DIGITAL-LOGIC

smart embedded computers

TECHNICAL USER'S MANUAL FOR:

MPCX48/A

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ATTENTION:
All information in this manual and the product are subject to change without prior notice.

REVISION HISTORY:

MPCX48 Version	Bios Version	Doc. Version	Date/Vis:	Modification: Remarks, News, Attention:
V0.1	V2.9	V0.1	07.2005 KUF	Initial Version
V1.0	V2.9	V1.0	10.2005 KUF	Basic Version
V1.0	V2.9	V1.0A	10.2005 DAR	Final Version
V1.0	V2.9	V1.0B	11.2005 DAR	New bios setup pictures, Bios MPCX48 3.0, ComSwitch
V1.0	V2.9	V1.0C	01.2006 DAR	Digital I/O pinout, corrected, additional driver description added
V1.0	V3.01	V1.0D	02.2006 DAR	Linux driver for COM-Switch and DIO, Bios V3.01 / Links added
V1.0	V3.03	V1.0E	03.2006 DAR	Bios V3.03
V1.0	V3.04	V1.0F	03.2006 DAR	Sound driver, Bios 3.04
V1.0	V3.04	V1.0G	06.2006 DAR	Chapter 3.8 /6 /7 supplemented
V1.0	V3.04	V1.0H	09.2006 DAR	Chapter 2.8
V1.0	V3.05	V1.0I	11.2006 DAR	Add chapter 2.7 and 2.8 to chapter2.7, Bios 3.05
V1.0	V3.05	V1.0J	12.2006 DAR	Minor corrections
V1.0	*V3.05*	*V1.0K*	*02.2007 DAR*	*Minor corrections*

Read the safety regulation in chapter 3
before you start the system
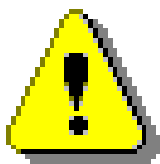
ATTENTION
1. All information in this manual and the product are subject to change without prior notice.
2. Read this manual prior installation of the product.
3. Read the security information carefully prior installtion of the product.

Table of Contents

1   PREFACE

This manual is for integrators and programmers of systems based on the MPCX-Computer family. It contains information on hardware requirements, interconnections, and details of how to program the system. The specifications given in this manual were correct at the time of printing; advances mean that some may have changed in the meantime.

1.1   How to use this Manual

This manual is written for the system integrator and the application programmer.

1.2   Trademarks

MICROSPACE, smartModule   DIGITAL-LOGIC AG
DOS Vx.y, Windows   Microsoft Inc.

1.3   Disclaimer

DIGITAL-LOGIC AG makes no representations or warranties with respect to the contents of this manual and specifically disclaims any implied warranty of merchantability or fitness for any particular purpose. DIGITAL-LOGIC AG shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this product, even if it has been notified of the possibility of such damage. DIGITAL-LOGIC AG reserves the right to revise this publication from time to time without obligation to notify any person of such revisions

1.4   Who should use this Productinformation

- Electronic engineers or system engineers with know-how in PC-technology.
- Without electronic know-how we expect you to have questions. This manual assumes, that you have a general knowledge of PC-electronics.
- Because of the complexity and the variability of PC-technology, we can't give any warranty that the product will work in any particular situation or combination.
- Pay attention to the electrostatic discharges. Use a CMOS protected workplace.
- Power supply OFF when you are working on the board or connecting any cables or devices.

DANGER   **Read the safety regulation in chapter 3**

1.5   Recycling Information

Hardware:

- **Print:**   epoxy with glass fiber
                     wires are of tin-plated copper

- **Components:**   ceramics and alloys of gold, silver
                     check your local electronic recycling

- **Batteries:**   NiMH-Batteriies and Lithium Batteries inside the Computer

- **Housing:**   Aluminium alloy

1.6   *Limited Warranty*

DIGITAL-LOGIC AG warrants the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for one year following the date of shipment from DIGITAL-LOGIC AG, Switzerland. This warranty is limited to the original purchaser of product and is not transferable.

During the one year warranty period, DIGITAL-LOGIC AG will repair or replace, at its discretion, any defective product or part at no additional charge, provided that the product is returned, shipping prepaid, to DIGITAL-LOGIC AG. All replaced parts and products become property of DIGITAL-LOGIC AG.

Before returning any product for repair, customers are required to contact the company.

This limited warranty does not extend to any product which has been damaged as a result of accident, misuse, abuse (such as use of incorrect input voltages, wrong cabling, wrong polarity, improper or insufficient ventilation, failure to follow the operating instructions that are provided by DIGITAL-LOGIC AG or other contingencies beyond the control of DIGITAL-LOGIC AG), wrong connection, wrong information or as a result of service or modification by anyone other than DIGITAL-LOGIC AG. Neither, if the user has not enough knowledge of these technologies or has not consulted the product manual or the technical support of DIGITAL-LOGIC AG and therefore the product has been damaged.

Except, as expressly set forth above, no other warranties are expressed or implied, including, but not limited to, any implied warranty of merchantability and fitness for a particular purpose, and DIGITAL-LOGIC AG expressly disclaims all warranties not stated herein. Under no circumstances will DIGITAL-LOGIC AG be liable to the purchaser or any user for any damage, including any incidental or consequential damage, expenses, lost profits, lost savings, or other damages arising out of the use or inability to use the product.

1.7 <u>EC – Declaration of conformity</u>

DIGITAL-LOGIC
smart embedded computers

EG – Konformitätserklärung
EC-Declaration of Conformity

Dokument Nr.: 014/06	Monat, Jahr: 04/2006
Document No.	*Month, Year:*

Hersteller: DIGITAL-LOGIC AG
Manufacturer

Anschrift: Nordstrasse 11/F
Address   CH-4542 Luterbach, Switzerland

Produktbezeichnung: Microspace-PCX48
Name of product,
type or model

Diese EG-Konformitätserklärung ersetzt die Konformitätserklärung 89/336/EWG vom 03.05.1989
This EC-Declaration of conformity replaces the EC-Declaration of conformity No. 89/336/EWG
of 03.05.1989

	Nummer / Kurztitel *Number / Titel*	Eingehaltene Vorschriften *Observed regulations*
☒	EN 55022	Limits and methods of measurement of radio disturbance characteris-tics of information technology equipment. Class-B
☒	EN 60555-2	Disturbances in supply systems caused by household appliances and similar electrical equipment „Harmonics"
☒	EN 50081-1	Generic emission standard part 1 Residual, commercial, and light industry
☒	EN 50082-1	Generic immunity standard part 1 Residual, commercial, and light industry
☒	EN 50081-2	Generic emission standard part 2 Industrial environment
☒	EN 50082-2	Generic immunity standard part 2 Industrial environment
☒	CE-marking	EC conformity marking

☒ Zutreffendes ist angekreuzt
☒ *marked, if applicable*

Zur Erfüllung obiger Normen sind gefilterte Kabel, gefilterte Netzteile und ein EMV konformes
Gehäuse notwendig. (Siehe dazu das Produkte Handbuch)
To fulfill the above norm filtered cables, filtered power supply, and an EMV conformed housing is necessary.
(See also the product manual)

Aussteller: Leiter Qualitätsmanagement
Issuer   *Director Quality Management*

Ort, Datum:
Place, date   CH-Luterbach, 10. April 2006

Konformitätsbeauftragter der
DIGITAL-LOGIC AG
Representative for conformity

Felix Kunz   (CEO & Leiter Qualitätsmanagement)
(CEO & Director Quality Management)

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2   OVERVIEW

2.1   Features of the MPCX48/A

The MICROSPACE-PCX48 is a miniaturized PC system incorporating the major elements of a PC/AT compatible computer. It includes standard PC/AT compatible elements, such as:

- PENTIUM-M CPU
- 0k or 512k-Cache
- SDRAM Memory 256 - 1024Mbyte (DDR-DIMM200)
- Digital I/O and Analog Inputs
- Videocontroller XVGA with up to 64Mbyte Videomemory (DVI, LVDS, Analog)
- USB2 controller 6 channels
- LAN 100/10Base-T controller
- Compact Flash Drive
- Monitoring of all supplies
- Watchdog functions

2.2   Optional Features of the MPCX48/A

The MICROSPACE-PCX48 has a set of option, they must be ordered for assembly:

- CD/DVD-Drive
- Harddisk: 20GB up to 80GB
- GSM MC55 GPRS modem/phone (uses COM2 / no voice transmission)
- GPS receiver (uses COM1)
- Wireless-LAN (WLAN)
- Preheating for negative temperatures with harddisks or CD/DVD
- PC/104plus Expansionbus (1 Slot)
- 3x relay Output with 60V/2A and 3x Optoisolated Input up to 30V

2.3   Specifications

CPU:

CPU Module	**SmartModule-C100 (Intel Celeron-M-100)** **Upgrade to SmartModule-C373**
Compatibility:	Pentium
1. Level Cache:	16k data and 16k code
2. Level Cache:	0kByte (upgrade to 512kByte with Celeron-M-C373)
Physical Addressing:	35 lines
FSB:	400MHz
Math. Coprocessor:	Integrated
Clock Rates:	600MHz Celeron-M-100 1000MHz Celeron-M-373
Main Memory:	256 Mbyte, (expandable up to 1Gbyte) DDRDIMM200pin

Power Management:

Available	ACPI functions

Chipsets:

MPCX48:	INTEL 855GME
LAN:	INTEL 82C551ER (ICH4 integrated)
Audio:	ICH4, AC97, 6ch.-Audio
Video:	855GME with max.64Mb shared Video RAM
WLAN-Option:	MiniPCI Intel Pro 2200BG
DVI:	Chrontel 7010 DVI Controller

Powersupply:

Supply Input:	Automotive-Mode: Nom. 12VDC , effective 13.8V (12-14V) Nom. 24VDC , effective 27.6V (24V-28V) Desktop-Mode: Nom. 18VDC (recommended range 12V to 24V), Minimum = 8Volt (max. duration = 30sec) Overvoltage* = 28 to 60VDC , limiter activated at 31VDC (+/-1.0V) Inverse polarity protected		
Protection:	EMI filtered		
Protection: Specification:	Load dump resistant, wrong polarity resistent		
Supply Output:	DVI:	5VDC, 0.1Amp.	0.1Amp. Overcurrent prot.
	LVDS Backlight:	DC-in, 0.5Amp	0.5Amp fuse protected
	LVDS Digital:	5VDC, 0.5Amp	0.5Amp fuse protected
	USB:	4 x 5VDC, 0.5Amp	0.75Amp fuse protected

Power Consumption:

At nom. 12V	Typical 3.0 Amp., at standard operation, without peripherals
At nom. 24V	Typical 1.5 Amp., at standard operation, without peripherals
Standby	Typical 100mA at 12Volt
Poweroff	Typical <5mA at 12Volt (without the option wake on LAN)

Option Harddisk Preheat:

Power:	At 12V DC-Supply: 12watts
	At 24V DC-Supply: 24watts
Preheating start:	Below –20℃ ambient temperatur
Preheating time:	tbd

Physical Characteristics:

Dimensions:	Length:	190 mm without Cover
	Length:	200 mm with Cover
	Depth:	160 mm
	Height:	66 mm
Weight:	2.8kg	
Mech.Tolerances	Following ISO DIN 2768-m	
	ISO DIN 2768-L	
	ISO DIM 2768-Part-6	

Massstorage: (OPTIONS)

Std.Harddisk	40GB / 80GB (MPCX48)
Amb.Temp.range:	600MHz-CPU: 0℃ to +50℃
	1.0GHz-CPU: 0℃ to +45℃
Ext.Temp.Harddisk	20GB / 40GB (MPCX48A)
Amb.Temp.range:	600MHz-CPU: -20℃ to +60℃, with p reheating option starting –40℃
	1.0GHz-CPU: -20℃ to +60℃, with preheating opti on starting –40℃
CD / DVD	Optional
CD / DVD	600MHz-CPU: 0℃ to +50℃
Amb.Temp.range	1.0GHz-CPU: 0℃ to +40℃
Std.-Compactflash:	Capacity: 16MB up to 4Gbyte (and more)
	0℃ to +50℃,
Ext.-Compactflash	Capacity: 16MB up to 4Gbyte (and more)
(E48):	-40℃ up to +70℃

Operating Environment:

Relative Humidity:	5: 90% non condensing
	C: IEC68-2-30 at -20° to +50℃ operating
	M: MIL-STD-810E meth. 501.3, 502.3 at –20° to +50 ℃ operating
Vibration operating:	C: IEC68-2-6 10-50Hz, 0.075mm and 55-500Hz, 1.0G
	M: MIL-STD-810E meth 506.3, 510.3 procedure-III
	10-50Hz, 0.075mm and 55-500Hz, 1.0G
Vibration nonoperating:	C: IEC68-2-6 10-50Hz, 0.15mm and 55-500Hz, 2.0G
	M: MIL-STD-810E meth 506.3, 510.3 procedure-III
	10-50Hz, 0.15mm and 55-500Hz, 2.0G
Shock operating:	C: IEC68-2-27 15G, 11ms ½ sine
	M: MIL-STD-810E meth 516.4
	15G, 11ms, ½ sine
Shock nonoperating:	C: IEC68-2-27 50G, 11ms, ½ sine
	M: MIL-STD-810E meth 516.4
	50G, 11ms, ½ sine
Altitude	C: IEC68-2-13 4571meter operating
	M: MIL-STD-810E meth 506.3, 510.3 procedure-III (Drip)
Temperature operating	C: IEC68-2-1,2,14: -20℃ to +50℃*
1)	M: MIL-STD-810E meth. 501.3, 502.3: -20℃ to +50℃
Temperature storage	C: IEC68-2-1,2,14: -40℃ to +85℃
1)	M: MIL-STD-810E meth. 501.3, 502.3: -40℃ to +85℃

* depending from the peripherals and the harddisk/CD are installed, see table below.

EMI / EMC (IEC1131-2 refer MIL 461/462):

ESD Electro Static Discharge:	IEC 801-2, EN55101-2, VDE 0843/0847 Part 2
	Metallic protection needed
	Separate Ground Layer included
	15 kV single peak
REF Radiated Electromagnetic Field:	IEC 801-3, VDE 0843 Part 3, IEC770 6.2.9.
	not tested
EFT Electric Fast Transient (Burst):	IEC 801-4, EN50082-1, VDE 0843 Part 4
	250V - 4kV, 50 ohms, Ts=5ns
	Grade 2: 1KV Supply, 500 I/O, 5Khz
SIR Surge Immunity Requirements:	IEC 801-5, IEEE587, VDE 0843 Part 5
	Supply: 2 kV, 6 pulse/minute
	I/O: 500 V, 2 pulse/minute
	FD, CRT: none
High-frequency radiation:	EN55022
Complies:	MIL-STD-461D, CE & FCC Class B

EMI / EMC (IEC1131-2 refer MIL 461/462):

ESD Electro Static Discharge:	IEC 801-2, EN55101-2, VDE 0843/0847 Part 2
	Metallic protection needed
	Separate Ground Layer included
	15 kV single peak

Security:

Car / trucks:	E1 020148
UL	In progress, finished end of Okt 2005
ETL	301
SEV	
Safety	AR385-16

2.4   *Operating temperature with different functions:*

CPU/Peripheral:	Option:	Minimum Temp.:	Maximum Temp.	Remarks
600MHz CPU – C100				
CompactFlash E48		-40℃	+70℃	
Solid State Drive 2.5" E48		-40℃	+70℃	
MicroDrive IBM std.		-20℃	+50℃	
Harddisk 2.5" -E28.		-20℃	+60℃	
Harddisk 2.5" -E28.	Preheating	-40℃	+60℃	
DVD/CD		0℃	+40℃	Not avilable in the MPCX48A
Harddisk 2.5" standad temp range		+5	+40℃	Not avilable in the MPCX48
1000MHz CPU – C373				
CompactFlash E48		-40℃	+60℃	
Solid State Drive 2.5" E48		-40℃	+60℃	
MicroDrive IBM std.		-20℃	+50℃	
Harddisk 2.5" 20GB-E28.		-20℃	+60℃	
Harddisk 2.5" 20GB-E28.	Preheating	-40℃	+60℃	
DVD/CD		0℃	+40℃	Not avilable in the MPCX48A
Harddisk 2.5" standad temp range		+5	+40℃	Not avilable in the MPCX48

With the optionally available harddisk-drive for extended temperatures
model: HTA422020F9ATJ0 Travelstar A4K20-20 refer to the description in chapter 4.6

2.5 *Thermoscan*

Will follow in a later version of this manual

2.6   Ordering Codes

MPCX-48:	MicroSpace PC with CPU Celeron-M-100, 2x COM, 1x LPT, 6x USB, MiniPCI socket, PC/104-socket, 256MB-SDRAM, CompactFlash	814300
CPU upgrade:		
SM855-C373	Upgrade to SM855 C373 (1GHz), 512kB Cache	814305
Memory upgrade:		
Upgrade 512MB	Upgrade from 256MB to 512MByte DDR-RAM	807361
Upgrade 1GB	Upgrade from 256MB to 1Gbyte DDR-RAM	807362
Harddisk upgrade:		
40GB Standard	Harddisk 0°to +50℃ operating temperatur	814310
20GB Extended	Harddisk with −20 to +70℃ operating temperature	81 4311
Preheat-Option	Harddisk Preheat for −40℃ operating	814345
Options:		
Plastic-Cover	Dust protection for the frontelements	814325
GPS-Receiver	Navigation	814335
GSM – GPRS	With MC55 Siemens Modul, VCC4, NF	814340
GSM – EDGE	With MC75 Siemens Modul, VCC4, NF	814341
WakeFromGSM	WakeFrom GSM Option	814242
WLAN-Modul	MiniPCI Intel Pro BG2200	814330
Digital I/O	3x Relais Output, 3x Optoinput	814320
Can (2x)	CAN Interface	814371
Canpiggy 251 opto	CAN Module	814272
2x CAN & 2xCOM	CAN and COM Interface	814370
COM 3 and COM 4	Dual COM Interface	814375
USB Boot Device	Bootable USB Stick (DOS & LINUX)	814350
Cables/Adapters:		
AC Adapter 110/220V	**Power supply for MPCX47/48 with the ignition signal enabled (the 812141 supply will no longer be used)**	**814380**

2.7 *Options for MPCX48/MPCX48A*

2.7.1 __Option Overview__

The MICROSPACE-MPCX48/A has different assembly options.

Ask the factory for the detailed information about the current available options and combination of options.

There are soldering and assembly options available:

Option	Soldering	Assembly
GSM Module MC45		· Modular option · Coax connector configured · Antennacable - Uses COM2
GSM Module MC75		· Modular option · Coax connector configured antenna cable · Uses USB port
GPS		Modular option Coax connector configured Antennacable Uses COM1
Harddisk		Different capacity
Harddisk preheating	Solder option	
Digital Input	Solder option	No LPT1 available
Digital Output	Solder option	No LPT1 available
WLAN-Option		MiniPCI Module
MSMC104+	Solder option	Vevtor CAN
MSMCA104+	Solder option	Peak CAN
MSMCX104+	Solder option	COM3 / COM4

All Serialconnectors (COM1 and COM2), they are not longer available while an option is installed, are disabled with a special cover. The cover prevents to connect a disabled interface.

This expansion board may be integrated to expans the functionality of the MPCX48. This integration is initialized with a customized partnumber for the MPCX48, to include all documents for the production and the testplans.

2.7.2 Combination of Options

Since the different options may influence each other, this chapter defines the exact combination of the standard options. If an option is not available from standard, then the MPCX48 must be customized. The customisation process needs a unique product number for the MPCX48 with extra costs for initialisation and documentation of this custom product number.

2.7.2.1 Combination of Options for MPCX48

The following table shows all possible combinations of options for a standard MPCX48 and the use of the affected connectors. Options which are not listed in the table (eg. WLAN) are independent and can always be assembled.

Concerned connectors: Port1-3, USB Port 4 / Concerned signals: COM1-4, CAN 1/2, LPT, Dig. out, USB 4

Options								Wiring		
CD/DVD	2xCAN (Vector or Peak)	2xCAN, 2xCOM	COM 3/4	GPS (uses COM1)	GSM-GPRS (uses COM2)	GSM-EDGE (uses USB Port 4)	3x Digital Out	Port 1 normally used for COM1	Port 2 normally used for COM2	Port 3 normally used for LPT
814315 or 814316	814371 or 814369	814370	814375	814335	814343	814341	814320			
-	-	-	-	op	-	op	-	COM1*	COM2	LPT
-	-	-	-	op	-	op	x	COM1*	COM2	Dig. out
-	-	-	-	op	x	-	-	COM1*	COM2*	LPT
-	-	-	-	op	x	-	x	COM1*	COM2*	Dig. out
-	-	-	x	-	-	op	-	COM1	COM2	COM3&4
-	-	-	x	-	x	-	-	COM1	COM2*	COM3&4
-	-	-	x	-	x	-	x	COM3	COM4	Dig. out
-	-	-	x	x	-	op	-	COM1*	COM2	COM3&4
-	-	-	x	x	-	op	x	COM3	COM4	Dig. out
-	-	-	x	x	x	-	-	COM3	COM4	LPT
-	-	-	x	x	x	-	x	COM3	COM4	Dig. out
-	-	x	-	x	-	op	-	CAN1	CAN2	COM 3&4
-	-	x	-	op	x	-	-	CAN1	CAN2	COM 3&4
-	x	-	-	op	x	-	x	CAN1	CAN2	Dig. Out
-	x	-	-	op	-	op	x	CAN1	CAN2	Dig. Out
-	x	-	-	-	-	op	-	CAN1	CAN2	COM1&2
-	x	-	-	-	x	-	-	CAN1	CAN2	COM1&2*
-	x	-	-	x	-	op	-	CAN1	CAN2	COM1*&2
-	x	-	-	x	x	-	-	CAN1	CAN2	LPT
x	-	-	-	op	-	-	-	COM1*	COM2	LPT
x	-	-	-	op	-	-	x	COM1*	COM2	Dig. out

x   assembled
-   not assembled
op   optionally assembled (possible to assemble this option without influence of the wiring)
*   switched COM1 is switched to GPS or external connector by software
        COM2 is switched to GSM-EDGE or external connector by software.

