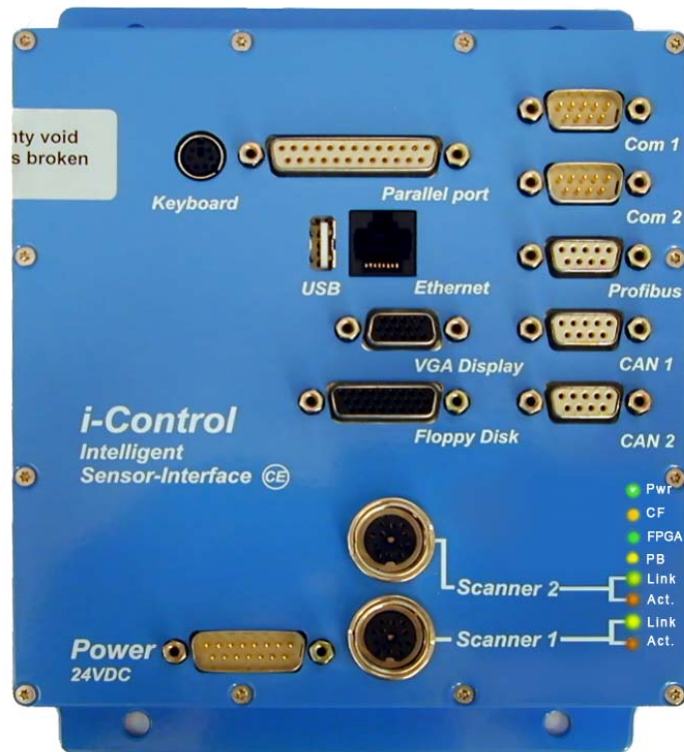


**MEL** MIKROELEKTRONIK GMBH  
intelligent sensors & measuring systems

## i-Control



## Electronic Control Module and Signal Processing System for MEL M2D Laser Scanner

### Hardware Manual

Version 4

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## System description

### System structure

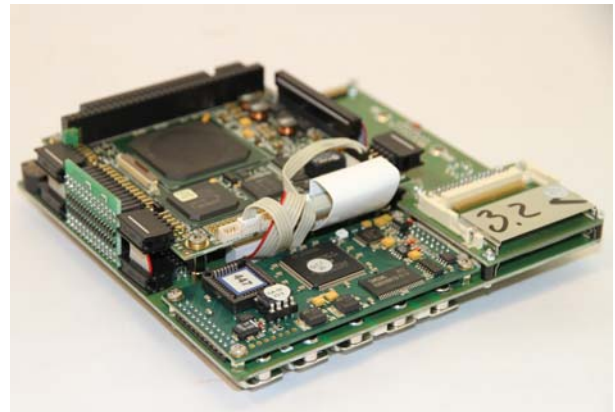
The **M2-i-Control** is a fan less PC-104 integrated in a metal enclosure. The CPU is mounted in good contact to the enclosure, so that the complete enclosure serves as a heat sink. When in contact with the machine bed or an industrial enclosure, effective cooling is made. The M2-i-Control provides interface connections for the common industrial Bus systems for operation and communication in the field: CAN-Bus, Profi-Bus-DP, Ethernet and RS-232. Operating system and application software is stored on Compact Flash Memory Cards Type II, as these are inexpensive, rugged and easily available.

Profibus applications require a system specific "GSD"-file for the PLC. The GSD file is text file. It is a descriptor for the PLC programming tool. Your PLC software engineer will import the GSD to make the PLC programming environment aware of i-Control as a Slave to the PLC (Master).

Follow the instructions about installation of the operating system / network and graphic drivers to complete the system installation with a minimum effort in time. When you ordered the system „turn key ready“ from MEL, the operating system should be installed and configured complete. For some reasons, network access must be reconfigured when you integrate the i-Control unit into an existing Ethernet network. When you communicate the necessary network parameters to MEL at time of the order, the network configuration can be made at MEL. For network configuration details see page 15.

Always use the + 24 V/1.5 A DC power adapter supplied by MEL. When you are using another power adaptor, make sure, that it could supply at least 1.5 A at 24 V DC. Power adapters not capable of delivering 1.5 Ampere peak current may cause hangs during boot or other unconditional system errors.

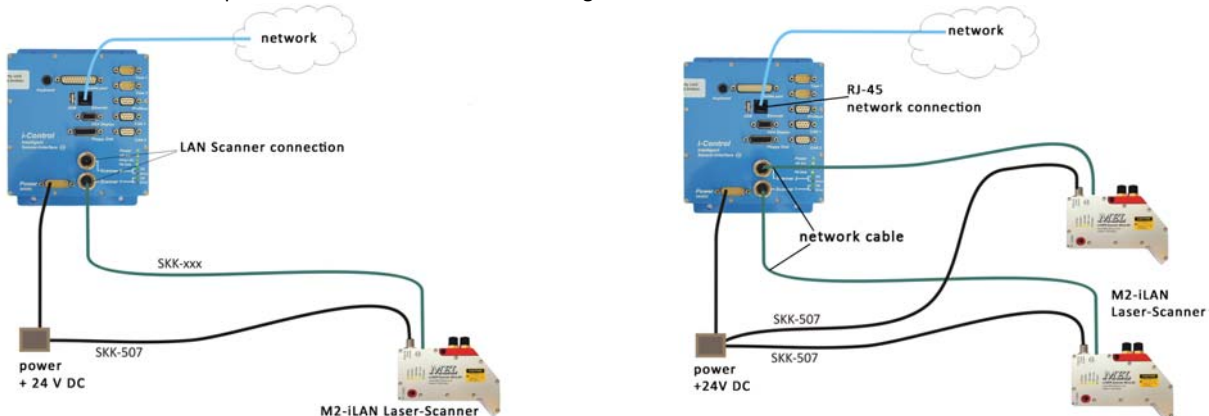
The i-Control electronic system has a "motherboard" making the connections to the peripheral connectors on the front panel and an integrated CPU PC104 with a 500 MHz-AMD-Processor and 1 GByte Ram. The 500MHz PC104 is a fully equipped, compact PC with all common features of a standard desktop PC: Serial interfaces COM 1 and COM 2, LPT-parallel interface, Ethernet, USB 2.0 and PS/2 keyboard. The PC-104 may be used as well for other application software as MEL software. MEL does not make warranties for proper functionality of other application software used with the i-Control.



### Network

The PC-104 provides an on board RJ-45 network connector. This on-board network connection may be used for remote access or as a connection to the *company network*.

Additionally to the *on board network connection* one or two integrated network controller boards called "LAN-Controller" are built into the iControl unit to provide access to one or two M2-iLAN-Laser Scanners. These boards do not require installation of a driver, but they can be used only by MEL application software for access to the Laser Scanners. The pictures below show schematic cabling of one or two M2-iLAN Laser Scanners and iControl-LAN.



