BASIC1

Cabinet PC in "book format"

User manual
Issue 2.00 of 28.5.2002

MICROCOMPUTERS · SYSTEMS · COMPONENTS · **TUTTLINGEN GMBH**

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These operating instructions are available as article no. **69 00 062**.

Subject to change without notice.

1   Basic notes on handling and operation

To this user manual

This user manual is component of the MSC IPC. It must always be stored in the near of the of the MSC IPC, in order to be fast available. This user manual is supposed to facilitate to become acquainted with the device and to use its specified applications.

The user manual contains important references to operate the MSC IPC safe, properly and economically. Your observation helps, to avoid dangers, decrease repair costs and downtimes and to increase the reliability and the service life of the MSC IPC.

This user manual must be understood by all persons who are responsible for the MSC IPC, read and considered in all points.

This concerns e.g.

• **Service,** including fault clearance, care and disposal of operating and auxiliary materials.

• **Maintenance** (Maintenance, inspection, repair) and/or transport

Particularly the **safety chapter** must be understood, read and be considered in all points.

Additional to the user manual and the obligatory regulations valid in the use country and at the use place for the accident prevention also the recognised compartment-technical rules are to be considered for safety and compartment-just working.

Only with knowledge of this user manual mistakes can be avoided and a trouble-free operation can be guaranteed. We do not take on any liability for mistakes and breakdowns that result from the non-observance of this user's guide.

If difficulties should result in spite of that, please contact directly the Manufacturer:

MSC TUTTLINGEN GMBH
Rudolf-Diesel-Str. 17
D-78532 Tuttlingen

Phone: (+49) 74 61/ 925-251
Fax: (+49) 74 61/ 925-291

Technical changes that were necessary for the improvement of the MSC IPC are reserved.

Customized variants

The user manual "BASIC1" describes all models of the computer family "BASIC1".
Also the customized variants are based on that.
If necessary, a description of the significant special features is added.

Guarantee and liability

Fundamentally our "General business conditions" apply. These are available to the operator at the latest since contract conclusion. Guarantee and liability claims with person and object damages are impossible if they are to be put down to one or several of the following causes:

• Not definition-appropriate use.

• Inappropriate installation, starting up, operation, repairing and observatories.

• Operation at defective safety devices or not operative safety and protection appliances.

• Nonobservance of the references in the user manual concerning transport, storage, assembly, start-up, operation, limit values and maintenance.

• Arbitrary modifying.

• Unsatisfactory check of parts which could be worn.

• Damages through foreign parts influence and force majeure.

Specified Use

The MSC industrial computer BASIC1 may be used only for mounting in switch cabinets and terminal boards. The range of application is limited by the specifications mentioned in the Technical Data and conditions.

Only recommended OEM devices and components may be connected to the MSC IPC.

Another use as aforementioned is not specified.

For damages arising from that no liability is taken over.

The specified use also includes:

• the considering of all references in the user manual and

• the keeping of the maintenance works.

Copyright

The copyright for this user manual remains at
MSC TUTTLINGEN GMBH, D-78532 Tuttlingen.

This user manual is only intended for the operator and his personnel.

This documents and its contents may not be disclosed to third parties, neither completely nor in part by duplication, transmission or any other means without written authority.

Non-compliance may lead to prosecution under criminal law.

Application Range

This user manual describes the BASIC1 in all system configurations.

Applicable documents

In addition to this user manual following documents contained in the scope of delivery are applicable:

• User manual of the operating system

• MSC proofing-certificates

2   Characteristics

2.1   Features

The BASIC1 is a computer to be mounted in cabinet, with extremely compact dimensions and based on the IPC586-board.

Connection ports as well as drive units are conveniently accessible and therefore provide an expedient installation of the systems.

Using a slot PLC board in the free slot for cards based on PCI or ISA together with fieldbus I/Os the BASIC1 becomes a full machine control system.

- Mechanically stable, robust system-unit cover made of galvanized sheet-steel to be installed in cabinet; mounting is possible on rear side of housing or on side wall.
- Single-board computer implies enormous computer performance, high safety and compact design. The all-in-one CPU, the central intelligence of our industrial PCs, includes all functions completely "on board" – in the version of an IPC 586 board.
- CPU ranging from Pentium 133 MHz MMX up to AMD K6-2E 400 MHz
- Memory up to 256 MB RAM
- IDE Flash disk up to 100 MB, alternative to Harddisk
- 2 MB video RAM
- Watchdog for system safety
- Integrated keyboard controller
- Floppy disk 3½" 1.44 MB
- Hard disk 2½" with more than 4.8 GB
- CD-ROM drive (Slim Line)
- COM1 and COM2 as RS-232
- COM3 and COM4 (option) as RS-232, RS-422/485 or TTY
- Parallel port LPT1
- Ethernet (RJ-45 socket): 10/100 Base-T
- 2 USB connections
- VGA connector
- PS/2 keyboard connection
- PS/2 mouse connection
- Repeater port (COM2, PS/2 keyboard, PS/2 mouse to connect TERMINAL)
- Interface of an external floppy disk drive, buffered
- Floating contact for overtemperature
- Reset button
- LEDs: hard disk, power, overtemperature
  and user (user specific)
- Passive backplane with 1 combislot (PCI or ISA)
- Internal interface for LPT2
- Slot for fieldbus modules CAN bus, InterBus, Profibus, as an alternative to COM3/COM4
- LS-120 drive (alternative to FDD)
- Operating systems: Windows NT®, Windows 2000®, MS-DOS®
- Registered in accordance with CE and UL

2.2   Nomenclature

The identification of the different types of „BASIC1" series depends on

• installed CPU,

• the options
  – used hard disk,
  – Memory,
  – Flash,
  – additional interfaces,
  – operating system,

Example:

BASIC1   -F .586-200   /0   /4800 /128 /F100 /3-485 /2000

        Option: Operating system, e.g. MS-Win 2000

        Option: COM 3/4 or Fieldbus, here RS 485

       Option: Flash in MB, here 100 MB

      Option: DRAM in MB, here 128 MB

     hard disk in MB, here 4,8 GB

    Display version, here always 0, i.e. without display

   CPU version, here Pentium 200

  Disk drive, here Floppy (Standard)

Basic device with 1 free slot
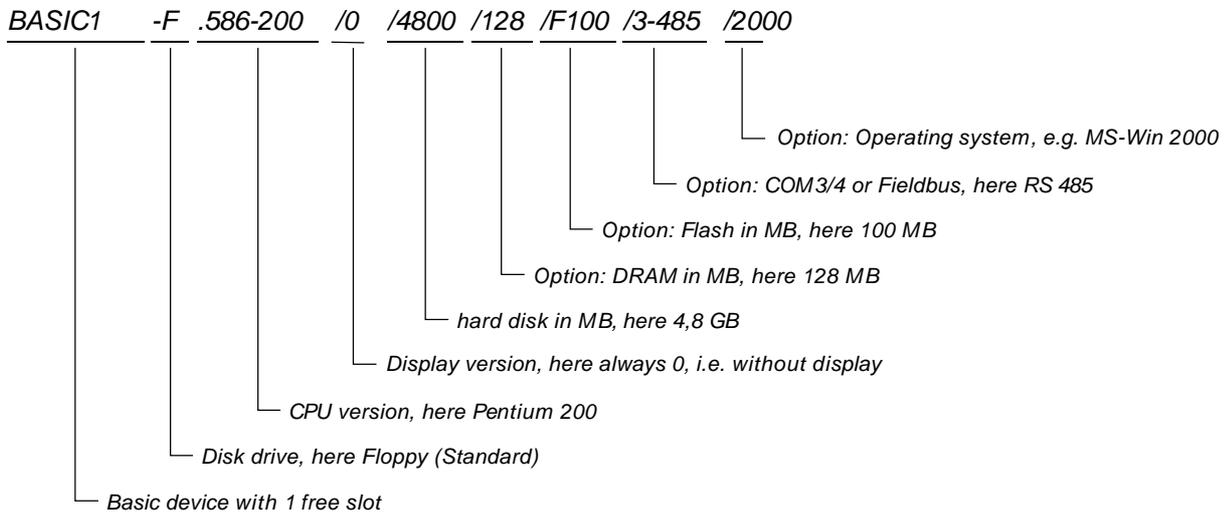
Fig. 2-1:   Example for the type indication

2.3   Basic equipment

Component	Description	Indication
Basic type	1 combislot	BASIC1
CPU version	SBC Pentium MMX 200 MHz	.586-200
	AMD K6-2E 333 MHz	.586-333
	AMD K6-2E 400 MHz	.586-400
Hard disk	Hard disk 2½" 4,8 GB	/4800
Drive unit	CD-ROM integrated 5 $^1/_4$"	/CD
Floppy	Floppy Disk 3½" 1,44 MB integrated	/1,44
	Connection for external Floppy	/FLOPPY DISK

2.4   Options

Component	Description	Indication
Memory (DRAM)	DIMM 32 MB RAM	/D32
	DIMM 64 MB RAM	/D64
	DIMM 128 MB RAM	/D128
	DIMM 256 MB RAM	/D256
IDE Flash Disk	32 MB Flash RAM	/F32
	100 MB Flash RAM	/F100
Serial interfaces	COM3 as RS 232	/3-232
	COM3 as RS 485 / RS 422	/3-485
	COM3 as TTY	/3-TTY
	COM4 as RS 232	/4-232
	COM4 as RS 485 / RS 422	/4-485
	COM4 as TTY	/4-TTY
Operating system	MS-DOS® 6.xx	/DOS
	MS-DOS® 6.xx English	/DOSengl.
	WINDOWS NT®	/NT
	WINDOWS NT English®	/Ntengl.
	WINDOWS 2000®	/2000
	WINDOWS 2000 English®	/2000engl.
Floppy	LS 120, 3 ½", (alternatively to FDD)	/120

3   Safety hints

3.1   Symbol and reference explanation

Immediate danger
to life and limb of personnel and others.
Nonobservance cause death or hardest injuries (Invalidity).

Hazardous situation
to life and limb of personnel and others.
Nonobservance may cause death or serious injuries.

Potentially hazardous situation
Nonobservance may cause slight injuries;
also as warning of property damages.

Notes on correct handling
With this symbol references and tips for the secure operation of the MSC IPC
are given.
Non-compliance may cause damage to the product
and/or damage to parts/items in the vicinity.

Environmental protection
Non-compliance may have an impact on the environment.

Activities

⇨ This arrow stands for actions of the operating and maintenance personnel.

3.2   Safety standards and determination

Following standards and determinations are valid for use and operation of the MSC IPC:

Electro-magnetic compatibility, 89/336/EMC:

For MSC industrial computers is valid:

$C\mkern-2mu\epsilon$ Products which carry the CE symbol meet the requirements of the EEC directive 89/336/EEC on electromagnetic compatibility.

The EEC declarations of conformity and the related documentation will be maintained at the following address for inspection by the responsible officials in accordance with article 10(1) of the above stated EEC directive:

MSC TUTTLINGEN GMBH
Rudolf-Diesel-Strasse 17
D-78532 Tuttlingen

3.3   Dangers

The MSC IPC is built according to state of art and with regard to safety rules. Nevertheless with the use dangers for life and limb of the user or third parties and/or influences at the product or at other real values may arise.

The MSC IPC is to be used only:

- for the specified use,

- in perfect state with regard to safety.

Troubles which can influence the safety are to be eliminated immediately. Before the MSC IPC must not be put into operation.

3.3.1   Electric hazards

Danger

Danger through electric tension !
Works at MSC IPC may be carried out only by an electrician/electronic technician !
Following determinations must be kept with installation and operation of MSC IPC:

- The valid accident prevention rules
  (in Germany in particular the VBG 4)

- Separate MSC IPC from the supply network before works. Unplug power plug.
  Consider in particular when plugging/unplugging peripherals.

Lithium batteries

Injury danger through possible blast !
Consider following hints absolutely when handling with batteries:
– Lithium batteries may and cannot be charged.
Caution – Never bring batteries into touch with fire or water.
– When replacing batteries, we recommend to use only batteries of the same type.

Replacing/Installation of static-vulnerable components (ESD)

When handling units with static-vulnerable components the ESD handling procedures are to be considered:

• Persons that work on the MSC IPC must be grounded for static discharge.

• Devices and tools may not be charged statically/have to be discharged.

• Unplug MSC IPC from the supply net before you work with electronic components.

• Taking ESD components only by the edge.

• Do not touch conducting paths or connector-pins at an ESD-unit.

3.3.2   Mechanical hazards

Injury danger at installation and maintenance jobs:
Cut and mining-wounds through angular components in the interior of the device.
Skin contact with metal parts (Sheet steel angles, screws, cords ...) can
Caution **cause allergic reactions for sensitive persons.**

3.4   Operating and service personnel

3.4.1   Consider hints

The knowledge of the basic safety-hints and the safety-rules is basic requirement for safe dealing and troublefree operation.

This user manual contains the most important hints in order to operate the MSC IPC safe.

In addition you have to consider the country-specific guidelines corresponding:

• Accident prevention

• Setup of electrical and mechanical installations

• Radio interference suppression, EMC-guideline

A basic education, and subsequent to that regular trainings, have to be carried out by the operator of the MSC IPC.

3.4.2   Obligation

All persons that are instructed with works at the MSC IPC oblige, before beginning work:

• to consider the basic rules about industrial safety and accident prevention,

• to read the safety chapter and the warnings of this manual and to confirm that they understood these through their signature.

The safety-conscious work of the personnel has to be checked in regular distances.

3.4.3   Qualification

Only trained personnel which is familiar with the device may work on the MSC IPC.

The responsibilities of the personnel are to be determined of course for the installation, starting up, operation, maintenance and repair.

Only a trained elektrospecialist may carry out following works:

• Installation

• Initiation

• Operation

• Maintenance

Personnel to be taught may work only under supervision of a practised person on the device.

Not qualified personnel

Operations of not qualified and not authorized persons without comprehensive know-how can result in considerable damages at the MSC IPC and in extreme cases dangers for life and limb.

Danger

3.5 Transport, storage, disposal

Transport

The customer bears the responsibility for the in-house transport of the MSC IPC and has to provide for the compliance of the safety and accident prevention rules.
Advance of device only in the original packing.

Storage

An inappropriate storage can cause defects.

Consider the ambient conditions under "Technical data".

Disposal

Electronic parts to be disposed load the environment.

Hand the components on to a specialised company, responsible for the recycling of electrotechnical material, in order to avoid a load of our environment. This applies in particular for batteries and accumulators.

Please do not dispose in any case about the dustbin!

3.6 Installation, start-up, maintenance

Important information:

- Only trained specialists may carry out installation, start-up and maintenance.

- In case of storage in cold environment formation of condensation could occur. Device must be completely dry before start-up !

- With start-up and operation the ambient conditions (Temperature, air humidity, etc.) of the device have to be considered for a safe operation.

- Spare parts/Extensions/Accessories:
  Only by MSC TUTTLINGEN GMBH recommended parts can be used. In case of use of other components the guarantee is dropped on the part of MSC TUTTLINGEN GMBH.

3.7   Cleaning

Before beginning of the cleaning works the device has to be unplugged of the supply net and to be protected against restoring the supply.

Only use detergents, that are recommended for cleaning in the section maintenance - cleaning !

3.8   Suitable fire extinguishing agents

In the fire case steam and gases can arise which could lead to health injuries.

In the fire case:

- Unplug MSC IPC of all external connections.
- Disconnect device from the net - unplug power plug.
- Using suitable fire abatement measures.

Use only:

- Residue-free carbon dioxide quenchers

Direct danger through current surge and where appropriate danger of explosion!

Danger

Do not use under any circumstances for quenching:

- Water
- Flux quencher (not suitable for electrical devices)
- Halon extinguisher (damages the ozonosphere)

4   Technical data

4.1   General

housing	Galvanized sheet metal 1 mm thickness
All-In-One-CPU	IPC 586 Board - SBC Pentium MMX 200 MHz - SBC AMD K6-2E 333 MHz - SBC AMD K6-2E 400 MHz – other processors on request
Memory	- /32 /64 /128 / 256 MB RAM [1 x DIMM168 on 586-board]
Hard disk	Hard disk 2½" : 4,8 GB
IDE-Chipdisk (optional)	Disk 2½" : ≥ 32 MB boat-capable flash, as alternative for harddisk
Floppy disk (optional)	Floppy disk 3½" : 1,44 MB
LS 120 (optional)	LS 120, 3½": 120 MB
Expansion board	- 1 floppy disk slot or 1 slot LS-120 - 1 slot CD-ROM
Interfaces - Standard	2 x serial (COM1, COM2) as RS 232 with overvoltage protection 1 x parallel (LPT1) 1 x Ethernet 1 x PS/2-Mouse 1 PS/2-keyboard x 1 x VGA for display unit 2 x USB 1 repeater-port x 1 x 37-pole Sub-D socket for ext. Floppy disk drive 1 x Floating Indicator Contact for overtemperature
- Options	COM3, COM4 as - RS 232 with overvoltage protection - RS 485 / RS 422 with optocoupler - TTY with optocoupler Slot for field bus modules, alternative to COM3/COM4 - CANopen - INTERBUS - PROFIBUS Internal interfaces for - LPT2 - Floppy - CD-ROM

Mains voltage	24 V DC (19 ... 36 V DC) SELV *)			
Power consumption	a maximum of. 87 W			
power output: Voltage Current Power	5 V 10 A 50 W	12 V 0,8 A 14,4 W	-12 V 0,4 A 2,4 W	–5 V 0,10 A 0,5 W
Type of protection	IP 20			
Mechanical measurements [B x H x T in mm]	315 x 240 x 120			
Weight	Approx. 5 kg, dependent on system configuration			
Ambient temperature (Operation) - vertical mounting	at non-flowing air: 5 ºC to +45 ºC			
Relative humidity	with a maximum of. 50 % +40 ºC with a maximum of. 90 % +20 ºC			
Ambient air	free from corrosive gases Device can not be operated in the explosion-hazard area.			
Vibration	Examination according to IEC 68-2-6: Frequency range: 0 - 150 Hz Amplitude (10 - 57 Hz): 0,075 mm Amplitude of the acceleration: Operation: 10 m/s Storage: 20 m/s			
Shock	Examination to IEC 68-2-27 (3 shocks into every positive and negative main axial direction): Pulse width: 11 ms Amplitude of the acceleration: Operation: 150 m/s Storage: 300 m/s			
Storage temperature	-25 ºC to +70 ºC			
C€ Testing for EEC conformity: - interference emission acc. to - interference resistance acc. to	EEC directive 89/336/EEC EN 55011 and/or. EN 55022 EN 50082-2			

Note:

*) The supply voltage must fulfill the specifications of a Safety Extra Low Voltage (SELV) according to DIN 60950.