2.7.2.2 Combination of Options for MPCX48A

A harddisk is always assemled in the MPCX48A. All PC104 / PC104+ boards (CAN, COM3&4), optical drives and HD preheating are not available. For options GPS, GSM-GPRS, GSM-EDGE, 3x Digital Out see table below. All other options (eg. WLAN) are independent and can always be assembled.

options				wiring		
GPS (uses COM1)	GSM-GPRS (uses COM2)	GSM-EDGE (uses USB Port 4)	3x Digital Out	**Port 1** normally used for COM1	**Port 2** normally used for COM2	**Port 3** normally used for LPT
814335	814343	814341	814320			
op	-	op	-	COM1*	COM2	LPT
op	-	op	x	COM1*	COM2	Dig. out
op	x	-	-	COM1*	COM2*	LPT
op	x	-	x	COM1*	COM2*	Dig. out

x   assembled
-    not assembled
op   optionally assembled (possible to assemble this option without influence of the wiring)
*   switched COM1 is switched to GPS or external connector by software
       COM2 is switched to GSM-EDGE or external connector by software.

2.7.3 Customized Port3 connector definition

For customized use of the PORT3, the 25pin or 37pin HiDens connector must be used in first priority.
The customization process includes the following steps:

- Definition of the functionality and evaluation of a Digital-Logic PC/104plus expansion board
  to fullfill the customers demand.

- Open a new Custom-MPCX48 partnumber, charging the customer for the initialization costs.

- Definition of the pinout of the 25/37pin connector, finalize the documentation
  1. Priority: Customization of the Port 3
  2. Priority: Customization of the Port 1 and Port 2

- 1 MPCX48 sample to send to the customer for validation and send back to Digital-Logic as a production
  sample (with a written approval from the customer) for the production start and the sample archive.

2.8   Related Application Notes

#	Description

➔ *Application Notes are availble at http://www.digitallogic.com ->support, or on any Application CD from DIGITAL-LOGIC.*

2.9 Packing List

Check the packing list after opening the box:

- MICROSPACE-PCX48
- Users Manual
- CD with drivers and documentations

A picture of the contents will follows in the next revision of this manual.

3   SAFETY REGULATIONS

The verification of the safety is followed to the guideline adapted from the US Army Communication and Electronics Command Supplement (119 version) 1 to AR385-16.

This sign indicates an important information.
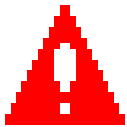
This sign indicates an information that may injure the health.

This sign indicates an information that may destroy the device.
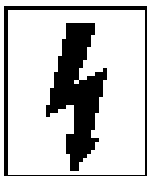
This sign indicates voltages above 28Volts.

3.1   Safety: PowerOn indicator

The green Power indicator is located in the front of the computersystem [MIL-STD-1472D].

3.2   Safety: Coded and marked connectors

All connectors (plugs and receptacles) are coded and marked to prevent insertion of the wrong plug into a receptacle or other mating unit [MIL-STD-1472D]. Depending of the mounted replicator unit, the connectors are PC-Style, DSUB or MIL versions.
The male connectors are deenergized when disconnected [MIL-STD-454M].

3.3   Safety: Protection of the supply input current

The computersystem protects the internal supply from overcurrent by an internal fuse of 6.3amp. In case of an overcurrent the fuse opens the main circuit and interrupts the fault current [MIL-STD-454M]

3.4   Safety: Wrong polarisation on the power input

The supply input is protected against wrong polarisation of the supply input with a seriediode. The diode withstands up to a voltage of 28Volts.

3.5   Safety: Protection of the output currents

The computer system limits the current of all peripheral supply outputs with fuses or with electronic currentlimiters. The following table shows the maximum available currents at each peripheral connector:

	Nominal max. current:	Max.Current
USB:	0.5 Amp. @ 5V	1 Amp. with resistor limiter
KB/MS:	0.1 Amp. @ 5V	0.2 Amp. with polyfuse
VGA:	0.1 Amp. @ 5V	0.2 Amp. with polyfuse
Firewire	1.0 Amp. @ 12V	2 Amp. with electronic limiter

3.6   Safety: Protection of overcurrent in the relay's

The computersystem can control 3 actors with the integrated relays. The current must be limited with an external currentlimiter, like a fuse. Place in each relays circuit a separate cablefuse of 2amp. to prevent the relays of overcurrent.

3.7   Safety: Load Dump Protection in 12V/24V systems

Currently there are two types of TVS devices integrated in the computer-system for the 12/24V automotive systems to protect against load dump: silicon-based single-junction Zener diodes and zinc-oxide-based metal oxide varistors (MOV). Even though Zener diodes and MOVs operate on different physical mechanisms, they both offer a typical 28V clamp voltage for the 12/24V systems.

Input Varistor: B72220S300K (Infineon) Vbreak=30V

3.8   Safety: Ground potential

DANGER

All interface connectors are permanently in contact to the ground (earth). The computersystem must be wired to a ground system with a ground wire (colors green with yellow strips). [NFPA 7087].
The ground must have the capacity to safely conduct any current that might be imposed theron. The ground is wired separate from the electrical ground.

The leakage current is: 5 uA at 28 V

The ground cable must be connected separatated to the chassis (case) by a slot nut.

3.9   Safety: Power On/Off switch

The power on/off switch does not cut all power of the complete equipement. In the OFF-state is a micro-contoller still working, to supervise the wakeup events (switch, remote-on, wake-on-LAN, wake-on-events) [MIL STD 454M]

The power switch is clearly identified and located on the front panel [MIL-STD-545M]

The power switch is protected from accidental contact, which causes a power on/off. The power switch must be activated over a defined periode 1-3sec.

When the system is opened, the replicator unit must be removed and in this way no external power supply is available. Take care, that the internally installed batteries are even connected to the system.

3.10   Safety: Batteries inside the device
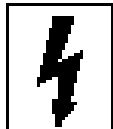
The system has two (RTC and GPS) integrated backup lithium batteries. Optional available is an internal primary NiMH-Battery. The energy of the primary battery is very high and the currents may destroy the system in case of accident. The primary battery system is overcurrent, overcharing, undercharging and temperatur protected. The batteries compartments are not vented. The system enclosure prevents the operator from an exploding battery cell.

3.11   Safety: Mobile Antenna

DANGER

RF Safe Approved Cell Phone Antennas when used in a car or truck, the roof acts as a ground plane for the antenna. To get the most from your antenna it should be centered on the roof without obstructions.
Once the antenna is centered on the ground plane (Roof of vehicle) guide the rf cable inside the car by opening the door and choosing a path to where you will be placing your cell phone. Suggestions are running the antennas wire above the sun vision and across the rear view mirror, down the center of the dash to a phone holder or on the seat at arms reach! This antenna can be changed to another car in less than a minute or even taken into the office or home for added performance and safety!

A Ground Plane Is Needed!
Most ALL external mounted antennas for cell phones are made to be used on a flat metal surface which provides a ground plane for the antenna. If you plan to use your antenna away from your car, the antenna should be mounted on a flat metal surface such as a filing cabinet, or a metal sheet about 8"x8" to 12"x12" for maximum performance.

By using a "Hardwire Car Antenna Kit, you move the RF radiation outside the car and away from you. Please note that glass mounted antenna kits cannot protect you from the radiation because the RF radiation can come through the window glass.
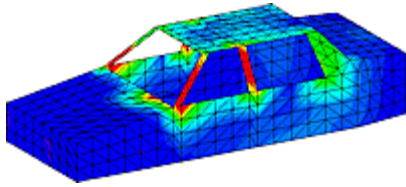
Diagram demonstrates RF radiation inside your car. The radiation cannot escape and is trapped inside the car with you.
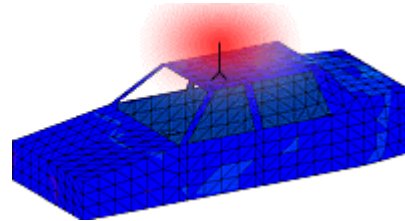
By using an external mounted antenna, you place the RF radiation outside the car and away from you and your family. **(w/RF Disabling Switch)**

Because most vehicles have metal roofs and largely come with factory tinted glass, your vehicle can act as a farady cage and concentrating reflector, amplifying RF density like a microwave oven.

You must use an RF Safe approved antenna kit or car kit to wave guide (transport) the RF Radiation outside the vehicle to prevent amplification of the microwave effect.

3.12   *Safety: Station Antenna*

The following general recommendations are made to insure your safety during the installation of an outdoor antenna. The following material should be considered as a *supplement* to the specific directions supplied by the manufacturer of the antenna.

- If you are installing or dismantling your antenna for the first time, seek professional assistance. If you are unsure of your competency regarding the installation, it is best to seek the help of a qualified professional antenna or tower installer.
- Read the manufacturer's directions and this advisory in full before proceeding.
- The installation or dismantling of any antenna near power lines is dangerous. Each year hundreds of people are killed or injured while attempting to install or dismantle an antenna. In many cases, the victim was well aware of the dangers, but did not take adequate steps to avoid the hazards. For your safety and proper antenna installation, read and follow all safety precautions.
- Choose an installation site for safety as well as performance.
  All electric power lines, cable lines and telephone lines look alike. To be safe, assume ANY overhead line can kill you.
  Do not place an antenna where it could potentially fall on to, or blow into a power line. To determine the SAFE DISTANCE follow these steps:
  (A). Determine the proposed height of your antenna.
  (B). Add the antenna length and the length of your tower mast.
  (C). Double the figure.
  Your answer will be the minimum safe distance from the nearest power line that you should install your antenna.
- Call the Power Company. Let them review your site. This might seem like an inconvenience, but a few hours with the Electric Company may help avoid a fatal accident. Play it safe. Never dig without contacting the utility companies.
- Never use a utility pole as a support for an antenna or guy wire. Never climb a utility pole.

- Outdoor antennas should be grounded with an approved lighting arresting device. Local codes may apply. The radio should also be grounded to an earth ground to help protect both the radio and its user. Do not use hot water pipes or gas lines as a ground source.
- Height or other restrictions on antennas may apply to your installation depending on your proximity to an airport, or local ordinances.
- Take the time to plan your installation procedure. Each person should have assigned tasks. A foreman or "boss" should be chosen to call out instructions and watch for signs of trouble.
- Dress properly with rubber soled shoes, rubber gloves, and long sleeve shirt. Use an approved safety belt.
- Do NOT work on a wet, snowy or windy day or if a thunderstorm is approaching.
- Do NOT use a metal ladder.
- If the assembly starts to drop . . . get away from it and let it fall. Remember that the antenna mast, cable, and guy wires are all excellent conductors of electrical current.
- If any part of the antenna should come in contact with a power line . . . DON'T TOUCH IT OR TRY TO REMOVE IT YOURSELF. Call your local power company immediately. They will remove it.
- Should an electrical accident occur . . . DON'T TOUCH THE PERSON IN CONTACT WITH THE POWER LINE, or you too can become electrocuted. Instead, use a DRY board, stick, or rope to push or pull the victim away from the power lines and antenna. Once clear, check the victim. If he has stopped breathing, immediately administer cardiopulmonary resuscitation (CPR) and stay with it. Have someone else call for medical help.
- Remember that guyed towers are NOT self-supporting at any height. If your antenna installation includes towering, read the additional advisory on towers.
- Install wire antennas high enough that they will not be "walked into" by people.
- Do not install wire antennas over or under utility lines.

3.13   *Safety: Protection from high voltages*

The computer system must be connected to earth, with a separat earth cable from the case to an earthpoint. The high voltage (more than 10kV) may be overcome from the antennas (bad weather), standing outsinde of the operators room or vehicle. Be sure, that the earth is connected to the vehicle ground or the the earth of the environment.

The antenna must have an adequacy lightning protection (NFPA 7087). If antenna acts as an aerial terminal, conductivity must equal or better that of #8 AWG solid copper. The joints must be mechanically strong & corrosion resistant. The resistance of the antenna joints must be less than 0.002Ohms.

The supply input is protected against overvoltage by fast transient suppressor diodes SMBJ28A.

Specifications:
Peak Pulse Power Dissipation on 10/1000us waveform   600 Watts
Breakdown voltage: 31.1 to 34.4 volts
Revers stand-off voltage: 28 volts
Peak pulse current: 45 amp
Non repetitive surge current: 100 amp
Fast response time: <1.0 picosec.

3.14   *Safety: Protection of the smartcard for the GSM*

The computer system can be ordered with an internal GSM/GPRS handy. In this case the SIM-Card must be placed into the smartCard holder for the GSM SIM-card. The computer system must be switched off, before changeing or inserting the GSM SIM-card.

3.15   Safety: Protection against overtemperature

The computer system integrates temperature sensitive components like:

- Harddisk   (max. 55°C)
- GSM/GPRS Handy   (max. 60°C)
- GPS Receiver   (max. 60°C)
- The CPU with a max. junction temperature of 105°C

In the BIOS, the temperatur level of the thermal protection of the CPU may be selected and enabled. If ena-baled, the systems will reduce the CPU-Clock automatically, if the temperature rises above the defined limit.

Do not cover the device with paper, textiles or other objects. This disables the passive cooling (cooling rips). The minimum space between the cooling rips and the next object is 50mm on each side. Make sure to allow enough airflow to the computersystem, when the device is assembled.

Protect the computersystem from solar radiation or other thermal energy exposure.

Do never place the running computer system in a closed case or box. Otherwise the inside air will heat up over the maximum temperature and the system will be destroied.

Clean the surface of the computer system from dust, oil and other isolating materials, to prevent a reduction of the cooling efficiency.

3.16   Mechanical Safety: System mounting

The computer system must be fixed with a minimum of 8 screws within the 2 or 4 nuts. It is very dangerous to place the device on the seat of a car, while driving. In case of an accident, the device will hit the window or a passenger. *Do never drill some mounting holes into the chassis of the computersystem. The inside electronics or harddisk may be damaged. Use only the mounting nuts for mechanic assemlby.*

The computer system can be installed in standard direction (mounting bolts on bottom side). The maximum tilt angle is   0°(-/+10°). Use shock absorber fo r mounting the computer system into a vehicle.

3.17   Mechanical Safety: Protection against broken glas

The cover of the computer system integrates a transparent glas.
To ensure your safety, there is thermally pre-stressed, non-shatterable glass for pressurized applications assembled, for special mechanical loads. If the glas should break, only the cover must be replaced. Do not repair the glas with a normal "window" glas.
Do not open a harddisk, since the disk platter is a glass media and may broken.

3.18   Environmental Safety: Protection against corrosion
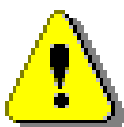
The computer system case is of anodized aluminium alloy. All screws and mechanical elements are in stainless material (V2A chrom nickel steel).
The anodized aluminium case is not protected against longterm salt water exposure.

3.19   *Environmental Safety: At 25℃ no hot surfaces*

The computer system running at +25℃ ambient temper ature shows no surfaces or other operating elements with temperatures above +60℃ [MIL-STD-454M].

3.20   *Environmental Safety: No release of toxic's*

As long as the computer system is used in the specified operating temperature range, no toxic, corrosive, or explosive fumes or vapors are exposed. [MIL-STD-454M].

3.21   *Environmental Safety: Laser devices*

The optionally available CD/DVD-Drive includes a laser class 1 device.
In this case, a warning label sticks on the rearside of the computer system.

3.22   *Environmental Safety: Noise emmission*

This computer system is a low noise system. The level is less than 35 dbA.

3.23   *Environmental Safety: Hazardous atmospheres*

The computer system must not be used in a hazardous atmosphere, because the system is not prevented from accidental ignition. Do never use the system in explosive gas or vapor, combustible dusts or ignitable fibers and flyings.

3.24   *Safety: Independent software*

The computer system is divided into 3 different parts of software, running each on an own microcontroller or CPU. All 3 systems are communicating over the SM-Bus (system management bus).

1. Power management CPU and software: Always running, even the system is powered off
2. Pentium-CPU main processor controlled from the power management CPU

3.25   *Safety: Recycling the computersystem*

Disposal:
Never dispose of old batteries or the hole computer system as domestic waste. Return it to the manufacturer.

3.26   *Safety: Static Electricity*

Excessive static electricity can damage components. Before you handle the chassis or its components, use the grounding wrist strap provided with the system to discharge static electricity. Instructions for using the wrist strap are printed on the strap's envelope. Handle the components by the handles or front panel to help prevent accidental damage caused by static discharge.

3.27   *Safety: Operators security*
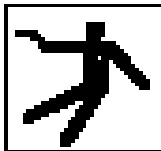
It is important to protect yourself and your equipment before you perform any of the procedures outlined in this manual. When making changes to the configuration, power off the system and disconnect all power cords from their source.

To avoid damage or injury, always power off the system and disconnect all power cords from their source before handling the equipment. To help prevent accidental damage caused by static discharge, use a grounding wrist strap or other static-dissipating device when handling the equipment.

Only qualified, experienced electronics service personnel should access and handle the equipment.

3.28   *Recorded Data Safety:*

Recorded data on the disk may be lost due to accidents such as disasters, shock damadge during operations, drive failure and overtemperature. Data may be lost due to unexpected or accidental power loss during write operation. The data may be lost due overvoltages or spikes over the specified limits of the internal protection circuits.

The manufacturer does not perform data recovery !

4   MPCX48 FUNCTIONS

4.1   Operating Elements on the frontside

4.1.1   Connectors

(1) 2x USB Slots *****
(2) Compact Flash socket
(3) SIM Card slot

* Digital-Logic recommend to use the following USB flash drive:

4.1.1.1   SanDisk Cruzer Micro:

- Available in 4 capacities: 256MB, 512MB, **1GB and 2GB**

- Dimensions: 7.9mm x 18.95mm x 52.2mm (H x W x L)

- Stylish, metal casing with changeable colored skins and caps

- Brilliant blue LED

- Includes CruzerLock 2 for data security, and trial versions of PocketCache (back-up) and Cruzer-Sync (Outlook synchronization) software

- Hi-Speed USB 2.0 certified (backwards compatible with all USB 1.1 ports)

- Compatible with Windows 98SE, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+

- Certified Windows XP

4.1.2   Indicator LED's

Nr.	Indicator (LED)	
1	Power	power off: LED is off power on: LED is on
2	Standby	power off: LED is blinking power on: LED is on
3	Secondary IDE LED	blinking = activity
4	Primary IDE LED	blinking = activity
5	LAN activity	blinking = activity
6	LAN link	if link is available the LED is on
7	HEAT	If the system heating the LED is on
8	GSM	blinking if transmission of GSM input
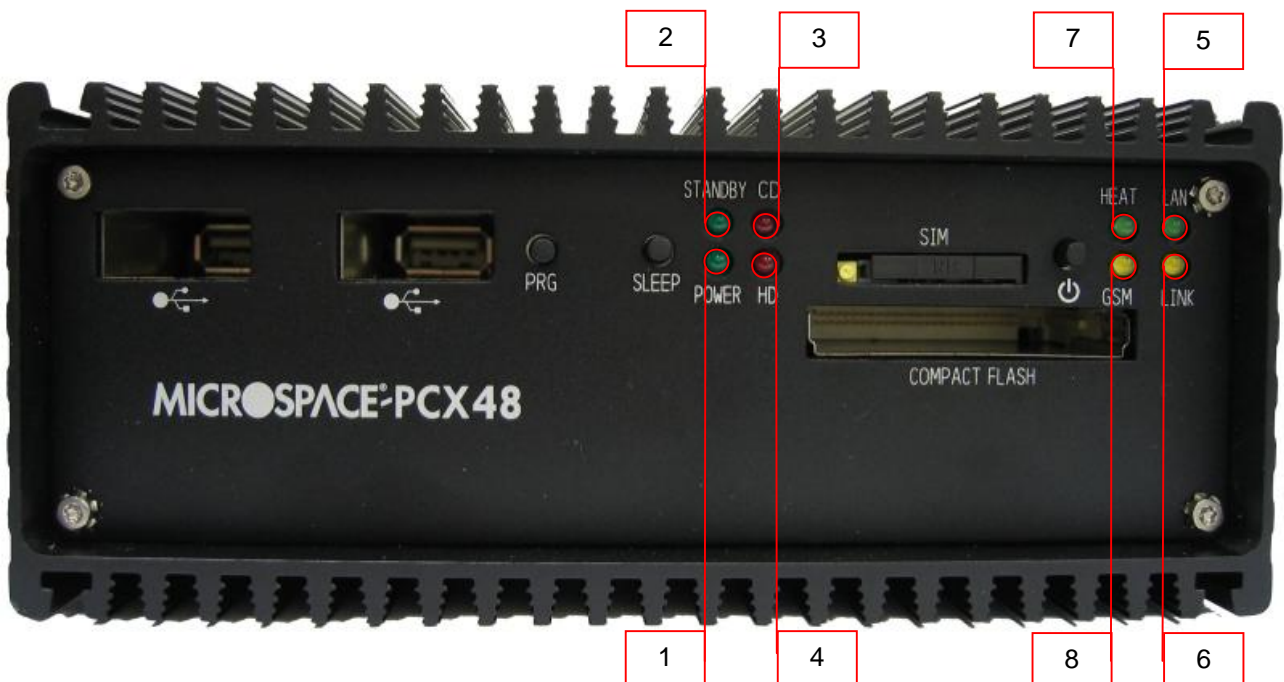
4.1.3   Operating Buttons