### Laser Scanners and i-Control-LAN

The LAN controller expects a scanner head with IP-address 192.168.123.245. This set up can not be changed. For a 2-channel LAN system, the scanners will have the same IP address. Normally, in a network it is not allowed that two network devices have the same IP address. The LAN controllers provide a network connection to the scanner at the outside, and on the inside, the LAN controller connects to the ISA Bus of the PC-104. Therefore the Scanners are accessed as an "ISA" device through ports 400 and 408, like a "conventional" M2D-Scanner head connected to the Scanner controller. This allows using *software* made for legacy M2D Scanners with a new M2-iLAN Scanner.

## Laser Scanner Heads M2-iL2-Series

M2-iLAN- and iL2-Scanner heads are equipped with M12 connectors at the head. This connection allows easy installation, maintenance and exchange of cables and scanner heads in the machine. Scanner head connection cables are available on request from MEL. **Cables** are available as ordered for projects with normal and extended specifications for extended temperature range, power chain or robot use.

**M12 Connectors** are available from various suppliers and as well from MEL.

Linearization data of the scanner heads is saved in the electronic system inside of the scanner head. This allows exchanging scanner heads without recalibration. For welding applications scanner head connection cables are available with special shielding and scanner heads are available with add-on water cooling option.

M2-iLAN Laser Scanner heads and electronic systems have unique serial numbers. During production the integrated control circuits are precisely matched to the Scanners heads optical range. Since the electronic linearization system is completely integrated into the scanner head, linearization data is always with the scanner head. M2-iLAN-scanner heads may be exchanged and used with any PC or i-Control unit.

## Using "legacy" M2D-Scanner Heads with LAN i-Controls

Newer generations of „legacy“ M2D-Scanner heads could be used with the 500 MHz Version of iControl with a modification to the LAN i-Control unit: instead of the LAN controller board a Scanner controller board would be integrated. Exchanging the LAN controller board would require to destroy the warranty sticker and this will cause warranty cease. Therefore the cross grade could be made only at the MEL headquarter in Germany.

## Using MEL M2-iLAN Laser Scanners with i-Control

All M2-iLAN-Scanner models could be combined with i-Control-500-LAN. Contact MEL with your specific requirements before ordering the system.


M2-iLAN-LaserScanner heads provide Ethernet M12-connectors on for easy cabling and easy installation. MEL manufactures Scanners with scan width from 4 mm up to 2.600 mm. Refer to the M2-iLAN datasheets for drawings and technical data of the individual scanner models. On request, MEL will send CAD data files of the scanner heads.

## Using M2-iLAN-Scanner Heads with legacy i-Controls

All M2-iLAN Scanner heads could be used with a modification to *legacy* i-Control units: instead of the integrated M2D-controller board a LAN controller board will be integrated into i-Control. The upgrade could be made only at the MEL headquarter in Germany. The i-Control unit should be sent in to MEL for verification and diagnosis before starting the modification. MEL will inspect the iControl and make up a quote for the cross grade.

## Software

The new **MelTrax**® Software Package provides 12 different algorithms for measurement applications, for welding, guiding ultrasonic testing and seam tracking equipment. MelTrax is available as demo software.

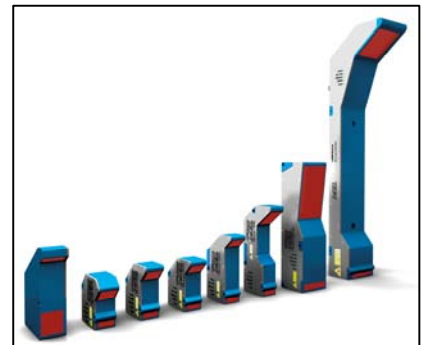
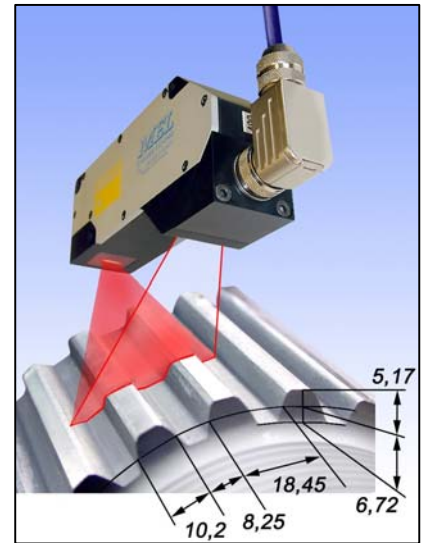
 Project specific description of software and information on *customer specific* MEL Software solutions are available on request. Mail to: [info@MELsensor.de](mailto:info@MELsensor.de)  
Information on connectors, register addresses for software engineers and technical details are given on the following pages – see page 10 .

## Accessories and Options

Relay-Box with RS232, 8 potential free Relay contacts, close contact – 1 A ; 8 digital inputs  
**i-CR-8**: a **relay box with 8 relays** and 8 digital inputs (24 V) is available for connection to the serial RS232 COM port. I-CR-8 relay box can be used with any PC like with the i-Control to deliver output signals potential free to any control system and accept logic input signals on the 8 digital inputs.

### Technical data

Digital inputs	8 w. Opto coupler
Outputs	8 x Relay
Max. out current	2A at 48V
Input voltage	Low 0V - 2V, High: 5V - 26V
Supply voltage	+12 ... +30 V DC
LED's	Activity, Power



**Option: AD/converter(s) / instead of LAN controller module(s)**

Four analogue voltage +/- 10V inputs – for example for connection of M11L- or M7L-LaserSensors

**i-CAD-4:** a 4-Channel A/D-converter board, can be integrated into the I-Control case instead of the M2D-LaserScanner controller board. Using M7L or M11L Laser sensors and application software, the i-Control turns into a signal acquisition, data logging and vibration control system. The AD/Converter board offers 4 A/D channels with 128 kHz Sampling frequency and 16 Bit resolution. Two of these AD/Converter boards may be inserted into the iControl instead of LAN controller boards, this makes a system with up to 8 channels.

The electronic units of the sensors deliver their output signals to the A/D-inputs at the 12-pin Binder Scanner connector at the front panel.

Input voltage = +/- 10 V; per Bit a Step of 5 mV pp is digitized.

This voltage corresponds to a step of 6 µm with a sensor of 2 mm range.

The sampling frequency and file size limit can be set by the application software.

The maximum sampling frequency is 128 kHz at 16 Bit resolution.

Table below: Record Duration for given file size of 8 MByte.



Sampling Frequency	Record Duration
128 kHz	0.27 min
64 kHz	0.55 min
32 kHz	1.09 min
16 kHz	2.18 min
8 kHz	4.37 min
4 kHz	8.74 min
2 kHz	17.48 min
1 kHz	34.95 min

- Sensor 1 distance - range -10,24 ... 10,24 V (± B\*\* mm) (0.005 V / bit)
- Sensor 1 Intensity - range 0 ... 10,24 V (0.0025V / bit)
- Sensor 2 distance - range -10,24 ... 10,24 V (± B\*\* mm) (0.005 V / bit)
- Sensor 2 Intensity - range 0 ... 10,24 V (0.0025V / bit)

\*\*B = range of Sensors

When only distance signals were used, up to 4 sensors per converter board can be measured.