4.2   Mechanical measurements
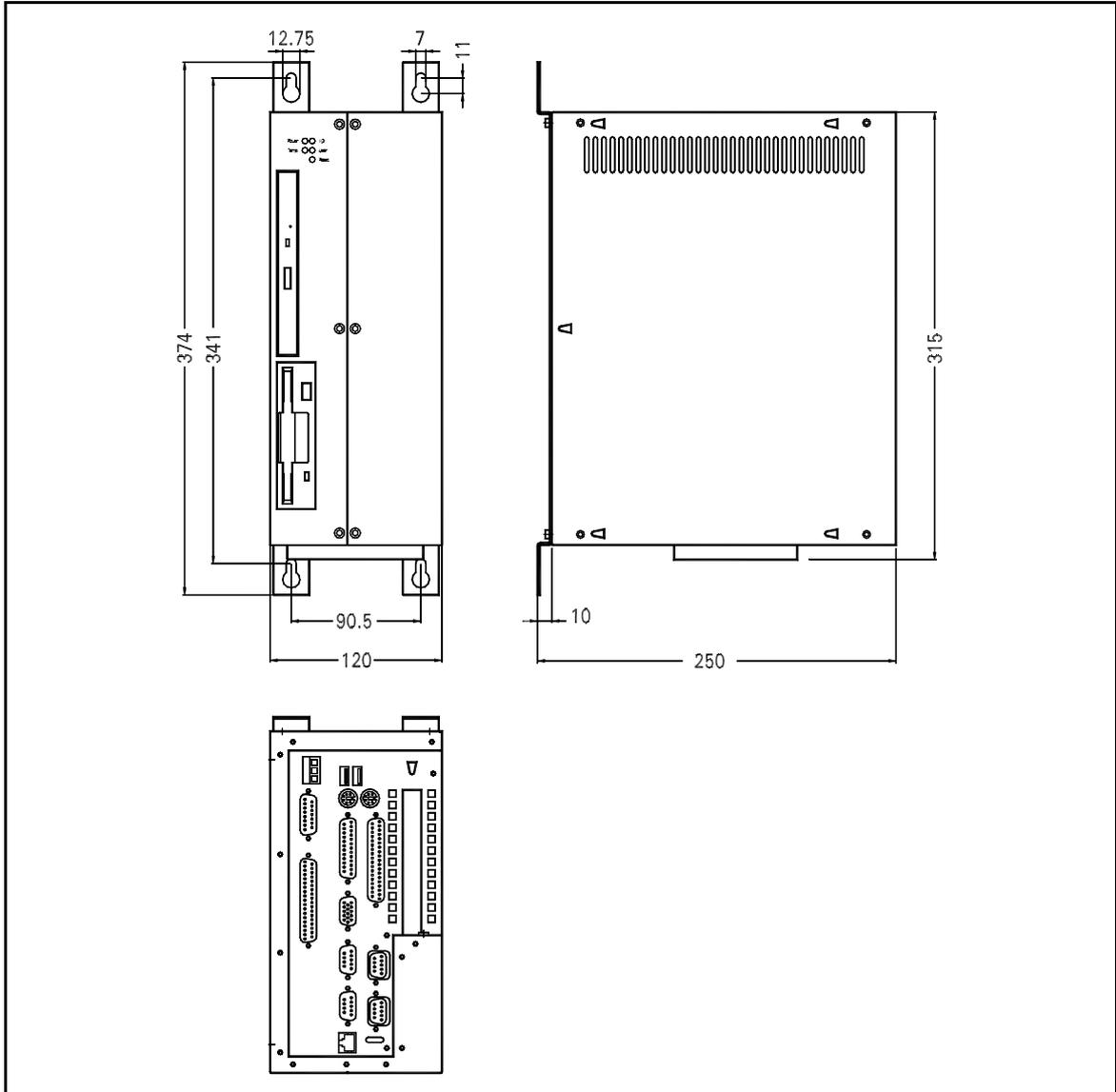
Fig. 4-1:   Mechanical measurements BASIC1

5   Installation

5.1   Unpacking MSC IPC and testing scope of delivery

5.1.1   Unpacking

⇨ Unpacking device cautiously after incoming good in order to avoid damage.

Keeping original packaging with all components. Only in the original packaging, the MSC IPC can be sent in a safe way.

5.1.2   Scope of delivery

Compare on receipt of the MSC IPC the delivery receipt with the content of the delivery. Missing parts or wrongly supplied parts must be complained immediately for guarantee reasons.

The scope of delivery consists of:

Hardware

• BASIC1

• 2 pieces wall mounting steel angle

Software

According to order:

• Without operating system

• MS Windows NT® 4.0

• MS Windows 2000®

• MS-DOS®

If you have commanded with an operating system, this is pre-installed ex works. All installation and driver files are stored on the hard disk of your MSC IPC.

Documentation

• BASIC1 operating manual/user's guide

• Operating system manual (Windows XX)

• Factory testing-report

5.2 Mounting Conditions

5.2.1 Environmental conditions

Ambient temperature and humidity

For a secure operation of the MSC IPC the values indicated in the technical dates must be kept with installation and operation.

- With vertical mounting of the MSC IPC and a maximum of. 45 °C ambient temperature in calm air the MSC IPC operates troublefree.
- Keep the MSC IPC out of direct exposure to sun – temperature in the device becomes too high.
- In the case of formation of condensation on the device it must be completely dry before start-up.

Dust

Operate the MSC IPC if possible in ultra-clean environment.
Extremely dust-containing air can cause damages of the device !

5.2.2 Ventilation

Open space around the device

During the mounting of the MSC IPC: ensure that open space is sufficiently around the device, so that a free access to the device is possible and no accumulation of heat can arise.

Vent holes

> **The vent holes of the MSC IPC must not be covered for the safe operation. A corresponding distance to neighbouring mounting components must be kept.**
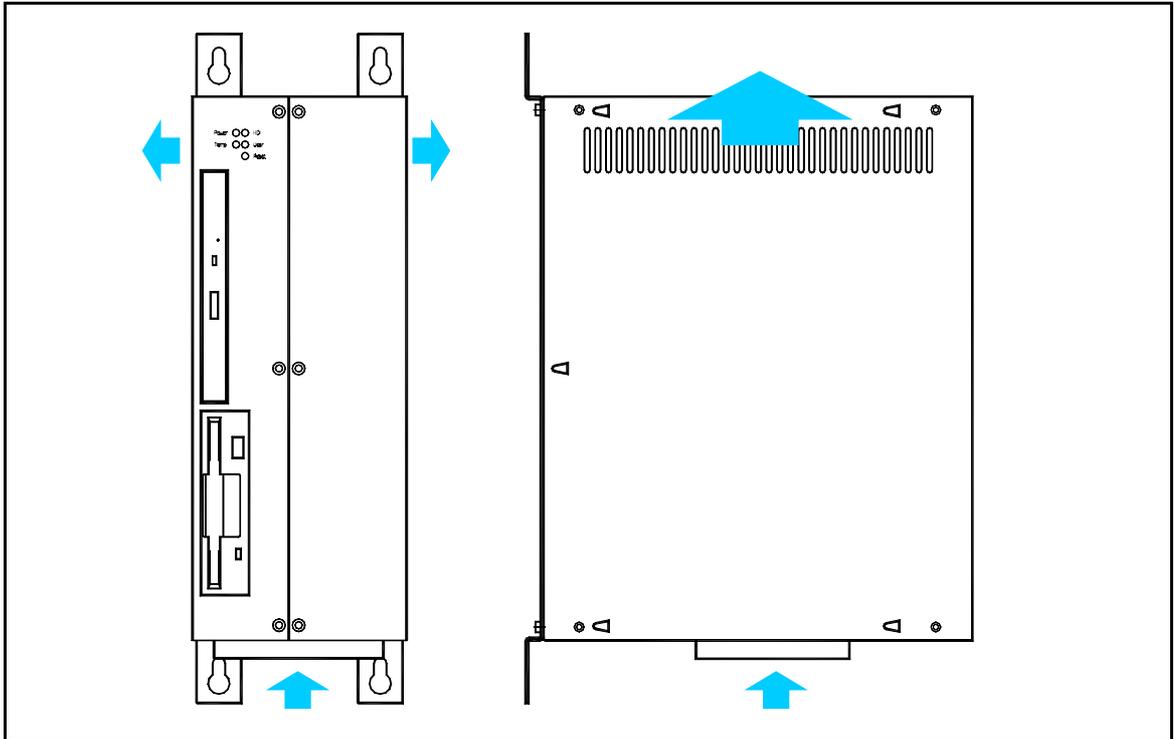
Fig. 5-1:   Vent holes

5.2.3   Mounting situation

Front of the housing

> **The front of the housing with CD-ROM, disk drive and LED must be freely accessible after mounting .**

• In case of equipment with CD-ROM drive or LS 120 ensure that the tilt angle of the MSC IPC is not more than 30 °.
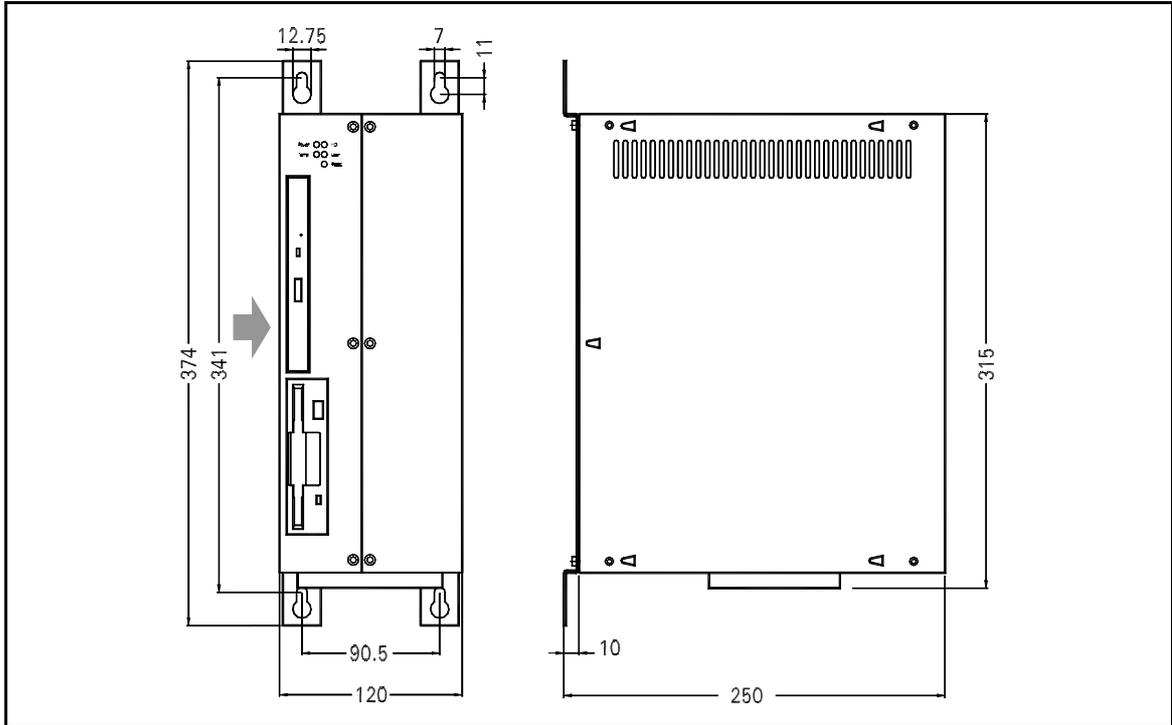
Fig. 5-2:   BASIC1 mounting situation with control elements to the front
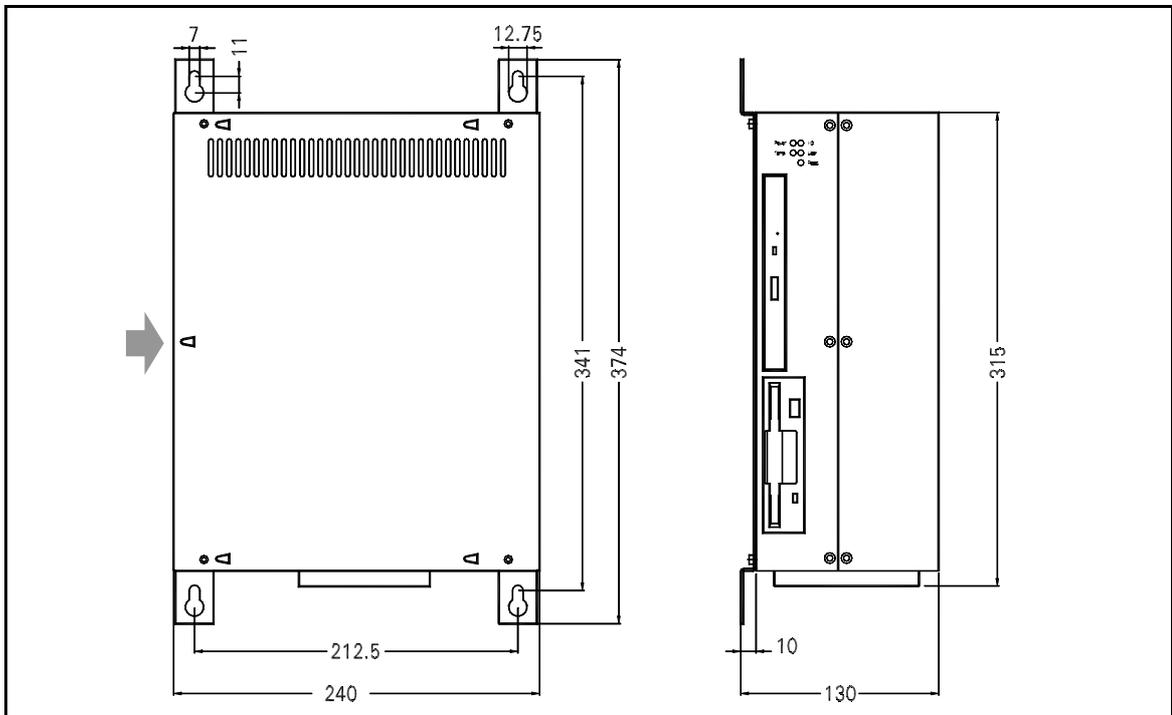
Fig. 5-3:   BASIC1 mounting situation with control elements to the left

5.3   Fixing

5.3.1   Accessories

- Wall mounting angles (contained in the scope of delivery)

5.3.2   Mounting

Consider situation of the mounting angles (see mounting situation) !

⇨ Grind mounting holes into switch cabinet mounting plate in accordance with mounting situation drawing.

⇨ Attach wall mounting angle to BASIC housing according to desired mounting situation.

⇨ Screw in holding-down bolts into boring, so that the BASIC housing can be hung up into the screws by means of slots at the mounting angle.

⇨ Completely screw in holding-down bolts and tighten holding-down bolts.

5.4   Connection of the peripherals

5.4.1   Safety

When handling units with static-vulnerable components the ESD handling procedures have to be considered:

Disconnect the MSC IPC and the subsequent devices before connection of peripherals from the power supply (Main power switch at the switch cabinet OFF) !
Disturbance-proof cords and connections are the basis for a interference-free operation.

- Use only shielded cables for all signal connections.

- All plug-in connectors must be screwed down or locked.

- Providing the cords for the safety with stress reliefs.

- Never lay signal lines together with high voltage lines in a duct.

5.4.2   External connections and interfaces

References:

- Do not connect or disconnect plugs during operation!

- Field bus interface and COM3/COM4 are to be equipped alternatively.

- Assignments of the serial interfaces COM3 and COM4 differs, dependant on the module used: RS 232, RS 485/422, TTY.

Customized assignment of the interfaces:

- The particular assignment of the interfaces of your MSC IPC can be recognized at the label on the housing.
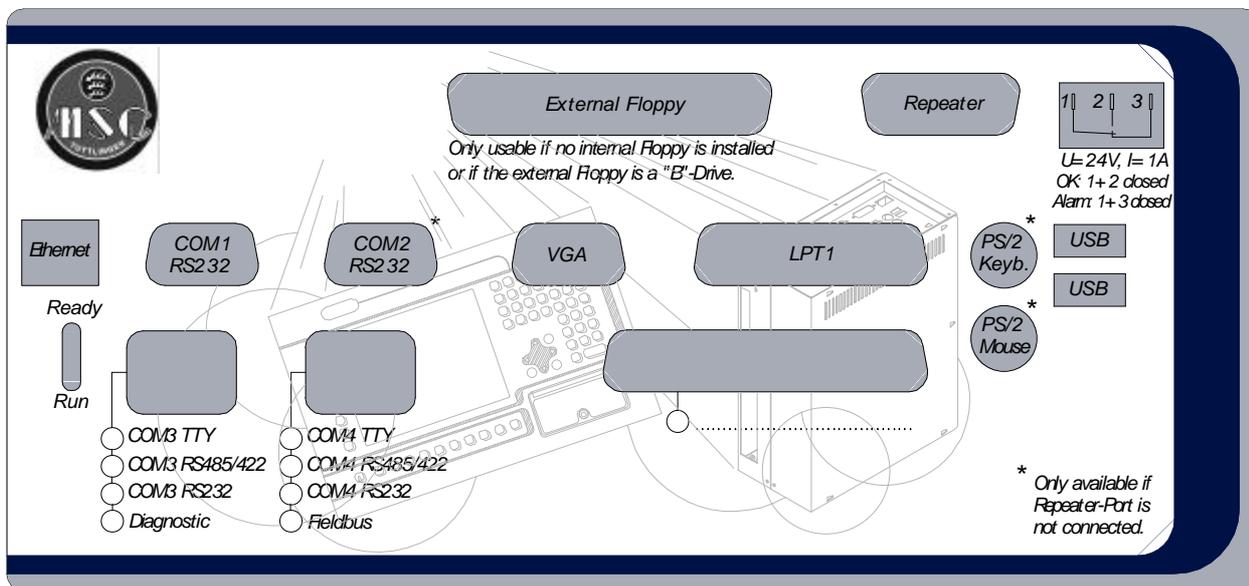
Fig. 5-4:   Label customized interface assignment

In combination with a 'TERMINAL' device of MSC TUTTLINGEN GMBH the connector cable for the repeater port of the Terminal is connected to the PS/2-interface for the keyboard, the mouse and the COM2-Interface.
In case of connection to a 'TERMINAL' the hint on the label applies: 'Only available, if Repeater-Port is not connected'.

Connections
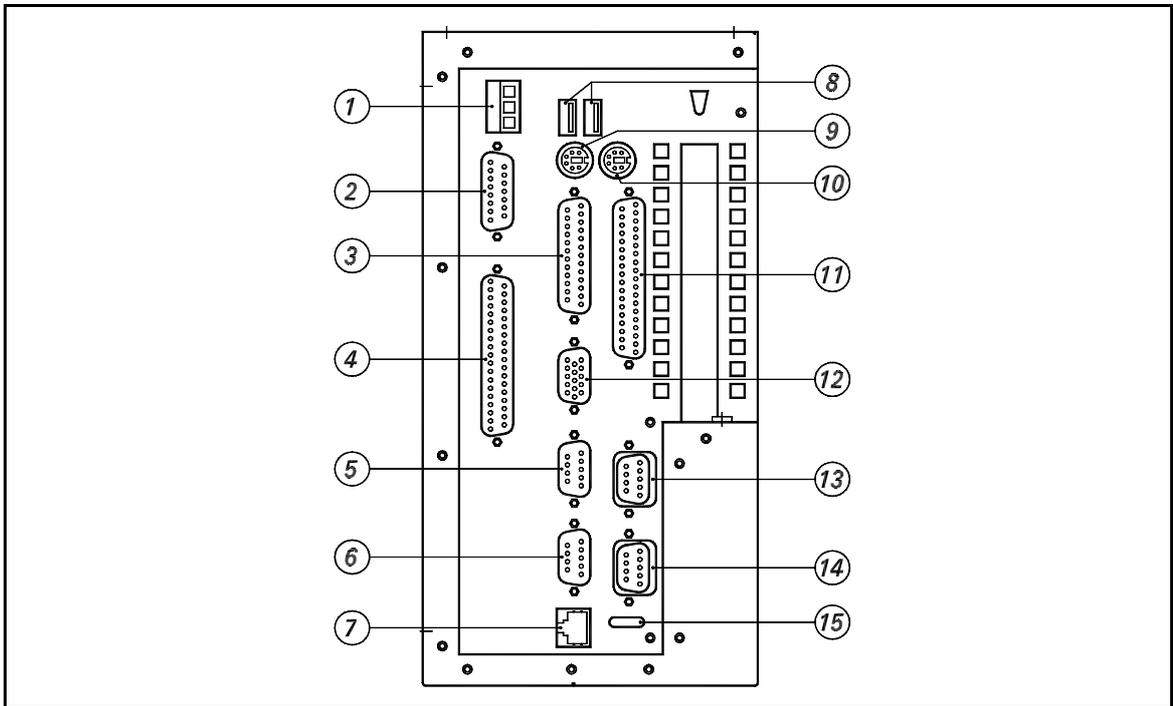
Fig. 5-5:   External connections and interfaces

Position /designation	Function
(1) Output temperature	Connection of an external logic for temperature alarm, if the permissible operating temperatures of the device are exceeded. Connection about Phoenix CombiCon-coupler.
	Floating contact U = 24 DC, I = 1 A
	Possible wiring (see housing label): OK: 1 + 2 sticks concludedly Alarm: 1 + 3 sticks concludedly
(2) Repeater	**Only with connection of the MSC TERMINAL:**
	Connection for the operation and visualization unit 'TERMINAL'.
	Sub-D-Socket, 15 pin
	All inputs that are made at the terminal about keyboard, touch, industrial mouse or external mouse are transmitted via this interface onto the CPU of the BASIC1.

