

PC-Control Panel LCP-57 Manual

Mikrap

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1.

Introduction

The Mikrap PC-Control Panel LCP-57 can be used as an operating panel, and with the integrated Soft-PLC and remote I/Os as a complete control panel.

Behind a stainless steel or plastic front supporting IP65, the LCP-57 includes a 5,7" flat-screen quarter VGA colour TFT display with 320 x 240 dots and backlight dimming. Operation is done by the integrated touch-screen and six additional function keys.

The LCP-57 is fitted with a Intel XScale low-power embedded RISC controller up to 398 MHz. This controller is optimised for the use of the operating system WindowsCE from Microsoft.

The LCP-57 can be fitted with a MMC/SD-card drive, two COM ports, two USB ports, one Ethernet port, two CAN ports, and a PROFIBUS port.

Attention:

The information in this manual has been carefully checked and is believed to be accurate. However, no responsibility will be taken for inaccuracies. All data is for information purposes only. It is subject to change and not guaranteed for legal purposes.

This manual is valid for the following products:

Order-Nr:	Product:	Remarks:
MN-10851	PC-Panel LCP-57i	Steel, 398 MHz, Ethernet, USB, CAN
MN-10684	PC-Panel LCP-57i	Steel, 206 MHz, Ethernet, USB, PROFIBUS
MN-10675	PC-Panel LCP-57i	Steel, 206 MHz, Ethernet, USB, CAN
MN-10850	PC-Panel LCP-57	Plastic, 398 MHz, Ethernet, USB, CAN
MN-10771	PC-Panel LCP-57	Plastic, 206 MHz, Ethernet, USB, PROFIBUS
MN-10800	PC-Panel LCP-57	Plastic, 206 MHz, Ethernet, USB, CAN

Dimensions

1.1.1 Steelfront

Outline:	W × H × D	215 × 156 × 70 mm
Display:	W × H	120 × 90 mm
Frontpanel thickness:		5 mm
Mounting depth:		65 mm
Weight:		1,9 kg

1.1.2 Plasticfront

Outline:	W × H × D	215 × 127 × 75 mm
Display:	W × H	120 × 90 mm
Frontpanel thickness:		10 mm
Mounting depth:		65 mm
Weight:		1,4 kg

1.2 Environment

Supply voltage:	24 Volt DC ± 20 %
Current consumption:	typ. 600 mA
Power consumption:	typ. 15 VA
Backup battery:	3,0 Volt Lithium
Operating temperature:	0 ... +55 °C
EMI:	With correct wiring and shielded connectors: according to EN 50081-2 Emission according to EN 50082-2 Immunity

1.3 Materials

For the panel housing, the following materials are used:

1.3.1 Steelfront

Panel front:	Stainless steel according to EN 10088-2
Front foil:	Polyester
Touch foil:	Polyester

1.3.2 Plasticfront

Panel front:	Polystyrol
Front foil:	Polyester
Touch foil:	Polyester

Attention:

Polyester foils have a limited resistance against UV light and should therefore not be used in the open for a longer period of time!

1.4 Cleaning

Cleaning of the front has be done using non scratching fabric humidified with water.

The use of soft household cleaners is allowed only in exeptions. Under no circumstan-ces, force, agressive cleaning materials, or solvents have to be applied!

1.5 Utilities

The following utilities are available for the PC-Control Panel LCP-57:

Order-Nr:	Product:	Remarks:
MN-90097	Manual PC-Control Panel LCP-57	German
MN-90112	Manual PC-Control Panel LCP-57	English
MN-10573	System Maintenance Tool SMT	
MN-42756	Supply Connector X3	Phoenix SMSTB 2.5/3-ST-5.08
MN-10657	Spare battery	3,0 Volt lithium
MN-10731	Serial cable	Null-modem
MN-10592	CAN cable WAGO	for WAGO I/O System
MN-10698	CAN cable Mikrap	for Mikrap PC-Units
MN-10840	MMC FlashCard 128 MByte	
MN-42606	MMC sticker	transparent label
MN-42514	MMC holder	Quad MMC holder