**Power Thru Option**

Power supply for the scanner fed with the scanner connection cable.

This option applies for single connector solutions – the scanner has only one connector and power is supplied with the network connection cable to the scanner head. The option requires a modification to the iControl main board. This modification can be made only at production time. Later modification will cause high cost.

Order code i550.xxx

**Power Split box**

The Power Split box inserts power to the scanner head connection cable.

Depending on the type of scanner and connection cable, power will not be taken from the iControl but from an external power source. This option could be used when upgrading legacy iControls with LAN Controller boards.

Order code i550.xxx



**Power Supply**

Standard 24 V DC power supply for all iControl Versions

Power supply 24V DC / 1.5 A; short time 1.7 A

Order code 550.121

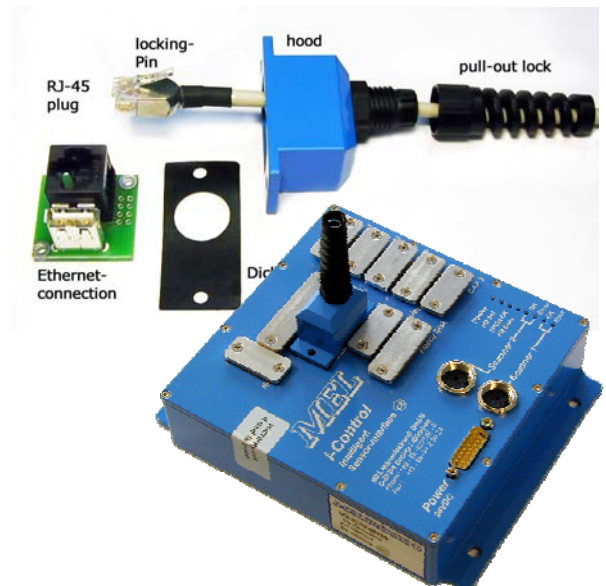
Input line voltage 100 ... 264 VAC

**Water resistant network connection**

Option: „Water tight IP65+“: covers for unused connectors

The option „water tight“ provides a rubber sealing gasket and metal cover on top of the individual front panel connectors. The Ethernet and USB connectors were covered with a hood. This means that the USB connector will then be not freely accessible because it is covered by the water protection hood.

Order code: 550.12x



**Floppy Disk drive with 26-pin HD connector**

A Floppy Disk drive integrated in a metal enclosure with cable having a 26 pin HD connector for connection to the iControl. The Floppy drive can boot the iControl with a Windows or Linux start disk.

Order code: 550.xxx



**Second LAN controller for M2-iLAN Laser Scanner**

LAN Controller board for integration into iControl

The LAN Controller board grants access to one M2-iLAN Laser Scanner for specific MEL application software. For installation of the LAN Controller board should be done at MEL headquarter. Contact MEL for upgrade options.


Order code: i548.022



**CF - Memory cards**

The i-Control unit is equipped with a dual card reader for compact flash memory cards (CFII). The upper slot is the slot for the operating system disk C./.. The card may store also application software or other data. The lower slot is optional for user data. Software updates can be done using the second (lower) card slot.

Prices for CF memory cards are on a daily basis. For orders of Memory cards call or mail to MEL for price information.

 Some Compact-Flash cards were not recognized when using *both* CF slots. In case of question use pre tested cards from MEL. MEL does not make warranties for proper functionality or take back memory cards of other suppliers. Compatible CF cards are available in 4 ... 8 GB size.

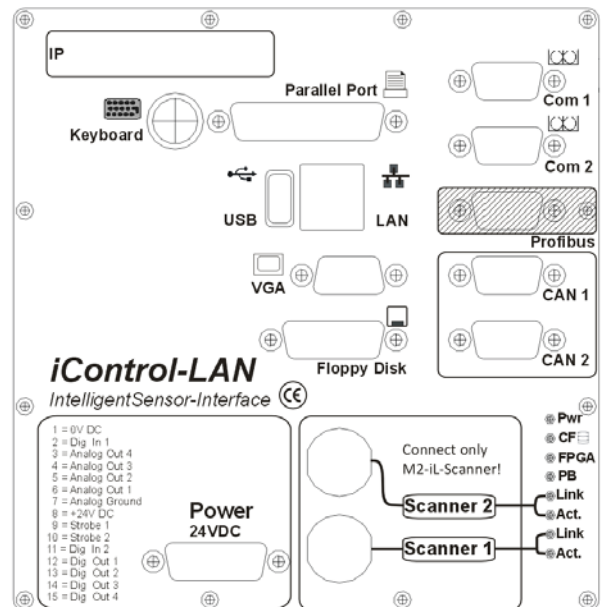


**Status LED's on the i-Control**

- Power = lit when supply power is on
- CF = access to CF card
- FPGA = FPGA Boot successful
- PB = Profibus send / receive data
- Scanner 2 Link = Scanner 2 connection is active
- Scanner 2 Act. = Scanner 2 receiving Profile data
- Scanner 1 Link = Scanner 1 connection is active
- Scanner 1 Act. = Scanner 1 receiving Profile data

**Connectors**

- Keyboard = PS/2 keyboard
- Parallel Port = printer connection
- USB = USB 2.0
- LAN = 100 MBit Network connection
- VGA = Monitor
- Floppy Disk = Floppy Disk Drive
- COM 1, COM 2 = serial port
- Profibus = Profibus-DP
- CAN 1, CAN 2 = CAN Bus
- Scanner 1, 2 = Ethernet-connection 10/100Mbit
- Power 24 V DC = power supply,
- CF-card(s) = 2 slots CF-II



**USB**

With Windows XP operating system USB does not require a driver. The USB port has a fuse of 500mA together with the PS/2 port. When the USB port is shorted, this fuse may blow. Make sure to prevent short circuits to the USB port!

**Printer**

The parallel port on the i-Control unit is a standard LPT-1 printer port. Default set up is EPP protocol.


## Technical Data

CPU	500 MHz AMD	fan less cooling: the CPU is mounted directly to the massive enclosure.
Ram	1 GByte	
Hard disk	CFII	4 GByte
Dimensions	155 x 160 x 45 mm	
Weight	1.3 kg	
Protection	IP-40	optional IP-65+
Intended use	Bus-Interface and process controller for industrial technology	
Ultra-compact Industry-PC, data logger, signal & data acquisition		
Data acquisition for up to 8 displacement sensors with 8 analog inputs (i-CAD-4)		
Data acquisition for up to 2 Laser-Line-Scanners M2D		
CE-certification	the M2-iControl has been tested under strongest conditions	
Standards	EN 61000-6:2001, part 1 ...4 (EN 50081-1/2 + 50082-1/2)	
	- The unit had no problems -	

<b>Connections</b>	2 x Scanner / Sensor	Binder 12 pin
	2 x RS-232	D-Sub-9, 115.320 Baud
	2 x CAN-Bus	D-Sub-9
	Profibus-DP	12 MBit Slave, GSD on request
	Floppy disk	D-Sub-HD-26
	Parallel Port	D-Sub-25
	Ethernet	10/100 MBit RJ-45 Western
	USB, PS/2	
	Power & Interface-connector:	24 V power supply
		4 analogue outputs 0 ... 10V, 2 digital outputs TTL (strobe)
		2 digital inputs – also for A/B-90°-encoder signals low = 0 ...2 V high = 5 ... 30 V
Status LED's	Power, FPGA, ProfiBus Activity (data), CF disk activity, FPGA (Integrity of the Eproms)	
	Link; Activity (Scanner 1 & 2)	

## Mounting and Cooling

The M2-i-Control has been designed for use in industrial environment. The CPU is heat-sinking directly to the metallic enclosure of the i-Control. To provide efficient cooling and long term thermal stability, mount the Controller directly to a metallic, flat and cool surface. Mounting the Controller onto a metallic cabinet wall is a good solution.