Position /denotation		Function
(3)	Parallel interface LPT1	Connection by means of Sub-D-Socket 25 pin, Centronics standard
(4)	Option: External floppy	<u>Only to use</u>, when no internal floppy is connected (Standard configuration is with floppy).
		Connection by means of Sub-D-Socket 37 pin.
		Do not connect/disconnect external floppy disk drive with computer switched on.
(5)	Serial interface COM2	Connection by means of D subminiature connector 9 pin, RS 232
(6)	Serial interface COM1	
(7)	Ethernet interface	Connection by means of RJ45-coupler, shielded version. Transmission rates of 10 Mbit/s and 100 Mbit/s
(8)	2 x USB	Connection of components with USB interface and Connector USB
(9)	PS/2-keyboard	Connection by means of Mini-DIN-Socket 6 pin.
(10)	PS/2-Mouse	
(11)	**Optional:** User interface	Additional Connection Option about Sub-D-Socket 37 pin.
		Is not required in most cases of application.
(12)	VGA monitor	Connection of a monitor by means of HD-Sub-D-Socket 15 pin
(13)	**Optional:** 1 field bus module or: COM4-module as RS 232, RS 485/422, TTY	Connections - SUB-D-Plug 9 pin or - SUB-D-Socket 9 pin
(14)	**Optional:** 1 field bus module or COM3-module as RS 232, RS 485/422, TTY	
(15)	Display-LED PROFIBUS, CANopen, INTERBUS	Only with field bus interface:
		Status-display: LED green = RUN LED yellow = READY

5.5   Connecting supply distribution

In case of works at the switch cabinet danger exists through electric tension!
Switch supply distribution voltageless (Main power switch OFF).
Attaching safety-sign to the switch cabinet.

Caution

Danger of damage for the MSC IPC
Consider the correct supply voltage with the connection of the MSC IPC.

Reference:
For the additional reliability an Interrupt Free Current Supply can be connected.
This is available under the denotation
DC USV 24, Art.-No. 6277093 at MSC TUTTLINGEN GMBH.

Adjustment of the correct supply voltage

The supply voltage and the maximum power consumption must correspond to the information on the type designation plate and in the Technical Data. The supply voltage must fulfill the specifications of a Safety Extra Low Voltage (SELV) according to DIN 60950.

Calculation of the required power consumption:

• The power consumption is different according to commanded system configuration and is a maximum of 87 W.

Important earthing hint

Before switching-on the supply voltage the MSC IPC must be grounded via the ground bolts at the case.

Connection of the MSC IPC to the supply voltage

Ground bolt
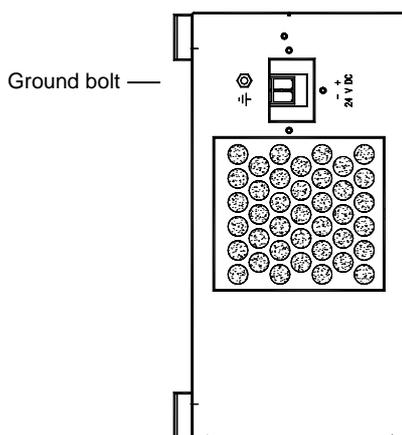
⇨ Connect MSC IPC by means of Phoenix CombiCon-coupler at supply voltage plug of the MSC IPC.

The DC/DC-transducer makes the supply possible with 24 V DC (19...36 V DC).
Connection by means of Phoenix Contact-coupler
PC 4/2-G-7, 62,

⇨ Consider correct polarity: '+' and ' - ':
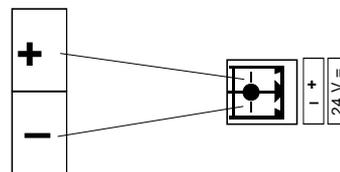
Fig. 5-6:   Ground bolt and connection 24 V

6   Putting into Operation

6.1   Functional elements
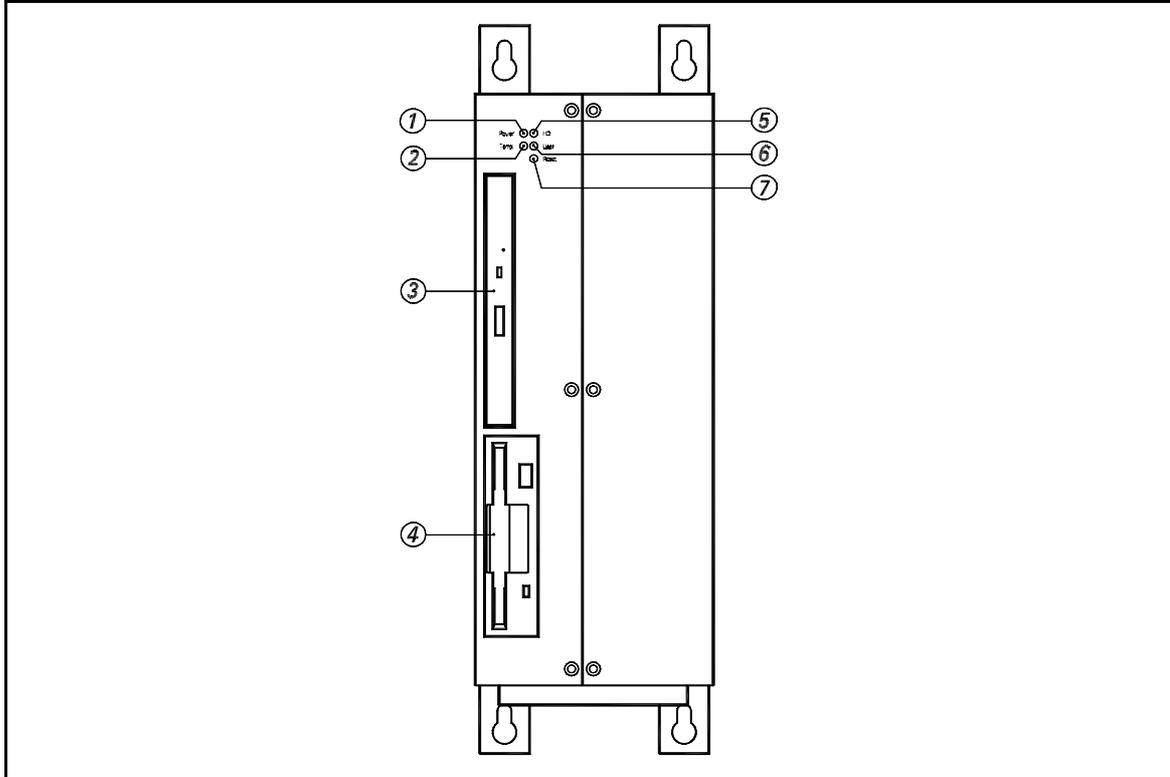
Fig. 6-1:   Front panel operating and functional elements

(1) Power LED (Power)	LED green, light up with standby
(2) Temperature alarm (Temp)	LED red, lights up when operating temperature of the CPU board is too high.
(3) CD-ROM drive (Option)	CD-ROM drive, 5 ¼", Slimline
(4) Floppy disk 3 ½"	Disk drive for 3 ½" disks, 1,44 MB, **Alternative:** LS 120, 5 ¼" for disk 120 MB
(5) Hard disk LED (HD)	LED yellow, lights up or flashes in case of access on hard disk
(6) LED green	Reserved
(7) Reset key (Reset)	Restart of the computer by hardware reset

6.2   Switch-on of the current supply

6.2.1   Conditions

- The correct mains voltage is adjusted and the MSC IPC is connected onto the supply distribution.

6.2.2   To boot the computer

- After switch-on of the current supply by means of main power switch at the switch cabinet and/or control unit supply the MSC IPC boots automatically. The green LED indicates the standby of the MSC IPC.

- While booting a self-test (POST Power On Self Test =) proceeds. The bios settings are tested and the connected system components are scanned.

- After successful booting the installed operating system is started (MS-DOS®, Windows 95®, NT®, 2000®).

⇨ Install the component drivers in accordance with user manual of the manufacturer and in accordance with user manual of the installed operating system. For more information see also section "Periphery driver installation".

6.3   Software installation

6.3.1   Installation of the operating system

In case of delivery of the MSC IPC the ordered operating system is already pre-installed. If the operating system must be installed subsequently, the corresponding installation CD-ROM is enclosed in the scope of delivery.

All installation files are additionally stored on the hard disk, in the directory **'C:\winnt_cd'** and/or **'C:\win95_cd'**.

You take full installation instructions from the delivered manuals for the corresponding operating system.

6.3.2   Installation of the periphery drivers

With delivery ex works you receive a completely configured MSC IPC. The following description applies only if you should carry out a change or extension of the system, and already installed components should not operate anymore due to a disturbance.

Where do you find the drivers?

You will find all drivers that you need, in the directory **'C:\Drivers'** on the hard disk.

If you would like to install additional drivers or must carry out a reinstallation, you find all Windows drivers and files in these directories.

Driver for Windows NT®

Graphics driver:
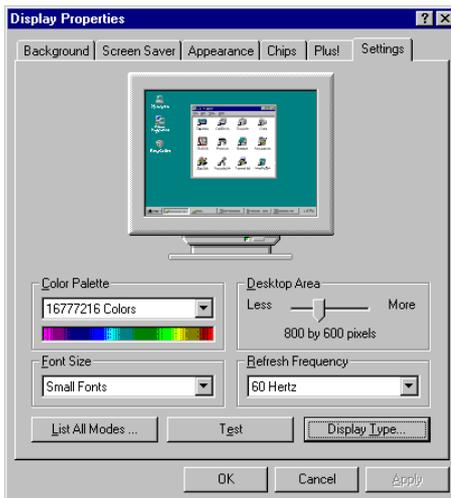
⇨ Doubleclick the icon **'display'** in **Windows control panel**.

⇨ Choose registers **'Settings'.**

⇨ Activate the button **'Display Type'**.

⇨ Activate the button **'Change'** in the following dialog.
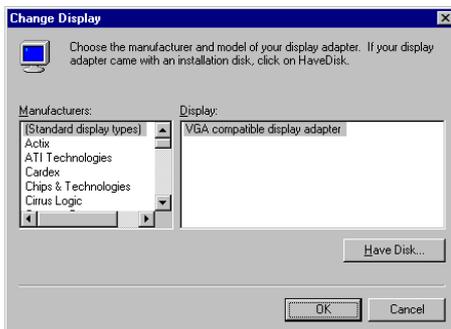
⇨ Activate the button **'Have Disk'.**

⇨ Activate the button **'search'** in the next dialog.
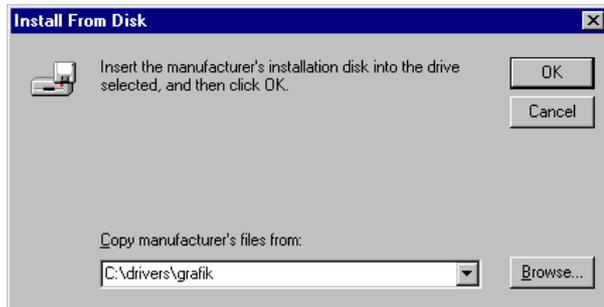
⇨ Select Directory **'C:\drivers\grafik'** and confirm with **'OK'**.

⇨ Choose drivers, and confirm with **'OK'**.

The installation is proceeded.

After a restart of the computer the new graphics driver is installed and you can tune the desired resolution and color palette.

Touch-driver (only devices with touch-screen):

⇨ If you have a device with touchscreen, the needed driver is in the directory **"C:\Drivers\Touch".**

⇨ Call the command **'Setup.exe'** for the installation of the driver in the above-mentioned directory.

⇨ Follow the instructions at the screen.

• The touch-screen **'Setup Wizard'** is called.

⇨ Enter the touch-controller type (ELO 2210) and the type of connection (Interface).

⇨ Select in addition the language for the touch-screen '**control panel'.**

• As a standard interface COM port 2 is defined.

⇨ End installation and restart the MSC IPC.

⇨ After the new start call up **'control panel'** and double click **'ELO-Touch-screen'**.

⇨ Press the button **'calibration'** and touch all 3 hot spots as they are indicated on the screen.

⇨ Confirm with **'yes'**, when the fingertip matches exactly with the hot spots.

⇨ Complete the calibration with **'OK**'.

Ethernet:
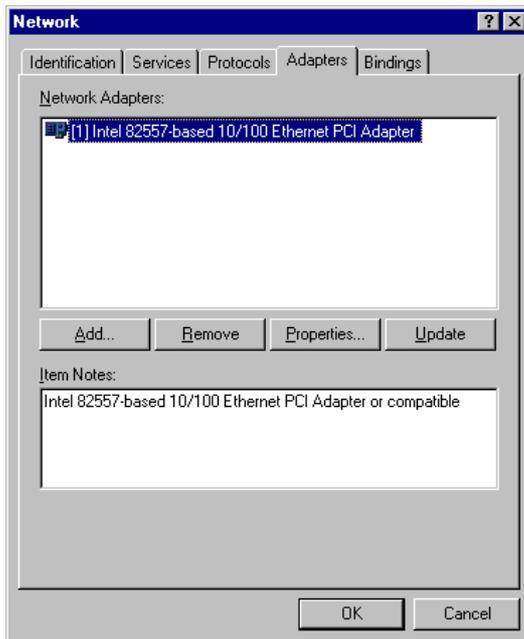
⇨ Double-click the icon **'Network' in the Windows control panel**.

⇨ Activate the button **'Add'**.

⇨ Activate the button **'disk'.**

⇨ Activate the button **'search'** in the next dialog.

⇨ Select directory **'C:\drivers\ethernet'** and confirm with **'OK'**.
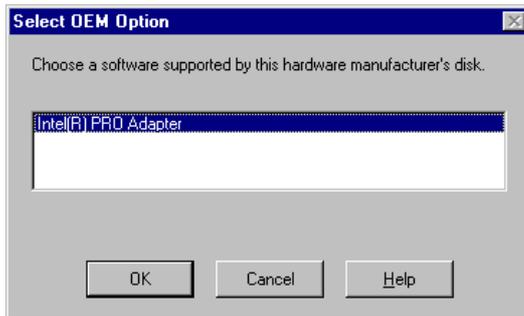
⇨ Select the network card **'Intel PRO Adapter'** in the following dialog.

⇨ During the further installation you are asked to copy some system files. In this case you must enter the following path: **'C:\winnt_cd'**.

The installation is proceeded.

After a restart of the computer the network card is installed and you can tune the network links.

After the driver installation in Windows NT® the latest service pack must be installed (download from Microsoft Homepage).

Driver for Windows 95

Graphics driver:

⇨ Call the command **'w95500.exe'** in the directory **'C:\Drivers\Grafik'.**

• The installation program searches for the installed graphics controller and installs the necessary driver and system files automatically on your system.

⇨ Restart MSC IPC and call the dialog **'display'** in the **Windows control panel** to adjust the resolution in the register **'settings'** for the screen.

Touch-driver (only devices with touch-screen)
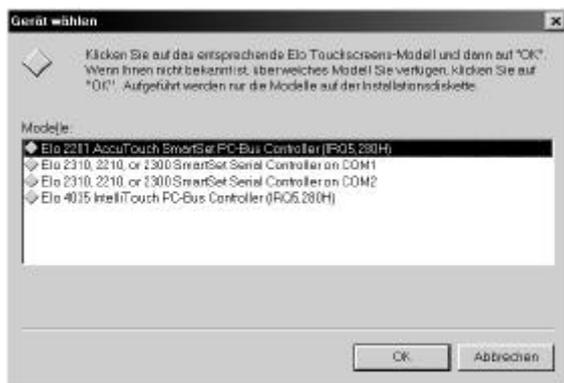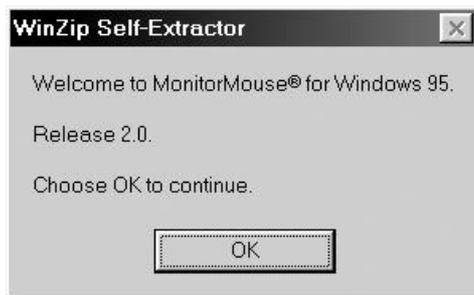
⇨ You find the required touch-driver in the directory: **'C:\Drivers\Touch**'.

⇨ Call the command **'mm95_200.exe'** in the above-mentioned directory to load the driver installation routine.

⇨ Start the installation routine with **'OK**'.

⇨ Unpack the program files with **'Unzip'** into the default directory.

⇨ Change into directory **'C:\elowin95'** and call file **'Setup.exe'.**

⇨ Choose the touchcontroller type and the connection in the following dialog.
ELO 2210 is standard at COM2.

⇨ End installation program and restart the MSC IPC.

⇨ After the new start of Windows 95 the calibrating program is called automatically.

⇨ Touch all 3 hot spots, being displayed as they appear on the screen.

⇨ Confirm with **'yes'**, when the fingertip matches exactly with the hot spots.

⇨ Complete the calibration with **'OK**'.

Ethernet-driver

⇨ Install Ethernet drivers analogous to Windows NT® (see section 'Windows NT® , Ethernet driver').

6.4   Data back-up

Fundamentally we recommend a regular data back-up.
On completion of the first boot process and the hardware-installation the
system data and the content of the whole hard disk must be backed up:

⇨ Create a system disk in accordance with user manual of the operating system.

⇨ Safe the content of the hard disk via network onto the hard disk of a server.

7 BIOS Setup

7.1 Hints for BIOS-Setup

The BIOS-setup is already installed ex works according to your system configuration. Changes may be made only:

• After a system expansion or -change

• After a BIOS-update

• After replacement of the system battery or other components

After a BIOS update the BIOS default values should be restored again with the command 'Load Bios defaults' before you adapt the BIOS setup to your system configuration again.

After that the system settings can be adapted again in accordance with your system configuration. Only use the Setup-record contained in the scope of delivery, for this purpose.

7.2 Calling BIOS-Setup

In order to call the BIOS-Setup, you proceed as follows:
⇨ Restart computer.

⇨ While booting the computer the following message is indicated:
'PRESS DEL TO ENTER SETUP'

⇨ With simulteanous pressing of the key 'Entf' or 'DEL' the computer changes to the BIOS-setup mode.

7.3   Setup Main Menue

```
                        ROM PCI/ISA BIOS (2A5LCMI5)
                          CMOS SETUP UTILITY
                          AWARD SOFTWARE. INC.
 STANDARD CMOS SETUP                        INTEGRATED PERIPHERALS

 BIOS FEATURES SETUP                        MICRO DESIGN FEATURES SETUP

 CHIPSET FEATURES SETUP                     PASSWORD SETTING

 POWER MANAGEMENT SETUP                     DIE HDD AUTO DETECTION

 PNP/PCI CONFIGURATION                      SAVE & EXIT SETUP

 LOAD BIOS DEFAULTS                         EXIT WITHOUT SAVING

 LOAD SETUP DEFAULTS

 Esc  : Quit                        ↑ ↓ → ←    : Select Item
 F10  : Save & Exit Setup           (Shift) F2   : Change Color

                    Time, Date, Hard Disk Type ...
```

Fig. 7-1:   Setup Main Menue

The following submenues can be selected in the Setup Main Menue.

Standard CMOS Setup

All standard BIOS settings are carried out here, as for example time and date, indication of the connected hard disks and floppy disk drives.

BIOS Features Setup

The menu contains all further BIOS settings, as for example Cache and Shadow settings, boot parameter etc.

Chipset Features Setup

In this menu chipset settings are carried out. Among other parameters the storage access times can be adapted here.

Power Management Setup

Settings for different power-saving-mode functions.

PNP/PCI Configuration

Settings for the configuration of PCI devices and the assignment of interrupts (IRQ) and DMA for plug- and play devices or Legacy ISA devices.

Load BIOS Defaults

Loads the BIOS default values of Setup.

Load SETUP Default

Loads the setup default values of Setup.

Integrated Peripherals

Configuration of the onboard-interfaces and devices. The interfaces of IDE, USB and floppy disk can be activated/deactivated with this menue, as well as the mode of the parallel port can be switched.

MicroDesign Features Setup

Setting of the base address of the MicroDesign Feature Port, Settings for the M-Systems Disk-OnChip Flash.

Password Setting

Here you may enter a password to protect the system or the setup from unauthorized accesses.

IDE HDD Auto Detection

In this menue, the BIOS tries to read the hard disk parameters of the IDE drive. The BIOS also supports the expanded modes for IDE drives with a memory capacity of more than 528 Mbyte.

Save & Exit Setup

Saves the alterations of the BIOS-setup into the CMOS and leaves setup menue.