2. **Features**

The Mikrap PC-Control Panel LCP-57 may include the following features:

- Cardsize Mikrap CPU Intel XScale embedded RISC controller up to 398 MHz
- flat screen 5,7" quarter VGA colour TFT LCD with 320 x 240 pixel
- backlight dimming by software
- resistive touch-screen and six additional function keys
- bicolour status LED
- integrated loudspeaker as signaling device
- MMC/SD-card drive for FlashCards up to 1 GByte
- changeable battery for backup of Real Time Clock and static RAM
- serial interface COM1 RS232 isolated on 9-pol. D-SUB connector
- serial interface COM2 RS232 on 9-pol. D-SUB connector
- serial interface USB1 on 4-pol. USB host connector
- serial interface USB2 on 4-pol. USB host connector
- 10/100 MBit Ethernet interface NET1 on FCC RJ45 connector
- CANopen / Basic-CAN interface CAN1 on D-SUB connector
- CANopen / Basic-CAN interface CAN2 on D-SUB connector
- PROFIBUS interface on D-SUB connector (in place of CAN1)
- IP65 proof stainless steel front

Attention:

Changes to improve our products can occur at any given time. This is true especially for mask changes of microcontrollers, which can change without prior notice.

3. **Putting into Operation**

Attention:

This product includes parts, which are sensitive to electrostatic discharges. To avoid damage to these parts, corresponding measures for packing and handling have to be taken seriously.

This product has to be used in accordance to all applicable local laws and standards. All necessary measures to correspond with these requirements (e.g. relating EMI, etc.) have to be taken by the user.

3.1 **Supply**

The PC-Control Panel LCP-57 has to be powered as follows:

X3/1 (Case)	Frame ground (earth)
X3/2 (0V)	Supply voltage 0 Volt DC
X3/3 (+24V)	Supply voltage +24 Volt DC $\pm 20\%$

Attention:

Please take special care for correct protective earth connection to the unit. This has to be done by connecting two as short as possible ground wires to the supply connector X3/1 as well as to the AMP 6.3 connector on the backcover.

3.2 **Battery Change**

On the base module, a changeable lithium battery is located. This battery supports the static RAM and the RTC on the CPU module for data retention. The expected lifetime of the battery is 5 to 8 years. It is recommended, to change the battery preventive every 5 years.

To change the battery, this procedure has to be followed:

- 1) unpack the new battery
- 2) unplug the supply from the PC-Panel
- 3) remove the old battery label
- 4) pull the old battery out of the holder
- 5) place the new battery into the holder
- 6) place the new battery label

Attention:

The new battery has to be inserted max. 10 seconds after the removal of the old battery. Otherwise, all data and time information is lost in the static RAM and the RTC!

3.3 Operating System Windows CE

The real-time performance of WindowsCE has improved with every new version. However, true real-time performance can only be guaranteed in connection with our real-time support MNSys.

WindowsCE supports the programming with the Microsoft development tools for Visual Basic, Visual C++, and Visual J++.

The operating system WindowsCE is preinstalled on the PC-Control Panel.

Update of the operating system is possible through the system interface COM2 or MMC. For that purpose, the System Maintenance Tool SMT will be used (See Utilities).

3.4 Soft-PLC CoDeSys

The integrated development tool CoDeSys for Automation Alliance from 3S allows the comfortable generation of PLC programs according to IEC 1131-3. CANopen as well as embedded C/C++ code is supported.

The runtime system PLCRT as well as the CoDeSys application will be loaded into the flash filesystem of the PC-Control Panel through the system interface COM2, Ethernet or MMC.

With some Mikrap PC-Control Panels, a run-time license for the CoDeSys PLC is already included in the hardware price.

3.5 Visualization CoDeSys

The integrated development tool CoDeSys for Automation Alliance from 3S allows the efficient configuration of graphical user interfaces with or without touch-screen. Both versions, the Target-Visu as well as the Web-Visu are supported.

The CoDeSys Visu application will be loaded into the flash filesystem of the PC-Control Panel through the system interface COM2, Ethernet or MMC.