 Avoid direct sunlight and heat radiation onto the i-Control.

The environmental temperature must not exceed 35° Celsius. Operation with temperatures **below 0° Celsius is not recommended**. When **no** cooling is applied (i-Control standing or lying free on a flat surface) ambient temperature may not raise above 30° Celsius. For higher environment temperatures forced cooling is a must.

## Operation in Tropical Environment

When using i-Control in a tropical environment, use cooling with caution. Due to very high humidity, condensation may happen already at higher temperatures. When the unit is chilled too much, water may collect inside and cause corrosion. Damage through water is excluded from warranty!

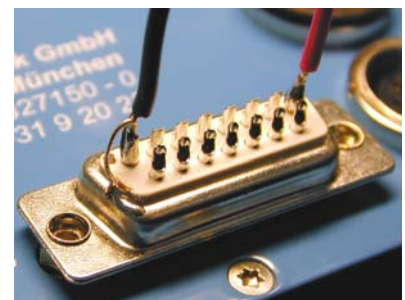
## Shielding and Ground

The signal and scanner connection cables were double shielded. The connection cable is shielded internally with a foil shield and from the outside with an additional metal mesh shield. This outer shield is connected to the enclosure of the connector at both ends of the cable. This shielding provides better isolation against electromagnetic noise from the outside: electrical shocks were conducted to the case and thus to Ground / PE without coupling to the signal wires.

**Pin 1** of the Power-connector shall be grounded to the connector frame with a short, thick wire, as shown in the picture on the right side.

The i-Control unit may be grounded with a lead of > 2.5 mm<sup>2</sup> to a central ground / PE connector on a metallic mounting plate. The mounting hole beneath the power connector is kept free of paint to provide good ground contact to the enclosure.

Use only potential free power supplies.





**Battery operation**

Operation on +24 V batteries is no problem. The internal voltage converter of i-Control works from 16.5 VDC up to 30 VDC input voltage. The current is approximately 1.1 A at 16.5 V. At higher voltage the efficiency of the converter improves, and the current drops to 0.52 A at +26 VDC input.

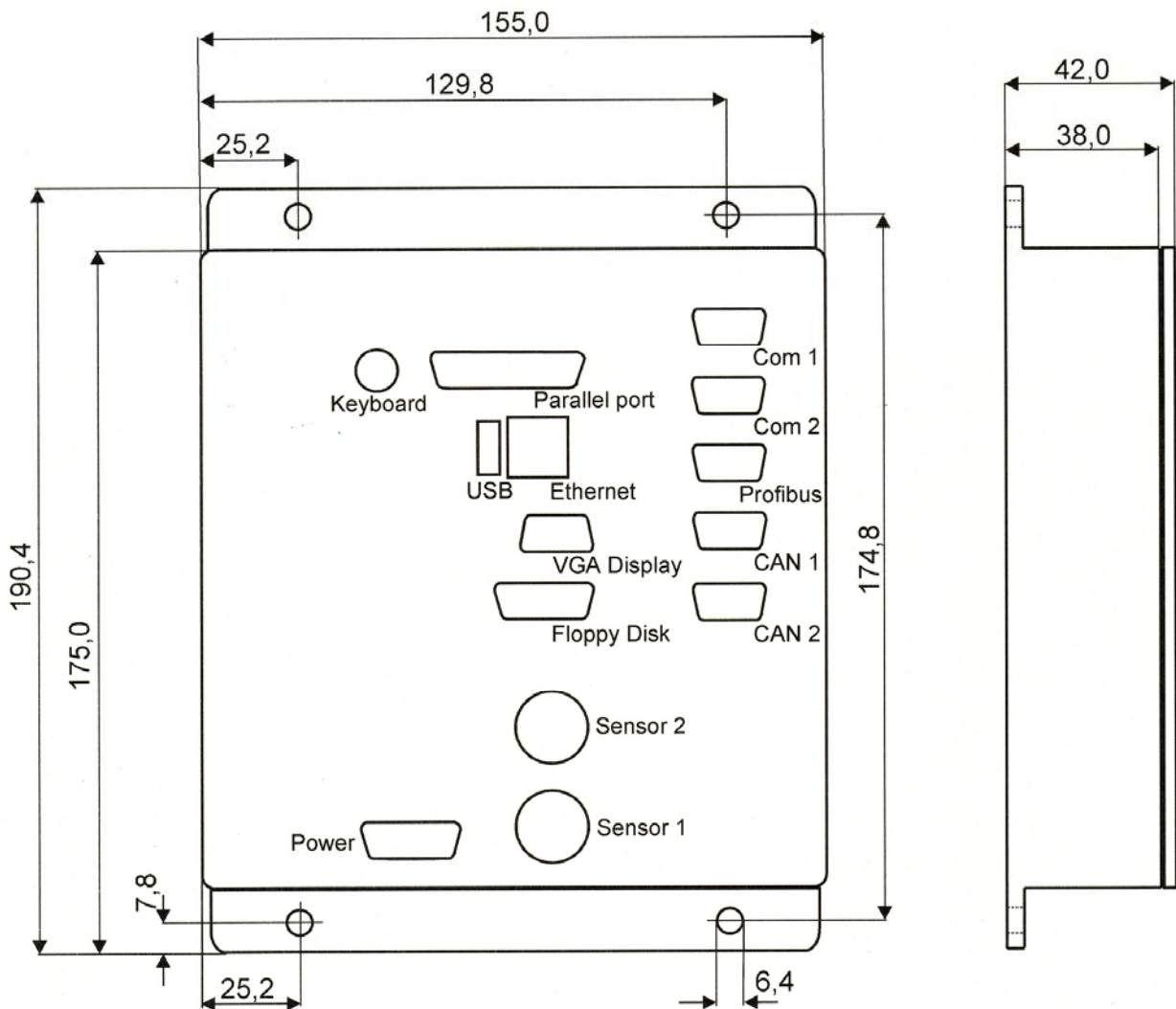
These values have been measured using Windows XP, 4 GB Compact-Flash in slot 1, keyboard, optical mouse and one scanner head.

With two scanner heads, floppy disk drive and Windows XP, power consumption will be slightly higher. During boot, power consumption varies by +/- 10%.