Exit Without Save

Ignores the alterations of the BIOS setup and leaves setup menue.

7.4   Standard CMOS Setup

```
                       ROM PCI/ISA BIOS (2A5LCMI5)
                          STANDARD CMOS SETUP
                          AWARD SOFTWARE.INC.

Date (mm:dd:yy) : Wed, Jul 29 2000
Time (hh:mm:ss) : 10:20:00

HARD DISKS          TYPE   SIZE   CYLS HEADS   PRECOMP  LANDZ  SECTOR    MODE

Primary Master  :  Auto     0      0     0        0       0       0      AUTO
Primary Slave   :  Auto     0      0     0        0       0       0      AUTO
Secondary Master:  Auto     0      0     0        0       0       0      AUTO
Secondary Slave :  Auto     0      0     0        0       0       0      AUTO

Drive A : 1,44M, 3.5 in.
Drive B : None                          Base Memory:      640K
                                    Extended Memory:    31744K
Video   : EGA/VGA                      Other Memory:      384K
Halt On : All Errors
                                       Total Memory:    32768K

  Esc  : Quit          ↑ ↓ → ← : Select Item      PU/PD/+/- : Modify
  F1   : Help         (Shift) F2 : Change Color
```

Fig. 7-2:   Standard CMOS Setup

The following system parameters can be set:

Date

Setting of the current date

• Month   [Jan to Dec]

• Day   [0 to 31]

• Year   [1994 to 2079]

Time

Setting of the current time:

• Hour   [00 to 23]

• Minute   [00 to 59]

• Seconds   [00 to 59]

Primary Master, Primary Slave, Secondary Master, Secondary Slave

Indication of the parameters for the connected IDE/EIDE devices. Additionally to IDE/EIDE hard disks the BIOS also supports devices with PIO Mode 4 and ATAPI-interface.

Drive A, Drive B

Indication of the type of the installed floppy disk drives:

- No drive   None
- 360 KByte, 5 ¼"   360K, 5.25 in.
- 1,2 MByte, 5 ¼"   1.2M, 5.25 in.
- 720 KByte, 3 ½"   720K, 3.5 in.
- 1,44 MByte, 3 ½"   1.44M, 3.5 in.
- 2,88 MByte, 3 ½"   2.88M, 3.5 in.

You can also connect a LS 120 floppy disk drive. To use such a drive as floppy disk drive A: proceed as follows:

⇨ Connect the LS 120 floppy disk drive as IDE Slave disk.

⇨ Set the parameter for Drive A to 'NONE'

⇨ In order to boot the computer with this drive, the setup parameter 'Boot Sequence' in the 'BIOS Features Setup' has to be set to 'LS/ZIP,C'.

Please remind that this drive can only be used as floppy disk drive with 1,44 Mbyte format, if it is installed without additional driver software with DOS. With the operating system Microsoft Windows® the disk drive can be operated with support of a Multiport driver.

Video

Indication of the Video Adapter:

- Monochrome Video adapter   MONO
- CGA 40 Video adapter   CGA 40
- CGA 80 Video adapter   CGA 80
- EGA or VGA   EGA/VGA (default)

Halt on

Halt of the boot process when errors occur

• No errors	No Errors
• All errors	All Errors
• All errors, with exception of keyboard errors	All, But Keyboard
• All errors, with exception of disk errors	All, But Disk (Default)
• All errors, with exception of errors of the keyboard and the disk	All, But Disk/Key

Memory Size of the computer (is indicated, not variable)

• Main Memory	Base Memory
• Extended Memory above 1 MB	Extended Memory
• Memory in the range from 640 kByte to 1 MByte	Other Memory
• Totally installed memory	Total Memory

7.5   BIOS Features Setup

```
                    ROM PCI/ISA BIOS (2A5LCMI5)
                        BIOS FEATURES SETUP
                        AWARD SOFTWARE.INC.

CPU Internal Cache          : Enabled    Video BIOS Shadow    : Enabled
External Cache              : Enabled    C8000-CBFFF Shadow   : Disabled
Quick Power On Self Test    : Disabled   CC000-CFFFF Shadow   : Disabled
Boot Sequence               : A, C, SCSI D0000-D3FFF Shadow   : Disabled
Swap Floppy Drive           : Disabled   D4000-D7FFF Shadow   : Disabled
Boot Up Floppy Seek         : Enabled    D8000-D8FFF Shadow   : Disabled
Boot Up NumLock Status      : On         DC000-DFFFF Shadow   : Disabled
Boot Up System Speed        : High
Gate A20 Option             : Fast
Typematic Rate Setting      : Enabled
Typematic Rate (Chars/Sec)  : 6
Typematic Delay (Msec)      : 250
Security Option             : Setup
PS/2 mouse function control : Enabled    Esc : Quit          ↑ ↓ → ← : Select Item
PCI/VGA Palette Snoop       : Disabled   F1  : Help          PU/PD/+/-  : Modify
OS Select For DRAM > 64 MB  : Non-OS2    F5  : Old Values  (Shift) F2 : Color
                                         F6  : Load BIOS Defaults
                                         F7  : Load Setup Defaults
```

Fig. 7-3:   BIOS Features Setup

The following system parameters can be set:

CPU Internal Cache

Release of the internal Cache Memory

- CPU Cache ON   Enabled (Default)
- CPU Cache OFF   Disabled

External Cache

Release of the external Cache Memory

- Cache ON   Enabled (Default)
- Cache OFF   Disabled

Quick Power on Self Test

Shortening of the POST Self Test with system start by excluding some test routines.

- Shortened Self Test ON   Enabled
- Shortened Self Test OFF   Disabled (Default)

**We recommend to hold this function to status 'Disabled'.
It proved as useful to indicate errors with system start to avoid system
crashes and data loss, even if the system start uses more time through that.**

Boot Sequence

Sequence of the system load routines of the different disk drives

- Floppy, Hard disk, SCSI   A,C,SCSI (Default)
- Hard disk, Floppy, SCSI   C,A,SCSI
- Hard disk, CD-ROM, Floppy   C,CDROM,A
- CD-ROM, Hard disk, Floppy   CDROM,C,A
- Hard disk, Floppy, SCSI   D/E/F,A,SCSI
- SCSI, Floppy, Hard disk   SCSI,A,C
- SCSI, Hard disk, Floppy   SCSI,C,A
- Only Hard disk   C only
- 20 MB Floppy, Hard disk   LS/ZIP,C

Swap Floppy Drive

Changes Floppy Disk assignment A/B to B/A

- Standard Floppy Disk assignment   Disabled (Default)
- Changed Floppy Disk assignment B/A   Enabled

Boot Up Floppy Seek

Test of the Floppy Disk drive with system start

- Floppy Disk Drive Test ON   Enabled (Default)
- Floppy Disk Drive Test OFF   Disabled

Boot Up NumLock Status

Status of the Numerical Keypad

- Numerical Keypad ON   On (Default)
- Numerical Keypad OFF   Off

Boot Up System Speed

Setting of Boot Speed

- High Boot Speed   High (Default)
- Low Boot Speed   Low

Gate A20 Option

Mode for the A20 address line

- Switch via the PS/2 Port 92h   Fast (Setup Default)
- Switch via the Keyboard Controller   Normal (BIOS Default)

Typematic Rate Setting

Release of the user defined settings for automatic key repetition.

- Programmed key repetition ON   Enabled
- Programmed key repetition OFF   Disabled (Default)

If setting is 'Disabled' the standard values 6 characters per second with 250 msec time delay is valid.

Typematic Rate (Chars/Sec)

Number of key repetitions.

- Number of key repetitions
  per second   6/8/10/12/15/20/24/30

> **These function is only available, when 'Typematic Rate Setting' is set to 'Enabled'.**

Typematic Delay (Msec)

Defines the time delay to start the automatic key repetition.

- Time delay in msec   250/500/750/ 000

> **These function is only available, when 'Typematic Rate Setting' is set to 'Enabled'.**

Security Option

Protect System with Password

- Password protection for Setup   Setup (Default)
- Password protection for System   System

PS/2 Mouse Function Control

Activating of the PS/2-Mouse support.

- PS/2-Mouse support ON   Enabled (Default)
- PS/2-Mouse support OFF   Disabled

PCI/VGA Palette Snoop

Selection of RAMDAC Shadowing for ISA/VGA-Additional Cards in a common palette range (Snoop Write Cycles) of the primary PCI grafic controller.

- Palette Snoop   Enabled
- No Palette Snoop   Disabled (Default)

> **We recommend to keep the value on 'Disabled'!**

OS Select for DRAM > 64 MB

Only select this option, when your system is equipped with 64 MB Memory and the operating system OS/2 is installed.

- Operating system OS/2   OS2
- Other Operating systems   No OS2 (Default)

Video BIOS Shadow

Copy Video BIOS into RAM (Shadow)

- Shadow ON   Enabled (Default)

- Shadow OFF   Disabled

C8000-CBFFF Shadow ... DC000-DFFFF Shadow

Copy ROM-BIOS into RAM (Shadow)

- Shadow ON   Enabled

- Shadow OFF   Disabled (Default)

Only existing ROM-modules are copied into RAM. If an address range is released for Shadow which includes no ROM-module, the corresponding range is not released for Shadow.

> **If the 'onboard Video BIOS is used, with no external graphic card plugged in, the parameters are set automatically to 'Video BIOS Shadow' and 'C8000-CBFFFFF Shadow', indepent from the settings in the Setup fields.**

7.6   Chipset Features Setup

```
                    ROM PCI/ISA BIOS (2A5LCMI5)
                        CHIPSET FEATURES SETUP
                         AWARD SOFTWARE.INC.

 DRAM Auto Configuration    : Disabled
 DRAM Timing Control        : Normal
 SDRAM Single/Burst Wrte    : Single
 SDRAM Cycle Length         : 2
 SDRAM Bank Interleave      : Disabled

 Sustained 3T Write         : Enabled
 2 Bank PBSRAM              : 3-1-1-1
 Read Pipeline              : Enabled
 Write Pipeline             : Enabled

 Video BIOS Cacheable       : Enabled     Esc : Quit         ↑ ↓ → ← : Select Item
 System BIOS Cacheable      : Enabled     F1  : Help      PU/PD/+/-  : Modify
 Memory Hole At 15 Mb Addr. : Disabled    F5  : Old Values  (Shift) F2 : Color
 ISA Bus Clock              : PCICLK/4    F6  : Load BIOS Defaults
                                          F7  : Load Setup Defaults
```

Fig. 7-4:   Chipset Features Setup

The following system parameters can be set:

DRAM Auto Configuration

Selection of the access time settings for memory modules. The automatic configuration with default values for different memory module types can be selected as well as the manual setting of the access parameters.

The standard settings were optimized for the module and should therefore not be altered.

- Manual selection of the parameters   Disabled (Default)
- Setting for 60 ns   Module 60 ns
- Setting for 70 ns   Module 70 ns

DRAM Timing Control

Selection of the memory access velocity. The automatic configuration was optimized for the module and should therefore not be altered.

- Access velocity   Normal (Default)
                                            Medium / Fast / Turbo / Auto

> **The selection 'Auto' is only available, when the function 'DRAM Auto Configuration was set to 60 nsec or 70.**

SDRAM Single/Burst Wrte

Selection of the access mode of memory areas for write operations.

- SDRAM write access   Single /Burst

SDRAM Cycle Length

Setting for memory access.

- Number of clocks   2 / 3

SDRAM Bank Interleave

Setting for memory access.

- Interleave access OFF   Disabled
- Interleave x banks   2 Bank / 4 Bank

Sustained 3T Write

Setting for the access to the L2 Cache (Write Back or Write Through)

- Sustained Write ON   Enabled (Default)
- Sustained Write OFF   Disabled

2 Band PBSRAM

Setting for memory access.

• Access 3-I-I-I	3-I-I-I (Default)
• Access 2-I-I-I	2-I-I-I

Read Pipeline

Setting for memory access.

• Read Pipeline ON	Enabled (Setup Default)
• Read Pipeline OFF	Disabled (BIOS Default)

Write Pipeline

Setting for memory access.

• Write Pipeline ON	Enabled (Setup Default)
• Write Pipeline OFF	Disabled (BIOS Default)

Video BIOS Cacheable

Activating of the Video BIOS Cache. If 'Enabled' is selected, the access on Video BIOS addresses is stored in the Cache, if the Cache Controller is activated.

• Video BIOS caching	Enabled (Default)
• No Video BIOS caching	Disabled

System BIOS Cacheable

Activating of the system BIOS Cache.

• System BIOS caching	Enabled (Default)
• No System BIOS caching	Disabled

Memory Hole At 15 MB Addr.

Setting for memory access.

• Deactivate function	Disabled (Default)
• Activate function	15M - 16M
	14M - 16M

ISA Bus Clock

Selection of the Clock speed for the ISA Bus

• 7 MHz	7.159 MHz
• 8 MHz	PCICLK/4 (Default)
• 10 MHz	PCICLK/3
• 16 MHz	PCICLK/2

7.7 Power Management Setup

```
                    ROM PCI/ISA BIOS (2A5LCMI5)
                       POWER MANAGEMENT SETUP
                        AWARD SOFTWARE.INC.

Power Management      : Disabled    IRQ5  (LPT2)         : Primary
PM Control by APM     : No          IRQ6  (Floppy Disk)  : Primary
Video Off Option      : Susp.Stby-> Off  IRQ7  (LPT1)    : Primary
Video Off Method      : V/H SYNC+Blank   IRQ8  (RTC Alarm) : Disabled
Modem Use IRQ         : Disabled    IRQ9  (IRQ2 Redir)  : Secondary
Boot Up Floppy Seek   : Enabled     IRQ10 (Reserved)    : Secondary
                                    IRQ11 (Reserved)    : Secondary
         ** PM Timers **            IRQ12 (PS/2 Mouse)  : Primary
HDD Power Down        : Disable     IRQ13 (Coprocessor) : Primary
Doze Mode             : Disable     IRQ14 (Hard Disk)   : Primary
Suspend Mode          : Disable     IRQ15 (Reserved)    : Disabled

         ** PM Events **
VGA                   : OFF
LPT & COM             : LPT/COM
HDD & FDD             : ON
DMA/master            : OFF
RTC Alarm Resume      : Disabled
Primary INTR          : ON          Esc : Quit          ↑ ↓ → ← : Select Item
IRQ3 (COM 2)          : Primary     F1  : Help          PU/PD/+/-  : Modify
IRQ4 (COM 1)          : Primary     F5  : Old Values  (Shift) F2 : Color
                                    F6  : Load BIOS Defaults
                                    F7  : Load Setup Defaults
```

Fig. 7-5:   Power Management Setup

The setup menue for the power management can be different, depending on the system configuration. Settings of the individual parameters can also change the setup menue.

'Doze Mode' designates a system state, in which the CPU is operated with a lower clock rate. 'Suspend' sets the system in a state, in which all components with exception of the CPU are shut off.

The following system parameters can be set:

Power Management

Setting of current saving mode

- Minimal current saving   Min Saving
- Maximal current saving   Max Saving
- Adjustable times for current   User Define
- Current saving mode OFF   Disable (Default)

PM Control by APM

Allocation of the APM-Interface for current saving mode

- APM ON   Yes
- APM OFF   No (Default)

Video Off Option

Current Saving level for deactivating the monitor.

- Never activate current saving mode   Always On
- Activate current saving mode in Suspend   Suspend ->Off (Default)
- Activate current saving mode in all levels   All Modes ->Off

Video Off Method

Setting of the current saving mode of the monitor.

- Blank screen   Blank Screen
- Current saving mode
  via. H-Sync u. V-Sync   V-H SYNC+Blank (Default)
- Current saving mode according to DPMS   DPMS Support

MODEM Use IRQ

Leave current saving mode when modem signals are active on an IRQ channel.

- No leaving of the Current saving mode
  when modem is active   NA
- IRQ for Modem   3,4,5,7,9,10,11

HDD Power Down

Release of the Current saving mode of hard disk.

- Wait time for switching on
  Current saving mode   1 Min - 15 Min

- Current saving mode OFF   Disable (Default)

> **The transition of the hard disk to the Current saving mode is done by the hard disk itself, if the function is activated.
> In order to release the function, the set time value is transmitted as clock signals from the system to the hard disk. The evaluation of the signals is done by the hard disk. As there are different clock lengths with different hard disks, tolerances in relation to the set time values could occur.**

Doze Mode

Activating the Doze Mode.

- Wait time for switching on
  the current saving mode   10 Sec - 1 Hr

- Do not activate current saving   Disable

Suspend Mode

Activating the Suspend Mode.

- Wait time for switching on
  the current saving level   0 Sec -1 Hr

- Do not activate current saving level   Disable

> **The set time value represents the wait time after having reached the Doze Mode, i.e. the timer for this function starts to run, when the system is in the state Doze.**

PM Events

These are events, when the system should return to normal operation, e.g. when the graphic card is active (VGA) or when there are activities at a serial or parallel interface (LPT & COM), at a floppy disk or a hard disk (HDD & FDD), at an interrupt signal or a DMA request.

- VGA   OFF, ON
- LPT & COM   LPT/COM, NONE, LPT, COM
- HDD & FDD   ON, OFF
- DMA/master   OFF, ON
- RTC Alarm Resume   Disabled, Enabled
- Primary INTR   ON, OFF
- IRQn   Primary, Secondary, Disabled

7.8   PNP/PCI Configuration

```
ROM PCI/ISA BIOS (2A5LCMI5)
PNP/PCI CONFIGURATION
AWARD SOFTWARE.INC.

Resources Controled by  : Manual      CPU to PCI Write Buffer : Enabled
Reset Configuration Data: Disabled    PCI Dynamic Bursting    : Disabled
                                      PCI Master 0 WS Write   : Enabled
IRQ-3  assigned to: Legacy ISA        PCI Peer Concurrency    : Enabled
IRQ-4  assigned to: Legacy ISA        PCI Delay Transaction   : Disabled
IRQ-5  assigned to: PCI/ISA PnP
IRQ-7  assigned to: Legacy ISA        PCI IRQ Activated By    : Edge
IRQ-9  assigned to: PCI/ISA PnP
IRQ-10 assigned to: PCI/ISA PnP        Primary   IDE INT#     : A
IRQ-11 assigned to: PCI/ISA PnP        Secondary IDE INT#     : B
IRQ-12 assigned to: PCI/ISA PnP       Reserve Memory At       : CCD00
IRQ-14 assigned to: Legacy ISA        Reserved Size           : 64 KB
IRQ-15 assigned to: Legacy ISA
DMA-D  assigned to: PCI/ISA PnP
DMA-1  assigned to: PCI/ISA PnP       Esc : Quit        ↑ ↓ → ← : Select Item
DMA-3  assigned to: PCI/ISA PnP       F1  : Help        PU/PD/+/-  : Modify
DMA-5  assigned to: PCI/ISA PnP       F5  : Old Values  (Shift) F2 : Color
DMA-6  assigned to: PCI/ISA PnP       F6  : Load BIOS Defaults
DMA-7  assigned to: PCI/ISA PnP       F7  : Load Setup Defaults
```

Fig. 7-6:   PNP/PCI Configuration

Following system parameters can be set:

Resources Controlled By

Selection of system ressources assignment.

- Assignment of ressources by the user   Manual (Setup Default)
- Automatic assignment by the system   Auto (BIOS Default)

Reset Configuration Data

Selection of system ressources assignment.

- Function OFF   Disabled (Default)
- Function ON   Enabled

IRQ-3 to IRQ-15

Allocation of IRQ signals with user-defined assignment.

- Allocation for ISA-Card   Legacy ISA
- Automatic assignment by the system   PCI/ISA PnP

DMA-0 bis DMA-7

Allocation of DMA signals with user-defined assignment.

- Allocation for ISA-Card   Legacy ISA
- Automatic assignment by the system   PCI/ISA PnP

CPU to PCI Write Buffer

Setting for the data flow on the PCI Bus by activating of a write buffer. If 'Enabled' is selected, up to 4 DWORD data can be written on the PCI bus without interruption of the CPU.

- Write Buffer   Enabled (Default)
- No Write Buffer   Disabled

PCI Dynamic Bursting

Setting for the data flow on the PCI bus.

- Dynamic Bursting   Enabled (Setup Default)
- No Bursting   Disabled (BIOS Default)

PCI Master 0 WS Write

Setting for the data flow on the PCI bus.