	Button:	Function of the button in the:		LED:
		ON State:	OFF state:	
1	Main ⏻	OFF switch (press this button for more than 4 seconds to switch off the device)	- ON switch (press this button for 2 seconds to power on the device)	Power
2	Sleep	ACPI Function (under Windows eg. Hypernate, sleep, power off …)	*	
3	PRG	No function		
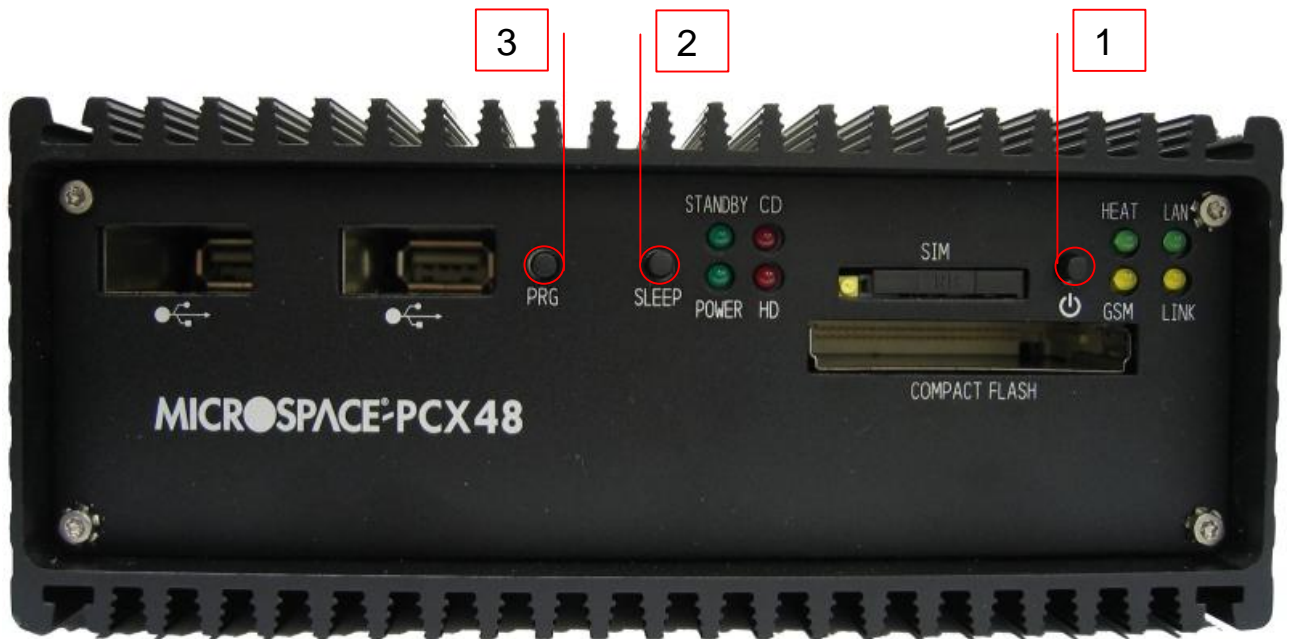
4.1.4 <u>Programmable function with the frontside buttons</u>

Will follow in a later version of this manual

4.2 Start Up Modes

4.2.1 Automotive-Mode (Remote ON/OFF with INGITION-Input

In the "Automotive" mode (J2 jumper is closed, since the MPCX48 version V1.1 the DIP switch must be on the right position):

The default start-up mode (factory setting) of the MPCX48 is the "Automotive-Mode", means that you can start-up the system only by an IGNITION signal (a voltage between 8V and 28V to the pin 2 of the power connector additional to the main VCC)

You can not start the MPCX48 with the "Main" button !

Automotive-Mode:

"Power on" is only possible if the IGNITION signal (8V-28V) is available on the Power connector pin 2. All buttons on the front are disabled!

"Power off" the system is possible if the IGNITION signal will be 0V or depending the configuration of the "Main" button or the "Sleep" button (configuration depending the operating system).

4.2.1.1 Timing diagram of the Ignition ON/OFF system control:
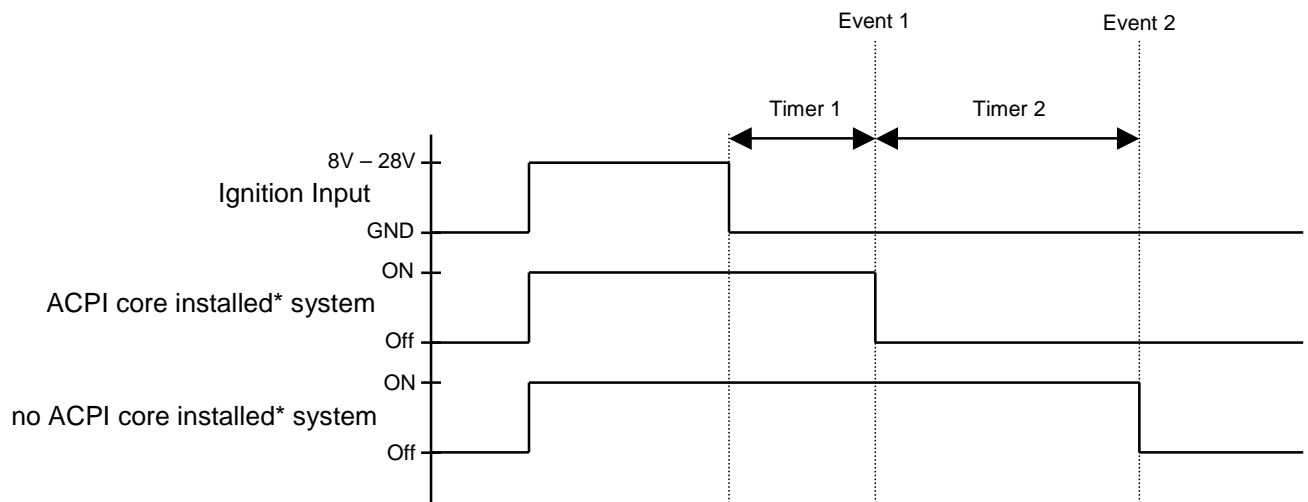
* A system which have a ACPI core installed (for example a standard Windows XP)

Timer 1: This timer waits for 5 minutes until the next event
Timer 2: This timer waits for 20 minutes until the next event

Event 1: At this event, the PC will send the POWERBTN signal. The event depends on the setting in the power management of the installed OS.
Event 2: At this event, the PC will turn off the input power so the PC will turn off itself.

Typically the board can start only from IGNITION signal, because startup PIC controller is disconnected from the power source.

The board can be switched off from:
a. Main Button
b. ACPI OS shutdown
c. Power Button – generate ACPI event (OS dependent).
d. Z IGNITION OFF signal.

Startup/shutdown conditions from the IGNITION signal:

- J2 must be closed or the DIP swith is on the right position (set to logical "0").
- IGNITION startup signal must be valid during 5 sec. (anti noise protection).

IGNITION shutdown – IGNITION signal must be inactive during 5 minutes (RED light pause), then PIC controller initiate Power Button signal (OS must be set to shutdown from the Power Button).

If S4(S5) signal is coming during the next 20 minutes, PIC initiate self shutdown procedure over complete power off mechanism, else (after 20 min.) it generate Main Button shutdown event and then goes to complete power off.

AT initialization sequence:
ATZ
ATE0
AT+CGMI
AT+CGMM
AT+CGMR
AT+CMEE=?
AT+CMEE=2
AT+CPIN?....AT+CPIN=2538
AT+CSCA
AT+CMGF=1
AT+CNMI=2,1,0,0,1
AT+COPS?

**Startup conditions with/without option preheating board Rev 1.0
(dependence on J4 (PIC_RD2) jumper and temperature).**

Current T°	Jumper J4	Preheating with startup request
T°>= 20℃	Open	OFF
T°< -21℃	Open	ON
T° ∞	Close	OFF

Note: **Having startup request (from the MAIN button, GSM SMS or IGNITION signal) system will start only when the temperature is valid. Else PIC controller switch on preheating and wait for a valid temperature.**
Note: If temperature sensor is inaccessible, PIC LED is flashing very fast and prevent any other startup operations.

4.2.2 Desktop-Mode

Desktop" mode (J2 jumper is opened since the MPCX48 version V1.1 the DIP switch must be on the left position), when the board can start from the next sources:

    a. Main Button
    b. GSM SMS message.

    In this mode startup PIC controller is always running and, if GSM module is installed and initialized, PIC is waiting for incoming wakeup GSM message.

    The board can be switched off from:
    a. Main Button
    b. ACPI OS shutdown – processor is going to S4 or S5 state.
    c. Power Button – generate ACPI event (OS dependent).

4.2.3 Wake From GSM Mode

The option GSM and WFG must be assembled.

GSM SMS message startup.
How it works:

-   SIM card PIN code must be set to "2538" or fully unprotected,
-   SMS message must contain "99999", card must have clean SMS message story (or min place for 1 SMS message).

GSM module is initialized at PIC powerup and every OS shutdown, thus:

GSM module get GSM_RESET signal, and after 5 seconds timeout, it get "AT commands" initialization sequence (with entering PIN code and enabling SMS messages reception).

This initialization is taking normally about 20 seconds at first start and about 5 sec after OS shutdown. During this time PIC doesn't execute any other functions and listen only MAIN button and IGNIOTION signal active level events (in the case of MAIN button push, GSM module initialization can be interrupted and not finished).
If GSM module is not installed, PIC makes 8 tries to initialize it and then goes to the minimal POWER consumption mode (SLEEP).
After successful GSM initialization, PIC goes to normal mode with enabled incoming GSM events.

When PIC receive "+GMTI" message – "You have incoming SMS message", PIC try to read this message with AT+GMGL="REC UNREAD" command. If message contains "9999" it set "startup" request flag, and if temperature conditions are suitable, it starts the board.

When the board is in ON state, all incoming GSM events are ignored.

Normally GSM SMS startup feature is working only in "desktop" mode, because in the "car" mode PIC controller isn't powered. And after start, PIC has only 5 sec pause before switching ON the board power and can't initialize GSM module.

4.3   Operating elements on the rearside:

Connectors:

LAN-Port A:	With activity / link – LED for port A
S-Video In:	Video-Input
VGA:	Analog VGA channel 1
DVI:	DVI-D
LVDS:	LVDS output
TV-Input	CVBS Ch1
TV-Input	CVBS Ch2
USB1	1.Connector USB
USB2	2.Connector USB
USB3	3.Connector USB
USB4	4.Connector USB
LPT1/Port3	Lineprinter Interface / signals depending the option
COM/Port 1	Serial Interface RS232 COM1/ CAN-Port 1 signals depending the option
COM/Port 2	Serial Interface RS232 COM2/ CAN-Port 2 signals depending the option
DC-IN:	Supply DC Input with remote on/off
Line IN	Audio Line Input
Line OUT	Audio Line Output
MIC IN	Audio Input for Microphone
SPDIF-Optical	12Channel Optic Connector for Dolby-Surround Signals

GSM
GPS
W-LAN

4.3.1 <u>Power Supply Connector</u>

Male
(Computer)

Female
(Cable)

Signal definitions:
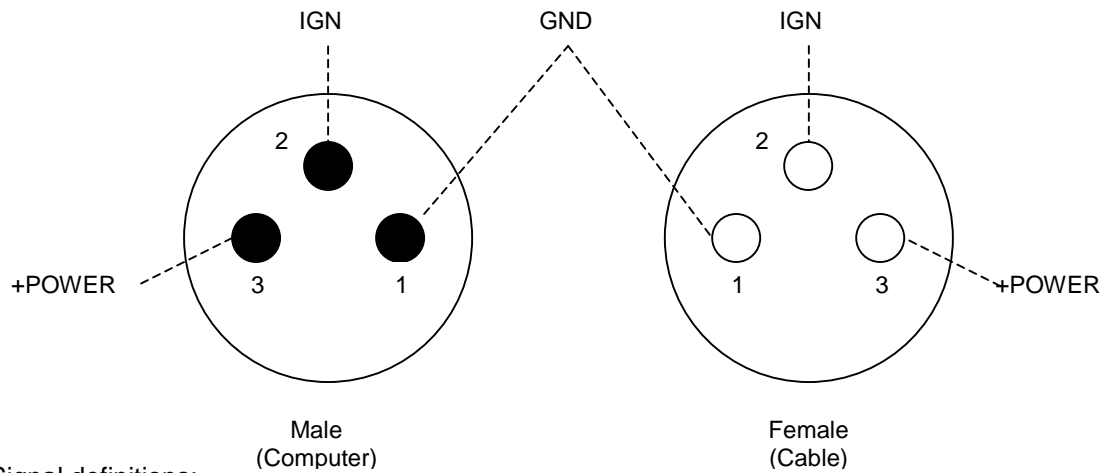
+ Power   10 – 28Volt Powersupply
GND   0V or Ground of the powersupply
IGN   Remote ON Input or IGNITION-Input , 8V – 28V level on this
                                     Input will switch ON the computersystem.

4.3.2 <u>PORT 1 Connector COM1/3 or CAN1*</u>

9pin DUB Connector male

Pin	Standard Function COM1:	Option COM3	Option CAN 1**
1	DCD	DCD	Can 1
2	RxD	RXD	Can 1
3	TxD	TxD	Can 1/Power***
4	DTR	DTR	Can 1
5	Ground	Ground	Power
6	DSR	DSR	Can 1
7	RTS	RTS	Can 1
8	CTS	CTS	Can 1
9	RI	RI	Can 1

* depending the table in chapter 2.7.2
** for the detailed CAN signal description see next page
*** depending to the CAN PIGGY

4.3.3 <u>PORT 2 Connector COM2/4 or CAN2*</u>

9pin DUB Connector male

Pin	Standard Function COM2:	Option COM4	Option CAN 2**
1	DCD	DCD	Can 1
2	RxD	RXD	Can 1
3	TxD	TxD	Can 1/Power***
4	DTR	DTR	Can 1
5	Ground	Ground	Power
6	DSR	DSR	Can 1
7	RTS	RTS	Can 1
8	CTS	CTS	Can 1
9	RI	RI	Can 1

* * depending the table in chapter 2.7.2
** for the detailed CAN signal description see next page
*** depending to the CAN PIGGY

CAN signal description and pin assignment:

Pin Dsub9	CAN PIGGY type								
	LIN 6259	2511050	251opto 1050opto	1041opto	1054	1054 opto	10011 opto	5790 C (Single Wire)	5791opto C
Pin 1	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.	N.C.
Pin 2	N.C.	CAN Low	CAN Low	CAN Low	CAN Low	CAN Low	CAN Low	N.C.	N.C.
Pin 3	VB-	GND	VB-	VB-	GND	VB-	VB-	GND	VB-
Pin 4	Pdis	RL	N.C.	Split	RL	N.C.	RL	R100	R100
Pin 5	Shield	Shield	Shield	Shield	Shield	Shield	Shield	Shield	Shield
Pin 6	RL	RL	RL	RL	RL	RL	RL	RL	RL
Pin 7	LIN	CAN high	CAN high	CAN high	CAN high	CAN high	CAN high	CAN	CAN
Pin 8	RL	RL	RL	RL	RL	RL	RL	RL	RL
Pin 9	VB+	N.C.	N.C.	VB+	N.C.	VB+	VB+	VB+	V_Batt

Shield: shield
GND: mass
V_{-Batt} :   battery voltage (+12 V referred to GND, extern)
N.C.:   not connected
RL: reserved lines, may not to be connected to any cable
VB+:   positive supply voltage, optically decoupled
V_{GND}:   galvanic decoupled mass
R100:   f the single wire CANcab is used in a high-speed net, there has to be a termination resistor be-
            tween CAN High and GND. This termination resistor is enabled in Fast Mode by the CANcab it-
            self, if CAN High (pin 7) and pin 4 are connected by a bridge.
Pdis: If this pin of the LINcab is connected to GND (pin 3), the internal voltage supply is switched off.

http://www.vector-informatik.de/english/

4.3.4 PORT 3 Connector (LPT1, Option: Dig.I/O or COM3/4)

25pin DUB Connector female

Pin	Standard Function LPT1:	Option Digital I/O	Option COM3/4 (or COM1/2)
	Jumpers J10 to J18 must be on 2-3 position	Jumpers J10 to J18 must be on position 1-2	Special cable internaly used to interface the COM3/4 expansion card
1	Strobe	Common contac 2	DCD COM3 (COM1)
2	Data 0	Active contact 0	RXD COM3 (COM1)
3	Data 1	Passive contact 0	TXD COM3 (COM1)
4	Data 2	Common contact 0	DTR COM3 (COM1)
5	Data 3	Active contact 1	Ground COM3 (COM1)
6	Data 4	Passive contact 1	DCD COM4 (COM2)
7	Data 5	Common contact 1	RXD COM4 (COM2)
8	Data 6	Active contact 2	TXD COM4 (COM2)
9	Data 7	Passive contact 2	DTR COM4 (COM2)
10	ACK	n.c.	Ground COM4 (COM2)
11	BUSY	n.c.	n.c.
12	Paper End	n.c.	n.c.
13	Select	n.c.	n.c.
14	Autofeed	n.c.	DSR COM3 (COM1)
15	Error	n.c.	RTS COM3 (COM1)
16	Init Printer	n.c.	CTS COM3 (COM1)
17	Shift In	n.c.	RI COM3 (COM1)
18	n.c.	Digital In 2 +	
19	n.c.	Digital In 1 -	DSR COM4 (COM2)
20	n.c.	Digital In 1 +	RTS COM4 (COM2)
21	n.c.	Digital In 0 -	CTS COM4 (COM2)
22	n.c.	Digital In 0 +	RI COM4 (COM2)
23	n.c.	Digital In 2 -	n.c.
24	Ground	n.c.	n.c.
25	Ground	n.c.	n.c.

n.c. = not connected, do not connect wires to this pins!

In some cases the LPT/PORT3 connector of the MPCX48 is used for 2 serial ports. LPT is not available in these cases.

_ An optional CAN board always uses the connectors of COM/PORT1 and COM/PORT2. PORT3 can be used in these 2 ways:

 _   PORT3 = COM1 and 2   → LPT is not available.   (standard for optional CAN board)

 _   PORT3 = LPT   → COM1 and 2 are not available externally but can be used for optional internal GPS / GSM module.

_ two additional COM ports (COM3 and 4) can be installed instead of LPT

Pinout of PORT3 if used for 2 COM ports

RS232 signal	PORT3 pin	Pin number on standard COM port with DSUB9 connector	
		COM A *	COM B *
DCD A	1	1	
RXD A	2	2	
TXD A	3	3	
DTR A	4	4	
GND	5	5	
DCD B	6		1
RXD B	7		2
TXD B	8		3
DTR B	9		4
GND	10		5
not connected	11		
not connected	12		
not connected	13		
DSR A	14	6	
RTS A	15	7	
CTS A	16	8	
RI A	17	9	
not connected	18		
DSR B	19		6
RTS B	20		7
CTS B	21		8
RI B	22		9
not connected	23		
not connected	24		
not connected	25		

* COM A: serial port 1 or 3
   COM B: serial port 2 or 4

Use this external cable to get 2 serial ports with standard pinout.

DSUB25 female connected to MPCX48 PORT3

COM A DSUB9 male

COM B DSUB9 male
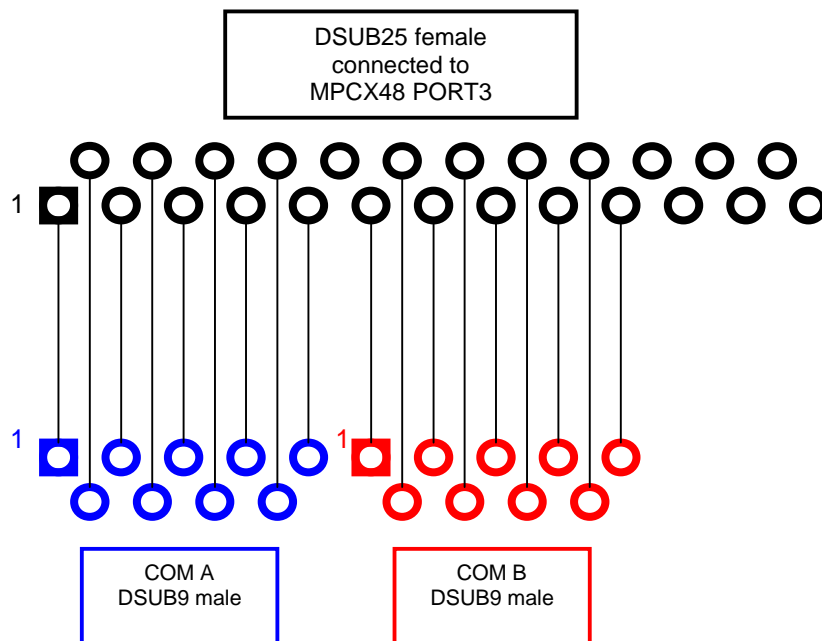
Remarks:
In the case of the COM3/4 pin definition, the flatcable of the DB25 connector may be spliced into two strips each fits to a DB9 connector.

The Option COM3/4 definition is also the same for COM1/2.

Option Digital I/O:

Digital Output:

- Relais contact 0 to 1: max. 60V / 2Amps, max. ferquency 100Hz
- Passive contact closed to common contact: the output is on level zero
- Aactive contact closed to common contact: the output is on level one

Digital Input:

- Optoisolated input: (see chapter 9.2)

4.3.5   Connectorsignals: LVDS:

The LVDS Display is connected to a 26pin HiDensity connector.