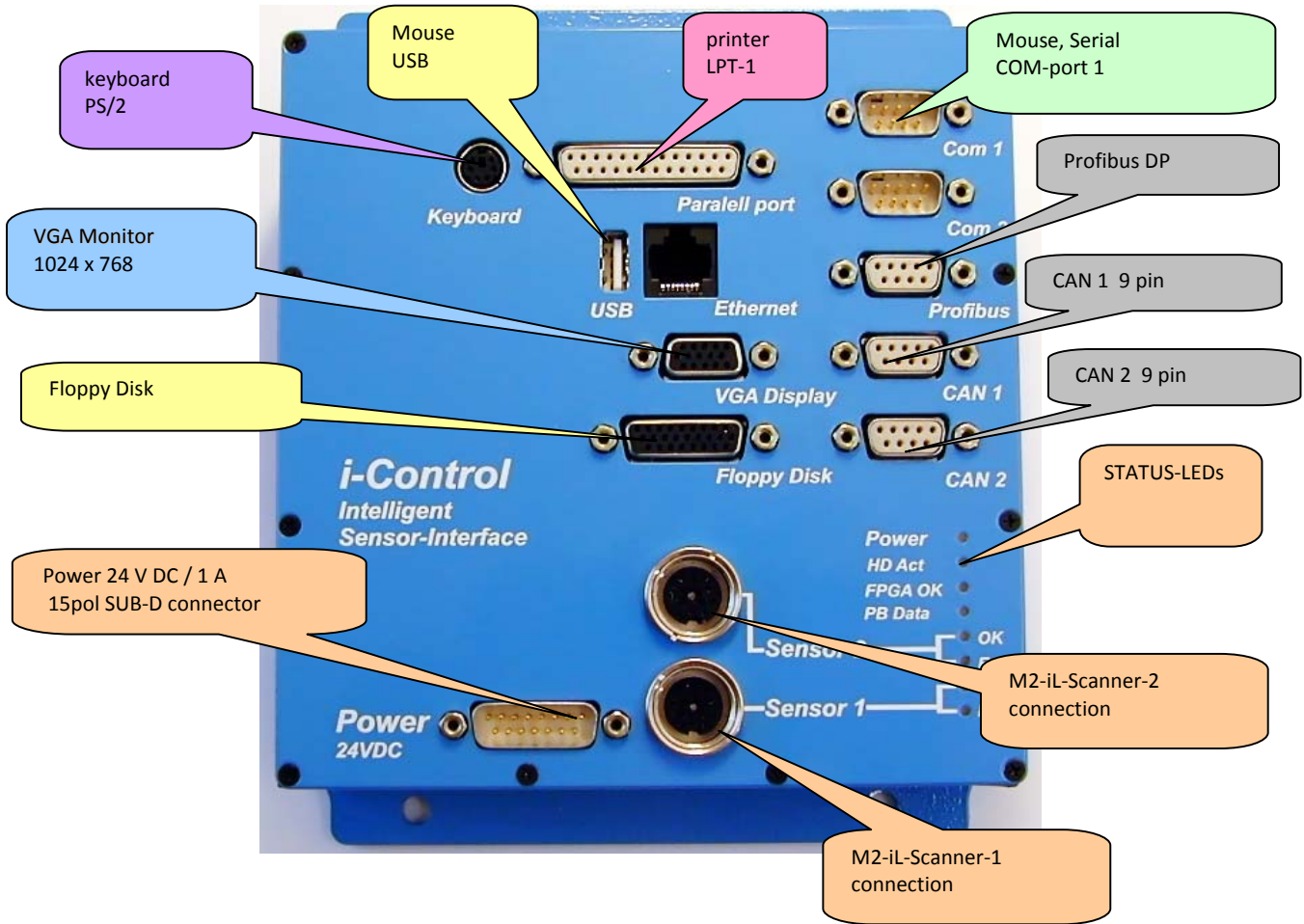
16.5 V is the minimum voltage, below 16.5 V DC input, the i-Control will not switch on. When the voltage drops below 16.5 V, i-Control will switch off.

Voltage / Current	
Input V	Current A
16.5	1.10
18	0.72
20	0.65
22	0.60
24	0.55
26	0.51

**Dimensions**



**Hardware Interface**  
**Front Panel Connections**



**24 VDC Power and interface connector**

PIN	Function	Description	Voltage Range	Colour *	Signal meaning
1	0 V DC	Supply power Zero	0 V Power	White	- Supply voltage GND
2	D. in 1	Digital Input 1		Brown	Digital Input 1
3	An. out 4	Analogue out	0-10V	Green	Left z value
4	An. out 3	Analogue out	0-10V	Yellow	Right z value
5	An. out 2	Analogue out	0-10V	Grey	No output assigned **
6	An. out 1	Analogue out	0-10V	Rose	Centre x value
7	AGND	Analogue outputs GND	0 V DC analogue	Blue	Analogue ground
8	Vin +	Supply power	+ 10...28 V DC/16 W	Red	+ Supply Voltage
9	Strobe 1	Strobe Scanner 1	TTL negative pulse	Black	Strobe out 1
10	Strobe 2	Strobe Scanner 2	TTL negative pulse	Purple	Strobe out 2
11	D. in 2	Digital Input 2		Grey-rose	Digital Input 2
12	D. out 1	Digital output 1	30 V DC max.	Red-blue	Open Collector out
13	D. out 2	Digital output 2	30 V DC max.	White-green	Open Collector out
14	D. out 3	Digital output 3	30 V DC max.	Brown-green	Open Collector out
15	D. out 4	Digital output 4	30 V DC max.	White-yellow	Open Collector out
	Shield	Shield		Yellow-brown	Shield / EMC

\* Colours are not mandatory

\*\* Digital in- / -outputs and analogue outputs must be assigned in the application software to output expected signals.

**Floppy Disk drive**

PIN-Nr	FD-Flat conn.34	Function	Description
1	8	INDEX	Index
2	12	DS0	Drive Select B
3	16	MOTOEB	Motor Enable B
4	20	STEP	STEP
5	24	WGATE	Floppy Write Enable
6	28	WPT	Write Protect
7	32	SIDE1	Head Select
8	5	GND	GND
9	7	GND	GND
10		+ 5 Volt	Power connector + 5 V
11	NC	NC	
12	NC	NC	
13	18	DIR	Direction
14	22	WDATE	Write Data
15	26	TRK00	Track 0
16	30	RDATA	Read Data
17	34	DSKCHG	Disk Change
18	9	GND	GND
19		+ 5 V	Power connector + 5 V
20			Power connector ground
21			Power connector ground
22	11	GND	
23	13	GND	
24	15	GND	
25	17	GND	
26	19	GND	

**Parallel Port LPT-1**

PIN-Nr.	Signal Name
1	Strobe
2	data 0
3	data 1
4	data 2
5	data 3
6	data 4
7	data 5
8	data 6
9	data 7
10	/nAck
11	Busy
12	Paper End
13	Select
14	Auto feed
15	Error
16	Initialise
17	Select In
18	Signal Ground
19	Signal Ground
20	Signal Ground
21	Signal Ground
22	Signal Ground
23	Signal Ground
24	Signal Ground
25	Signal Ground