- Function active   Enabled (Default)
- Function not active   Disabled

PCI Peer Concurrency

Setting for the data flow on the PCI bus.

- Concurrency   Enabled (Default)
- No Concurrency   Disabled

PCI Delay Transaction

Setting for the data flow on the PCI bus.

- Delay Transaction   Enabled
- No Delay   Disabled (Default)

PCI IRQ Activated By

Selection of the identification of an IRQ request.

- IRQ with Edge Signal   Edge (Default)
- IRQ with Level Signal   Level

Primary IDE INT#

Selection of a INT#Signal for the first (primary) IDE channel.

- Selection of the INT#-Signal   A, B, C or D

Secondary IDE INT#

Selection of a INT#Signal for the second (secondary) IDE Channel.

- Selection of the INT#-Signal   A, B, C or D

Reserve Memory At

Selection of a memory range for non-PnP extension cards.

- Allocate no memory range   N/A (Default)
- Allocate memory from address   [CC000 bis DE000]

Reserved Size

Selection of allocated memory size.

• Memory range   8KB/16KB/32KB/64KB

> **This function is only available, when an address was allocated for the selection 'Reserve memory At'.**

7.9   Integrated Peripherals

```
                    ROM PCI/ISA BIOS (2A5LCMI5)
                      INTEGRATED PERIPHERALS
                       AWARD SOFTWARE.INC.

PCI Slot IDE 2nd Channel  : Enabled    Onboard FDC Controller  : Enabled
IDE HDD Block Mode        : Disabled   Onboard UART 1          : Auto
IDE Prefetch Mode         : Disabled   Onboard UART 2          : Auto
                                       Onboard UART 2 Mode     : Standard
OnChip IDE First Channel  : Enabled    IR Duplex Mode          : Half
IDE Primary Master PIO    : Auto       FAST_IR MODE Pins       : IRR3
IDE Primary Slave  PIO    : Auto       Onboard Parallel Port   : 378/IRQ7
IDE Primary Master UDMA   : Disabled   Parallel Port Mode      : EPP
IDE Primary Slave  UDMA   : Disabled   ECP Modem Use DMA       : 3
                                       Parallel Port EPP Type  : EPP1.7
OnChip DIE Second Channel : Enabled    Onboard Serial Port 3   : Disabled
IDE Secondary Master PIO  : Auto       Serial Port 3 Use IRQ   : IRQ3
IDE Secondary Slave  PIO  : Auto       Onboard Serial Port 4   : Disabled
IDE Secondary Master UDMA : Disabled   Serial Port 4 Use IRQ   : IRQ10
IDE Secondary Slave  UDMA : Disabled   Onboard Parallel Port 2 : Disabled
                                       Parallel Port 2 Use IRQ : IRQ7
OnChip USB                : Disabled   Parallel Port 2 Mode    : Normal
                                       LPT2 ECP Mode Use DMA   : 3

```

Fig. 7-7:   Integrated Peripherals

The following system parameters can be set:

IDE HDD Block Mode

Activating the EIDE Block Mode.

• Block Mode ON   Enabled (Setup Default)

• Block Mode OFF   Disabled (BIOS Default)

IDE Prefetch Mode

Setting for the EIDE data flow.

- Prefetch ON   Enabled (Setup Default)
- No Prefetch   Disabled (BIOS Default)

OnChip IDE First Channel

Activating of the onboard EIDE Controller (primary channel).

- Primary IDE Channel active   Enabled (Default)
- Primary IDE Channel not active   Disabled

IDE Primary Master PIO

Selection of the EIDE PIO Mode for the first EIDE channel (Master Device).

- Automatic assignment by the system   Auto (Default)
- PIO Mode   Mode 0 to Mode 4

IDE Primary Slave PIO

Selection of the EIDE PIO Mode for the first EIDE channel (Slave Device).

- Automatic assignment by the system   Auto (Default)
- PIO Mode   Mode 0 to Mode 4

IDE Primary Master UDMA

Selection of the Ultra-DMA Mode for the first EIDE channel (Master Device).

- Automatic assignment by the system   Auto (Setup Default)
- No Ultra-DMA Mode   Disabled (BIOS Default)

IDE Primary Slave UDMA

Selection of the Ultra-DMA Mode for the first EIDE channel (Slave Device).

- Automatic assignment by the system   Auto (Setup Default)
- No Ultra-DMA Mode   Disabled (BIOS Default)

OnChip IDE Second Channel

Activating the onboard EIDE Controller (secondary channel)

- Secondary IDE Channel active   Enabled (Default)
- Secondary IDE Channel not active   Disabled

IDE Secondary Master PIO

Selection of the EIDE PIO Mode for the second EIDE channel (Master Device).

• Automatic assignment by the system   Auto (Default)

• PIO Mode   Mode 0 to Mode 4

IDE Secondary Slave PIO

Selection of the EIDE PIO Mode for the second EIDE channel (Slave Device).

• Automatic assignment by the system   Auto (Default)

• PIO Mode   Mode 0 to Mode 4

IDE Secondary Master UDMA

Selection of the Ultra-DMA Mode for the second EIDE channel (Master Device).

• Automatic assignment by the system   Auto (Setup Default)

• No Ultra-DMA Mode   Disabled (BIOS Default)

IDE Secondary Slave UDMA

Selection of the Ultra-DMA Mode for the second EIDE channel (Slave Device).

• Automatic assignment by the system   Auto (Setup Default)

• No Ultra-DMA Mode   Disabled (BIOS Default)

OnChip USB

Activating of the Universal Serial Bus-Interface (USB).

• USB active   Enabled

• USB not active   Disabled (Default)

Onboard FDC Controller

Activating the onboard Floppy Disk Controller.

• Onboard Controller ON   Enabled (Default)

• Onboard Controller OFF   Disabled

Onboard UART 1

Selection of the Port Address and the interrupts for COM

- Automatic assignment by the system   Auto (Default)

- Deactivate interface   Disabled

- Interrupt, Address   3F8/IRQ4, 2F8/IRQ3,
                                                                        3E8/IRQ4, 2E8/IRQ3

Onboard UART 2

Selection of the Port Address and the interrupt for COM2.

- Automatic assignment by the system   Auto (Default)

- Deactivate interface   Disabled

- Interrupt, Address   3F8/IRQ4, 2F8/IRQ3,
                                                                        3E8/IRQ4, 2E8/IRQ3

OnBoard UART 2 Mode

Selection of Operating Mode of the interface.

- Serial Interface   Standard (Default)

- Infrared Interface   HPSIR, ASKIR, Fast SIR

IR Duplex Mode

Selection of the infrared interface mode.

- Half Duplex transmission   Half (Default)

- Duplex transmission   Full

This option is only available, when the OnBoard UART2 Mode was set as infrared interface.

FAST_IR MODE Pins

Selection of the IR Signal pins.

- Mode IRR3   IRR3 (Default)

- Mode IR   IR Mode

This option is only available, when the OnBoard UART2 Mode was set as infrared interface.

Onboard Parallel Port

Selection of the port address and the interrupts for the parallel interface.

- Deactivate Interface   Disable
- Address, Interrupt   3F8/IRQ7, 3BC/IRQ7, 278/IRQ5

Parallel Port Mode

Selection of the operating mode for the parallel interface.

- Normal Mode   Normal (Default)
- Enhanced Parallel Port   EPP
- Enhanced Capabilities Port   ECP
- ECP and EPP   ECP+EPP

> **ⓘ**   **If the parallel interface was set to the address 3BC and on interrupt IRQ7, only default mode 'Normal' is available.**
> **Enhanced Modes are not available in this case (ECP, EPP).**

ECP Mode Use DMA

Assignment of an DMA line for the ECP Mode.

- DMA Line 1   1
- DMA Line 3   3 (Default)

Parallel Port EPP Type

Selection of the EPP Type.

- Version 1.7   EPP1.7 (Default)
- Version 1.9   EPP1.9

Onboard Serial Port 3

Selection of the port address for COM3.

- Deactivate interface   Disabled (Default)
- Selection of port address   3F8, 2F8, 3E8, 2E8

Serial Port 3 Use IRQ

Selection of the interrupt line for COM3.

- Interrupt   IRQ3, IRQ 10, IRQ11, IRQ4

Onboard Serial Port 4

Selection of the port address for COM4.

• Deactivate Interface	Disabled (Default)
• Selection of port address	3F8, 2F8, 3E8, 2E8

Serial Port 4 Use IRQ

Selection of the interrupt line for COM4.

• Interrupt	IRQ3, IRQ 10, IRQ11, IRQ4

Onboard Parallel Port 2

Selection of the port address for the second parallel interface (LPT2).

• Deactivate Interface	Disabled (Default)
• Selection of port address	3BC, 378, 278

Parallel Port 2 Use IRQ

Selection of the interrupt for the second parallel interface (LPT2).

• Interrupt	IRQ7, IRQ5

Parallel Port 2 Mode

Selection of the operating mode for the parallel interface.

• Normal Mode	Normal (Default)
• Enhanced Parallel Port	EPP
• Enhanced Capabilities Port	ECP
• ECP und EPP	ECP+EPP

> **If the parallel interface was set to the address 3BC and on interrupt IRQ7, only default mode 'Normal' is available.**
> **Enhanced Modes are not available in this case (ECP, EPP).**

LPT2 ECP Mode Use DMA

Assignment of a DMA Line for the ECP Mode of the LPT2 interface.

• DMA-Line 1	1
• DMA-Line 3	3

7.10   MicroDesign Features Setup

```
                  ROM PCI/ISA BIOS (2A5LCMI5)
                  MICRODESIGN FEATURES SETUP
                    AWARD SOFTWARE.INC.

 MD-Feature-Port    : 110h         Temperature     :     25 °C
 M-Systems-FFS      : disabled     Supply (5V)     :   5000 mV
 FFS window addres  : auto         12 Volt         :  12000 mV
                     (flash n/a)   CPU Temp        :     25 °C
                                   neg. 12V        :  12000 mV
 LCD&CRT            : Auto         3.3 V CPU       :   3300 mV
                                   CPU Core Voltage :  3300 mV
 FieldBus Address   : DC00h        Fan 1 Speed     :   5720RPM
 FieldBus IRQ       : 11



                                  Esc : Quit       ↑ ↓ → ← : Select Item
                                  F1  : Help       PU/PD/+/-  : Modify
                                  F5  : Old Values  (Shift) F2 : Color
                                  F6  : Load BIOS Defaults
                                  F7  : Load Setup Defaults
```

Fig. 7-8:   MicroDesign Features Setup

The following system parameters can be set:

MD-Feature-Port

Setting of the basic address for the MicroDesign Feature Port. Please check the basic address before setting, if it is unused to avoid collision with addresses of other components.

• Basic address   110h (Default)
                                         118h, 128h, 160h, 168h, 350h, 580h, 7F8h

M-Systems-FFS

Activating of the M-Systems DiskOnChip Flash Filing Systems

• M-System active   auto

• M-System not active   disabled (Default)

FFS Window Address

Setting of the memory window address on the M-Systems DiskOnChip Flash Filing System.

- Automatic Selection of the Address   Auto (Default)
- Address of the memory window   [C800 to DC00]

This function is only available, if the option 'M-Systems-FFS' was set to 'Disabled'.

LCD&CRT

Selection of the interface for the graphic display (Monitor and/or LCD Panel).

- Automatic Selection   Auto (Default)
- Display only on CRT   CRT only
- Display only CRT and LCD   SimulScan
- Display only on LCD   LCD only

With 'Automatic Selection' the screen display is adapted during the system start for reason of compatibility.

The clock signal must be set to 'Open Collector'!
In the mode 'Auto' the CRT screen is selected and the LCD is switched off, if a CRT and a LCD are connected to the system.

FieldBus Address, FieldBus IRQ

Indication of the basic address and the IRQ Line for the field bus.

These parameters cannot be changed.

Temperature, Supply, u.s.w

The indicated measurements can only be read, but not be altered.
The indication of the rotational speed of the CPU fan is only available with fans, which supply a special clock signal.

8   Software Interfaces

8.1   Address Overview System Memory

In Real-Address Mode 1 Mbyte address space is available. In Protected-Virtual Mode up to 16 Mbyte physical address space can be administrated onboard.

After a system reset the CPU is in Real-Address Mode. It executes the Code at address FFFFF0h. For this reason the BIOS range has to be placed into the top 64 kByte segment of the 16 Mbyte address space.

From this address range a far jump into the segment F000h is executed.

Hex-Adresse	Name	Function
00000000h to 0009FFFFh	640 kByte User-RAM	DOS applications
000A0000h to 000BFFFFh	128 kByte Video-RAM	display refresh memory
000C0000h to 000CBFFFh	48 kByte VGA-BIOS	VGA BIOS range
000CC000h to 000EFFFFh	144 kByte Extension-ROM	Expanded BIOS range For ISA-cards only CC000-DFFFF! is applicable
000F0000h to 000FFFFFh	64 kByte onboard BIOS	BIOS range
	CC000 —DFFFF	Expanded range, e.g. for ISA option or PnP-Option ROM (Silicon-Disk BIOS extension)
	E0000 —EFFFF	POST: indication of the first 64 kByte BIOS
00100000h to 07FFFFFFh	Onboard-RAM 2-128 MByte	Extended Memory, only to use in Protected Mode
00000000h to 00FFFFFFh	Offboard-RAM 16 MByte	Memory range on expansion boards
FFFF0000h to FFFFFFFFh	64 kByte onboard BIOS	BIOS range after Reset

8.2   Interrupts (IRQ)

The NMI of the CPU and two 8259 Interrupt-Controllers of the chipset supply totally 16 system in-terrupts. All interrupts can be masked. The interrupts are sorted according to priority, beginning with the highest priority.

The following table lists the 16 available interrupts.

If a peripheral device is deactivated, such as serial or parallel interface, PS/2-mouse or hard disk controller, the assigned interrupt gets free again.

Interrupt-Level		Funktion
NMI		Parity- or I/O-channel error
Master	Slave	
IRQ 0		Timer Output 0
IRQ 1		Keyboard
IRQ 2		Cascaded for Slave Controller (≈IRQ9)
	IRQ 8	Real time Clock (RTC)
	IRQ 9	ACPI Power Management
	IRQ 10	free /serial interface 3 / 4
	IRQ 11	Serial interface 3 / 4
	IRQ 12	PS/2® -mouse /free
	IRQ 13	Coprocessor
	IRQ 14	Hard disk controller 1
	IRQ 15	Hard disk controller 2
IRQ 3		serial interface 2
IRQ 4		serial interface 1
IRQ 5		free /LPT2
IRQ 6		Floppy controller
IRQ 7		LPT 1

9 System expansions/Alterations

9.1 Safety

Works on MSC IPC may only be done by an elektrospecialist!
When working on MSC IPC the device has to be disconnected from the supply net – disconnect power plug!

When handling static-vulnerable components the ESD protective measures have to be considered.

Absolutely consider the notes on safety in the section 'safety' of this manual.

9.2 Open housing
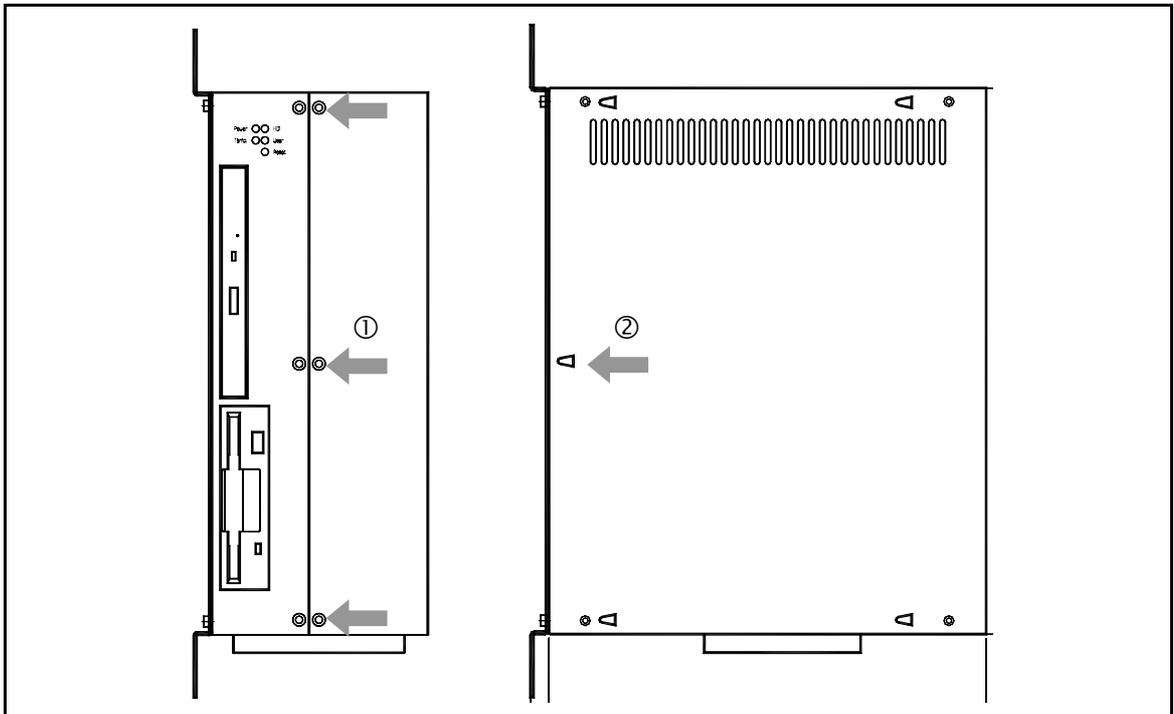
Fig. 9-1:   Open housing

⇨ Loosen fixing screws of the right or left housing cover (see arrows, (1)).

⇨ Put a screwdriver into the centre hole of the metal extension of the housing cover (2) and turn the screwdriver about 90 degrees clockwise. Lift the cover and remove it cautiously.

9.3   Installation of a slot card

The bus frame is mounted as backplane in vertical position to the single-board computer and is stabilized with a bus support.

Multi-purpose slot = 1 x ISA oder 1 x PCI

Equippable with an ISA-slotcard or a PCI Card.

Conditions:

• The MSC IPC has to be disconnected from the supply net (disconnect power plug).

• The right cover is opened.
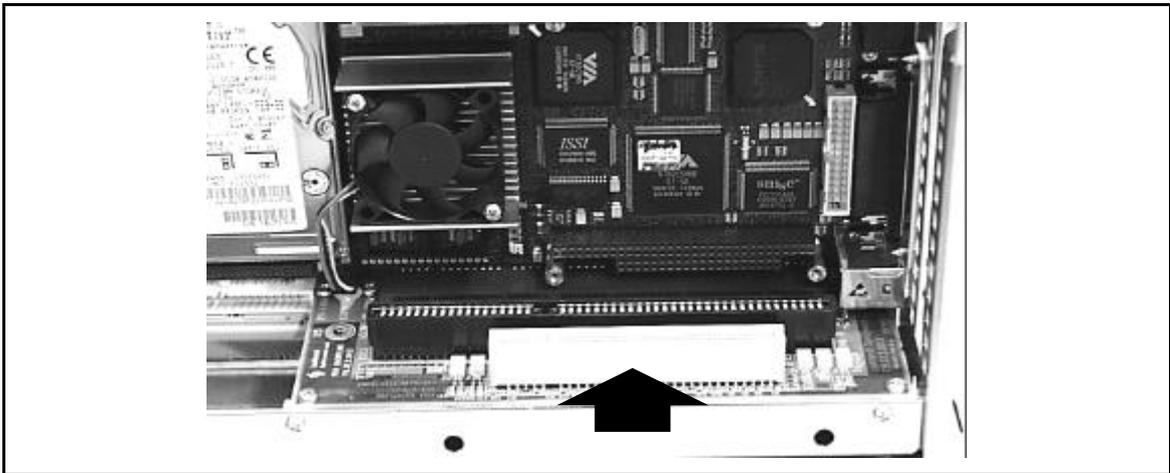
Fig. 9-2:   Combi-slotcard for ISA- or PCI-Card

⇨ Plug Slot-card according to user instructions of the manufacturer into the bus slot.

⇨ Fix Slot sheet steel at the housing.

⇨ Attach housing cover again and fix it with screws.

⇨ Connect power supply and restart MSC IPC.

⇨ Call Bios-setup if required and set specific settings (I/O-address, IRQ) for slot card according to user instructions of the manufacturer.