Pin Number	Signal / Function:	Direction, Voltage	Safety and Remarks
1	LVDS-Signal 0-	out	
2	LVDS-Signal 0+	out	
3	LVDS-Signal 1-	out	
4	LVDS-Signal 1+	out	
5	LVDS-Signal 2-	out	
6	LVDS-Signal 2+	out	
7	LVDS-Signal 3-	out	
8	LVDS-Signal 3+	out	
9	Logic Ground		
10	LVDS-Clock -	Out	
11	LVDS-Clock+	Out	
12	USB Ground		
13	USB Channel 5 -	Out	
14	USB Channel 5+	Out	
15	USB Power +5Volt (+0/-5%), Imax=0.5A	Out	0.75mA Fuseprotected
16	Video Input LUMA	IN	Svideo
17	Video Input Chroma	IN	Svideo
18	Nc		
19	Nc		
20	Nc		
21	Logic VCC +5Volt (+/-5%), Imax=0.25A	Out	Overcurrentprotected
22	Switched LCD-Supply 5Volt (+0/-10%), I=0.5A	Out	1 Amp. Fuse protected
23	Switched LCD-Supply 5Volt (+0/-10%), I=0.5A	Out	1 Amp.
24	Switched LCD-Backlight Dcin (+0/-5%), I=0.5A	Out	1 Amp
25	Switched LCD-Backlight Dcin (+0/-5%), I=0.5A	Out	1 Amp.
26	Logic Ground , Imax=1A	Out	

4.3.6 Connectorsignals: DVI-D:
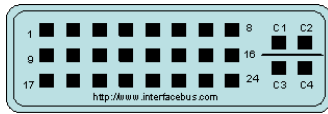
Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDSData0+
3	TMDS Data2/4 Shield	11	TMDS Data1/3 Shield	19	TMDS Data0/5 Shield
4	TMDS Data4-	12	TMDS Data3-	20	TMDS Data5-
5	TMDS Data4+	13	TMDS Data3+	21	TMDS Data5+
6	DDC Clock [SCL]	14	+5 V Power	22	TMDS Clock Shield
7	DDC Data [SDA]	15	Ground (for +5 V)	23	TMDS Clock +
8	Analog vertical sync	16	Hot Plug Detect	24	TMDS Clock -
C1	Chroma	--	--	--	--
C2	Luma	--	--	--	--
C3	CVBS	--	--	--	--
C4	HSYNC	--	--	--	--

4.3.7 Connectorsignals: VGA-Analog:

The following table shows the pinouts of a VGA cable connector:
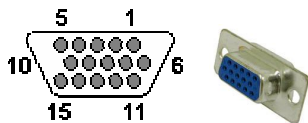
(To the Monitor)

Pin	Signal name	Description
1	RED	Red video signal
2	GREEN	Green video signal
3	BLUE	Blue video signal
4	n.c.	No connect
5	GND	Ground
6	RED_RTN	Red video signal return
7	GREEN_RTN	Green video signal return
8	BLUE_RTN	Blue video signal return
9	n.c.	No connect
10	GND	Ground
11	n.c.	No connect
12	SDA	I2C data
13	HSYNC	Horizontal synchronization signal
14	VSYNC	Vertical synchronization signal
15	SCL	I2C clock

4.3.8   Connectorsignals: USB

Pin	Signal Name	Description
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain
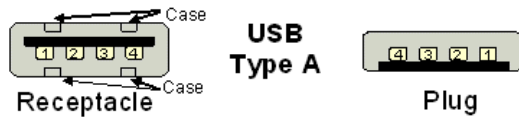
4.3.9   Connectorsignals: SVideo:

Pin	Name	Description
1	GND	Ground (Y)
2	GND	Ground (C)
3	Y	Intensity (Luminance)
4	C	Color (Chrominance)

4.3.10   Connectorsignals: TV1/2 Input:

This follows the standard pin definition.

Name	Description
Core	Signal
Shield	Ground

4.3.11   Connectorsignals: Sound:

The following description is valid for the "line in", "mic in" and the "line out" jack on the device.

Name	Description
L	Left Signal
R	Right Signal
GROUND	Ground
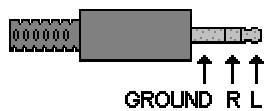
4.3.12   Connectorsignals: LAN:

This follows the standard pin definition.

87654321
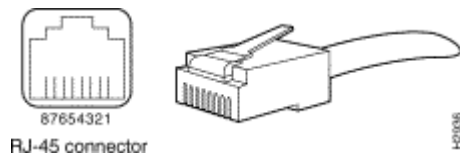
RJ-45 connector

RJ45 connector 10BaseT (IEEE 802.3i), 100BaseTX (IEEE 802.3u):

MDI-Pin	EIA/TIA 568A colours (wire/line)	Pin	Twisted Pair
TX+	White /green	1	**3**
TX-	Green	2	**3**
RX+	White/orange	3	**2**
GND ..		4	**1**
GND ..		5	**1**
RX-	Orange	6	**2**
GND ..		7	**4**
GND ..		8	**4**

Cabling: Not exceeding 100m (328 feet) , Quality at least CAT5, better S/FTP or STP CAT6
             Take care on a well balanced shield/ground concept.

4.4 Power Supply

(1) AC-Adapter (814380):	(2) Car-Adapter-Cable
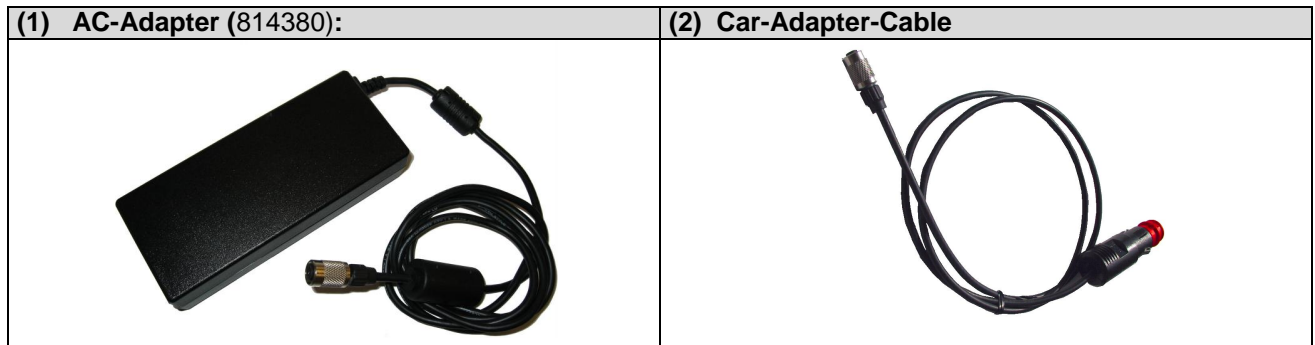
4.5 DC-Powerinput Specifications

4.5.1 Nominal DC-Powerinput voltage

The nominal DC-powerinput is within the range of: 10Volt to 24Volt.
That means the device may be used in 12V or 24V battery supplies as used in boats, cars and trucks.

The DC-input is protected with an internal fuse from over-current !

To prevent from high voltage spikes there are different voltage supressor diodes integrated. Short spikes up to 100V may be limited to 24V, to protect the internal electronic components.

4.5.2 DC-Powerinput voltage specification

Once the motor has been started, the power supply voltage may be reduced to under 8Volt for a short moment.

The MPCX48 is running with a minimal voltage of 7.2Volt, measured at the input of the rear connector.

The following limits are specified:

DC-Input Voltage	Duration	Comment:
Over 30V	Protection circuit will work	
24V		Nominal operating
12V		Nominal operating
10 Volt	Lowest static voltage	
8 Volt	30sec limit	The current is to high !
7.2Volt	5sec limit	The high current brings the filters probably into saturation
6.5Volt	10ms limit	Determined by the input capacitor energy at a given load.

4.5.3   DC-Powercable Specifications

The powercable must be capable to bring the energy into the MPCX, without a to high voltage lost. Therefore the diameter of the powercord and the cable length are very important. Generally, use the cable as short as possible.

We recommend:

Cable type	Square diameter	Max. Length	Comment	
3pin Powercable to the 3pin connector	0.75 mm2	1 meter	150mV lost	
3pin Powercable to the 3pin connector	0.50 mm2	1 meter	200mV lost	

ATTENTION:
The "Minimal DC-Powerinput voltage specification" must be added to the voltage lost of the DC-cable!

4.6 _Storage devices (Optional)_

4.6.1 Harddisk 2.5" for MPCX48A (standard temp. range)

Technical Specifications of the optional internal hard disk:

Characteristics:

Capacity	40 to 80 Gbyte
Manufacturer	Hitachi / Seagate
Sector size	512 Bytes
Data heads	4 - 8
Disks	2 or 4
Rotations speed	4200 RPM
Latency	7ms
Operating temperature	+5℃ to +55℃ (for the syst em temperatures refer to chapter 2.5)
Relative Humidity	8% to 90%
Power-on hours	333h / month
Max. read/write duty cycles	20%
Vibration in operation	0.67G (5-500Hz) random
Non operation shock	800G / 1ms
Vibration non operat.	3G (5-500Hz)
Acoustic Noise (seek)	33dBA

4.6.2   Harddisk 2.5" for Extended Temperature (MPCX48)

Technical Specifications of the optional internal harddisk:

Characteristics:

Capacity	20 / 40 Gbyte
Manufacturer	Hitachi / Fujitsu
Sector size	512 Bytes
Data heads	2
Disks	1
Rotations speed	4200 RPM
Latency	7ms
Operating temperature	-20℃ to +85℃ (for the sys tem temperatures refer chapter 2.5)
Temperature gradient	Max. 60℃ / hour
Relative Humidity	5% to 90%
Power-on hours	333h / month
Max. read/write duty cycles	20%
Vibration in operation	1.00G (22-500Hz) random
Non operation shock	800G / 1ms
Vibration non operat.	5G (22-500Hz)
Acoustic Noise (seek)	33dBA

4.6.3 MicroDrive and CompactFlash

Hard disk drive specifications
IBM Microdrive™
with CF+ Type II interface
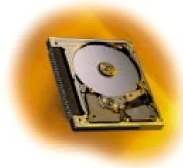
Models: DSCM-11000
         DSCM-10512
         DSCM-10340

Formatted capacity

The defaults of the logical drive parameters in Identify Device Data are as follows:

358,686,720	538,804,224	1,077,608,448 Total Logical Data Bytes
701,568	1,052,352	2,104,704 Number of Sectors
695	1044	2088 Number of Cylinders
63	63	63 Number of Sectors/Track
16	16	16 Number of Heads

Characteristics:

Capacity	1Gbyte
Manufacturer	IBM MicroDrive Modell: DSCM-11000
Sector size	512 Bytes
Data heads	16
Disks	2
Rotations speed	3600 RPM
Latency	8ms
Operating temperature	+0℃ to +55℃ (for the sys tem temperatures refer chapter)
Relative Humidity	8% to 90%
Vibration in operation	0.67G (5-500Hz) random
Non operation shock	1500G / 1ms
Vibration non operat.	3G (5-500Hz)

DMA-Function: Only with the 1Gbyte Drive available !

4.6.4 Solid State Flashdisk Drive

Technical Specifications of the internal harddisk without the shockabsorbers:

Characteristics:

Capacity	2Gbyte
Manufacturer	M-Systems
Write cycles:	5 Mio, unlimited read cycles
MTBF:	2,3 Mio h
Data retention:	Min. 10 years
Burst rate:	16.7 Mbyte/sec
Access time	< 1ms
Operating temperature	-40℃ to +85℃
Relative Humidity	5% to 95%
Vibration in operation	16G (5-500Hz) random MIL-STD-810F
Operation shock	1500G / 0.5ms halfsine MIL-STD-810F
Vibration non operat.	16G (5-500Hz)
Altitude	0 to 80'000 feet

4.7 Serial and Parallel Interfaces

4.7.1 Serial Interfaces

It is possible to change the COM 1 / COM 2 configuration as follows:

Source:	IRQ:	COM Switch:	Connector:
COM1	4	COM1 RS232	Port 1
		OR	
COM1	4	GPS	Internal GPS module (option)
COM2	3	COM2 RS232	Port 2
		OR	
COM2	3	GSM	Internal GSM module (option)

There are two possibilities to change the COM modes:

4.7.1.1 Serial Port Mode: COMSwitch:

To change the COM configuration you have to use the tool "COM48Switch.exe":
(**Note:** Be sure that you have installed the int15dl_installxx.exe driver before -> chapter 6.1.4

For automatically set the COM configuration on startup, you have to set a "command line" command:

4.7.1.2   Serial Port Mode: Bios Setup

If the MPCX48 bios version V3.0 or higher is installed, you can set the COM prot mode also in the bios setup.
In this case you don't need to use the COM48Switch.exe.

Enter the bios setup (F2) and change to "Advanced" menu, "I/O Device Configuration":

Set the "mode" to COM/Port A:
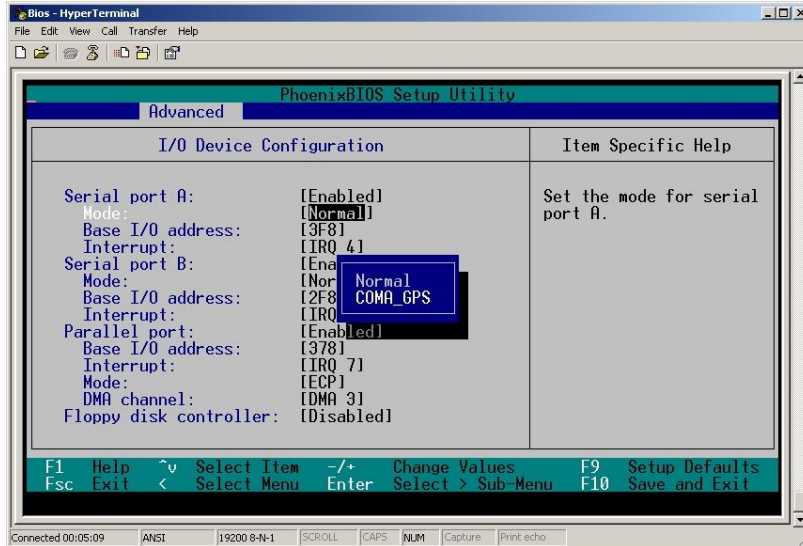
Set the "mode" to COM/Port B:
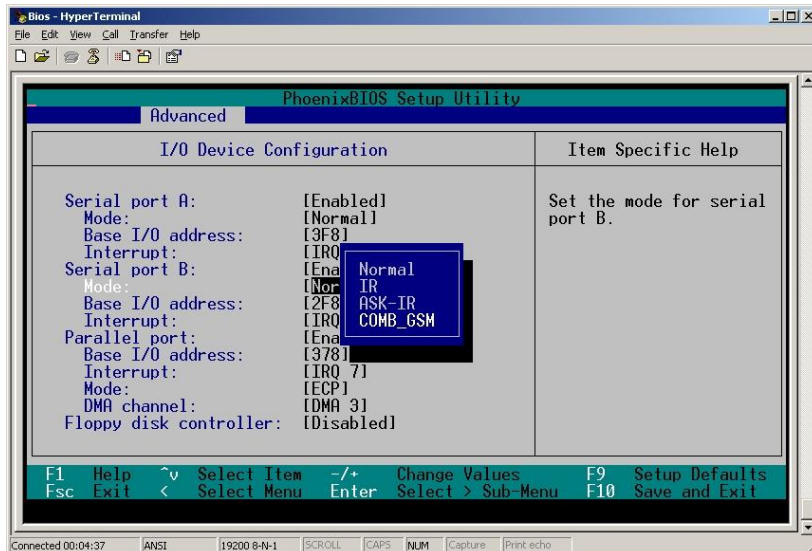
4.7.2   Parallel Interface

Source:	IRQ:	Connector:	Comment:
LPT1	7	DB25	Standard parallel port

4.8 <u>Controllers</u>

4.8.1 <u>INTEL Processor Pentium-M</u>

The Intel® Pentium® M processor is a high performance, low power mobile processor with several micro-architectural enhancements over existing Intel mobile processors.

The following list provides some of the key features on this processor:
_ Supports Intel® Architecture with Dynamic Execution
_ High performance, low-power core
_ On-die, primary 32-kbyte instruction cache and 32-kbyte write-back data cache
_ On-die, 1-Mbyte / 2 Mbyte second level cache with Advanced Transfer Cache Architecture
_ Advanced Branch Prediction and Data Prefetch Logic
_ Streaming SIMD Extensions 2 (SSE2)
_ 400/533-MHz, Source-Synchronous processor system bus
_ Advanced Power Management features including Enhanced Intel® SpeedStep® technology
_ Micro-FCPGA and Micro-FCBGA packaging technologies

The Intel Pentium M processor is manufactured on Intel's advanced 0.13/0.09 micron process technology with copper interconnect. The processor maintains support for MMX™ technology and Internet Streaming SIMD instructions and full compatibility with IA-32 software. The high performance core features architectural innovations like Micro-op Fusion and Advanced Stack Management that reduce the number of micro-ops handled by the processor. This results in more efficient scheduling and better performance at lower power. The on-die 32-kB Level 1 instruction and data caches and the 1-MB Level 2 cache with Advanced Transfer Cache Architecture enable significant performance improvement over existing mobile processors. The processor also features a very advanced branch prediction architecture that significantly reduces the number of mispredicted branches. The processor's Data Prefetch Logic speculatively fetches data to the L2 cache before an L1 cache requests occurs, resulting in reduced bus cycle penalties and improved performance. The Streaming SIMD Extensions 2 (SSE2) enable break-through levels of performance in multimedia applications including 3-D graphics, video decoding/encoding, and speech recognition. The new packed double-precision floating-point instructions enhance performance for applications that require greater range and precision, including scientific and engineering applications and advanced 3-D geometry techniques, such as ray tracing.

The Intel Pentium M processor's 400-MHz processor system bus utilizes a split-transaction, deferred reply protocol. The 400-MHz processor system bus uses Source-Synchronous Transfer (SST) of address and data to improve performance by transferring data four times per bus clock (4X data transfer rate, as in AGP 4X). Along with the 4X data bus, the address bus can deliver addresses two times per bus clock and is referred to as a "double-clocked" or 2X address bus. Working together, the 4X data bus and 2X address bus provide a data bus bandwidth of up to 3.2 Gbytes/second. The processor system bus uses Advanced Gunning Transceiver Logic (AGTL+) signal technology, a variant of GTL+ signalling technology with low power enhancements.

4.8.1.1 <u>Introduction</u>

The processor features Enhanced Intel SpeedStep technology, which enables real-time dynamic switching between multiple voltage and frequency points instead of two points supported on previous versions of Intel SpeedStep technology. This results in optimal performance without compromising low power. The processor features the Auto Halt, Stop-Grant, Deep Sleep, and Deeper Sleep low power states. The Intel Pentium M processor utilizes socketable Micro Flip-Chip Pin Grid Array (Micro-FCPGA) and surface mount Micro Flip-Chip Ball Grid Array (Micro-FCBGA) package technology. The Micro-FCPGA package plugs into a 479-hole, surface-mount, Zero Insertion Force (ZIF) socket, which is referred to as the mPGA479M socket.

This document includes specifications for the Intel Pentium M processor at Highest Frequency Mode (HFM) core frequencies of 1.30, 1.40, 1.50, and 1.60 GHz, the Low Voltage Intel Pentium M processor at HFM core frequency of 1.10 GHz and the Ultra Low Voltage Intel Pentium M processor at HFM core frequency of 900 MHz.

4.8.1.2   Deep Sleep State

Deep Sleep state is a very low power state the processor can enter while maintaining context. Deep Sleep state is entered by asserting the DPSLP# pin while in the Sleep state. BCLK may be stopped during the Deep Sleep state for additional platform level power savings. BCLK stop/restart timings on Intel 855PM and Intel 855GM chipset-based platforms are as follows:
Intel® Pentium® M Processor Datasheet 14

4.8.1.2.1   **Low Power Features**

_   Deep Sleep entry - DPSLP# and CPU_STP# are asserted simultaneously. The platform clock chip will stop/tristate BCLK within 2 BCLKs +/- a few nanoseconds.

_   Deep Sleep exit - DPSLP# and CPU_STP# are deasserted simultaneously. The platform clock chip will drive BCLK to differential DC levels within 2-3 ns and starts toggling BCLK 2-6 BCLK periods later. To re-enter the Sleep state, the DPSLP# pin must be deasserted. BCLK can be re-started after DPSLP# deas-sertion as described above. A period of 30 microseconds (to allow for PLL stabilization) must occur be-fore the processor can be considered to be in the Sleep state. Once in the Sleep state, the SLP# pin must be deasserted to re-enter the Stop-Grant state. While in Deep Sleep state, the processor is incapable of responding to snoop transactions or latching interrupt signals. No transitions of signals are allowed on the system bus while the processor is in Deep Sleep state. Any transition on an input signal before the proc-essor has returned to Stop-Grant state will result in unpredictable behavior.

4.8.1.3   Deeper Sleep State

The Deeper Sleep state is the lowest power state the processor can enter. This state is functionally identical to the Deep Sleep state but at a lower core voltage. The control signals to the voltage regulator to initiate a transition to the Deeper Sleep state are provided on the platform. Please refer to the platform design guides for details.

4.8.1.3.1   **Low Power Features**

• No bus master arbiter disable required prior to transition and no processor cache flush necessary.

• Improved Intel Thermal Monitor mode.
— When the on-die thermal sensor indicates that the die temperature is too high, the
    processor can automatically perform a transition to a lower frequency/voltage specified in
    a software programmable MSR.
— The processor waits for a fixed time period. If the die temperature is down to acceptable
    levels, an up transition to the previous frequency/voltage point occurs.
— An interrupt is generated for the up and down Intel Thermal Monitor transitions enabling
    better system level thermal management.