With some Mikrap PC-Control Panels, a run-time license for the CoDeSys Visu is already included in the hardware price.

3.6 Visualization QVis

The visualization tool QVis for Windows from Kinz Elektronik allows the efficient configuration of graphical user interfaces with or without touch-screen. The implementation of graphic fonts as chinese, mandarin, e.g. as well as on-line language change are supported.

The runtime system QVisRT as well as the QVis project can be loaded into the flash filesystem of the PC-Control Panel through the system interface COM2, Ethernet or MMC.

With some Mikrap PC-Control Panels, a run-time license for QVis is already included in the hardware price.

4. Functional Description

4.1 Basic Module

On the PC-Basis LCP, the +24 Volt power supply as well as all DC/DC converters for the isolated interfaces are located. A removable 3,0 Volt lithium battery supplies the static RAM and the RTC of the CPU module for data retention. A MMC drive supports the use of MultiMedia FlashCards.

The LCD flat panel display, the VFL backlight, as well as the touch-screen are connected through internal interfaces.

4.2 CPU Module

The cardsize Mikrap CPU module is plugged onto the basic module. There exist different CPU modules to be selected from:

- CPU-X255LCD/NET mit 398 MHz Intel XScale PXA255
- CPU-1110LCD/NET mit 206 MHz Intel StrongARM SA1110

4.3 LCD Flat Panel Display

The LCD flat panel display is connected through a internal interface to the basic module

4.4 Backlight

The inverter for the VFL backlight will be controlled directly from the CPU module.

4.5 Touch-Panel

The integrated resistive touch-panel with the additional six function keys will be checked directly from the CPU module.

4.6 Status LED

The bicolour red/green status LED will be controlled directly from the CPU module.

4.7 Signaling Device

The integrated loudspeaker will be controlled directly from the CPU module.

5. Interface Description

5.1 Connector Layout

The PC-Control Panel LCP-57 can be equipped with the following connectors:

X3: 3-pole CombiCon connector for supply of stainless steel front only

X6: 9-pole D-SUB male connector for serial COM2

X8: 9-pole D-SUB male connector for CAN1 or
9-pole D-SUB female connector for PROFIBUS

X9: 9-pole D-SUB male connector for serial COM1 or
9-pole D-SUB male connector for CAN2

X10: 10-pole FCC RJ45 connector for Ethernet

X11: 4-pole USB host connector for serial USB1

X12: 4-pole USB host connector for serial USB2

See also assembly plan in the appendix

5.1.1 Connector X3 (Supply)

Pin	Signal	Typ	Remarks
1	Case	IN	frame ground (earth)
2	0V	IN	supply voltage 0 Volt DC
3	+24V	IN	supply voltage +24 Volt DC $\pm 20\%$, current consumption typ. 600mA

5.1.2 Connector X6 (COM2 RS232)

Pin	Signal	Typ	Remarks
1	nc	-	not connected
2	-RXD2	IN	COM2 RS232 level
3	-TXD2	OUT	COM2 RS232 level
4	DTR2	OUT	COM2 RS232 level
5	GND	OUT	
6	nc	-	not connected
7	RTS2	OUT	COM2 RS232 level
8	CTS2	IN	COM2 RS232 level
9	nc	-	not connected

5.1.3 Connector X8 (CAN1)

Pin	Signal	Typ	Remarks
1	nc	-	not connected
2	CAN1-L	I/O	data low CAN1
3	GND_C1	OUT	isolated GND of CAN1
4	nc	-	not connected
5	Shield	OUT	frame ground (earth)
6	GND_C1	OUT	isolated GND of CAN1
7	CAN1-H	I/O	data high CAN1
8	nc	-	not connected
9	nc	-	not connected

5.1.4 Connector X8 (PROFIBUS)

Pin	Signal	Typ	Remarks
1	Shield	OUT	frame ground (earth)
2	nc	-	not connected
3	Rx/Tx+	I/O	PROFIBUS Data +
4	Enable		
5	GND_PB	OUT	isolated GND of PROFIBUS
6	+5V_PB	OUT	isolated +5V of PROFIBUS
7	nc	-	not connected
8	Rx/Tx-	I/O	PROFIBUS Data -
9	nc	-	not connected