⇨ Restart computer and install device drivers, if required.

9.4   Install Memory Module

The main memory of the IPC 586 Single Board Computer consists of one SDRAM module. Several modules with different memory size are available (see section Characteristics).

Conditions

- The MSC IPC has to be disconnected from the supply net (disconnect power plug).

- The right cover is opened.
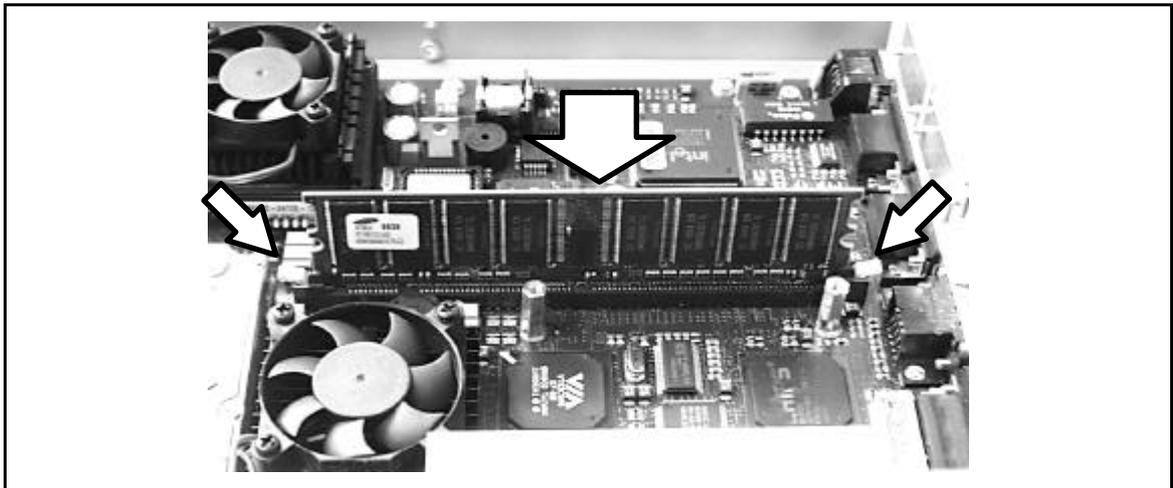
Fig. 9-3:   Install memory module

⇨ Insert memory module vertically into slot – with contact bank first.
  Pay attention to the codings (slots) at the module and at the memory socket.
⇨ Press memory module into the slot, until both side latches lock the module safely.
⇨ Attach housing cover again and fix it with screws.
⇨ Connect power supply and restart MSC IPC.

Deinstall memory module

⇨ Press both side latches downwards to release the module.
- The memory module is pushed upwards.
⇨ Withdraw memory module.

9.5 Install field bus module (Hilscher)

With help of the Leukhardt adapter card a fieldbus module can be plugged directly as module onto the fieldbus interface of the CPU board.

Conditions

• The MSC IPC has to be disconnected from the supply net (disconnect power plug).

• The right cover is opened.
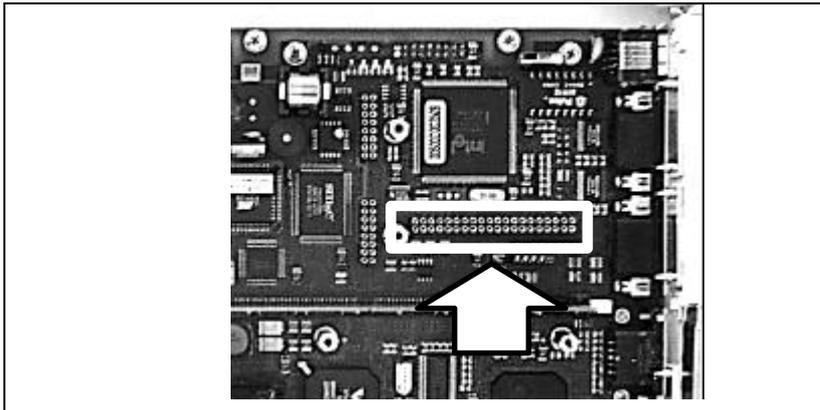
The fieldbus interface is placed above the DRAM memory module (see fig., marking)

Fig. 9-4:   Fieldbus-interface on CPU board
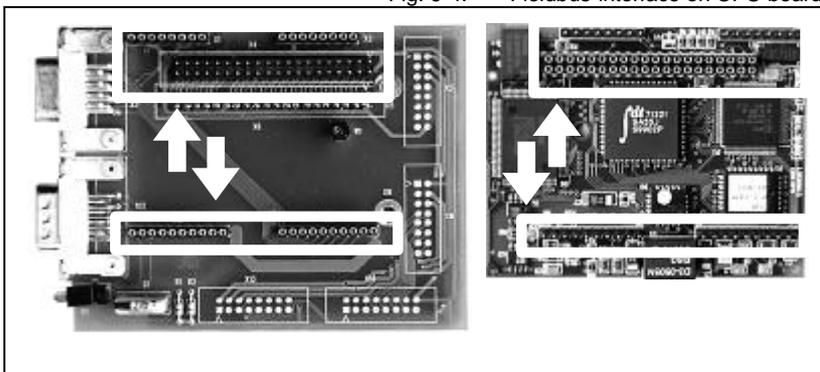
The pins of the Leukhardt fieldbus adapter card and the pins of the fieldbus interface are interconnected (see fig., marking).

Press the cards cautiously together to avoid damaging the pins!

Fig. 9-5:   Leukhardt fieldbus adapter card and fieldbus interface, Hilscher
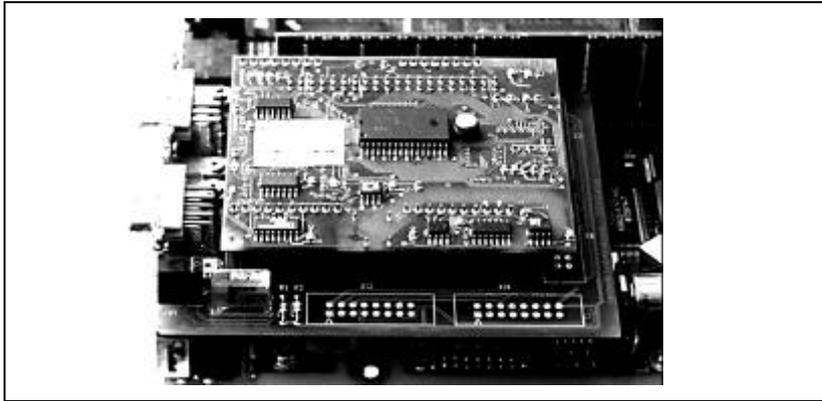
The interconnected cards (adapter card/fieldbus card) are plugged into the fieldbus slot with the lower side of the adapter card.

Fig. 9-6:   Fieldbus interface on adapter card and CPU board

For fieldbus modules an address range of 16 K beginning at address DC000h is set as default value.
IRQ 11 is available as interrupt.

10   Fault diagnosis

10.1   General references

       In this chapter we give you tips how you can define frequently occurring errors and eliminate them.

- Please look up error reports of the operating system in the user manual of the Operating system.

- With errors and problems, that cannot be solved by means of the following description, please contact our application department.

10.2   General errors, cause, remedy

Error situation	Cause	Remedy
After switch-on of the mains voltage the personal computer is not ready for operation and/or does not boot.	Erroneous voltage supply	⇨ Test whether power plug is plugged and whether power plug sits correctly. ⇨ Check, if power supply is on. ⇨ Check fuse in the external power supply.
MSC IPC shuts down while booting.	Possible causes: • Double assignment of I/O-addresses • Double assignment of hardware-interrupts and/or DMA channels • Deviating assignment of couplers • Supply voltage to low.	⇨ Test computer configuration by means of the delivery documents: ⇨ Corresponds the MSC IPC to the as-supplied condition, call our application department. ⇨ If the configuration was modified, you restore the as-supplied condition: Deinstall additional units and restart the computer again. ⇨ Measure Supply voltage. If the mistake still exists after that, contact the supplier of the unit.

Error situation	Cause	Remedy
The connected display unit (Screen, display) remains dark / no screen.	• Connecting cable of display unit to the MSC IPC (VGA-Interface) is not connected correctly. • 'LCD only' is set in BIOS-Setup. • Other cause.	⇨ Test connecting cables for correct connection and firm seat. ⇨ Set in the 'MicroDesign Features Setup' the Parameter 'LCD&CRT on 'CRT only', 'Simulscan' or 'Auto' in BIOS-Setup. ⇨ With other cause: Read operating manual of the display unit.
On the connected display unit no mouse is indicated.	• No connection of mouse connecting cable and PS/2-interface (Mini-DIN-socket) • IRQ 12 is used by another card.	⇨ Switch off MSC IPC and test connecting cables for correct connection and firm seat (Mouse interface is marked at the device). ⇨ Test whether the software driver was installed for the mouse; install when necessary. ⇨ Check interrupt allocation of the computer. Set other cards to another IRQ, if required.
Time and/or date of the MSC IPC are not correct.	• System time in the BIOS erroneous • Empty system battery	⇨ Restart MSC IPC and Calling BIOS-Setup. ⇨ Set time/date correctly and store the change when leaving the Setup. If the problem still exists, the system battery is empty. For more information see maintenance section, battery change.
While booting the MSC IPC the hard disk is not recognized.	• Mistake in the BIOS-Setup: Detection of hard disk does not function. • Defective harddisk	⇨ Restart MSC IPC and enter the hard disk dates again in the BIOS-Setup: Start the MSC IPC new. ⇨ Replace harddisk.

11   Maintenance/Repair of the MSC IPC

11.1   Safety

Only skilled specialists are authorized to perform maintenance works

When handling modules with static-vulnerable components the ESD protective measures have to be considered.

Disconnect MSC IPC from supply net, when performing maintenance works – switch off main switch at the switch cabinet!

Caution

11.2   Cleaning

11.2.1   General Hints

Do not use aggressive cleaning agents as acids or leaches – danger of damages of the metal surfaces.

Caution

No wet cleaning: only use a moistened cloth, dampened with commercial cleaning agent!

11.2.2   Cleaning of fan filter mat

If the filter mat is not cleaned regularly, system components could be damaged as a result of overtemperature of the components.

Caution
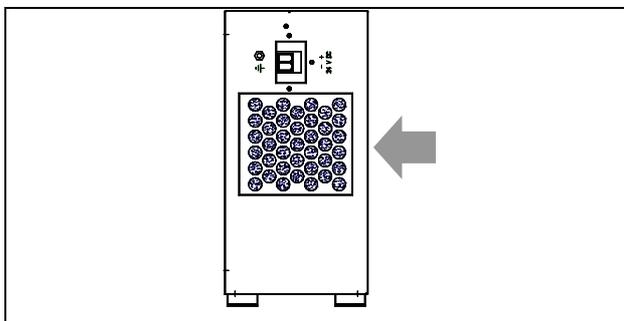
⇨ Clean the filter mat semiannual to avoid contamination of the fan, especially to avoid unsatisfactory ventilation.

⇨ Push fan cover on the side and remove it.

⇨ Remove filter mat from fan cover and clean it in a washing leach. Dry it afterwards.

Fig. 11-1:   Fan filter mat

11.3   Replace device fan

⚠️ **Caution**

**If the device fan is defective, damages of system components can be the result as consequence of an overtemperature of the device.
Replace defective housing fan immediately.**
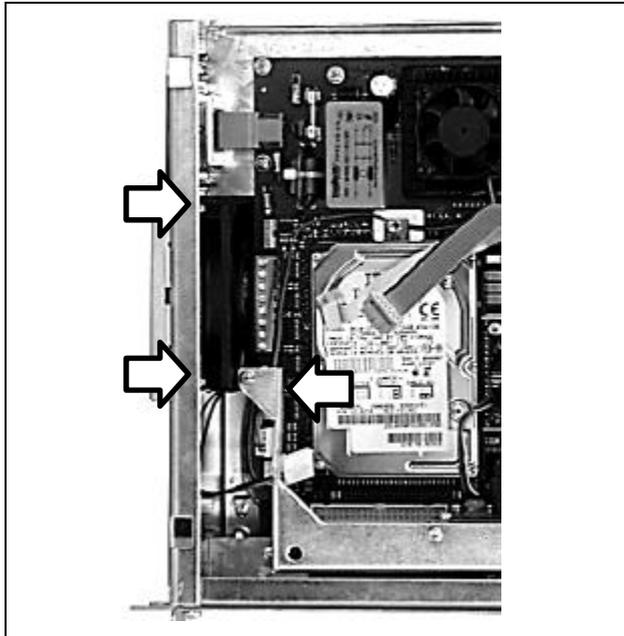
⇨ Unplug current supply of the fan.

⇨ Push fan cover on the side and remove it (see 11.2.2).

⇨ Loosen the four fixing screws of the fan housing.

⇨ Remove fan from computer housing.

⇨ Mount new fan and fix it with screws.

⇨ Mount fan cover with filter mat again.

⇨ Plug in current supply – consider polarity.

⇨ Check function of the fan.

Fig. 11-2:   Housing fan

11.4   Replace CPU fan

Vibrations and noises could be the consequence from a defective CPU fan. The defective fan has to be replaced immediately.
Only mount appropriate fans. Get more information at MSC TUTTLINGEN GMBH.
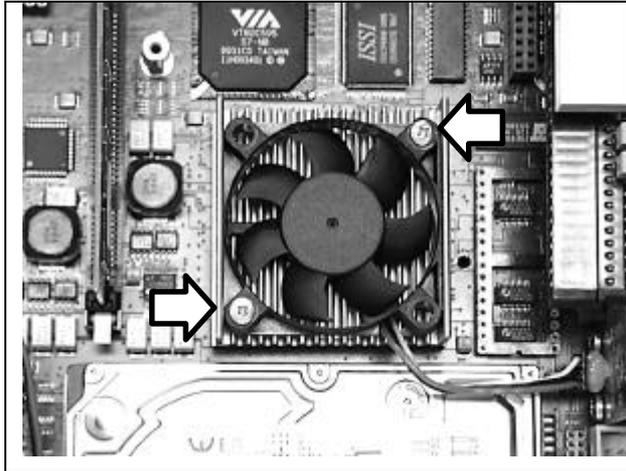
⇨ Unplug current supply of the fan.

⇨ Loosen the fixing screws of the fan housing (see arrow in figure) and re-move fan cautiously.

⇨ Mount new fan cautiosly onto the cool-ing element and fix it with screws.

⇨ Plug in current supply – consider po-larity.

⇨ **The tachometer output of the fan (yellow cord) has to be connected to 'Open Collector'.**

⇨ Check function of the fan.

Fig. 11-3:   CPU fan

11.5   Replace system battery

If wrong BIOS data are indicated with system start (wrong time/date, hard disk not detected) the cause for this errors is normally a system battery with too low capacity or an empty system battery.

Lithium battery

Danger of injury through possible explosion!
Please consider the following hints, when handling batteries:

Caution

- Lithium batteries may not and cannot be charged again, when they are empty.

- Do not get batteries into touch with fire or water.

- Only use recommended batteries of the same type to replace batteries.

- Do not dispose used batteries into the domestic waste. Batteries have to be disposed according to valid environmental directives.

Replace battery

⇨ Loosen the fixing screws of the right housing cover and remove the cover.
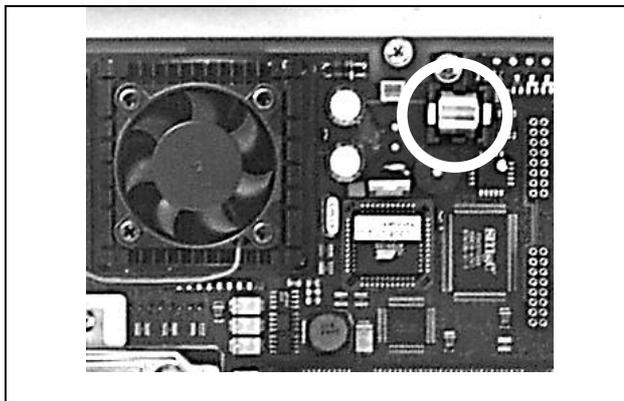
Replace battery as follows:
⇨ Remove used battery from the socket (see marking).
⇨ Consider correct polarity of the new battery. Only use the same battery type.
⇨ Insert new battery into the socket and press it, so that the battery is flush with the top edge of the socket.
⇨ Attach housing cover, plug in current supply and restart computer.

Fig. 11-4:   System battery

⇨ Call Bios-Setup and set data as time and date correctly (see 7.4)
⇨ Restart computer.

Option battery chamber (customized version)

If your BASIC is equipped with battery chamber, the system battery can be changed without opening the computer housing.

Replace battery as follows:

⇨ Open cover of the battery chamber (see arrow, figure is without battery).

⇨ Battery can be loosened and removed by pulling out of the sticking-ribbon.

⇨ Insert new battery and close battery chamber again.

⇨ Restart computer and set Bios settings correctly.
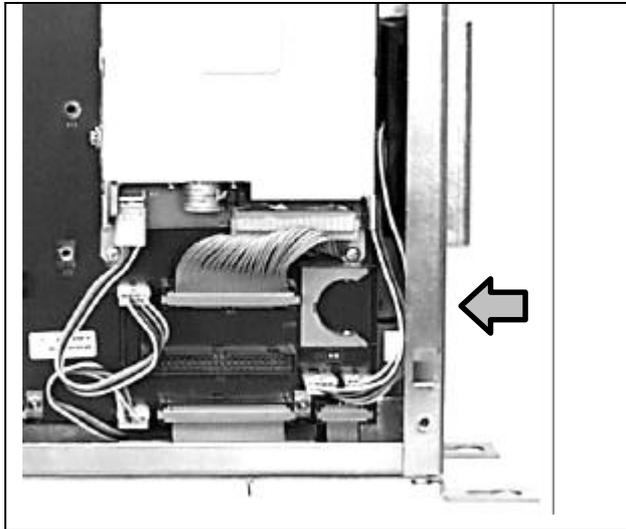
Fig. 11-5:   System battery with battery chamber

11.6   Spare parts

Always specify the article no. and series no. of your MSC IPC when ordering spare parts.

Art.-No.	Designation	Type
64 100 15	Lithium battery (system battery)	CR 1/3 N Lithium 3V
52 070 30	DC fan 80 x 80 x 20 (housing fan)	SD 802012 HB
64 080 24	Fan filter mat 84 x 92 x 9	705.01.3.032.a
60 170 28	Cooling element with fan (CPU fan)	

11.7   Questions to the manufacturer, user questions

11.7.1 Contact

MSC TUTTLINGEN GMBH

Rudolf-Diesel-Strasse 17
D-78532 Tuttlingen

Phone +49 74 61 925-251
Fax   +49 74 61 925-291
E-Mail: tuttlingen@msc.de
Internet: http://www.msc.de/tuttlingen/

11.7.2 Data for calling

Please specify the following data for your MSC IPC when calling:

- Device designation and type (e.g. BASIC1)

- Series-No. (see type label on MSC IPC)

- CPU (e.g. AMD K-6E, 333 MHz, pay attention to the boot routine)

- BIOS-Version (pay attention to the boot routine and call Bios Setup)

11.8   Current Drivers and Tools

You will find the current drivers and tools for your MSC IPC on our homepage in the column 'Support' at http://www.msc.de/tuttlingen/.