**CAN Bus**

PIN-Number	Function
1	
2	CAN - Low
3	GND
4	
5	
6	GND
7	CAN - High
8	
9	

**Profibus-DP**

PIN-Nr	Function	Description
1	screen	-
2	ground	-
3	RxD/TxD-P+	Receive and transmit data Plus / B-wire
4	CNTR-P	Control signal for repeaters(direction) Plus RTS
5	DGNG	5V Ground, Digital Ground
6	VP	-
7	P 24	-
8	RxD/TxD-N-	Receive and transmit data Minus / A-wire
9	CNTR-N	-

**COM 1, COM 2**

PIN-Number	Name	Direction	Description
1	CD	<-----	Carrier Detect
2	RXD	<-----	Receive Data
3	TXD	----->	Transmit Data
4	DTR	----->	Data Terminal Ready
5	GND	-----	System Ground
6	DSR	<-----	Data Set Ready
7	RTS	----->	Request to Send
8	CTS	<-----	Clear to Send
9	RI	<-----	Ring Indicator

**VGA**

PIN-Nr	Function	Description
1	Red	Video signal red
2	Green	Video signal Green
3	Blue	Video signal Blue
4	ID2	Monitor Identification bit 2
5	N.C.	unused
6	GND Red	ground Video red
7	GND Green	ground Video green
8	GND Blue	ground Video blue
9	Coding	coding
10	GND Sync	ground Sync Signal
11	ID 0	Monitor Identification bit 0
12	ID 1	Monitor Identification bit 1
13	H-Sync	Horizontal Sync signal
14	V-Sync	Vertical Sync signal
15	N.C.	unused

**Scanner input**

Binder 12pin socket	Signal	Color	Description	RJ-45
A				
B	Tx-	Green	Ethernet Transmit data	6
C				
D				
E	Rx+	Orange / White	Ethernet Receive data	1
F	Tx+	Green / White	Ethernet Transmit data	3
G	Rx-	Orange	Ethernet Receive data	2
H				
J				
K	+ 24V	Blue	Supply voltage + 24 V	--
L	Ground	Blue / White	Supply Voltage Ground, 0 V	--
M				
	EMV	Shield		Shield

The optional AD/Converter board turns the iControl into a data acquisition system.  
Table below: pin out for two sensors M7L-Sensors with intensity and distance signals.

**AD/Converter input**

Binder 12pin socket	Function	Sensor 1	Sensor 2
A	Case GND		
B	A.GND	14	
C	A.GND		14
D	A.GND		
E	A.GND		
F	input 4		20 Intensity
G	input 3		1 Distance
H	input 1	1 Distance	
J	Case GND		
M	input 2	20 Intensity	

## Getting started

Connect your Monitor to the VGA-Display connector on the front panel of the M2-i-Control. Do **not** connect M2D-iLAN Scanner heads **unless** your operating system and application software has been installed.

A PC needs an operating system to do something useful. If no operating system has been ordered and pre-installed by MEL, you will now need to install the operating system before proceeding to the steps of using application software and connecting MEL hardware. MEL will not deliver operating systems, when not ordered with the initial order.

## BIOS

BIOS is the computers binary input output system. Any operating system talks to the computers hardware through the BIOS. The Bios provides routines for the software to access and use hardware components as Hard Disk, Floppy Disk, Processor, Memory and other. BIOS settings are important, if you want to run the installation routines of the operating system. The BIOS must enable to boot the PC104 inside of the M2-i-Control unit from a CDRom drive, to be able to launch the installation routine.

### Set CDRom drive as first boot device

Make sure that your monitor is connected to VGA and powered up. Connect your keyboard to the PS/2 and the mouse to the USB connector. Connect the 24 V DC power supply and switch power on.

After a very short while the i-Control unit should **beep**. Immediately after the beep press DEL.

Your monitor should show the BIOS main screen (picture at right side).

When the BIOS prompt on the screen disappears too fast to read:

Press the Pause key on the keyboard to view the text.

When the BIOS screen is not visible, reboot the system (cycle power) and immediately after the short beep **press DEL**.

Select "Advanced BIOS Features"

Use arrow keys  $\uparrow\downarrow$  to navigate to „First Boot Device“

Press Enter

Navigate  $\uparrow\downarrow$  to „USB CD Rom“

Press Enter

Press ESC to leave the selection

Press ESC to leave the menu

Confirm "Save to CMOS and Exit" Y



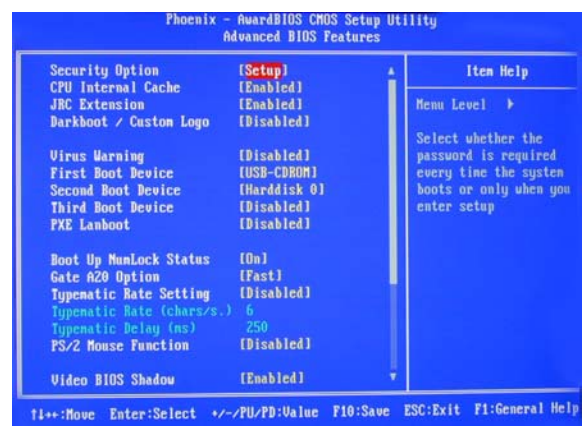
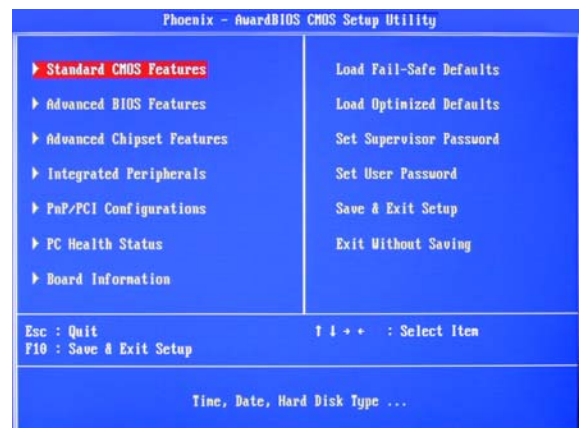
Please note, that colours may be different, depending on individual BIOS settings. Wrong BIOS settings may cause the PCs operating system to be unstable, to hang or render it inoperable.

If you want to prevent BIOS settings to be changed, you could lock the BIOS settings with a password, but we think this is not a good idea: if the BIOS password is lost, no further changes could be made to the BIOS.

Exchanging the BIOS chip is **not** possible, replacing the BIOS chip could be made only at the manufacturer of the PC-104. Retrieving the BIOS password needs highly specialized tools, a lot of time and knowledge, so best method is *not to set a BIOS password!*

## Boot

When the CDRom drive has been defined in the BIOS as first boot device, the iControl will search for a USB-CDRom when power is switched on.