5.1.5 Connector X9 (COM1 RS232)

Pin	Signal	Typ	Remarks
1	nc	-	not connected
2	-RXD1	IN	COM1 RS232 level
3	-TXD1	OUT	COM1 RS232 level
4	DTR1	OUT	COM1 RS232 level
5	GND	OUT	
6	nc	-	not connected
7	RTS1	OUT	COM1 RS232 level
8	CTS1	IN	COM1 RS232 level
9	nc	-	not connected

5.1.6 Connector X9 (COM1 RS422/485)

Pin	Signal	Typ	Remarks
1	nc	-	not connected
2	T+	OUT	COM1 (TXD) RS485 level
3	GND	OUT	
4	R+	IN	COM1 (RXD) RS485 level
5	nc	-	not connected
6	nc	-	not connected
7	T-	OUT	COM1 (TXD) RS485 level
8	R-	IN	COM1 (RXD) RS485 level
9	nc	-	not connected

5.1.7 Connector X9 (CAN2)

Pin	Signal	Typ	Remarks
1	nc	-	not connected
2	CAN2-L	I/O	data low CAN2
3	GND_C2	OUT	isolated GND of CAN2
4	nc	-	not connected
5	nc	-	not connected
6	GND_C2	OUT	isolated GND of CAN2
7	CAN2-H	I/O	data high CAN2
8	nc	-	not connected
9	nc	-	not connected

5.1.8 Connector X10 (Ethernet)

Pin	Signal	Typ	Remarks
1	TX+	OUT	Ethernet transmit data +
2	TX-	OUT	Ethernet transmit data -
3	RX+	IN	Ethernet receive data +
4	-	-	RC termination to frame ground (earth)
5	-	-	RC termination to frame ground (earth)
6	RX-	IN	Ethernet receive data -
7	-	-	RC termination to frame ground (earth)
8	-	-	RC termination to frame ground (earth)

5.1.9 Connector X11 (USB1)

Pin	Signal	Typ	Remarks
1	V+	OUT	USB1 supply +5 Volt DC $\pm 5\%$, max. 200 mA
2	D-	I/O	USB1 data -
3	D+	I/O	USB1 data +
4	GND	OUT	

5.1.10 Connector X12 (USB2)

Pin	Signal	Typ	Remarks
1	V+	OUT	USB2 supply +5 Volt DC $\pm 5\%$, max. 200 mA
2	D-	I/O	USB2 data -
3	D+	I/O	USB2 data +
4	GND	OUT	

6. **Appendix**

6.1 **Literature**

List of recommended data-books:

XScale PXA255:

Document: PXA255 Processor Developer's Manual
PXA255 Processor Design Guide
PXA255 Electrical, Mechanical, and Thermal Specification
PXA255 Application Processors User's Guide
Manufacturer: Intel Corp.
www.intel.com

StrongARM SA1110:

Document: SA-1110 Technical Reference Manual
Manufacturer: Intel Corp.
www.intel.com

Ethernet-Controller LAN91C111:

Document: Datenblatt LAN91C111
Manufacturer: SMSC
www.smsc.com

CAN-Controller SAE 81C91:

Document: Microcomputer Components Standalone Full-CAN Controller
Manufacturer: Infineon
www.infineon.com

Fieldbus-Controller EP1:

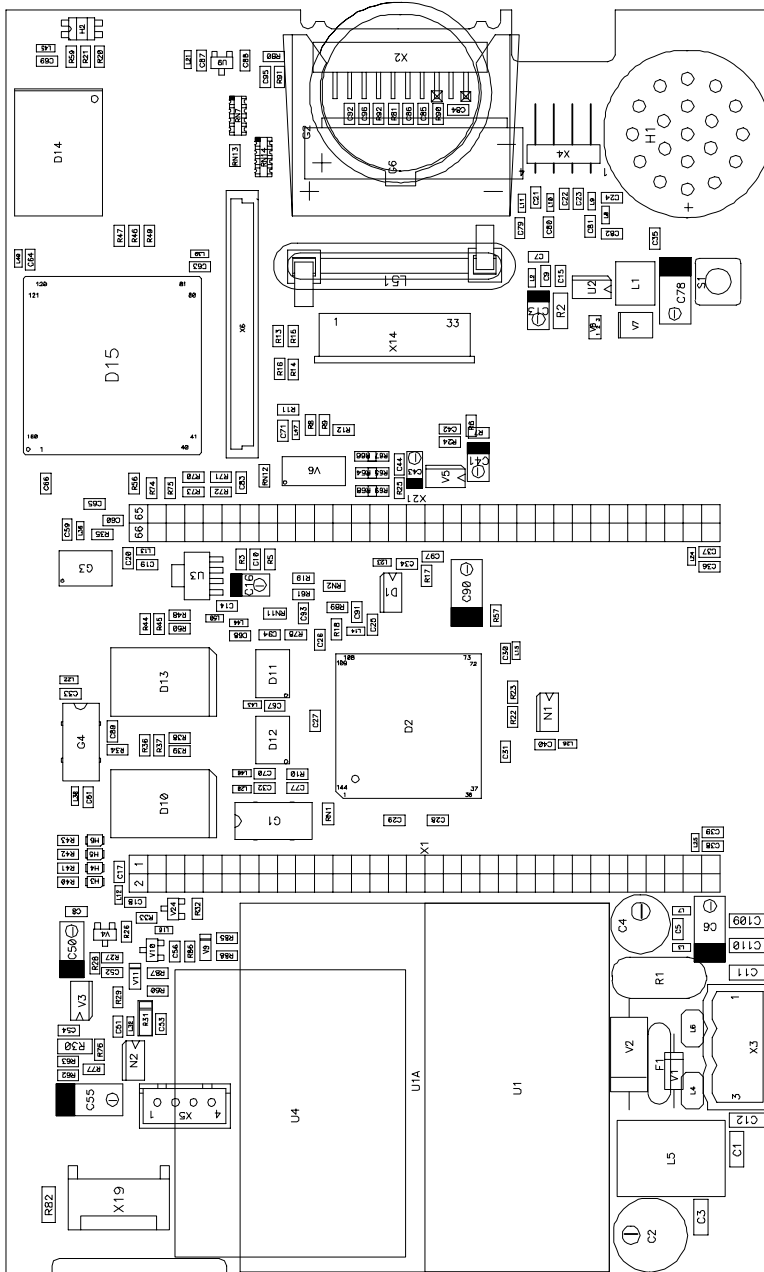
Document: Datenblatt EP1
Manufacturer: Hilscher
www.hilscher.com

MultiMedia FlashCard:

Document: MultiMediaCard Product Manual
Manufacturer: SanDisk
www.sandisk.com

MMC Standard:

Document: MultiMediaCard Specification
Source: MultiMediaCard Association
www.mmca.org