12   Annex

12.1   Interface assignments / Connections on the CPU board

12.1.1 Module configurator IPC586: 586-board with CPU of the Pentium and AMD K6-2 series
   Component side
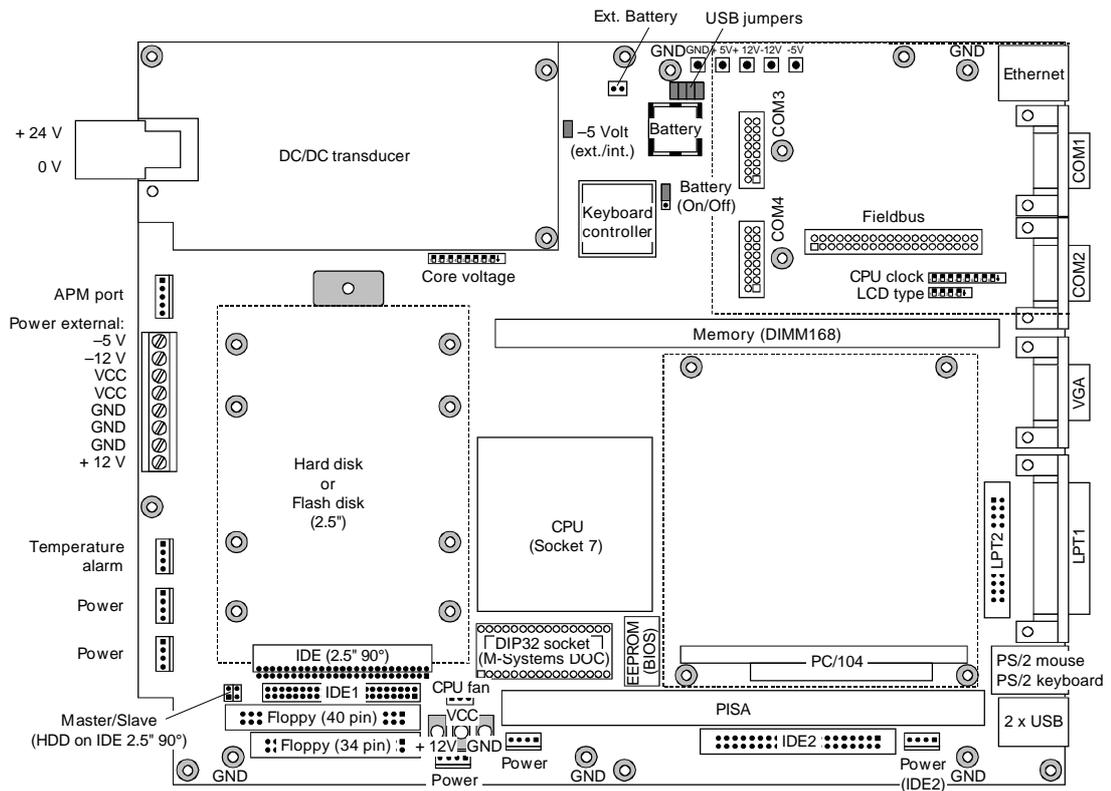
Fig. 12-1:   Module configurator IPC586 [Component side]

12.2   Voltage supply

12.2.1 Internal voltage supply
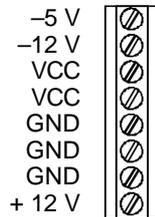
8 pin terminal strip in the middle of the left-hand edge of board to supply the four PC voltages of the power supply unit or the DC/DC transducer.

Each terminal is to be inscribed with the corresponding voltage.

–5 V
–12 V
VCC
VCC
GND
GND
GND
+ 12 V

Plug-in connection:

Phoenix Contact MKDS1.5/8-5.08

Fig. 12-2:   Internal voltage supply

12.2.2 Test pads

Test pads with the four PC voltages at the upper edge of the component side of the All-In-One board for service tasks.

GND + 5V + 12V -12V -5V
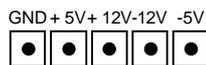
Fig. 12-3:   Test pads

12.3   Peripheral ports

12.3.1 Serial interfaces COM1 and COM2 [RS-232]

Two serial interfaces located on 9 pin Sub-D connectors, each as a RS-232,
marked by "COM1" and "COM2".

RS-232-interface

Sub-D male adapter, 9 pin

1	DCD	Data Carrier Detect	In
2	RxD	Receive Data	In
3	TxD	Transmit Data	Out
4	DTR	Data Terminal Ready	Out
5	GND	Signal Ground	---
6	DSR	Data Set Ready	In
7	RTS	Request to Send	Out
8	CTS	Clear to Send	In
9	RI	Ring Indicator	In
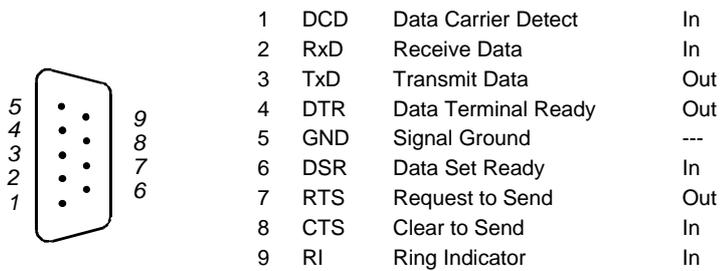
Fig. 12-4:   COM1 and COM2 [RS 232]

COM3 and COM4 as an option

The serial interfaces COM3 and COM 4 can be realized by expansion modules as
RS-232, RS-422/485 or TTY, alternatively to the fieldbus interface.

12.3.2 Serial interfaces COM3 and COM4 [option]

Two 16 pin female connection strips on the component side of the All-In-One board are used as locations of the modules for the serial interfaces COM3 and COM4. They provide TTL signals and supply voltages.

Each module can be fixed by a M3 screw in a GND contacted drill hole with a hole diameter of 3.5 mm.

Female connection strip, 16 pin

GND	1	2	–5V
GND	3	4	–12V
GND	5	6	+12V
DCD	7	8	DSR
RxD	9	10	RTS
TxD	11	12	CTS
DTR	13	14	RI
GND	15	16	VCC

Fig. 12-5   COM3 and COM4 [female connection strip, internal]

From this internal connection, the modules generate the external interfaces:

• RS-232 complete with overvoltage protection

• RS-422/485 opto-decoupled

• TTY opto-decoupled

Technical data on the serial interfaces are contained in the leaflets of the relevant interface modules.

RS232 module

X1:   Male connection strip, 16 pin
       (on solder side)

X3:   Sub-D male adapter, 9 pin

Fig. 12-6:   RS232 module

RS-232 interface to All-In-One board (on solder side):

Male connection strip, 16 pin

RS-232 with overvoltage protection

Interface to periphery:

Sub-D male adapter, 9 pin
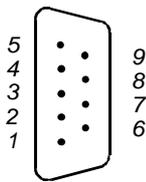
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Fig. 12-7:   COM3 and COM4 [RS-232]

RS422/485 module

X1:   Male connection strip, 16 pin
        (on solder side)

X3:   Sub-D female adapter, 9 pin

Fig. 12-8:   RS422/485 module

RS-232 interface to All-In-One board (on solder side):

Male connection strip, 16 pin

RS-422/485 opto-decoupled

Interface to periphery:

Sub-D female adapter, 9 pin
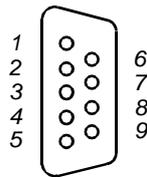
Pin	Half duplex	Full duplex
1		RxD–
2		Termination Receive
3	TxD–/RxD–	TxD–
4	Termination Transmit/Receive	Termination Transmit
5	GND	GND
6		RxD+
7	GND	GND
8	TxD+/RxD+	TxD+
9	Duplex mode	Duplex mode

Fig. 12-9:   COM3 and COM4 [RS-422/485]

Standard setting on delivery:

• Full duplex

• No termination

Switching in case of half duplex mode

In half duplex mode the RTS signal of RS-232 interface switches over from transmit to receive mode.

Operating mode and termination

The features half duplex and termination of transmit and/or receive line can be externally config-ured by solder joints at the 9 pin Sub-D adapter.

Solder joint	Operating mode	Solder joint	Termination
	Full duplex = State of delivery		**No termination = State of delivery**
	Half duplex		Termination – Full duplex
			Termination – Half duplex
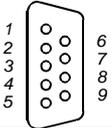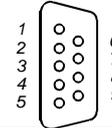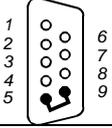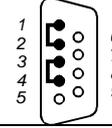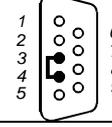
The termination of the transmit and receive line with a resistance of 120 Ohm is conducted each to one pin of the Sub-D female adapter. By connecting this pin with the corresponding line at the socket outside the housing, the termination can be handled variably without open the case and possibly change a jumper setting on the interface module.

Examples to connect periphery

Full duplex without termination
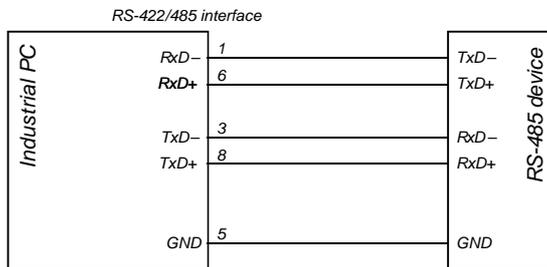
Half duplex without termination
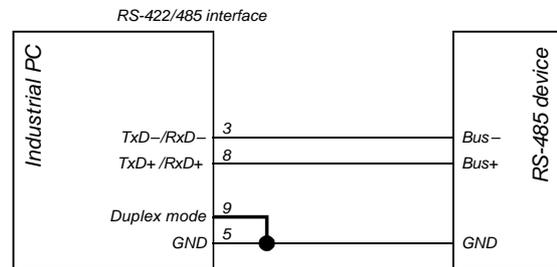
Full duplex with termination
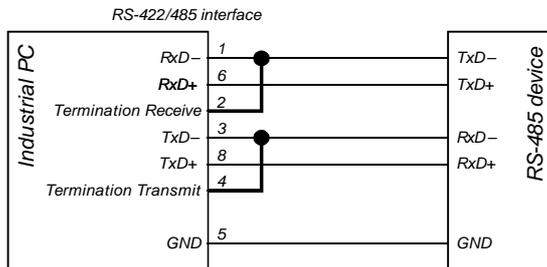
Half duplex with termination
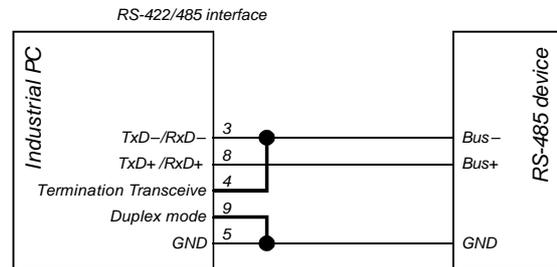
TTY module
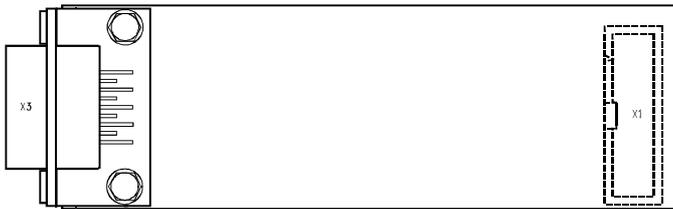
X1:   Male connection strip, 16 pin
        (on solder side)

X3:   Sub-D female adapter, 9 pin

Fig. 12-10:   TTY module

RS-232 interface to All-In-One board (on solder side):

Male connection strip, 16 pin

TTY opto-decoupled

Interface to periphery:

Sub-D female adapter, 9 pin
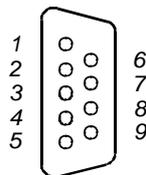
1	Current source 20 mA
2	TxD+
3	RxD+
4	Current source 20 mA
5	GND
6	220 Ω to GND
7	TxD−
8	RxD−
9	220 Ω to GND

Fig. 12-11:   COM3 and COM4 [TTY]

Operating modes

• active
  The module current sources supply the required constant current of 20 mA on
  the transmit and receive line.

• passive
  The periphery current sources supply the required constant current of 20 mA on
  the transmit and receive line.

Examples to connect periphery
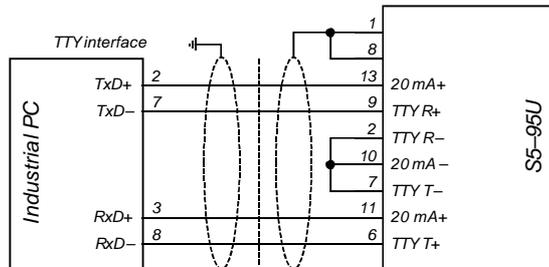
S5-95U   WT 41201
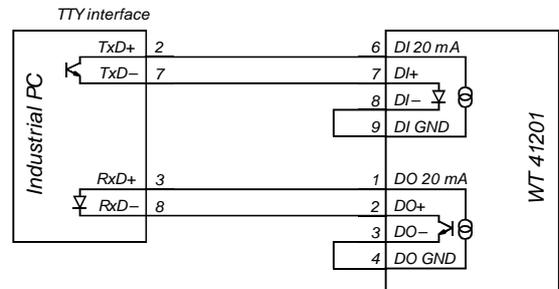
12.3.3 Fieldbus interface [option]

Instead of the two serial interface modules COM3 and COM4 an expansion module like a "Hilscher COM module" can be put on a 40 pin female connection strip via a fieldbus adapter.

See "Design guide COM" Index 4 of Hilscher company for the electrical specification of this bus just as for the assignment of the connections to periphery by the 9 pin Sub-D connector and the 9 pin Sub-D socket also for the function of the two light emitting diodes.

Female connection strip, 40 pin

GND	1	2	VCC
N.C.	3	4	SMEMW–
SMEMR–	5	6	N.C.
	7	8	SA2
SA1	9	10	SA0
DED7	11	12	SA3
DED6	13	14	SA4
DED5	15	16	SA5
DED4	17	18	SA6
DED3	19	20	SA7
DED2	21	22	SA8
DED1	23	24	SA9
DED0	25	26	SA10
SA11	27	28	SA12
GND	29	30	VCC
SA13	31	32	RSTDRV
N.C.	33	34	N.C.
	35	36	N.C.
N.C.	37	38	
N.C.	39	40	N.C.

Fig. 12-12:   Fieldbus [female connection strip, internal]

From this internal connection, the various modules generate the interfaces to the fieldbus systems:
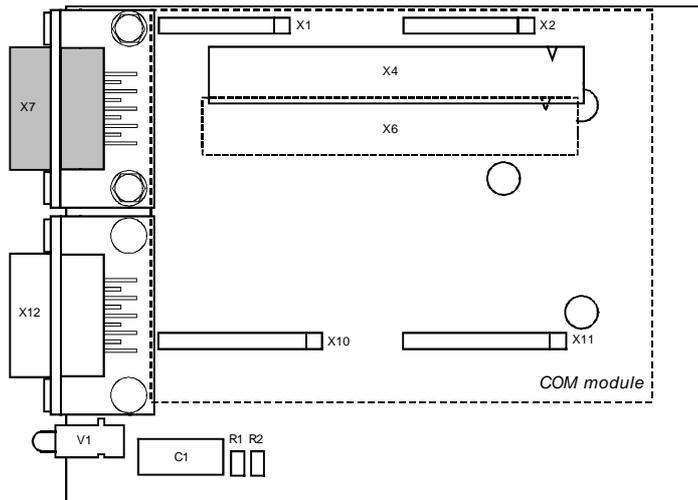
• CANopen

• InterBus

• PROFIBUS

See "Design guide COM" and leaflets of Hilscher company for technical data of the COM modules.

Fieldbus adapter

There are two versions of fieldbus adapter, differed by connection X7 – depending on fieldbus system:

Fieldbus system	Connection X7
CANopen	Sub-D male, 9 pin
InterBus PROFIBUS	Sub-D female, 9 pin

X1: Female connection strip, 8 pin

X2: Female connection strip, 8 pin

X4: Male connection strip, 40 pin

X6: Male conn. strip, 40 pin (solder side)

X7: Sub-D connector, 9 pin
      (for CANopen)
Sub-D socket, 9 pin
      (for InterBus and PROFIBUS)

X10: Female conn. strip, 10 pin (diagnosis)

X11: Female conn. strip, 10 pin (fieldbus)

X12: Sub-D connector, 9 pin (diagnosis)

V1: LED green "Run"
LED yellow "Ready"

Fig. 12-13:   Interface module "Fieldbus adapter"

Connection to fieldbus module (on component side): Male connection strip, 40 pin, X4

Connection to All-In-One board (on solder side): Male connection strip, 40 pin, X6

> The signal pinning of both connection strips is identical and corresponds to the pinning of the 40 pin female connection strip "Fieldbus" of the All-In-One board.

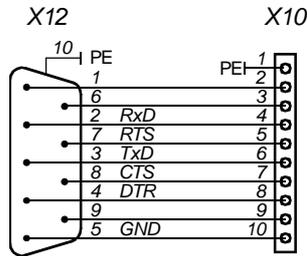Fieldbus, connection to periphery, X7:

> CANopen: Sub-D connector, 9 pin
>
> InterBus: Sub-D socket, 9 pin
>
> ProfiBus: Sub-D socket, 9 pin

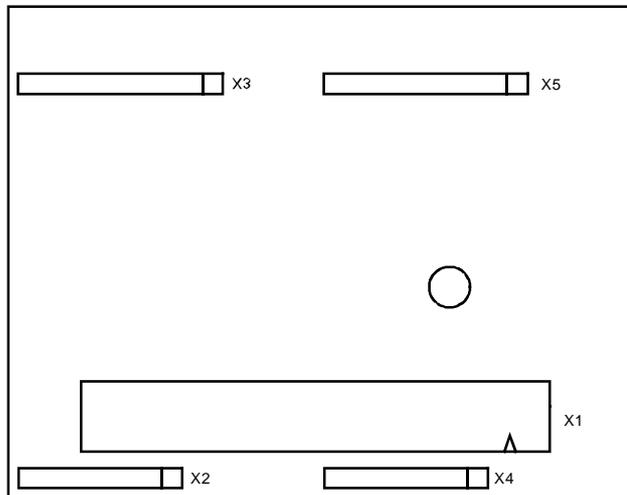Fieldbus, connection to fieldbus module: Female connection strip, 10 pin, X11
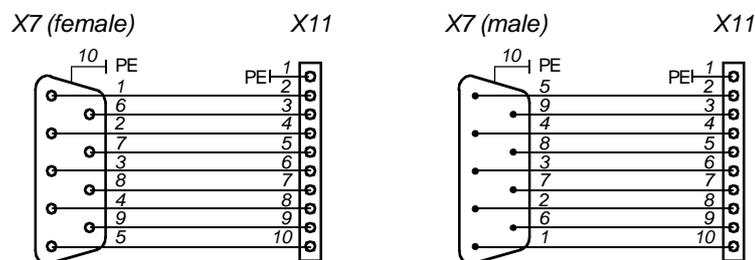
Diagnosis, connection to periphery: Sub-D connector, 9 pin, X12

Diagnosis, connection to fieldbus module: Female connection strip, 10 pin, X10

COM modules

X1:   Female connection strip, 40 pin

X2:   Male connection strip, 8 pin

X3:   Male connection strip, 10 pin (diagnosis)

X4:   Male connection strip, 8 pin

X5:   Male connection strip, 10 pin (fieldbus)

Fig. 12-14:   COM modules

Fieldbus interface: Male connection strip, 10 pin, X5

The signal pinning depends on fieldbus.

Diagnosis interface: Male connection strip, 10 pin, X3

The signal pinning of this RS-232 interface is identical for all COM modules.

Sub-D male, 9 pin	Conn. strip, 10 pin	Designation	Signal	Input/Output
2	4	RxD	Receive Data	In
3	6	TxD	Transmit Data	Out
4	8	DTR	Data Terminal Ready	Out
5	10	GND	Signal Ground	---
7	5	RTS	Ready to Send	Out
8	7	CTS	Clear to Send	In

Fig. 12-15:   Diagnosis interface

Note for all COM modules:

• Hardware settings
  – Address   DC000
  – Interrupt   Polling

• Memory size 2 / 8 KB Dual-port memory

CANopen

Sub-D male, 9 pin	Conn. strip, 10 pin	Designation	Signal	Input/Output
–	1	PE	Earth Ground	---
2	8	CAN–	Data Line low	In/Out
3	6	DGND	Data Reference Potential	---
6	9	DGND	Data Reference Potential	---
7	7	CAN+	Data Line high	In/Out
–	10		Shield	Shield of bus cable

Fig. 12-16:   CANopen interface

InterBus

Sub-D female, 9 pin	Conn. strip, 10 pin	Designation	Signal	Input/Output
–	1	PE	Earth Ground	---
1	2	DO2	Send Data Line +	Out
2	4	DI2	Receive Data Line +	In
3	6	GND2	Ground	---
5	10	U_{dd}	Logic Voltage 5 V	Out
6	3	DO2–	Send Data Line –	Out
7	5	DI2–	Receive Data Line –	In
9	9	BC_UM	Bus Connector IN	In

Fig. 12-17:   InterBus interface

PROFIBUS

Sub-D female, 9 pin	Conn. strip, 10 pin	Designation	Signal	Input/Output
–	1	PE	Earth Ground	---
3	6	RxD/TxD-P	Data Line	In/Out
4	8	CNTR-P	Repeater Control Signal	Out
5	10	DGND	Data Reference Potential	---
6	3	VP	Power Supply positive	---
8	7	RxD/TxD-N	Data Line inverse	In/Out

Fig. 12-18:   PROFIBUS interface

12.3.4 Parallel interface LPT1

The parallel port (LPT1) is PC/AT compatible,
its control signals correspond to the Centronics standard.