Enhancements:
• Dynamic PSB Power Down
• BPRI# control for address and control input buffers
• Dynamic On Die Termination disabling
• Low VCCP (I/O termination voltage) switching power at all times.
    monitoring requirements in the Deeper Sleep state.

4.9 *INTEL 855GM: Grafic-Memory-Control Hub*

4.9.1 **Processor Host Interface**

The GMCH is optimized for the Intel Pentium M processor. Key features of the Intel Pentium M processor system bus (PSB) are:
- Source synchronous double pumped address
- Source synchronous quad pumped data
- System bus interrupt delivery
- Low voltage swing (Vtt = 1.05 V)
- Dynamic Power Down (DPWR#) support
- GMCH supports a 64-B cache line size
- Support for a 400-MHz system bus frequency. Dual processor is not supported
- AGTL+ termination resistors on all of the AGTL+ signals
- Supports 64-bit host bus addressing allowing the CPU to access the entire 4 GB of the GMCH memory address space.
- A 12-deep, In-Order queue to support up to twelve outstanding pipelined address requests on the host bus
- Drives DPWR# signal to the processor, which can then disable its sense amplifiers
- Supports only one outstanding defer cycle at a time to any particular I/O interface
- Host initiated I/O cycles are positively decoded to the GMCH configuration space and subtractively decoded to the Hub Interface
- Host initiated memory cycles are positively decoded to DDR SDRAM
- Memory accesses initiated from the Hub Interface to DDR SDRAM will be snooped on the system bus

4.9.1.1 Intel 855GM GMCH Host Bus Error Checking

The Intel 855GM GMCH does not generate nor check parity on Data, Address/Request, and Response signals on the PSB.

4.9.1.2 Intel 855GM GMCH System Memory Interface

The GMCH System Memory Controller directly supports the following:
- One channel of PC1600/2100 SO-DIMM DDR SDRAM memory
- DDR SDRAM devices with densities of 128-Mb, 256-Mb, and 512-Mb technology
- Maximum System Memory with two, double-sided SO-DIMMs (four rows populated) supporting up to 1 -GB system memory, and high density supporting up to 2-GB system memory
- Variable page sizes of 2 kB, 4 kB, 8 kB, and 16 kB. Page size is individually selectable for every row and a maximum of 16 pages may be opened simultaneously

The GMCH System Memory interface supports a thermal throttling scheme to selectively throttle reads and/or writes. Throttling can be triggered either by the on-die thermal sensor, or by preset write bandwidth limits. Read throttle can also be triggered by an external input pin. The memory controller logic supports aggressive Dynamic Row Power Down features to help reduce power and supports Address and Control line Tri-stating when DDR SDRAM is in an active power down or in self refresh state. The GMCH System Memory architecture is optimized to maintain open pages (up to 16-kB page size) across multiple rows. As a result, up to 16 pages across four rows is supported. To complement this, the GMCH will tend to keep pages open within rows, or will only close a single bank on a page miss. The GMCH supports only four bank memory technologies.

4.9.2   Intel 855GM GMCH Internal Graphics

The GMCH IGD provides a highly integrated graphics accelerator delivering high performance 2D, 3D, and video capabilities. With its interfaces to UMA using a DVMT configuration, an analog display, a LVDS port, and two digital display ports (e.g. flat panel), the GMCH can provide a complete graphics solution.
The GMCH also provides 2D hardware acceleration for block transfers of data (BLTs). The BLT engine provides the ability to copy a source block of data to a destination and perform raster operations (e.g., ROP1, ROP2, and ROP3) on the data using a pattern, and/or another destination. Performing these common tasks in hardware reduces CPU load, and thus improves performance.
High bandwidth access to data is provided through the System Memory interface. The GMCH uses Tiling architecture to increase System Memory efficiency and thus maximize effective rendering bandwidth. The Intel 855GM GMCH also improves 3D performance and quality with 3D Zone Rendering technology.
The GMCH has four display ports, one analog and three digital. These provide support for a progressive scan analog monitor, a dedicated dual channel LVDS LCD panel, and two DVO devices. Each port can transmit data according to one or more protocols. The DVO ports are connected to an external device that converts one protocol to another. Examples of this are TV-out encoders, external DACs, LVDS transmitters, and TMDS transmitters. Each display port has control signals that may be used to control, configure and/or determine the capabilities of an external device. The data that is sent out the display port is selected from one of the two possible sources, Pipe A or Pipe B.

4.9.2.1   Intel 855GM GMCH Analog Display Port

Intel 855GM GMCH has an integrated 350-MHz, 24-bit RAMDAC that can directly drive a progressive scan analog monitor pixel resolution up to 1600x1200 at 85-Hz refresh and up to 2048x1536 at 72-Hz refresh. The Analog display port can be driven by Pipe A or Pipe B.

4.9.2.2   Intel 855GM GMCH Integrated DVO Ports

The DVO B/C interface is compliant with the DVI Specification 1.0. When combined with a DVI compliant external device (e.g. TMDS Flat Panel Transmitter, TV-out encoder, etc.), the GMCH provides a high-speed interface to a digital or analog display (e.g. flat panel, TV monitor, etc.).
The GMCH provides two DVO ports that are each capable of driving a 165-MHz pixel clock at the DVO B or DVO C interface. When DVO B and DVO C are combined into a single DVO port, then an effective pixel rate of 330 MHz can be achieved. The DVO B/C ports can be driven by Pipe A or Pipe B. If driven on Pipe B, then the LVDS port must be disabled.

4.9.3   Hub Interface

A proprietary interconnect connects the GMCH to the ICH4-M. All communication between the GMCH and the ICH4-M occurs over the Hub Interface 1.5. The Hub Interface runs at 66 MHz (266-MB/s).

4.9.4   Address Decode Policies

Host initiated I/O cycles are positively decoded to the GMCH configuration space and subtractively decoded to Hub Interface. Host initiated System Memory cycles are positively decoded to DDR SDRAM and are again subtractively decoded to Hub Interface if under 4 GB. System Memory accesses from Hub Interface to DDR SDRAM will be snooped on the PSB.

4.10   *IO Control Hub Intel-ICH4 / ICH4M*

Features:

PCI Bus Interface	Supports PCI Revision 2.2 Specification at33 MHz
	133 MB/sec maximum throughput
	Supports up to six master devices on PCI
	One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
	Support for 44-bit addressing on PCI using DAC protocol

Integrated LAN Controller	WfM 2.0 and IEEE 802.3 compliant
	LAN Connect Interface (LCI)
	10/100 Mbit/sec ethernet support

Integrated IDE Controller	Supports "Native Mode" register and interrupts
	Independent timing of up to 4 drives, with separate primary and secondary IDE cable connections
	Ultra ATA/100/66/33, BMIDE and PIO modes
	Tri-state modes to enable swap bay

USB	Includes three UHCI host controllers that support six external ports
	New: Includes one EHCI high-speed USB 2.0 Host Controller that supports all six ports
	New: Supports a USB 2.0 high-speed debug port
	Supports wake-up from sleeping states S1–S5
	Supports legacy keyboard/mouse software

AC-Link for Audio CODECs	Supports AC '97 2.3
	New: Third AC_SDATA_IN line for three codec support
	New: Independent bus master logic for seven channels (PCM In/Out, Mic 1 input, Mic 2 input, modem in/out, S/PDIF out)
	Separate independent PCI functions for audio and modem
	Support for up to six channels of PCM audio output (full AC3 decode)
	Supports wake-up events

Interrupt Controller	Support up to eight PCI interrupt pins
	Supports PCI 2.2 message signaled interrupts
	Two cascaded 82C59 with 15 interrupts
	Integrated I/O APIC capability with 24 interrupts
	Supports serial interrupt protocol
	Supports processor system bus interrupt delivery

New: 1.5 V operation with 3.3 V I/O	5 V tolerant buffers on IDE, PCI, USB overcurrent and legacy signals

Timers Based on 82C54	System timer, refresh request, speaker tone output

Power Management Logic	ACPI 2.0 compliant
	ACPI-defined power states (C1–C2, S3–S5)
	Supports Desktop S1 state (like C2 state, only STPCLK# active)
	ACPI power management timer
	PCI PME# support
	SMI# generation
	All registers readable/restorable for proper resume from 0V susp.states

External Glue Integration	Integrated pull-up, pull-down and series termination resistors on IDE, processor interface
	Integrated Pull-down and Series resistors on USB

Enhanced Hub Interface Buffers Improve Routing flexibility (Not available with all MemController Hubs)

Firmware Hub (FWH) Interface Supports BIOS memory size up to 8 MB

Low Pin Count (LPC) Interface	Supports two Master/DMA devices.

Enhanced DMA Controller	Two cascaded 8237 DMA controllers
	PCI DMA: Supports PC/PCI — Includes two PC/PCI REQ#/GNT# pairs
	Supports LPC DMA
	Supports DMA collection buffer to provide Type-F DMA performance for all DMA channels

Real-Time Clock	256-byte battery-backed CMOS RAM

System TCO Reduction Circuits	Timers to generate SMI# and Reset upon detection of system hang
	Timers to detect improper processor reset
	Supports ability to disable external devices

SMBus	New: Hardware packet error checking
	New: Supports SMBus 2.0 Specification
	Host interface allows processor to communicate via SMBus
	Slave interface allows an ext. microcontroller to access system resources
	Compatible with most 2-wire components that are also I2C compatible

GPIO	TTL, open-drain, inversion

4.10.1 Addressing PCI Devices on the MPCX48:

DEVICE	IDSEL	PIRQ	#REG	#GNT	Remarks
internal Chipset PCI devices and resources					
GMCH	internal	A / B / C / D	---	---	PCI Bus 0
AGP Controller	internal	A / B	---	---	PCI Bus 0
Graphics Controller	internal	A / B	---	---	PCI Bus 0
ICH4_USB Controller	Internal	A / D / C / H	---	---	PCI Bus 0 Func 0 = USB0 mapped to PIRQA Func 1 = USB1 mapped to PIRQD Func 2 = USB2 mapped to PIRQC Func 7 = USB3 mapped to PIRQH
ICH4_PCI Controller	internal	A / B / C / D	---	---	PCI Bus 0
ICH4_LPC Controller		C / B	---	---	PCI Bus 0 IDE mapped to PIRQC SMB mapped to PIRQB AC97 Audio mapped to PIRQB AC97 Modem mapped to PIRQB
Network	AD24	E	---	---	Internal chipset onboard device
External PCI slots					
PC/104+ Slot 1	AD20	E / F / G / H	0-4	0-4	PCI Bus 2
PC/104+ Slot 2	AD21	F / G / H / E	0-4	0-4	PCI Bus 2
PC/104+ Slot 3	AD22	G / H / E / F	0-4	0-4	PCI Bus 2
PC/104+ Slot 4	AD23	H / E / F / G	0-4	0-4	PCI Bus 2

Separate PCI Controller onboard.

DEVICE	IDSEL	PIRQ	#REG	#GNT	Remarks
MiniPCI	AD27	A	3	3	onboard

4.10.2 <u>Interrupt Controllers</u>

An 8259A compatible interrupt controller, within the chipset device, provides seven prioritized interrupt lev-els. Of these, several are normally associated with the board's onboard device interfaces and controllers, and several are available on the AT expansion bus.

Interrupt	Sources	onboard used
IRQ0	ROM-BIOS clock tick function, from timer 0	yes
IRQ1	Keyboard controller output buffer full	yes
IRQ2	Used for cascade 2. 8259	yes
IRQ3	COM2 (fix)	yes
IRQ4	COM1 (fix)	yes
IRQ5	Reserved	yes
IRQ6	Not used (if disabled Floppy function)	yes
IRQ7	Reserved for LPT1	yes
IRQ8	System CMOS / real time clock	yes
IRQ9	ACPI-Compliant system PCI-9 for USB PCI-9 for LAN PCI-9 for Sound	yes
IRQ10	Reserved	
IRQ11	Reserved	
IRQ12	PS/2 mouse	Yes
IRQ13	Math coprocessor	Yes
IRQ14	Harddisk Primary - IDE	Yes
IRQ15	Secondary IDE (Optional CF / CD / DVD)	yes

Attention:

LPT1:   Printerfunction without IRQ-support, if needed use an USB-Printer
FD: No floppy support, use always a USB-Floppy

4.10.3 <u>Device Manager / IRQ usage</u>

In the "Device Manager" of the operating system the used IRQ's should be displayed.

4.11   *Display Properties*

Start / Control Panel / Apperance and Themes / Display
Register Settings:
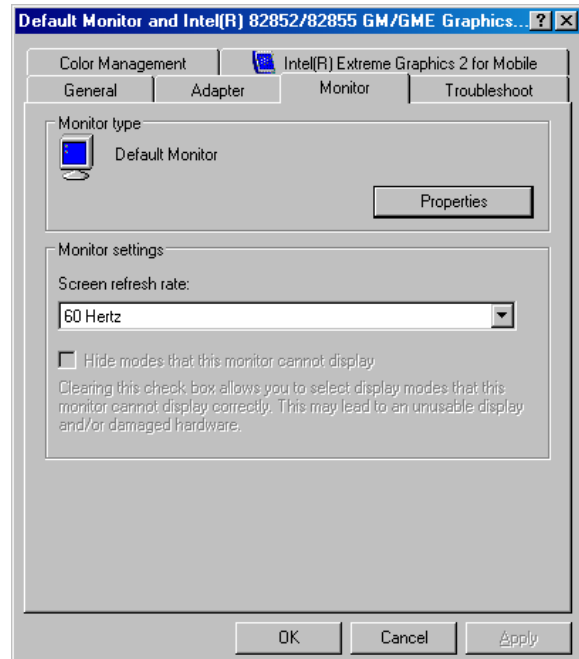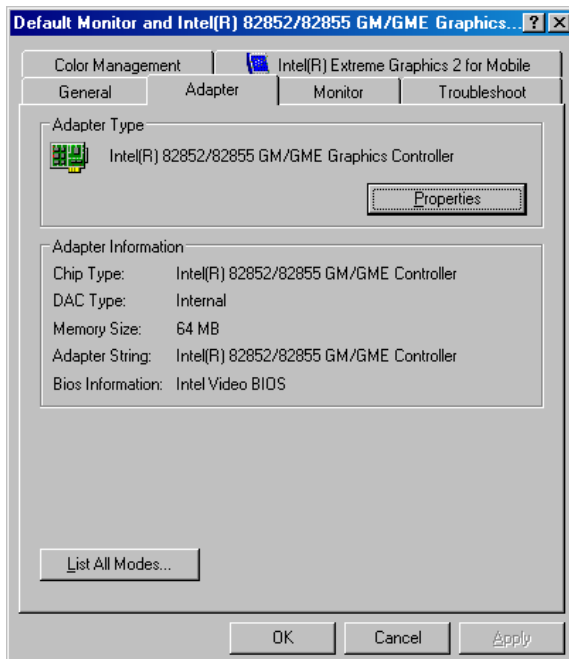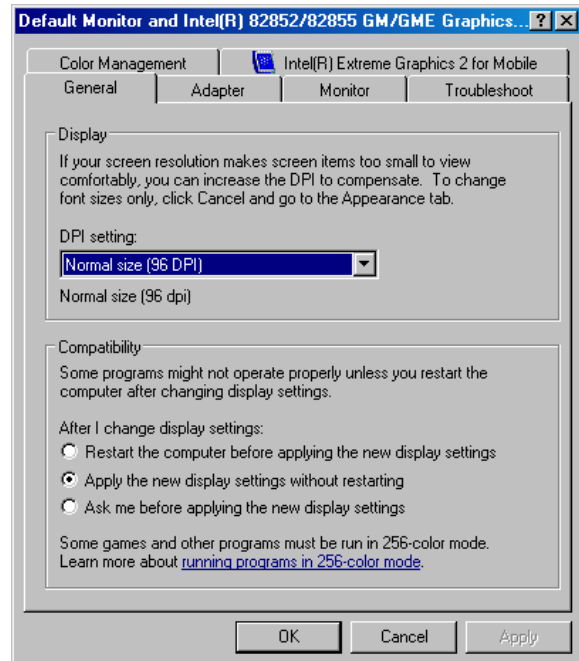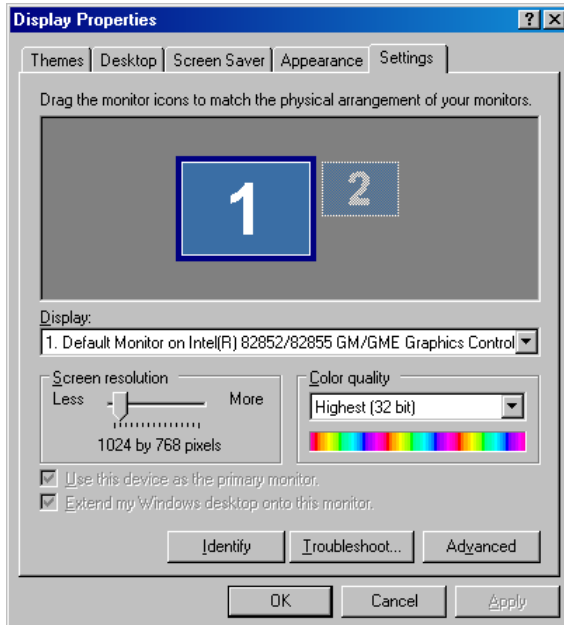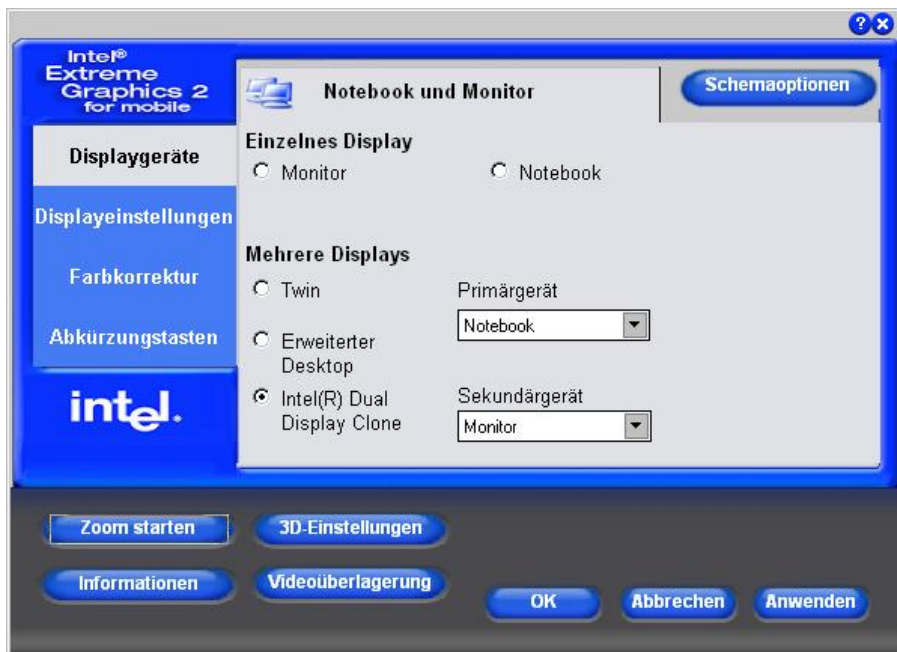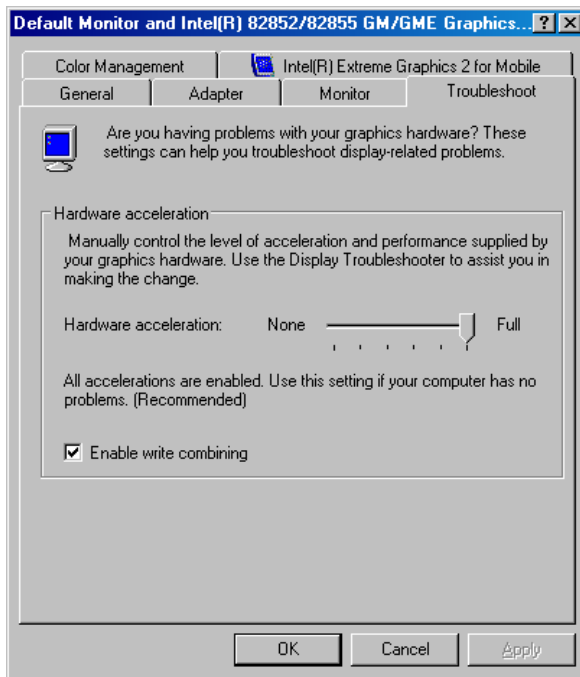
Attention!

There is no picture after changing values in the menu "DISPLAY PROPERTIES -> Settings"or you started the system without a connected monitor:

You have to press the following key combination to get a picture again:

CTRL+ALT+ **Fx**

Fx:

F1 = VGA
F2 or F3 = SVIDEO
F4 = DVI

We recommend to change the settings in this Intel garphic menu.

4.12   AC97 Sound

Sound Settings:
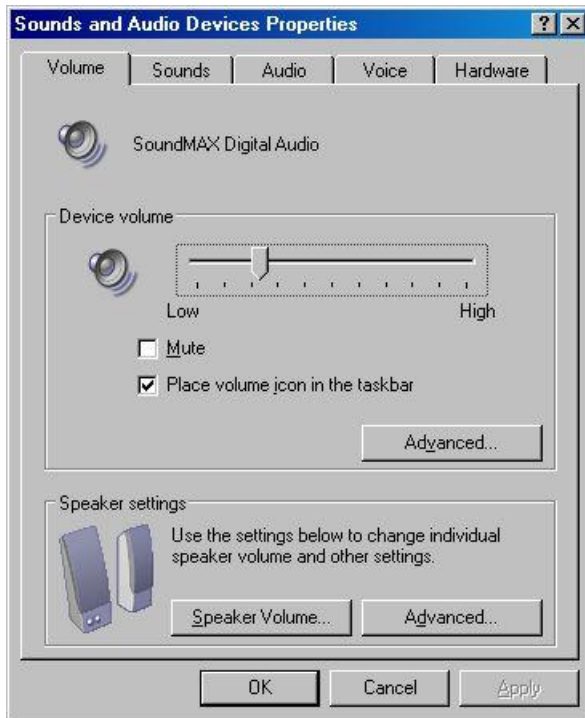
4.13   USB V2.0

USB Host controller functional description.