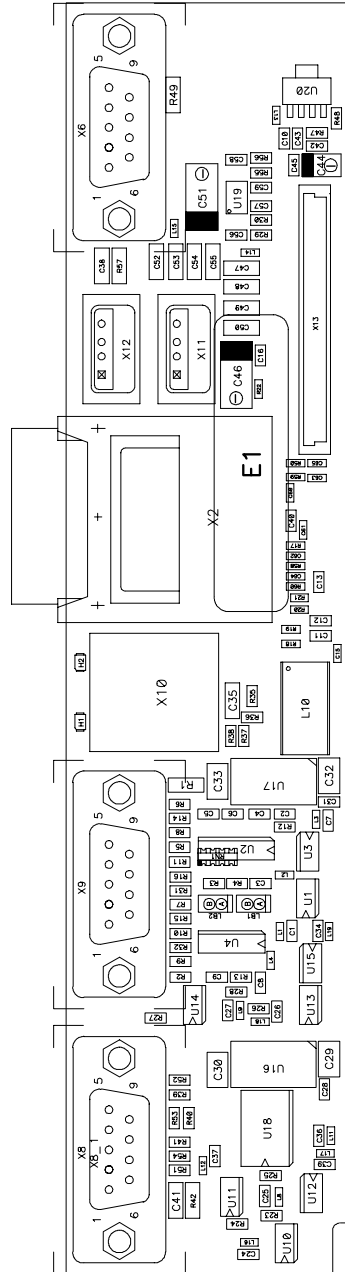
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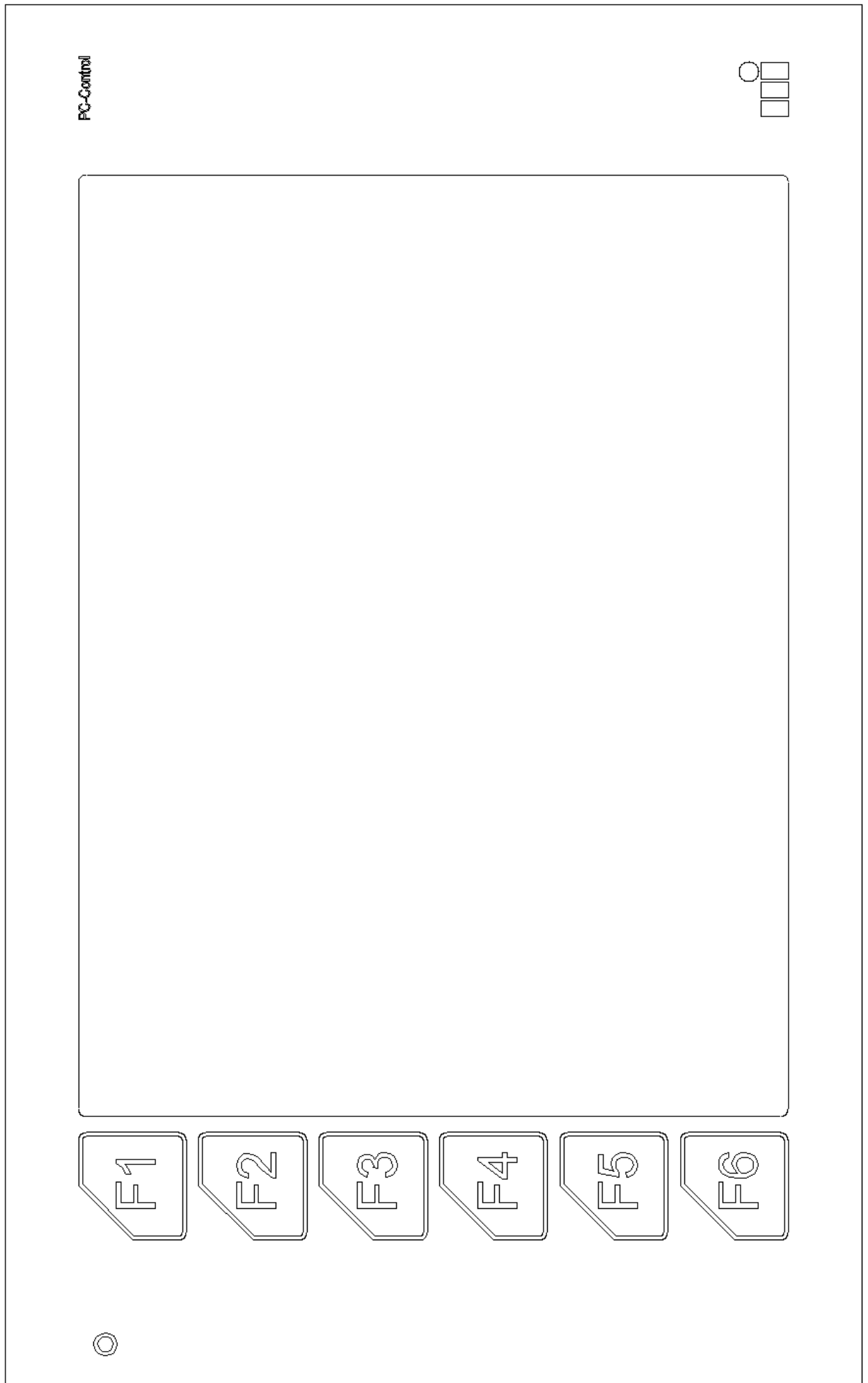