## Installation of the Network Adapter

The MOPSIcdLX uses a Intel 82551ER PCI Fast Ethernet Controller. The network controllers support 10/100 Base-T interfaces. The devices auto-negotiate the use of a 10 Mbit/sec or 100 Mbit/sec connection. Error-free network operation can be guaranteed up to 100 meters CAT5e Ethernet cable, for details see cable manufacturer's specifications.

Intel 825xER Ethernet drivers are available for Windows XP, Windows 2000, Windows 98 and NT. In case that you want to use another operating system (Linux), please refer to the Kontron Website: [www.Kontron.de](http://www.Kontron.de)

For Windows XP driver installation follow the given procedure below:

- 1) do a **right mouse click** on "My Computer"
- 2) Select "Manage"
- 3) Select Device Manager
- 4) Double click on the yellow question mark item **network adapter**
- 5) Select the tab **Driver**
- 6) Choose "install driver" or "**update driver**"
- 7) **Deny** when the installer asks to make up an internet connection
- 8) Choose "from list or specific location"
- 9) Point to your USB stick with the driver
- 10) Select the folder "LAN" and run the installer
- 11) When Microsoft moans, that the driver is not certified click "install anyway"
- 12) The installation routine will copy files from the Microsoft Windows XP CDROM

## Network Configuration

- 1) Go to the start menu | Settings | Control panel
- 2) select "Local Area Connection" and do right mouse click
- 3) select "Properties"

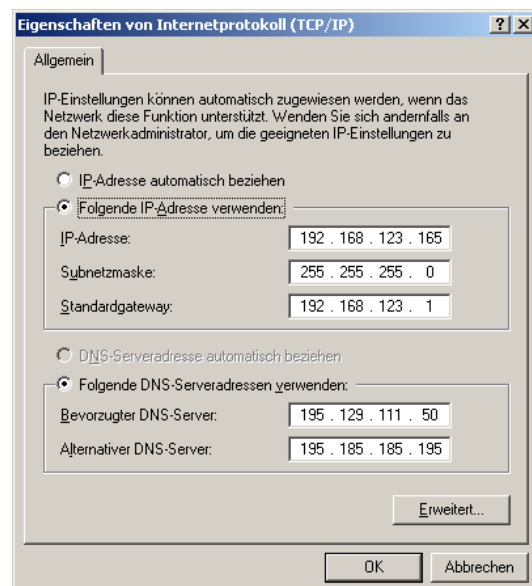
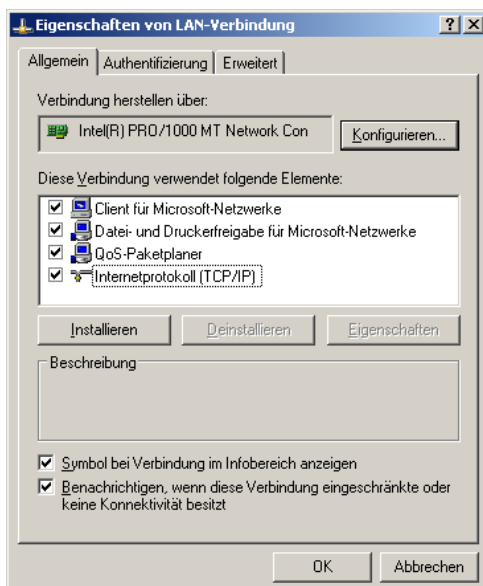
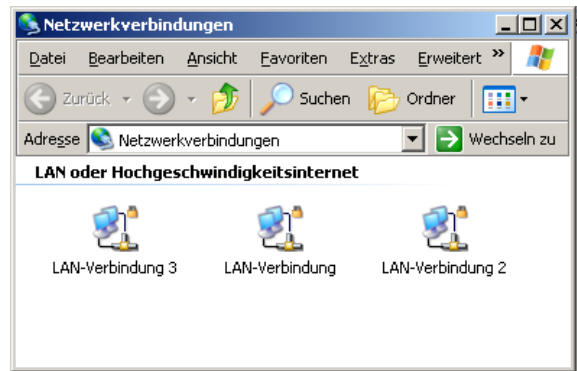
The IP-Addresses of the network cards were set in the control panel "properties" of local area network.

DHCP is not supported. The address of the network card connecting to the scanner needs to be set to a network address in the same *Subnet*. Switches may be used, Hubs were not recommended.

When you connect the Scanner directly to a network card, a crossed Ethernet cable, also known as "**crosslink**" must be used. Use cables of category CAT5e or better quality.

## Set the IP-Address

Do a right mouse click on the network symbol in the system tray. Open the properties dialog. In the pop-up menu, click "Status". The screen below left appears.



Select Internet protocol TCP/IP and properties (alternative method: double click on TCP) - the screenshot at the right side appears.

A *DNS Server* is not required *but it will do nothing bad* when a DNS address is set.

Please note: when your network uses a Proxy, you may have to set the Proxy's IP address as a gateway\*.



Make sure, that TCP/IP protocol is installed. If your network server supplies DHCP (Dynamic Host Controlled Protocol), leave the options as default settings. If DHCP is not available in your network, *consult your system administrator\** for a valid, defined TCP-address and some configuration help.



For test you could use a TCP address in the range of 192.168.xxx.xxx.

Example: 192.168.1.100

When the network connection is made, the **network neighbourhood** should now be accessible.

## Installation of the graphic adapter

When MEL installed the operating system, the driver for AMD Graphics adapter is already installed and a copy of the drivers will be stored under c:/Program files/MEL/drivers

The procedure is basically the same as previous procedure for installation of the network adapter.

The AMD driver will cause the operating system to present a "warning".

Choose "continue anyway" to install the driver.

Please note: MEL's application software is designed for best display results at 1024 x 768 pixels.

The driver for the AMD graphic chip is available for Windows XP / 2000 from MEL's FTP site.

There is **no** graphic driver for Windows 98.

## System activation

Microsoft Windows XP operating system requires system activation with Microsoft. This procedure can be done with a few mouse clicks when the iControl is connected to the internet. This requires having the network driver and configuration set up to be successfully completed. Without internet connection, the activation procedure can be done by telephone, which is much more time consuming. After network installation is done, check for connectivity to the internet. Click on the keys symbol to call the activation routine for online registration and activation with Microsoft.



Without activation, the operating system will stop working after 30 days.

## Installation of a printer

Have your USB CDrom connected to the iControl. During the printer installation routine, the system Use a network printer on another PC and connect the i-Control to the Ethernet network. When network printers are available in the network, the installation requires only access to the printer through the network. Make sure, that the printer is *shared*, before you start printer installation. A double click on the new printer icon calls the printer installation wizard. The wizard will guide you through the installation process. Select the path for the printer and click finish.



Installing a local printer requires operating system CD or a copy of the CD on a local volume (for example a second CF card, which has been copied from the operating system CD). Use the installation wizard and define the printer's brand and type. The printer installation wizard will ask for operating system CD. The wizard will search for the driver's location and load the correct driver.