USB UHCI Controllers:

The ICH4 contains three USB UHCI Host Controllers. Each Host Controller includes a root hub with two separate USB ports each, for a total of 6 USB ports. The ICH4 Host Controllers support the standard *Universal Host Controller Interface (UHCI) Specification, Revision 1.1.*•Overcurrent detection on all 6 USB ports is supported. The overcurrent inputs are 5-V tolerant, and can be used as GPIs if not needed. •The ICH4's USB UHCI controllers are arbitrated differently than standard PCI devices to improve arbitration latency.•The USB UHCI controllers use the Analog Front End (AFE) embedded cell that allows support for USB High-speed signaling rates, instead of USB I/O buffers.

USB EHCI Controller:

The ICH4 contains an Enhanced Host Controller Interface (EHCI) compliant host controller which supports up to 6 high-speed USB 2.0 Specification compliant root ports. High-speed USB 2.0 allows data transfers up to 480 Mbps using the same pins as the 6 Full-speed/Low-speed USB UHCI ports. The ICH4 contains port-routing logic that determines whether a USB port is controlled by one of the UHCI controllers or by the EHCI controller. A USB 2.0 based Debug Port is also implemented in the ICH4.

4.14   LCD PanelLink (DVI)

Silicon Image's Transition Minimized Differential Signaling is an electrical standard used to transmit digital data to a display device. The transition minimization is achieved by implementing an advanced encoding algorithm that converts 8 bits of data into a 10-bit transition minimized, DC balanced character. The signal is optimized to reduce Electromagnetic Interference (EMI), which allows for faster signal transfer rates with increased accuracy. The differential circuitry in TMDS allows complimentary limited amplitude signals to be transmitted over twisted pair wires instead of more expensive coaxial cable. The TMDS link architecture consists of a TMDS transmitter that encodes and serially transmits a data stream over the TMDS link to a TMDS receiver. Video and sync information are serialized and sent over three sets of twisted pair wires, one set for red, green and blue data channels. An additional pair of wires is used to transmit a clock signal for timing. At the other end, the TMDS receiver synchronizes itself to character boundaries in each of the serial data streams, the transmitted signal is recovered and decoded. A fundamental principle of physics known as the "Copper Barrier" limits the amount of data that can be squeezed through a single copper wire. The limit is a bandwidth of about 165MHz, which equates to 165 million pixels per second. A single TMDS link has a bandwidth of 165 MHz, which enough to display resolutions of up to 1600 x 1200 (UXGA) at 60Hz. DVI, which is the first standard specifically written for the TMDS digital interface allows for up to two TMDS links, a total of 6 channels sharing a single clock, to be integrated into a single DVI connector to support a minimum bandwidth of 330 mega pixels per second. That is enough bandwidth to enable digital displays to reach resolutions of up to 2048 x 1536 (QXGA).
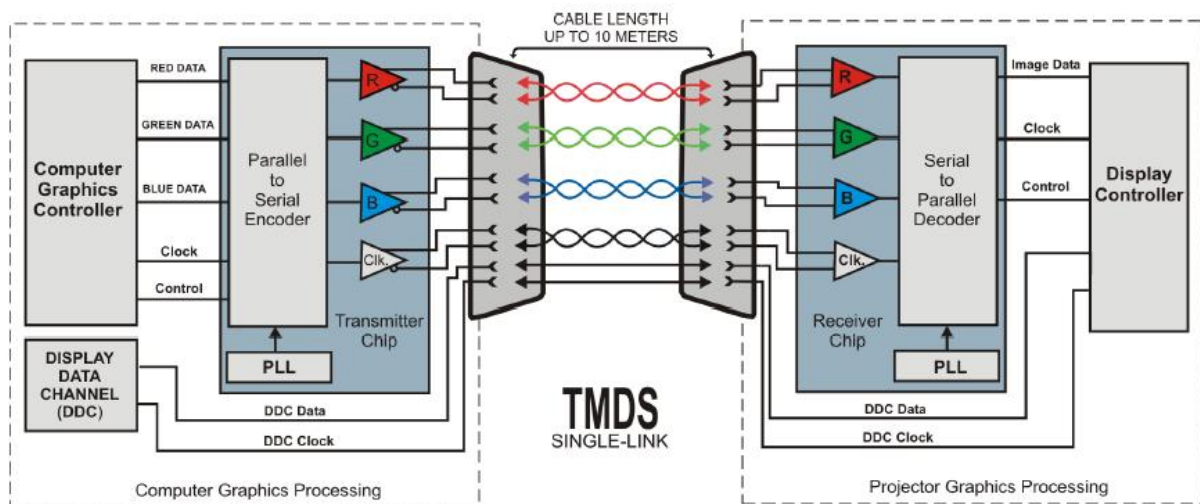
The DVI specification supports hot plug and play of display devices. DVI also supports the VESA Display Data Channel (DDC) and Extended Display Identification Data (EDID) specifications, which enable the display, graphics adapter, and computer to communicate and automatically configure the system to support the different features available in the display. EDID is a standard data format for information such as display vendor, resolution and timing capabilities. A purely digital connection allows projector manufacturers to design products, which provide the sharpest, clearest image possible, without the need for any fine sync or complex pixel clock adjustments.

DISPLAY RESOLUTION CHART	
Resolution Name	**Pixel Resolution**
Video Graphics Array (VGA)	640 x 480
Super VGA (SVGA)	800 x 600
Extended Graphics Array (XGA)	1024 x 768
Super XGA	1280 x 1024
Ultra XGA	1600 x 1200
High Definition TV (HDTV)	1920 x 1080
Quad XGA (QXGA)	2048 x 1536

Display	RESOLUTIONS SUPPORTED BY DVI	
	Single-Link DVI	**Dual-Link DVI**
60-Hz LCD with 5% blanking Interval	Up to 1920 x 1080 (HDTV)	Up to 2048 x 1536 (QXGA)
75-Hz CRT with approx. 15% blanking interval	Up to 1280 x 1024 (SXGA)	Up to QXGA
85-Hz CRT with approx. 15% blanking interval	Up to SXGA	Up to HDTV

4.14.1 DVI-Integrated (DVI-D):

Supports digital connections to the display. This 29-pin connector can carry single or dual-link all-digital video/data signals on 24 pins
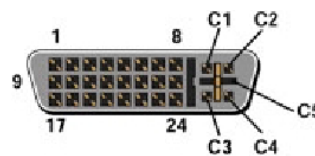
DVI-I
Receptacle Connector

	DIGITAL CONNECTOR PIN ASSIGNMENTS				
Pin	**Signal Assignment**	**Pin**	**Signal Assignment**	**Pin**	**Signal Assignment**
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (return for +5V, Hsync, and Vsync)	23	T.M.D.S. Clock+
8	Analog Vertical Sync	16	Hot Plug Detect	24	T.M.D.S. Clock-

ATTENTION !:

The analog VGA signals on the DVI-I connector (C1-C5) are not available !

4.14.2 <u>General Description:</u>

The SiI 160 transmitter uses PanelLink Digital technology to support displays ranging from VGA to UXGA resolutions (25-165 MHz). The SiI 160 transmitter supports up to true color panels (24 bit/pixel, 16.7M colors) in 1 or 2 pixels/clock mode, and also features an inter-pair skew tolerance up to 1 full input clock cycle. An advanced on-chip jitter filter is also added to extend tolerance to VGA clock jitter. Since all PanelLink products are designed on scaleable CMOS architecture to support future performance requirements while maintaining the same logical interface, system designers can be assured that the interface will be fixed through a number of technology and performance generations. PanelLink Digital technology simplifies PC & display interface design by resolving many of the system level issues associated with high-speed digital design, providing the system designer with a digital interface solution that is quicker to market and lower in cost.

Features:

_   Scaleable Bandwidth: 25-165 MHz (VGA to UXGA)
_   Low Power: 3.3V core operation
_   High Skew Tolerance: 1 full input clock cycle (6ns at 165 MHz)
_   Flexible panel interface: single or dual pixel in at up to 24-bits
_   Cable Distance Support: over 5m with twisted-pair, fiber-optics ready
_   Compliant with DVI 1.0 (DVI is backwards compatible with VESA® P&DTM and DFP)

Transmitter from Silicon Image: SIL 160
Recommended receiver: SIL161

4.15   WLAN Option

Internaly connected to the MiniPCI socket !

4.15.1 WLAN MiniPCI Modul:

Intel® PRO/Wireless 2200BG Network Connection (Dual mode 802.11b/g)

Wi-Fi CERTIFIED* for single band, 2.4 GHz band, and Wi-Fi Protected Access (WPA)

2.4GHz ISM: Direct Sequence Spread Spectrum (DSSS) for 802.11b
2.4GHz Orthogonal Frequency Division Multiplexing (OFDM) for 802.11

Typical indoor range of 100 ft (30 m) @ 54 Mbps / 300 ft (91 m) @ 1 Mbps for 802.11g and 100 ft (30 m) @ 11 Mbps / 300 ft (90 m) @ 1 Mbps for 802.11b. Intel® Wireless Coexistence System support enables re-duced interference between Intel PRO/Wireless & certain Bluetooth* devices. For systems designed with two antennas, real-time antenna selection enables optimized WLAN performance.
Real-time temperature calibration dynamically optimizes wireless performance by adjusting output power to temperature changes for increased throughput & range with 802.11a radio.[∞]

Softwarepackage:
Easy-to-use interface with Intel® Smart Wireless Solutions support
IT Configuration Utility
Single Sign On support
Centralized Profile Management
EAP-SIM support
Supports Cisco, Check Point Software Technologies, Microsoft and Intel VPN connections.[+]

Powermanagement:
Intel® Intelligent Scanning Technology reduces power by controlling the frequency of scanning for access points. A user selectable feature with five different Power states, which allows the user to make their own power vs. performance choices when in battery mode.

4.16   GPS Receiver TU30-410-031 Option

Features
- Uniform printed circuit board design for all four available configurations
- Twelve parallel satellite tracking channels for fast acquisition and re-acquisition
- Fast Time-To-First-Fix (TTFF) performance if required or minimum power consumption for standard operation
- Less than 8 seconds TTFF hot start, less than 40 seconds cold start with the CX11239
- Less than 1 second reacquisition after blockages up to 10 seconds
- Enhanced algorithms provide superior navigation performance in "urban canyon" and foliage environments
- Adaptive threshold-based signal detection for improved reception of weak signals
- Maximum navigation accuracy achievable with the Standard Positioning Service (SPS)
- Automatic altitude hold mode from Three-Dimensional to Two-Dimensional navigation
- Automatic cold start acquisition process (when no initialization data is entered by the user)
- Maximum operational flexibility and configurability via user commands over the host serial port
- Ability to accept externally supplied initialization data over the host serial port
- User selectable satellites
- User selectable visible satellite mask angle
- Serial data output that includes Conexant binary protocol and selected National Marine Electronics
- Association (NMEA-0183) v2.1 messages

Technical Specifications:

Accuracy	Accuracy is a function of the entire Navstar GPS system and geometry of the satellites at the time of measurement. In general, individual receivers have very little influence on the accuracy provided. Navigational accuracies using Full Accuracy C/A Code (SA Off) and the SPS (SA On) are shown in Table 3. These accuracies are based on a Position Dilution of Precision (PDOP) of 6.0 and the maximum vehicle dynamic of 500 m/s
Solution Update Rate	Once per second
Re-acquisition	second typical with a 10 second blockage
Serial Data Output Protocol	Conexant binary serial I/O messages and NMEA 0183 v2.1 (selected messages)
Power Requirements	Regulated primary power for the Jupiter GPS receiver is required according to the information provided in Table 5. Besides regulated primary power, the board can be supplied with backup power to maintain SRAM and RTC states whenever primary power is removed. Backup power must be between 2.5 and 3.5 V (for all boards, regardless of regulated primary power voltage), and will draw between 50 and 70 uA when primary power is removed. When primary power is present, the board will draw no current from the backup source. When the receiver is operated with an active GPS antenna, the antenna's maximum preamp "pass-through" current is 50 mA at voltages up to +12 V. This current must be limited outside of the receiver.
Radio Frequency Signal Environment RF Input	1575.42 MHz (GPS L1 frequency) at a level between −130 dBW and −163 dBW. If an active antenna is used, the best results are obtained when total gain (antenna gain, amplifier gain, and cable loss) is in the range of 12 to 18 dB. Maximum total gain must be less than 23 dB
Burnout Protection	−10 dBW signal within a bandwidth of 10 MHz centered about the L1 carrier frequency
Physical Dimensions	2.800 x 1.600 x 0.440 inches (71 x 41 x 11 mm)
Weight	Depending on configuration, not to exceed 25 grams
Environmental	
Cooling (operating/storage)	Convection
Temperature	−40℃ to +85℃
Humidity	Relative humidity up to 95 percent non-condensing or a wet-bulb temperature of +35°C, whichever is less
Altitude (operating/storage)	−1000 feet to 60,000 feet
Maximum Vehicle Dynamic	500 m/s (acquisition and navigation)
Vibration	Full performance. See the composite SAE curve in Figure 7. Survival, 18G peak, 5 ms duration
Antenna	50Ω

ATTENTION:

- After installing a Windows operating system (W2k, XP) with the option GSM assembled, Windows detects a MS BallPoint.
You have to disable this MS BallPoint in the device manager (Power of the system with the power switch and start Windows again, after that, disable the MS BallPoint in the device manager).
Have also a look into the following Microsoft knowledge base entry:
http://support.microsoft.com/default.aspx?scid=kb;en-us;283063)

- First step, before using the GPS mode, the COM1 must be conencted to the GPS module with the "COM48Switch". Start the "COM48Switch" a select the GSM/GPRS selection.
Or change the COM-Port mode in the bios setup.

Please find the description in the chapter 4.7

For more information about the GPS receiver, please have a look into the datasheets located in the "manual" directory on the product CD or on the download area on www.digitallogic.com -> Support -> MPC Support

Useful links:

Antenna:

http://www.sanav.com/gps_antennas/aw-3c.htm

4.17   Option GSM / GPRS

Specification:	MC55	MC75 QuadBand Siemens
Powersupply		3.3V
Frequency bands:		850/900/1800/1900 GSM
Transmit power		2W (900) / 1W (1800/1900)
Operating Temperature		-20℃ to +55℃
GPRS connectivity:		GPRS class B Downlink: max 85 kBit/s Uplink: max. 21 kBit/s
SMS:		MT, MO, CB, Text and PDU mode
FAX		Group 3 class 1&2
Serialinterface:		AT commands
SIM card:		3V cards
Antenna		50Ω

First step, before using the GSM/GPRS modes, the COM2 must be conencted to the GSM-Handy with the "COM48Switch". Start the "COM48Switch" a select the GSM/GPRS selection.
Or change the COM-Port mode in the bios setup.

Please find the description in the chapter 4.7

For more information about the GSM modul, please have a look into the datasheets located in the "manual" directory on the product CD or on the download area on www.digitallogic.com -> Support -> MPC Support

Useful links:

Antenna:

http://www.asianproducts.com/viewproduct-big_A3789539744212.htm

4.17.1   Changing of the SIM-Card

Attention
The system must be power-off for replacing the SIM-Card. Open the SIM-Card holder at the frontside of the system and put in the SIM-Card in correct direction.

NOTE: Please use the SIM-Card without a PIN Code or change the PIN Code to "2538" otherwise there is no access possible to the SIM-Card.

4.18   Option: External Active cooler

The option for the external active cooling is used for temperatur critical applications, where not enough passive or natural air flow may be available.

The motor is regulated and begins to run when the computer system is heated over +40°C. The air inlet is on both sides an will be blown through all nuts of the cover. The cooler is producing a laminar air flow. The power is supplied from the rear USB connector.

Specifications	
Starting temperature	40°C
Air flow	12m/s
Power consumption	5V / 100mA
Lifetime of the motor	50'000h
Service:	Change of the airinlet filters

4.19   Option: External cooler from airconditioner

The option for the external cooler from the air conditioning system in the vehicle is used for temperatur critical applications, where not enough passive or natural air flow may be available.

With the help of a 17mm diameter tube the air is transported from the airconditioning system to the computer system. The air inlet is is connected to the tube. The air will be blown through all nuts of the cover. The cooler is producing a laminar air flow. This option is a fully passive cooling system with a long lifetime.

Specifications	
Starting temperature	Always
Air flow	Depends of the air conditioner
Air inlet diameter	17mm
Power consumption	None
Lifetime of the motor	10 years
Service:	None

4.20 Thermal Specifications

Will follow in a later version of this manual

5 OPERATING SYSTEMS COMPATIBILITY

The CPU PENTIUM is fully compatible to other PC-standard CPUs. The Intel chipsets are also fully PC-compatible. No incompatibilities are known.

5.1   *Microsoft Windows*

This system is fully compatible with Windows 2000 and Windows XP Professional / Home.

We do not recomment to install older Windows OS as Windows 95/98/ME/NT4 because of the incomplete driver support from Intel.

5.2 *Microsoft Windows CE 4.2 / 5.0*

Since we are in cooperation with Pfaadtsoft we recommend to use the WINCE 4.2/5.0 Board Support Package (BSP) which are developed especially for this product.
http://www.pfaadtsoft.de/

There are also DEMO Windows CE 4.2 / 5.0 images available for free:

http://dlag.pfaadtsoft.de/

5.3   *LINUX*

Since we are in cooperation with SYSCO we recommend to use the ElinOS Linux distribution.
http://www.elinos.com/

SYSCO developed a board support package (BSP) for the Pentium M and the Pentium BX/TX chipset based products for ELinOS.

If you are interested or if you have any questions about ElinOS, please get in contact with SYSCO.

5.3.1 What is ELinOS?

ELinOS is a development environment based on Linux for the creation of embedded systems for intelligent devices. With ELinOS the memory demand of Linux is reduced to less than 1 MB ROM and 2 MB RAM. In this manner, Linux can for the first time conform to the reduced hardware conditions of embedded systems. Even in this basic configuration, Linux offers largely the same functionality which made it so popular in the server and desktop field. By virtue of access to the constantly growing number of Linux components, the basic system can be at any time expanded.
The core of ELinOS is a Linux distribution custom-tailored to the embedded systems currently sold. Besides the well-known Linux version for x86,
ELinOS v2.2 also supports PowerPC-, ARM-, MIPS-, and SH3-platforms which are very popular in the embedded field.

5.3.2 ELinOS v3.0

The emphasis of version 3.0 is on the new CoTools, CODEO and COGNITO. CODEO is Eclipse based and provides additional Plug-ins for project management and target communication, which substantially improves the ease of development of applications with ELinOS. COGNITO is a further integrated tool for the analysis of system performance. It permits the collection, recording and display of all system information and facilitates the fast optimization of software for intelligent devices.
ELinOS v3.0 has been updated to the new version of the GNU tool chain, contains the stable 2.4.25 Linux Kernel and has integration of Java and the real time extensions RTAI 3.0 for hard real time requirements. The package is complemented with Carrier Grade Extensions such as IPv6, IPSec, SNMP etc. for the use of Linux in applications in the telecommunications market.

5.4 *Realtime OS*

Must be tested carefully first. Many powermanagementfunction will control the latency time.
Contact your realtime operating system manufacturer and ask for the support of the intel chipset 855GME.

6 DRIVER INSTALLATION

6.1 Windows 2000 & XP

On the MICROSPACE Application CD you will find all tools and drivers you will need to work with the card.
If you are not sure about the topicality of the software, please visit our homepage at
http://www.digitallogic.com to get the latest release!

A correct installation of Windows is required for the following steps.

Close all applications before beginning with driver installation!
Put DIGITAL-LOGIC driver CD into CD-drive. Start menu is supposed to appear automatically.
If there is no menu then open up CD manually on desktop.

6.1.1 Chipset:
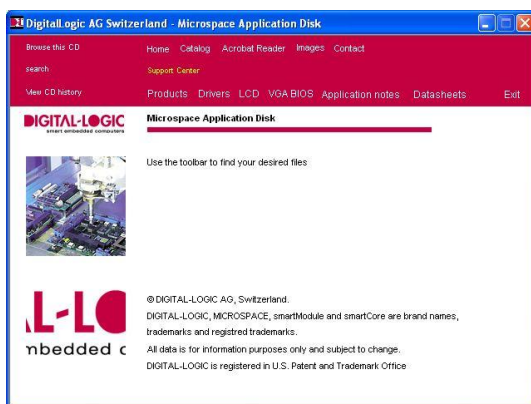
Driver: x: \Drivers\MPCX4_\Chipset\

Doubleclick on setup.exe. Follow the instructions:
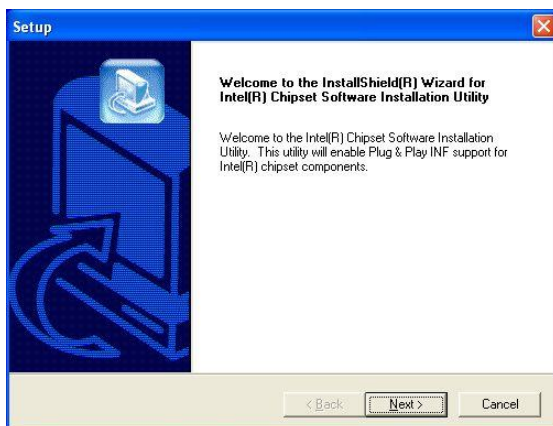
Reboot the system after the installation.

