separately
Analog outputs:	2x AnalogOut, output range ±10V, max. 1mA, 12 bit resolution (0.025%), accuracy 0.1%, 2 LSB
Resolution:	in the relevant meas. ranges: 16 bit (=0.3125mV in the ±10V measuring range)
Relative accuracy:	0.0015%
Error between measuring ranges:	typ. ±0.1%
Max. sampling rate:	1kHz / channel (converter rate: 10µs), depending on software and PC
Converter error:	typ. ±4 LSB
Overload protection:	max. ±35V (when turned on), max. ±20V (when turned off), max. ±20mA in total of all input channels!
Input resistance:	1MΩ (with PC turned off: 1kΩ)
Input capacity:	5pF
Zero drift:	±25ppm/°C
Gain drift:	±25ppm/°C

The values for accuracy always relate to the respective value measuring value. Errors might add at worst.
When booting up the data logger the analog outputs are initialized with 0V. The cards are factory set in the range of ±5V.

• Digital channels

Channels:	32 (2x 16 bit) digital channels, programmable in groups of 16 as input or output
Input voltage*:	TTL level (0 = 0.0V..0.5V; 1 > 2.6V..5.0V), max. 5V
Input resistance:	min. 1MΩ (with PC turned off: 1kΩ)
Overload protection:	max. +5.5V, max. 20mA in total of all input channels!
Current drain (at each pin):	1mA (with app. 4V level), max. 2.5mA (with app. 3V level), max. 20mA in total of all output channels!
Max. sampling rate :	1kHz / channel (converter rate: max. 100kHz), depending on software and PC

*** Open inputs are not defined.**

• General data

Power supply:	10-36V DC, typ. 10W without additional I/O cards, max. 25W, electrically isolated by DC/DC converter
Protection:	with 2A multi-fuse
CPU:	ETX Geode LX800 (Congatec), wattage app. 5W
Memory:	RAM 256MB, CompactFlash® card (2GB), memory requirements 2 bytes/meas. value
LCD display:	LCD text display field for 4x20 characters, backlit, 4 lighted keys, 3 LEDs, IR transmitter/sensor, power supply control, temperature control
PC components:	beeper, battery, fan
Housing :	aluminum housing with plastic frame
Dimensions:	W x H x D: 110 x 110 x 215mm³
Protection type:	IP30
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1; for decl. of conformity (PDF) visit www.bmcm.de
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. perm. potentials:	60V DC acc. to VDE, max. 1kV ESD on open lines
Temperature ranges (supervised):	operating temp. -25°C..70°C, storage temp. -25..85°C
Relative humidity:	0-90% (not condensing)
Delivery:	product with case, null modem cable, CompactFlash® card with device software, description
Accessories (optional):	AC power supply ZU-PW70W, CompactFlash® card ZU-CF2GB, CF card reader ZU-CFR, USB keyboard ZU-KBS, IR remote controls ZU-IRS/ZU-IRX, MAL amplifier backplane BP104, DIN rail set ZU-SCHI, several connecting cables, plugs and sockets
Guarantee:	2 years with effect from sales date, damages at product resulting from improper use excluded

• Software support

Device software (provided):	measurement and analysis program *ModulLab*, remote version *MLRemote*
optional NextView®4 Analysis:	software for the display of signal files and analysis of measured data under Windows® 2000/XP/Vista

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 3.1 07/21/2008