Connection via 25 pin Sub-D female adapter,
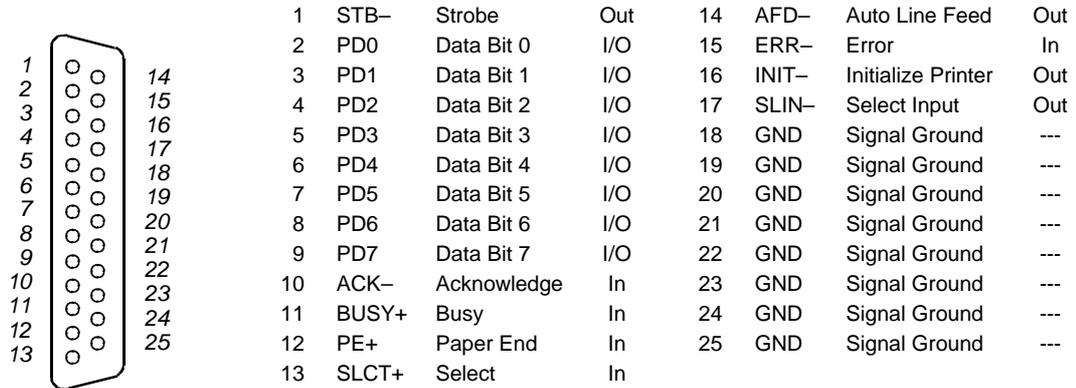labeled "LPT1".

Sub-D female adapter, 25 pin

Pin	Signal	Description	Dir	Pin	Signal	Description	Dir
1	STB–	Strobe	Out	14	AFD–	Auto Line Feed	Out
2	PD0	Data Bit 0	I/O	15	ERR–	Error	In
3	PD1	Data Bit 1	I/O	16	INIT–	Initialize Printer	Out
4	PD2	Data Bit 2	I/O	17	SLIN–	Select Input	Out
5	PD3	Data Bit 3	I/O	18	GND	Signal Ground	---
6	PD4	Data Bit 4	I/O	19	GND	Signal Ground	---
7	PD5	Data Bit 5	I/O	20	GND	Signal Ground	---
8	PD6	Data Bit 6	I/O	21	GND	Signal Ground	---
9	PD7	Data Bit 7	I/O	22	GND	Signal Ground	---
10	ACK–	Acknowledge	In	23	GND	Signal Ground	---
11	BUSY+	Busy	In	24	GND	Signal Ground	---
12	PE+	Paper End	In	25	GND	Signal Ground	---
13	SLCT+	Select	In				

Fig. 12-19: LPT1

12.3.5 Parallel interface LPT2 [option]

Additionally it is possible to connect the second parallel interface LPT2 by a 26 pin plug on the
All-In-One board and to put it out by a 25 pin Sub-D female adapter next to the LPT1 socket.

For LPT2 you need an adapter bracket!

Male connection strip, 26 pin

STB–	1	2	AFD–
PD0	3	4	ERR–
PD1	5	6	INIT–
PD2	7	8	SLIN–
PD3	9	10	GND
PD4	11	12	GND
PD5	13	14	GND
PD6	15	16	GND
PD7	17	18	GND
ACK–	19	20	GND
BUSY+	21	22	GND
PE+	23	24	GND
SLCT+	25	26	VCC

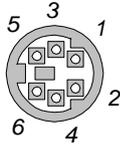Fig. 12-20: LPT2 [option]

Remark:

In addition to LPT2 port this cut-out in side plate can be used for a 37 pin female Sub-D adapter
to attach an external floppy disk drive.

12.3.6 PS/2 mouse and PS/2 keyboard

Two 6 pin MiniDIN sockets next to each other to connect an external mouse and an external MF keyboard:
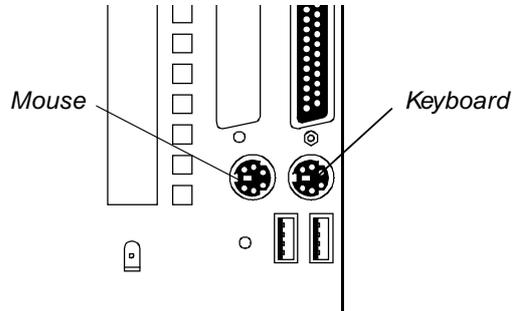
MiniDIN socket, 6 pin

Mouse		
1	MSDAT	Mouse Data
2	N.C.	
3	GND	Ground
4	VCC	
5	MSCLK	Mouse Clock
6	N.C.	

Keyboard		
1	KBDAT	Keyboard Data
2	N.C.	
3	GND	Ground
4	VCC	
5	KBCLK	Keyboard Clock
6	N.C.	

Fig. 12-21:   PS/2 mouse and PS/2 keyboard

12.3.7 USB connections

Double USB connector to attach peripheral USB devices.
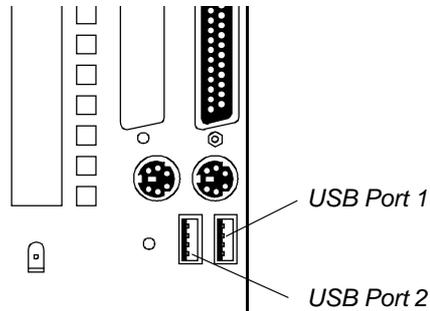
USB Port 1

USB Port 2

USB connector, 4 pin

	USB Port 1	**USB Port 2**
4	1 VCC	1 VCC
3	2 Data0–	2 Data1–
2	3 Data0+	3 Data1+
1	4 GND	4 GND

Fig. 12-22:   USB

12.3.8 Ethernet

Ethernet connection via 10Base-T connector of shielded version.
The Intel 82558 controller supports transfer rates of
10 Mbit/s and 100 Mbit/s.

10Base-T

RJ45 CAT5
shielded in part

10

1
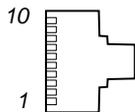
1	TxD+	10Base-T Transmit	Differential Output
2	TxD–	10Base-T Transmit	Differential Output
3	RxD+	10Base-T Receive	Differential Input
4	TRM/TTM	Schirm	
5	TRM/TTM	Schirm	
6	RxD–	10Base-T Receive	Differential Input
7	TRM/TTM	Schirm	
8	TRM/TTM	Schirm	

Fig. 12-23:   Ethernet

12.3.9 VGA monitor port

Enables operation of an external display unit in form of a monitor or various different display types, e.g. from MSC TERMINAL series, via 15 pin HD-Sub-D female adapter "VGA EXT.".

HD-Sub-D female adapter, 15 pin
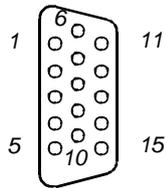
1	Video signal red	6	Ground red	11	Screen ID Bit 0
2	Video signal green	7	Ground green	12	Screen ID Bit 1
3	Video signal blue	8	Ground blue	13	Horizontal synchronization
4	Screen ID Bit 2	9	N.C. (coded)	14	Vertical synchronization
5	GND (earth)	10	Synchronization ground	15	Screen ID Bit 3

Fig. 12-24:   VGA ext.

12.3.10 External floppy drive unit [option]

The 37 pin Sub-D female adapter to connect an external floppy disk drive is to be inserted in the cut-out assigned for at the peripheral ports on the left-hand side of the case.

Via a flat cable the female adapter is to be connected to a 40 pin upright male connection strip on the All-In-One board. Note the special wiring of this flat cable.

The interface also provides the voltage supply (+5 V, GND) for the external floppy drive unit, in addition to the signals of the 34 pin connection strip.

Sub-D female adapter, 37 pin

Pin	Signal	Description	Pin	Signal
1	VCC		20	GND
2	VCC		21	GND
3	DRVDEN0	Density Select 0	22	GND
4	N.C.	reserved	23	GND
5	DRVDEN1	Density Select 1	24	GND
6	IDX–	Index	25	GND
7	MTO–	Motor Enable 0	26	GND
8	DR1–	Drive Select 1	27	GND
9	DR0–	Drive Select 0	28	GND
10	MT1–	Motor Enable 1	29	GND
11	DIR–	Direction	30	GND
12	STP–	Step	31	GND
13	WD–	Write Data	32	GND
14	WG–	Write Gate	33	GND
15	TR0–	Track 0	34	GND
16	WPRT–	Write Protect	35	GND
17	RDATA–	Read Data	36	GND
18	HDSL–	Head Select	37	GND
19	DC–	Disk Change		

Fig. 12-25:   Floppy external [option]

Note:

- With the computer switched on:
  do not connect or disconnect external floppy drive unit!

- If there is a floppy disk drive integrated in BASIC1,
  an external drive unit may not be connected.

Remark:
An external floppy drive unit 3½" – 1.44 MB complete with pre-configured cable is available in our delivery program.

12.4   DC/DC transducer

The DC/DC transducer provides power supply to the IPC586-board inclusive all connected components like e.g. display, hard disk, bus board etc.

- Input

Voltage range	18 ... 36 V DC
Fuse	T6, 3 A plug-in
Starting current limitation	Active, electronic

- Output

	U1	**U2**	**U3**
Output voltage DC	+5.1 V	+12 V	−12 V
Tolerance	±3%	±5%	±5%
Nominal current version 1	10 A	1.2 A	0.3 A
Nominal current version 2	11.5 A	1.5 A	0 A
Ripple U_{eff} (< 20 MHz)	≤ 20 mV	≤ 20 mV	≤ 20 mV
Ripple U_{ss} (< 20 MHz)	≤ 100 mV	≤ 100 mV	≤ 100 mV
Current limitation (typ.)	13 A	1.8 A	0.7 A

- Protection

	U1	**U2**	**U3**
Current limitation	Yes		
Power output limitation	75 W		
Proof against open-circuit	Yes		
Hold-up time	5 ms approx. for U = 24 V and P = 75 W		
	10 ms approx. for U = 24 V and P = 37.5W		
Protection against incorrect polarity	Active, electronic		
Overvoltage shutdown	Yes, if U1 > 5.5 V		

- Safety

Norm	EN 60950
Output	Safe extra low voltage (SELV) according to EN 60950
Protective class	Class II
Test voltage	500 V / 50 Hz or 750 VDC

12.5   Interfaces and Connections on the expansion board
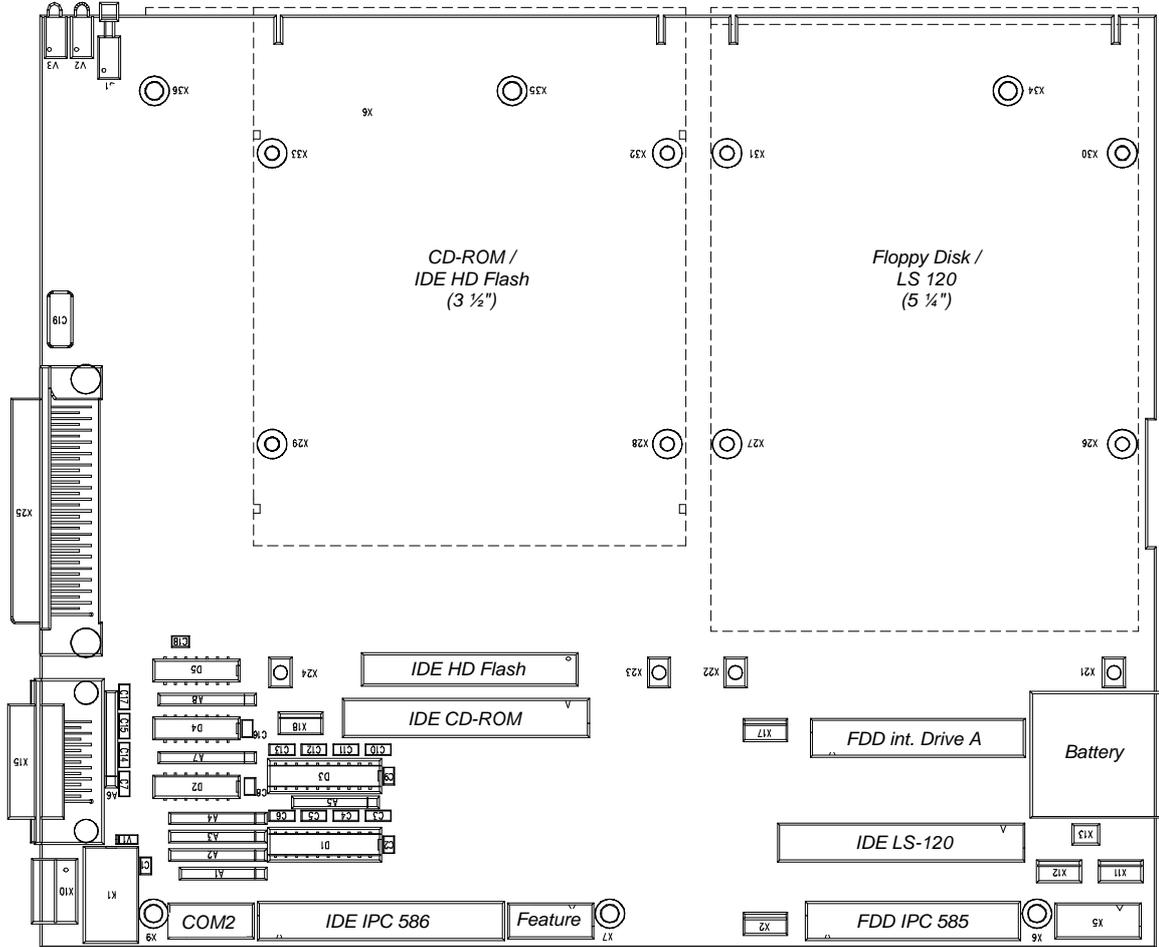
Fig. 12-26:   Expansion board

12.5.1 IDE HD Flash / IDE CD-ROM

These interfaces can only be allocated alternative. Here you can connect either a CD-ROM disk or a DiskOnChip Flash RAM. The required component can be connected at the appropriate female connector strip.

12.5.2 FDD intern Drive A / IDE LS 120

These interfaces can only be allocated alternative. Here you can connect either a floppy disk or a LS120 disk. The required component can be connected at the appropriate female connector strip.

12.6   Configuration of jumpers and adjustment of switches

Jumpers and switches are configured ready for operation ex works. The settings described in the following are only to use if you alter the system configuration.

12.6.1 Set jumper "Master/Slave" for first hard disk (onboard)

This jumper sets the onboard hard disk as master or slave. It is equivalent to the jumper group of the hard disk, i.e Pin1 of the jumper group is equivalent to the hard disk jumper group. The on-board IDE hard disk is set as IDE master ex works. If an additional hard disk is installed, the user instructions of the applicated hard disk has to be considered.

„Master/Slave"	
1	**Default:** **Setting of the jumper depends on the used hard disk.**

12.6.2 Set jumper for battery supply ON/OFF (jumper 'battery')

This jumper determines whether the circuit board is supplied with battery voltage.

It also can be used for entering of an external battery voltage.

"Battery (On/Off)"		
1 2 3	**Battery on**	**Default**
1 2 3	Battery off	

12.6.3 Supply voltage –5V for the ISA-Bus external/internal (jumper '-5 Volt)

This jumper determines whether the –5 Volt regulator existing on the board produces –5 Volt.

"–5 Volt (ext./int.)"		
	–5 Volt external	
	–5 Volt internal	**Default**

12.6.4 Switch border "CPU clock"

This switch border is used for the configuration of the different CPU types through the adjustment of the internal and the external bus clock of the CPU.

"CPU clock"	Version of socket-7-compatible CPU
1▪ 2▫ 3▪ 4▪ 5▪ 6▪ 7▫ 8▪ ↓	Pentium 133 MHz
1▫ 2▪ 3▪ 4▪ 5▪ 6▫ 7▪ 8▪ ↓	Pentium 200 MHz MMX
1▫ 2▪ 3▪ 4▫ 5▫ 6▫ 7▫ 8▪ ↓	AMD K6-2E 333 MHz
1▪ 2▫ 3▪ 4▪ 5▪ 6▫ 7▫ 8▪ ↓	AMD K6-2E 400 MHz

12.6.5 Core voltage and Onboard PCI-Ethernet (Switch unit "Core voltage")

This switch unit provides the configuration of the core voltage of the CPU as well as for the switching off of the PCI Ethernet controller.

Switch 1 ... 5   Core voltage

Switch 6 ... 7   reserved

Switch 8   PCI-Ethernet-OnBoard Enable/Disable

- Concerning CPUs with one supply voltage (3.3 V)
  the voltage installed here is without significance.
- Concerning CPUs with two supply voltages
  the voltage differing from 3.3 V will be installed.

ℹ️   **Do not change the core voltage, because it is optimized ex works!**

- Switch no. 8 is only efficient
  if the PCI variant of the Ethernet controller is equipped.

"Core voltage"	CPU type	Core voltage
1▪ 2▪ 3▪ 4▪ 5▫ 6▪ 7▫ 8▪ ↓	Pentium 133 MHz	3.3 V
1▫ 2▪ 3▪ 4▪ 5▫ 6▫ 7▫ 8▪ ↓	Pentium 200 MHz MMX	2.8 V
1▫ 2▫ 3▪ 4▫ 5▪ 6▫ 7▫ 8▪ ↓	AMD K6-2E 333 MHz	1.9 V
1▪ 2▪ 3▫ 4▫ 5▫ 6▫ 7▫ 8▫ ↓	AMD K6-2E 400 MHz	2.2 V

"Core voltage": SW8	PCI-Ethernet-OnBoard	
1▫ 2▫ 3▫ 4▫ 5▫ 6▫ 7▫ 8▪ ↓	**enabled**	**Default**
1▫ 2▫ 3▫ 4▫ 5▫ 6▫ 7▫ 8▪ ↓	disabled	

12.7   Setting of the watchdog timer function

The watchdog timer function is part of the feature port functions. The access to the watchdog timer function is possible via the BIOS Feature API.

12.7.1 Identification and Header

Each program, which will access to the BIOS Feature API functions has to detect, if the API Header is in the Bios Code Segment (F0000h bis FFFFFh). If the header is not detected, there is no access possible to the API functions.

Header (DWORD ALIGNED)

Field Description	Offset	Size	Value
Signature	00h	4 Byte	$MiD (ASCII)
API Version	04h	1 Byte	10h
Header Length	05h	1 Byte	0Eh
Reserved	06h	4 Byte	undefined
16 Bit-Real-Mode-Code-Offset	0Ah	2 Byte	variable
16 Bit-Real-Mode-Code-Segment	0Ch	2 Byte	variable

Example for detecting the API header with an Assembler routine

Use the following example to detect the header:

```
.......
mov ax,0F000h              ;BIOS Code Seg
mov es, ax                 ;;
xor di, di                 ;First possible Offset
mov eax,44694D24h          ;Signature "$MiD "
mov cx,4000h               ;Number of dwords to scan
cld                        ;Scan forward
repne scasd                ;;
jne MD_API_NotFound        ;Jump if Signature not found
sub di,4                   ;ES:DI points to header
jmp MD_API_Found           ;;
......
```

12.7.2 Watchdog Function (Major function ID 05)

This API category provides functions for the watchdog timer.

Watchdog Timer On (Minor function ID 00)

- Input: AX   = 0500h

BX	= 55AH: Program watchdog by register CX
CX: Bit 6	= 1, Enable reset pin
CX: Bit 5	= 1, enable IOCHK pin
CX: Bit 4-0	= Top 5 bit for count (0.5 -19 s)
BX !	= 55AH, disable pins and set count to a maximum of 8.75 s

- Output: CF   = 0 Function not provided, Watchdog enabled
                   CF   = 1 (Function not provided!)

Watchdog Timer Off (Minor function ID 01)

- Input: AX   = 0501h

- Output: CF   = 0 Function not provided, Watchdog disabled
                   CF   = 1 (Function not provided!)

Watchdog Timer Reset (Minor function ID 02)

- Input: AX   = 0502h

- Output: CF   = 0 Function not provided!, Watchdog timer reset
                   CF   = 1 (Function not provided!)

12.8   Index