6.1.2 VGA / CRT

Driver: x:\Drivers\MPCX4_\VGA\

Doubleclick on setup.exe. Follow the instructions:
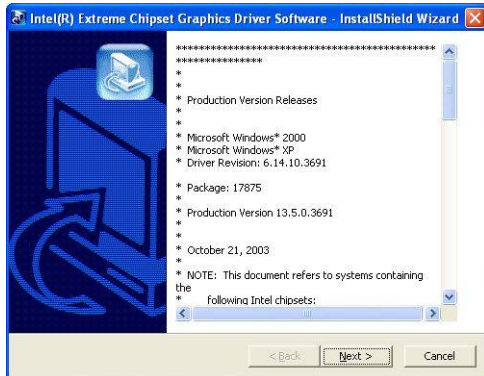
Reboot the system after the installation.

6.1.3 LAN / Ethernet

Driver: x:\Drivers\MPCX4_\LAN\

Doubleclick on setup.exe. Follow the instructions:
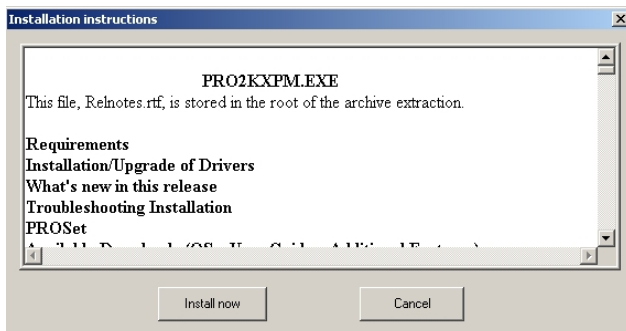
or doubleclick autorun.exe and follow the instructions:

Press "Install Software"

Reboot the system after the installation.

6.1.4 <u>Video Input BT878</u>

This driver you have to install manually, that means there is no setup.exe available.

1. Open the device manager:

2. Open the properties of the "Multimedia Video Controller":
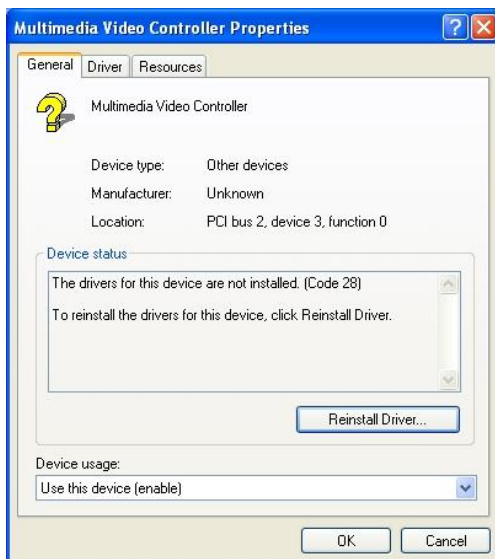
3. Select "Reinstall Driver…":

4. Select "Install from a list or specific location"
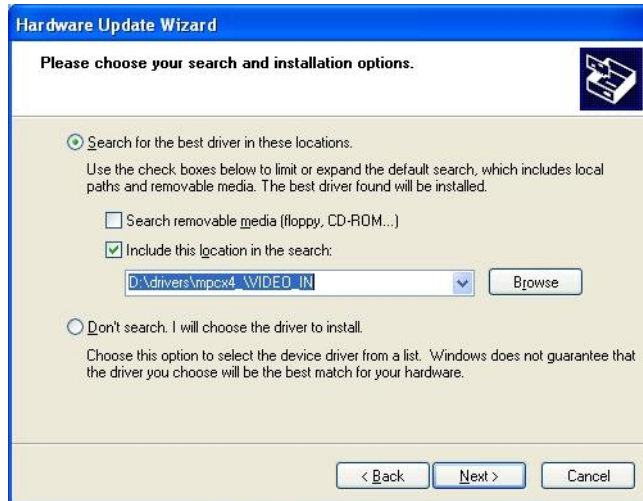
5. Browse the following folder: X:\drivers\mpcx4_\video_in\ and go on

6. The setup will find the WDM Video Capture driver:

7. Afterthat, setup will find again new hardware.

- WDM Tv Tuner
- WDM Crossbar

Please proceed as described above (repeat points 4 to 6 two times)

8. After that, you have to open the device manager again.
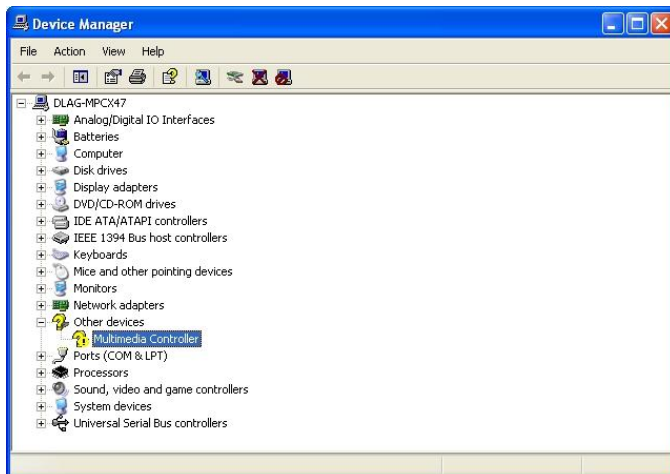
9. Open the properties of the "Multimedia Video Controller":

10. Select "Reinstall Driver…":
11. Please proceed as described above (repeat points 4 to 6) to install the WDM Audio Capture.

6.1.5 AC97-SOUND

Driver: x:\drivers\ MPCX4_\SOUND\

Doubleclick on setup.exe Follow the instructions:
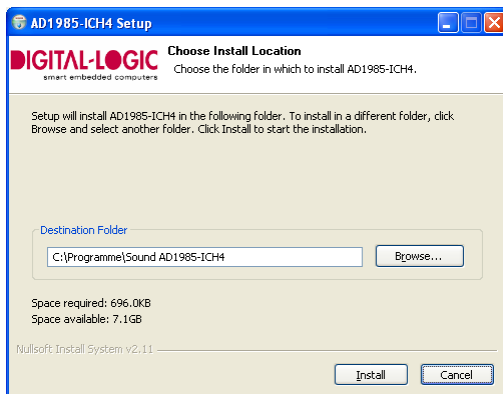
Reboot the system after the installation.

6.1.6 Int15 emulator

Location: \tools\mpcx4_\INT15\ int15dl_installxx.exe

How to:

Execute the file int15dl_installxx.exe

After installation of this driver you can use the tools:

WinInt15.exe (Int15 function test tool), T855.exe (Temperatur sensor (SMBUS) monitor)
(see chapter 7.1), the COM48Switch.exe, and the GSM tools (see chapter 7.5)

6.1.7 DIO (Digital I/O

Location: \tools\mpcx4_\mpcx48\DIO\dio_installxx.exe

How to:

Execute the file dio_installxx.exe

After installation of this driver you can use the tools:

DIO.exe (chapter 7.3)

ATTENTION!!

Before you install the digital I/O driver you have to disable the LPT port first!
You can disable the LPT port in the bios setup or in the device manager.

6.1.8 Intel Wlan ProSet/Wireless

(if this option is assembled)

Driver: x:\drivers\ MPCX4_\WLAN\

Doubleclick on "wireless_9.0.2.0_-_generic_TIC_97904.exe". Follow the instructions:

6.2 *LINUX*

6.2.1 **VGA Dualhead mode for CRT and DVI**

Please configure the X-Window system (Xfree86 – www.xfree86.org) as follow to get the dualhead mode with DVI and CRT:

```
# XF86Config-4 (XFree86 X Window System server configuration file)
#

Section "Files"
        FontPath        "unix/:7100"                    # local font server
        # if the local font server has problems, we can fall back on these
        FontPath        "/usr/lib/X11/fonts/misc"
        FontPath        "/usr/lib/X11/fonts/cyrillic"
        FontPath        "/usr/lib/X11/fonts/100dpi/:unscaled"
        FontPath        "/usr/lib/X11/fonts/75dpi/:unscaled"
        FontPath        "/usr/lib/X11/fonts/Type1"
        FontPath        "/usr/lib/X11/fonts/CID"
        FontPath        "/usr/lib/X11/fonts/Speedo"
        FontPath        "/usr/lib/X11/fonts/100dpi"
        FontPath        "/usr/lib/X11/fonts/75dpi"
EndSection

Section "Module"
        Load    "GLcore"
        Load    "bitmap"
        Load    "dbe"
        Load    "ddc"
        Load    "dri"
        Load    "extmod"
        Load    "freetype"
        Load    "glx"
        Load    "int10"
        Load    "record"
        Load    "speedo"
        Load    "type1"
        Load    "vbe"
EndSection

Section "InputDevice"
        Identifier      "Generic Keyboard"
        Driver          "keyboard"
        Option          "CoreKeyboard"
        Option          "XkbRules"       "xfree86"
        Option          "XkbModel"       "pc104"
        Option          "XkbLayout"      "de"
EndSection

Section "InputDevice"
        Identifier      "Configured Mouse"
        Driver          "mouse"
        Option          "CorePointer"
        Option          "Device"                 "/dev/psaux"
        Option          "Protocol"               "PS/2"
        Option          "Emulate3Buttons"        "true"
        Option          "ZAxisMapping"           "4 5"
EndSection
```

```
Section "InputDevice"
        Identifier      "Generic Mouse"
        Driver          "mouse"
        Option          "SendCoreEvents"        "true"
        Option          "Device"                "/dev/input/mice"
        Option          "Protocol"              "ImPS/2"
        Option          "Emulate3Buttons"       "true"
        Option          "ZAxisMapping"          "4 5"
EndSection

Section "Device"
        Identifier      "Intel0"
        Driver          "i810"
        VideoRam        65535
        BusID           "PCI:0:2:0"
        Option          "MonitorLayout"         "CRT,DFP"
        Option          "AGPMode"               "4"
        Screen          0
EndSection

Section "Device"
        Identifier      "Intel1"
        Driver          "i810"
        BusID           "PCI:0:2:0"
        Option          "MonitorLayout"         "CRT,DFP"
        Option          "DevicePresence"        "true"
        Option          "AGPMode"               "4"
        Screen          1
EndSection

Section "Monitor"
        Identifier      "TargaCRT"
        HorizSync       30-64
        VertRefresh     48-75
        Option          "DPMS"
EndSection

Section "Monitor"
        Identifier      "SonyTFT"
        HorizSync       28-64
        VertRefresh     48-75
EndSection

Section "Screen"
        Identifier      "Screen0"
        Device          "Intel0"
        Monitor         "TargaCRT"
        DefaultDepth    24
        SubSection "Display"
                Depth           24
                Modes           "1024x768" "800x600" "640x480"
        EndSubSection
EndSection

Section "Screen"
        Identifier      "Screen1"
        Device          "Intel1"
        Monitor         "SonyTFT"
        DefaultDepth    24
        SubSection "Display"
                Depth           24
                Modes           "1024x768" "800x600" "640x480"
```

```
        EndSubSection
EndSection


Section "ServerLayout"
        Identifier        "Default Layout"
        Screen            0 "Screen0"
        Screen            1 "Screen1" LeftOf "Screen0"
        InputDevice       "Generic Keyboard"
        InputDevice       "Configured Mouse"
        InputDevice       "Generic Mouse"
        Option            "Xinerama"        "true"
EndSection

Section "DRI"
        Mode    0666
EndSection
```

6.2.2 I/O kernel driver

6.2.2.1 Description

How to build and use the mpcx48io kernel driver for Linux. The driver provides access to the digital I/Os and allows to switch the serial port mode. The driver sets up a mpcx48 directory in the proc file system. Applications can access these files.

Please fin the driver on the product CD: x:\tools\mpcx4_\mpcx48\Linux

6.2.2.2 Build and Install

To build the driver use the Makefile provided. You will need the sources of your running kernel and the bin utils to be able to compile this driver. This driver has only been tested with 2.6.x kernels.
```
# make
# make install
```

Note that you need root privilege to install.

6.2.2.3 Usage

To Load the module do a
```
# modprobe mpcx48io
```

Applications can then read from and write to the entries in the proc file system to control the digital I/Os.

Name	*Access*	*Function*	*Range*
/proc/mpcx48/dout	Read/write	Digital outputs	0..7
/proc/mpcx48/din	Read	Digital inputs	0..7
/proc/mpcx48/ttyS0-mode	Read/write	Mode of ttyS0	com, gps
/proc/mpcx48/ttyS1-mode	Read/write	Mode of ttyS1	com, gsm
/proc/mpcx48/lp-mode	Read/write	Mode of lp	lp, io

Note that in order to access the digital I/Os no printer driver must be loaded. However, access to the serial port mode switch always working.

6.2.3 <u>Linux SM855 Wachtdog support</u>

The watchdog must be programmed directly on the Winbond 83627 SUPER I/O:

The necessary driver is included the Linux kernel:

Description in the Linux kernel tree:
./Documentation/watchdog/

Source of the watchdog module (kernel module):
- is2-isa
- w83727hf_wd

In linux kernel 2.6.15 the filename of watchdog source is "w83627hf_wdt.c"
The watchdog timeout is fixed and = 60 sec

If one want a shorter timeout one have to modify the source.

6.2.4 <u>Linux SM855 reading temperature</u>

Required Kernel modules:
i2c_i801 (Intel 82801DB)
adm1021 (ADM1023 Sensor)
eeprom
i2c_core
i2c_sensor
i2c_dev (SMBus unter /dev)

Getting the sensor data
With sysfs data can be read under /sys/class/i2c-adapter/i2c-x/device/x-xxxx/

Device Addresses:
ADM1023: 0x4e (1001110)
AT24c64: 0x57 (1010111)
SO-DIMM: 0x50 (1010000)

adm1021:
temp1_input: Sensor
temp2_input: CPU

eeprom:
eeprom: EEPROM Daten

The address from the EEPROM is 0x57 (SMBus address)
With the tool eeprog it should be possible to read values from the EEPROM. The problem is that you have to adapt this tool to our board. At the moment we are not able to do that. But you can download the tool from the following website: http://codesink.org/eeprog.html and try it.

Read from/Write to EEPROM with eeprog:
eeprog (http://codesink.org/eeprog.html)
eeprog /dev/i2c-0 0x57 -x -16 -r 0x400:0x400 (liest Byte EEPROM aus 0x400..0x7FF)

ATTENTION: full write access, also to the lower 1k segment!

7 SOFTWARE

7.1 Windows Int15 Tool

Please find the tool and the driver under: x:\tools\mpcx4_\INT15 on the product CD or in the download area of the support center.

Note:
Before you can use these tools, you have to install the Windows WDM driver first.
See chapter 6.1.4

7.1.1 Int15 Windows Software

_ WinInt15.exe (Int15 function test tool)
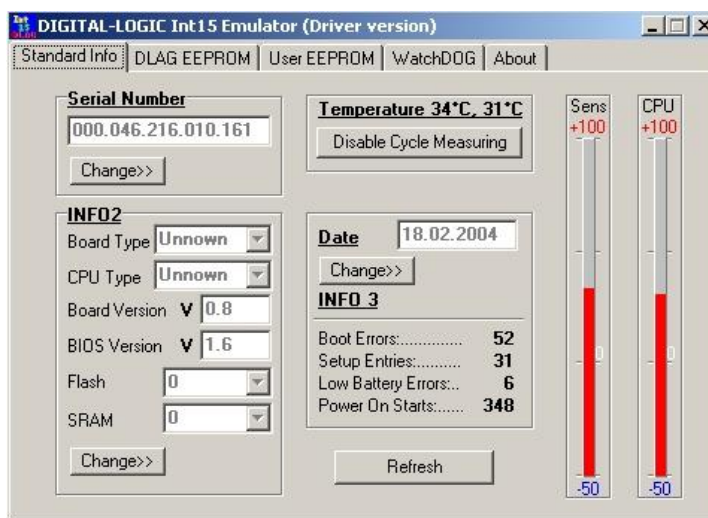
_ T855.exe (Temperatur sensor (SMBUS) monitor)
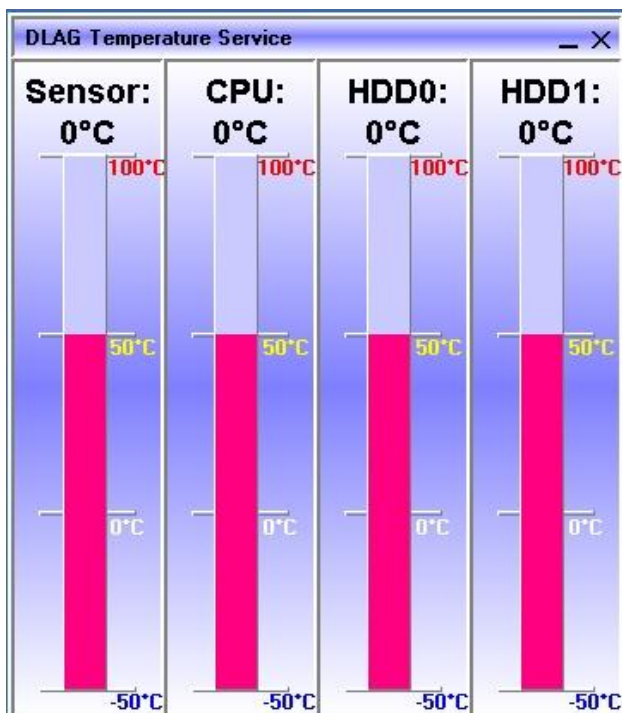
7.2 COM Switch (GPS / GSM switch)

Location: x:\tools\mpcx4_\mpcx48\COM_Switch\ COM48Switch.exe

Before you can use the GSM or GPS module, you have to execute the tool COM48Switch.exe, but first the Windows WDM driver must be installed (See chapter 6.1.4)

You can also use the command line the set the COM:

ATTENTION! Since the bios version MPCX V3.0 it is also possible to set the COMSwitch48 function in the bios setup. Please refer to the chapter 4.7.1.2

7.3 DIO (Digital I/O)

Location: x:\tools\mpcx4_\mpcx48\DIO\DIO.exe
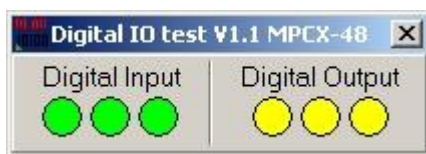
Note:
Before you can use these tools, you have to install the dio_installx.exe first.
See chapter 6.1.7

7.4 *Ignition Shutdown Software*

Location: x:\tools\mpcx4_\mpcx48\Ignition\ IgDown.exe

This software is working only with MPCX-48 board and driver "DIO" must be installed.
It's based on monitoring of the IGNITION signal every 5 sec.
After start, this software shows an icon in the system tray. To view it as GUI form it's necessary to click on this icon.

Option "Ignition Alarm" enables appearing of the GUI form, when IGNITION signal is going to inactive state, otherwise it will just show an "Alarm" icon in the tray.
Option "Start with Windows" enables to start application automatically after Windows startup.
Option "Use Hibernation" enables to use hibernation instead of shutdown, if hibernation is enabled.

"ShutDown Timeout" define timing interval between detection of the inactive IGNITION signal state and software shutdown (or hibernation). Thus this software will initiate system shutdown in "ShutDown Timeout" timing interval after detection of inactive state of the IGNITION signal.

Press the button "Q" to quit application, because "Close" button will only minimize application to the system tray and application will stay active.

Note:
Before you can use these tools, you have to install the ADCDIO driver first. See chapter 6.1.7

Developer Bundle: You will find a developer bundle on the product CD to develop own applications
(\tools\mpcx4_\mpcx48\developer-bundle\…)

7.5   GSM / GPRS Tools

7.5.1 Phone tool

The "Phone" program demonstrates some features of the GSM/GPRS module.