## Installing application software

To install application software either use the Floppy disk drive, use a USB stick, copy the software over the network or copy the software to a compact flash disk and insert that compact flash disk into the lower slot of the card readers. If the software needs to run an installation routine, run the installation routine after the above steps have been completed.

MEL application software will be pre-installed and configured ready to run when you order the i-Control-system complete with software and operation system from MEL. If that is not the case, MEL will not deliver support free of charge with problems when installing operation system or other (non-MEL) application software.

For the configuration of MEL demo software please refer to the M2E-Show and M2Vision manuals available on the MEL ftp server and MEL-Dealer-CDs.

## Configuration of the MEL application software

For configuration of test and demo software follow the manual of the MEL application software. The manual for the MEL demo software MelTrax is available on request from MEL or as free download from the MEL FTP-server (<ftp://melsensor.de/Software/DemoSoftware-2007-2009/MelTrax>).

## Using other application software

Other than MEL application software may require different set up or hardware-parameters. MEL cannot make warranties, that other application software may be useable on the i-Control unit as on other PCs. Microsoft office software (Word, Excel), Adobe Acrobat reader, Internet-Explorer and many other free and shareware has been tested successfully. No conflicts with MEL application software have been found so far. To prevent fragmentation and keeping up performance, installation of other application software is not recommended.



Using other application software while running MEL application software may degrade performance of measurement frequency significantly. Quit all other application software, before launching MEL application software.

**Performance**

If performance degradations were recognized, MEL recommends reformatting the system disk and reinstalling the operating system in a minimum configuration. Tweaking the operating system requires some experience. If system components were disabled, which were used by any application software, program errors, system instability and hangs may occur.

**Using Internet Browser Software**

Internet Explorer Version 7 or higher versions, works stable with all PC-104s. With MEL application software no incompatibilities with Internet Browser software has been found. Any software versions not tested by MEL are not supported. Call or mail to MEL, when you need advice how to locate other versions of assisting software.

## Interface description

### Register-Addresses of I/O Ports, D/A, A/D-Converter, Position Encoder

IO-Address 0x400	16Bit	= Data register Scanner 1
IO-Address 0x404	16Bit	= Data register Scanner 2
IO-Address 0x406	16Bit	= Position Encoder
IO-Address 0x408	16Bit	= Configuration Register Interrupts + Digital IO
IO-Address 0x40A	16Bit	= 4 x 12Bit DA converter 0-10V
IO-Address 0x40C + 0x40E	16Bit	= ProfiBus Controller
IO-Address 0x410 – 0x42F	8Bit	= CAN-Controller1 Data
IO-Address 0x430 – 0x43F	8Bit	= CAN-Controller2 Data
IO-Address 0x450	8Bit	= CAN-Controller1+2 Mapping Register

Address		Bit's	Function	Status
Hexadecimal				
0x400	read	0..7 8..15	<u>Sensor1</u> 1.Data bit 2.Data bit	
	write	0..7 8..15	Command Sensor1 NC	
0x404	read	0..7 8..15	<u>Sensor2</u> 1.Data bit 2.Data bit	
	write	0..7 8..15	Command Sensor2 NC	
0x406	read	Byte=0 0..15 Byte=1 0..7 8 9..15	position encoder Bit 0..15  position encoder Bit 16..23  Encoder direction NC	
	write	0 1 2..15	Read Byte Reset position encoder NC	0 = Byte 0   1 = Byte 1 with 1

### AD-Converter Option

Register 0x402 + 0x406: instead of the position encoder option, 2 boards with 4 channels AD-converter can be integrated into the i-Control unit. A special firmware is required.

The AD-converter boards fit into the sockets of the M2D-electronic controller boards inside i-Control unit. It is possible to mix M2D controller boards and AD-converter boards in i-Control. Example: 1 AD-controller boards for up to 4 analog sensors + 1 x M2-LAN-controller board for one M2D-Laser-Scanner head.

0x402*	read	0..11 12 13..15	Analog Data board 1 Conversion ok, is erased, after read NC	1 = conversion OK
	write	0 1..2 3 4 5..7 8..15	switching Sensor1 - AD-board 1 adjust read channel manual / start / continuous start in manual mode NC Adjust sampling frequency	1 = AD-board 00=1 01=2 10=3 11=4 1 = continuous 1 = Start 0,5 KHz Steps up to 128kHz
0x406*	read	0..11 12 13..15	Analog Data board 2 Conversion ok, is erased, after read NC	1 = conversion OK
	write	0 1..2 3 4 5..7 8..15	switch Sensor2 - AD-board 2 adjust read channel manual start / continuous conversion Start in manual mode NC Adjust sampling frequency	1 = AD-board 00=1 01=2 10=3 11=4 1 = continuous 1 = Start 0,5 KHz Steps up to 128kHz

\* when equipped with AD-converter board

0x408	read	0 1 2 3 4 5 6 7 8..15	Strobe Signal from Sensor 1 Strobe Signal from Sensor 2 Digital in 1 (0 = < 1V 1 = >2-28V) Digital in 2 (0 = < 1V 1 = >2-28V) Power good Profi-Bus Controller ready Interrupt Sensor1 occurred Interrupt Sensor2 occurred NC	Negative Impuls Negative Impuls 1 = voltage on 1 = voltage on OK = 1 1 = Ready 1 = Interrupt occurred 1 = Interrupt occurred
	write	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14..15	Digital out 1 Digital out 2 Digital out 3 Digital out 4 Switch Strobe out Strobe1 Output (only when Strobe out = 1) Strobe2 Output (only when Strobe out = 1) Interrupt Sensor1 on <u>INT5</u> activate Interrupt Sensor2 on <u>INT5</u> activate Interrupt CAN-Controller1 on <u>INT10</u> activate Interrupt CAN-Controller2 on <u>INT10</u> activate Interrupt Profi-Bus on <u>INT11</u> activate Interrupt Flag Sensor1 erase Interrupt Flag Sensor1 erase NC	ON = 1 Output to GND Open Collector out Max. 28V 50mA 0=Sensor Strobe 1=IO-Port 5V max 20mA 5V max 20mA activate with 1 activate with 1 activate with 1 activate with 1 activate with 1 with 1 with 1
0x40A	write	0..11 12..13 14..15	DA-converter Data NC 00=DA-converter 1 01=DA-converter 2 10=DA-converter 3 11=DA-converter 4	
	read	0..4 5..8 9..11 12..13 14..15	day month year Revision number after decimal separator Revision number before decimal separator	Read out version date and version number
0x40C	write	0..10 11 12..15	Profi-Bus Address Profi-Bus Reset NC	with 1
0x40E	write	0..7 8..15	Profi-Bus Data NC	
	read	0..7 8..15	Profi-Bus Data NC	
0x410   0x42F	read write	0..7	CAN-Controller1 Data	
0x430   0x44F	read write	0..7	CAN-Controller2 Data	
0x450	write	0..1 2..3 4..7	CAN-Controller1 Mapping Register CAN-Controller2 Mapping Register NC	

Documentation on SJA1000 (Philips) CAN-Controller chip, GSD-file and SPC-3 (Siemens) Profi-Bus chips are available on request.