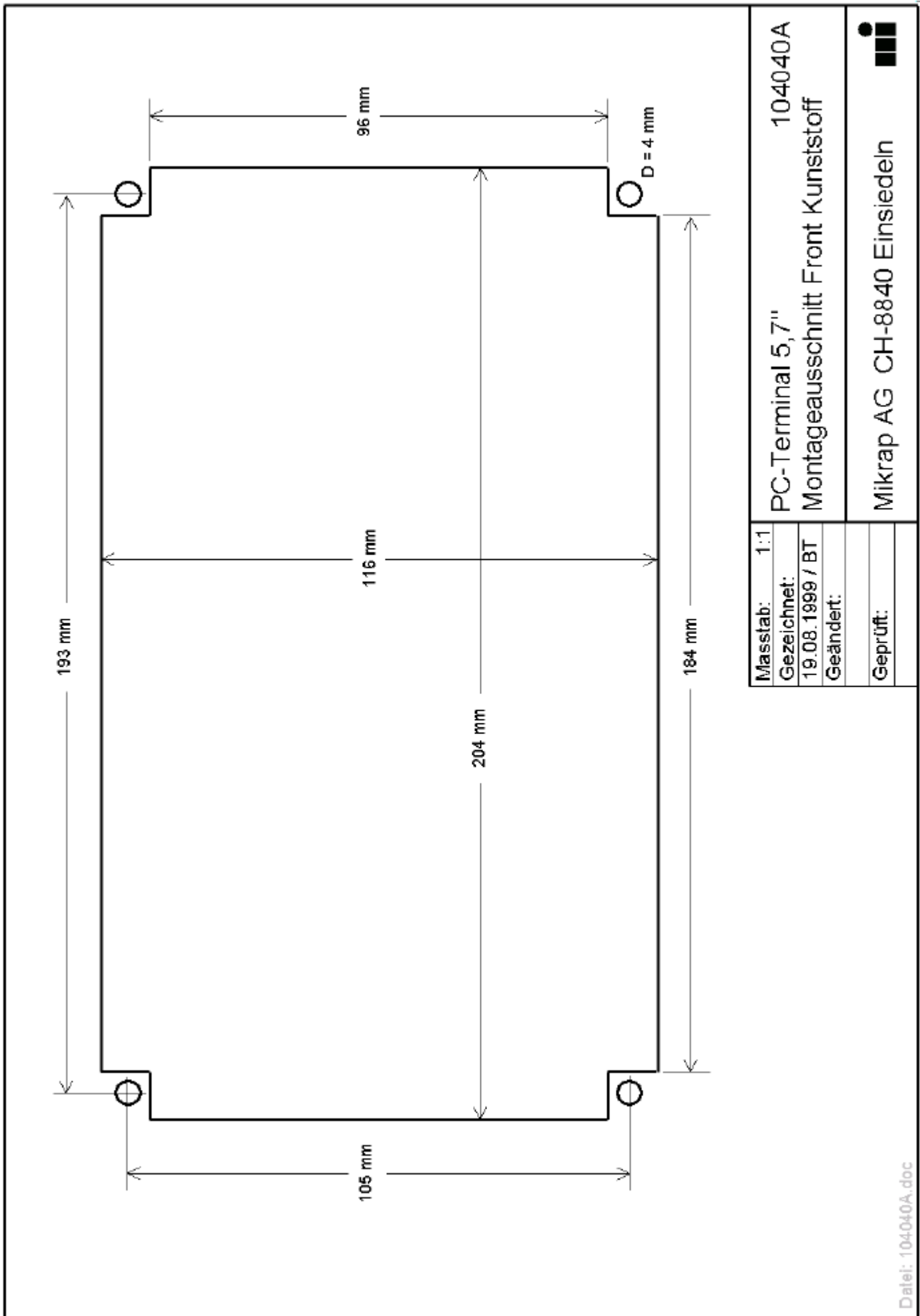


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