Location: x:\tools\mpcx4_\Phone\phone.exe
(for more information about the tool, please have a look into phone.hlp: x\tools\mpcx4_\Phone\MC45-55-75)

Note:
- Before you can use these tools, you have to install the Windows WDM driver first
See chapter 6.1.4

- In the MPCX48 no voice functions are available – only data transfer (data or sms) is possible

7.5.2 Module Demo

Location: x:\tools\mpcx4_\Phone\MC35\ModuleDemo.exe
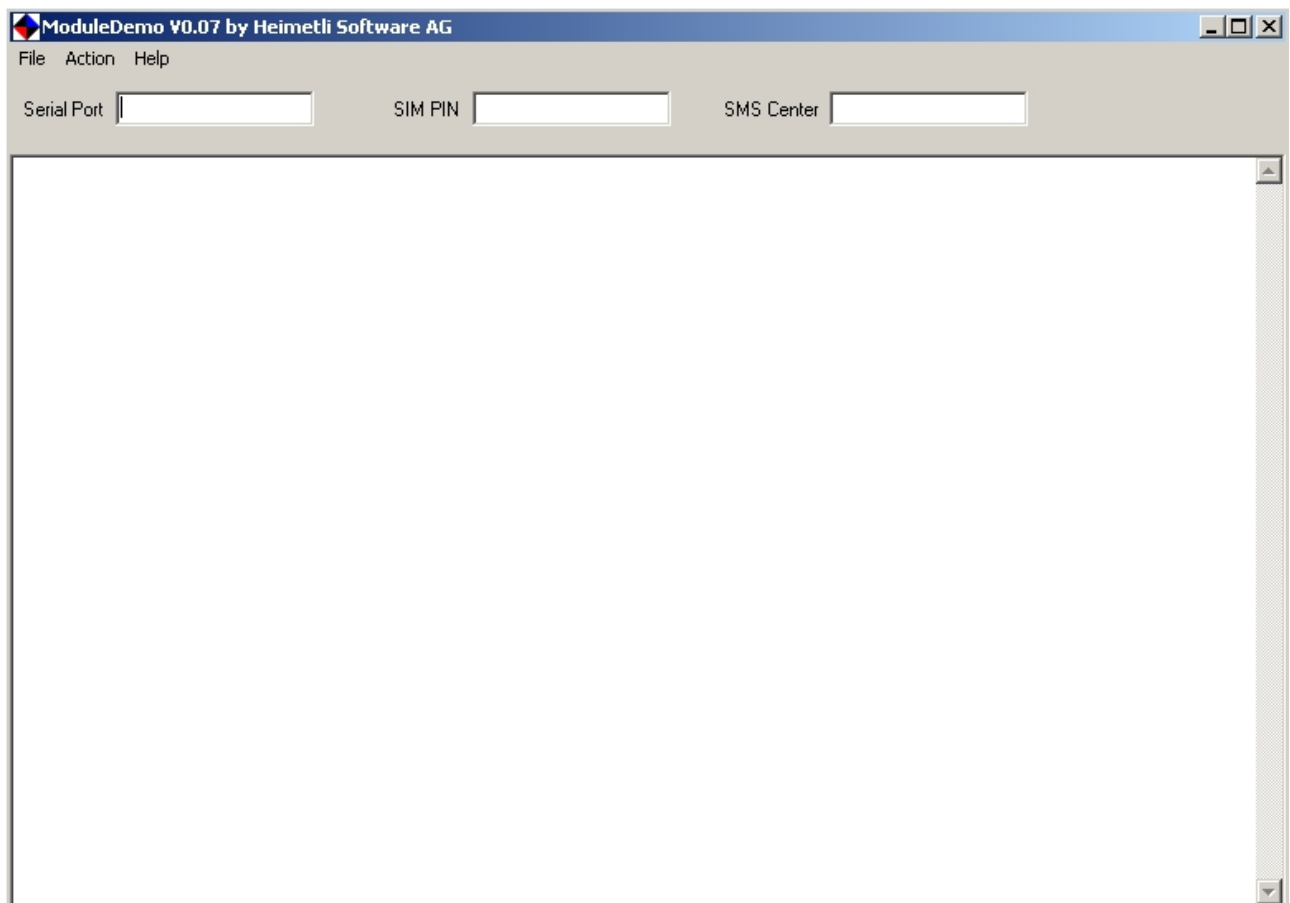
7.6 <u>GPS Diagnostic Tool</u>

Location: x:\tools\mpcx4_\GPS\ VisualGPSInstall.exe

Use this tool to check if the GPS receiver is receiving any satellites.

Execute the file VisualGPSInstall.exe to install the Visual GPS tool. Visual GPS is freeware.
For more details, please refer to the readme in the tool.
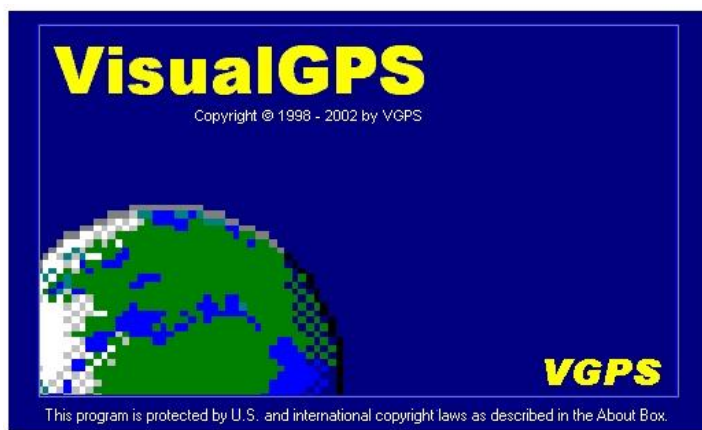
7.7 *Video Framegrabber tools*

7.7.1 AMCap 878A for WINDOWS

Location: x:\drivers\mpcx48\VIDEO_IN\

AMCap from Microsoft-XP is a sample application which can preview and capture input from audio / video capture PC peripherals, including (but not limited to) 1394 conferencing cameras, DV camcorders, USB microphones and webcams, and TV tuner cards. AMCap is provided in the Windows DDK as a tool for testing Video Capture drivers and drivers.

Usage
-File - AMCap can save audio and / or video as a file in the Microsoft AVI (Audio Video Interleave) format. See the DirectX documentation for additional information on AVI files

-File -Set Capture File - specify a file location for the captured file (before capture)
-File -Allocate File Space - pre-allocate a file for improved performance (generally unnecessary on PCs faster than 200 mHz)
-File -Save Captured Video As - save a captured file (after capture)
-Devices - AMCap lists the Video and Audio devices available on the menu. You can select from multiple choices

-Options
-Options -Preview – toggle video preview on / off
-Options -Audio Format – specify audio capture options
-Options -Video Capture Filter – specify video filter settings (see the DirectX SDK for additional information)
Selects PAL/NTSC or SECAM Format !
-Options -Video Capture Pins – specify video filter settings (see the DirectX SDK for additional information)
-Capture -Start Capture – start capture to file
-Capture -Stop Capture – stop capture to file (pressing the Escape key will also halt the capture)
-Capture -Capture Audio – toggle audio capture on / off
-Capture -Closed Captioning – toggle closed captioning on / off (closed caption enabled device must be available – see DDK documentation for details)
-Capture -Master Stream – specify which stream (audio, video, none) is used to synchronize the capture
-Capture -Set Frame Rate – select the frames per second for video capture
-Capture -Set Time Limit – specify a length of time for the capture to last

Complete documentation for AMCap (including source code) is in the Microsoft DirectX SDK, which is available as a free download on the DirectX Home Page at http://www.microsoft.com/directx.

Channel selection:

Channel 1 = internal TV-Tuner
Channel 2 = external Svideo Source (input on the rearside)
Channel 3 = not used

7.7.2   Video Framegrabber 878A for WINDOWS

Digital-Logic AG   Video Grabber for 878A of MPC40 Systems

Location: x:\Software\VideoIn

If you need other TV-Standard as PAL, than select the standard with the AMCap bevor
Using this videograbber.

Selects PAL/NTSC or SECAM Format in AMCap !

The VIDEOGRABBER program is intended for showing the simple use of video input.

At the first start up of the program, it is necessary to have a driver available, which supports the capturing feature. Open dialog window „Settings"(the button " ") and choose the driver in the drop-down list. If no driver is mentioned, then it's necessary to close the program and to install a driver, using the Windows standard driver installation procedure.

Main window buttons assignment:

Captures single frame from the video-input and copies it to standard Windows clipboard (Ctrl+C).

Captures single frame and saves it as standard Windows graphics file ("bmp" format) (Alt+F).

Captures video-stream and saves it as standard Windows video file ("avi" format). To stop capture, press the ESC key or press the button again (Alt+G).

Plays captured video file. Pressing this button while playing stops the playing and allows you to look at any frame of the video file, using the slider under the toolbar (Alt+P).

Opens "Settings" dialog window (Alt+S).

Shows this help file (F1).

Exits the program (Alt+X).

Settings
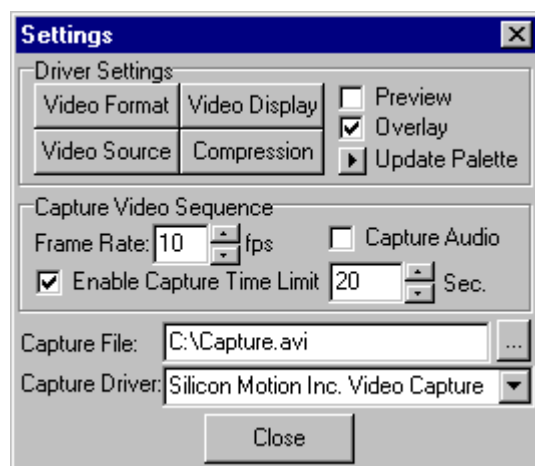
This dialog allows you to adjust picture parameters, select input video channel and set the timing values for the video capturing process.

The buttons "Video Format", "Video Source" and "Video Display" calls appropriated dialogs for changing some parameters of the picture format such as "Brightness", "Contrast", image dimensions and some others.

The button "Compression" calls a dialog of video compression. This dialog box lets you specify software compression techniques during a capture session. Because software compression requires processing time, it is generally inappropriate to use it during a real-time capture, except at very slow frame rates. The RLE compression method, which requires similar processing time during capture and playback, is the only recommended method during real-time capture.

"Options":
Preview. Sets the display area to display an image stored in the frame buffer after capture.
Overlay. Sets the display area to display the video-input signal from the hardware source (before capture).

"Capture Video Sequence": This lets you specify parameters for the capture session and the video sequence, including the video and audio format.
There are the following options:

Frame Rate. Sets the number of frames per second to capture. More frames per second provide a better quality but require more storage space and a faster data-transfer rate. The maximum is determined by the capabilities of your capture system.

Enable Capture Time Limit. Specifies whether to capture for a preset length of time. If this option is selected, you can type a time-limited value in the Seconds box.

Capture Audio. Specifies whether to capture audio while capturing video, ensuring close synchronization between the audio and video tracks.

"Capture File": A file created on the hard disk for the purpose of storing captured video and audio data.

Troubleshooting:

A video source for real-time capture (such as a video camera or video recorder) provides an uninterrupted stream of information to the capture hardware. The capture hardware copies each frame of the video sequence (and each portion of audio) and transfers it to the disk before the next frame of data enters the capture hardware. A video frame contains one image of the video sequence.

Real-time capture demands a fast computer and hard disk. The computer must process and store the incoming video frame before the next frame is received in the capture board. If the system gets slower, during capture, frames of video data are dropped (lost).

Note During capture, your hard disk might not keep up with the frame rate you specified. If this occurs, the program inserts blank frames where it is unable to store frame data. When the capture session is completed, the program reports the number of blank or dropped frames. Dropped frames use minimal storage space (8 bytes) and do not adversely affect audio/video synchronization.

Note: Using enough fast frame rate on a slow computer, will might cause a crash or hanging your system.

This software release has been tested on a DLAG PENTIUM 166 computer, showing good results under the following conditions:

Video format – 320x240, 8 bit.
a. Overlay "on", frame rate = 5 fps.
b. Preview and Overlay "off", frame rate = 8 fps.

Video Grabber (C) 2002 DIGITAL-LOGIC AG

7.8 Identification Utility

7.8.1 Processor Frequency Utility

Path: x:\ tools\mpcx4_\fidenu32.msi

7.8.2 Frequency Display

Path: x:\tools\mpcx4_\FrequencyDisplay202.exe
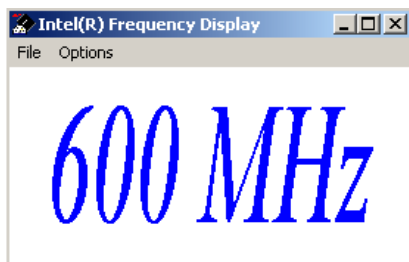
7.8.3 Chipset Identification Utility

Path: x:\tools\mpcx4_\CHIPUTIL.EXE
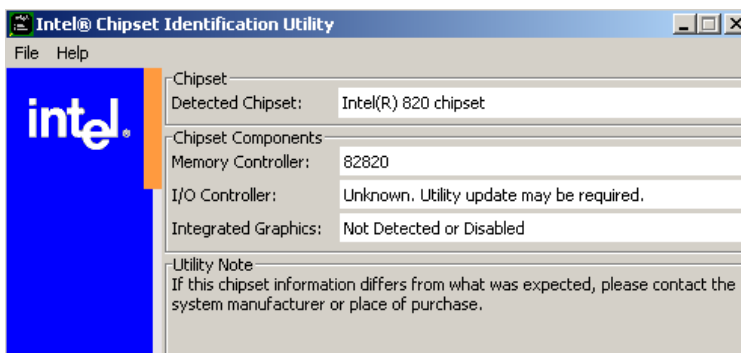
8 <u>BIOS</u>

The BIOS-setup menu allows several adjustments of the system which must be implemented only by skilled personal.

8.1 <u>BIOS-History</u>

Version/ Release:	Date:	Description
2.9	May 05	CPUID for Dothan Revision C0 (CPUID 6D8) ACPI battery state, capacity and remaning time, ACPI negative temp. capture corrected
3.01	December 05	- Separate bios version for the MPCX48 - CRTFIX: Added Setup Item IGD - CRTFix to set the LID Switch Status. If Closed, the windows driver switch off LVDS and switch to CRT - Default Primary Video Adapter: - Added Setup Item Default Primary Video -Adapter, so its possible to select wich graphic card is primary (Internal or PCI) - ACPI Fix for no Picture after StandBy - New VGA Bios Version 1235 Add resolution 800x480 for LVDS Display - New PXE Boot Extension (removed RPL cause it was too large) - MemoryWindow set to 2MB for CardBus behind PCI Bridge - - Special Version for MPCX48 : Add COM_Switch for GPS and GSM Module into Bios
3.03	March 06	- Final Video Bios from Intel 1270 - CH4/ICH4M universal Bios - Fix for wrong SpeedStep Table if GV3
3.04	March 06	- Fix for secondary IDE (was always Removable) - Corrected detection of Celeron without SpeedStep and TM1
3.05	**November 06**	- **Added USB 2.0 Legacy Support** - **Menu to select USB FullSpeed (USB1.1) or HiSpeed (USB2.0)** - **Disabling of USB2.0 Support fixed**

8.2 *PMPIC-BIOS-History*

Version/ Release:	Date:	Description	Remarks	File
8.0	25.6.03	Basic Version		

8.3 *Activate the BIOS setup*

- After turning on the device, immediately press the key:

F2

  and the menu of the BIOS setup appears.

8.4 *Phoenix BIOS function keys*

The special keys which are used in the Phoenix BIOS are:

Action:	Key:
Call BIOS	F2
Change settings	SPACE / ENTER
Navigation	Arrows
Save and Exit	F10
Terminate	ESC

8.5 *Key <ESC>*

Pressing of <Esc> changes to the POST screen and activates one of two functions:
1. In case multi boot is installed the boot process is running to the end of POST, where the **Boot First Menu** will be shown:
➢ Loading of an operating system of a bootable free selectable carrier.
➢ Go into setup.
➢ Leaving the Boot First Menu (with <ESC>) and loading of the operating system in the defined sequence.
➢ If multi boot is not installed the process is carried out without query.

8.6 *Key <F2>*

Through pressing of key <F2> during the boot process change will be made onto POST screen and the BIOS setup will be displayed.

8.7 Download CORE-BIOS

Before downloading a BIOS, please check as follows:

- Make a bootable diskette including the following files:

  - DELEP855.EXE
  - phlash16.exe
  - core BIOS (SM855_xx_FLASHABL.ROM)

Rename the SM855_xx_FLASHABL.ROM file to **bios.wph**

IMPORTANT:
Do not use boot disks created in a Windows operating system. If you do not have a MSDOS 6.22 disk available, you can download a boot disk from www.bootdisk.com .

NOTE:

Use SM855_xx_FLASHABL.ROM for downloading with the phlash16.exe.
The bios SM855_xx.cor is only usable for external programmer.

_ Select the SHADOW option in the BIOS, for a BIOS and VGA (if this option is available).
_ Disable the EMM386 or other memory managers in the CONFIG.SYS of your bootdisk.
_ Make sure, that the PHLASH16.EXE programm and the BIOS to download are on the same path and directory!
_ Boot the DOS without config.sys & autoexec.bat -> press "F5" while starting DOS boot.
_ Is the empty diskspace, where the PHLASH16.EXE is located, larger than 64kB (for safe storage)
_ Is the floppydisk not write-protected

Start the DOWNLOADING process:

1. Start the system with the bootable diskette. If you do not have a bootable diskette or floppy drive, you may can start in DOS mode by pressing the F5 key to disable the autoexec.bat and config.sys.

2. Run DELEP855.EXE to clear the CMOS and the EEPROM

IF YOU DO NOT RUN THE DELEP855.EXE, THE SYSTEM WILL BE DESTROYED DURING THE BIOS UPGRADE!

1. Run phlash16.exe

2. If the bios download is finished you have to power off the system

3. After power on the system, press "F2" to enter the setup, set the default values with "F9" and save and leave the setup with "F10"

4. Power off the system

5. Power on the system and wait for the long "beep" signal

6. Power off the system again

7. Now the download procedure is finished

Product:	BIOS-Core download
File-Extension:	*.COR
BIOS Size:	1024k
Addressrange:	E0000 - FFFFFh
MSM855 PHOENIX- BIOS	PHLASH16.EXE

8.8 Error Messages (Beep Codes)

During the boot process the BIOS produces status messages in the shape of data onto Port 80H and acoustically by internal beeper in case the screen is not initialized.

PHOENIX	
1	1 x sort signal before booting (INT19H)
1-2	Search for BIOS extensions. 1x long, 2x short signal by faulty checksum.
2-2-3-1	Test at not allowed interrupt
1-3-4-1	Memory address error *xxxx*
1-3-4-3	Memory data error *xxxx*
1-3-1-1	Test memory freshening
1-3-1-3	Test 8742 keyboard controller
1-2-2-3	BIOS ROM checksum
1-2-3-1	Timer error
1-2-3-3	DMA controller error
1-3-3-1	Memory error
1-4-2-1	CMOS error, set standard value in BIOS setup

8.9 *BIOS Settings*

8.9.1 Quick guide:

8.9.1.1 Sub Menu „Main Choice"
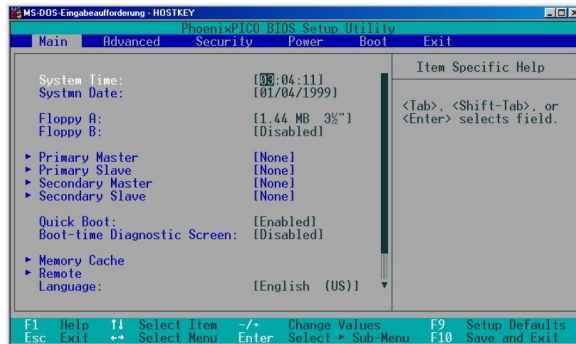
In this main overview the following changes can be carried out:

Set Date/Time (see chart below)

Turn on and off quick boot resp. diagnostic screen.

* Language choice between german and english.

Feature	Options	Description
System time	HH:MM:SS	Set time
System date	MM/DD/YYYY	Set of current date

8.9.1.2 Sub Menu „Advanced"

For Win95 „Installed O/S" set <Win95>, for all other operating systems to position <other>. The BIOS re-quires this information for the identification of PnP under Windows 95.
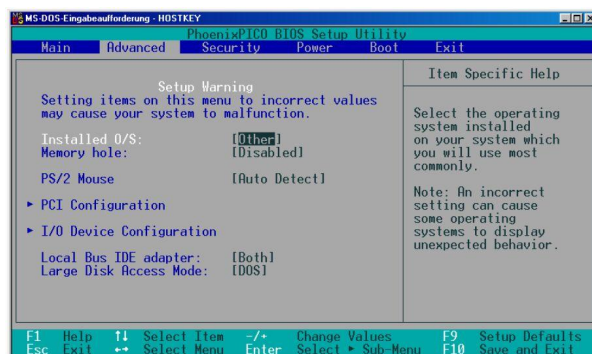
Feature	Options	Description
PS/2 Mouse	Enabled Disabled Auto Detect OS Controlled	„Disabled" activates the mouseport and sets free the IRQ12 for the ISA Bus.
Shut down Control	Off Soft Off	The ATX Support will be deactivated which means that the voltages won't automatically deactivated during shut down. The ATX Support will be switched on whereby the system can be switched off on software base after shutting down.

8.9.1.3   I/O Device Configuration

Feature	Options	Description
Serial interface A: Seraial interface B:	Disabled Enabled Auto OS Controlled	"Disabled" turns off the ports. "Enabled" requires a manual base address and an IRQ. "Auto" configurates through PnP resources for the interface. "OS Controlled": The BIOS leaves the assigning of the resources to the operating system and reserves no resources.
Parallel Port:	Disabled Enabled Auto OS Controlled	„Disabled" turns off the serial interfaces. „Enabled" requires a manual base address and a IRQ. "Auto" configurates through PnP resources for the interface. "OS Controlled": The BIOS leaves the assigning of the resources to the operating system and reserves no resources
Mode	Output only Bi-directional	Output only is the standard protocol for the unidirectional operation.

8.9.1.4   Submenu „Security"
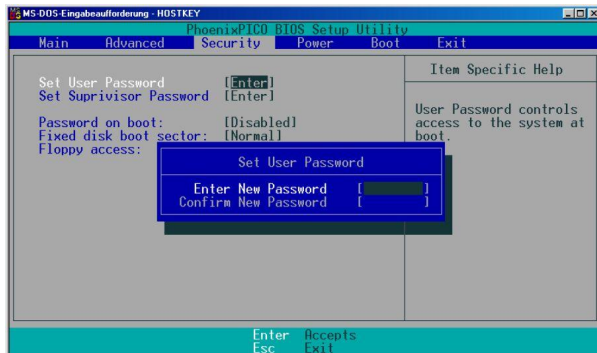
To use password security functions see following chart:

Feature	Options	Description
Setting of user pass-word	Max. 7 alpa-numeric fig-ures	Pressing the <Enter> key summons the entering of a user password. Therewith certain settings are protected.
Feature	Options	Description
Setting of supervisor password	Max. 7 al-phanumeric figures	Pressing the <Enter> key summons the entering of a supervisor password. This function allows full access to all settings.
Password on boot	Enabled Disabled	Setting „Enabled" summons the entering of a password for boot function from floppy.

8.9.1.5   List of Supported USB Devices

Excerpt of devices tested by Digital-Logic:

Devices	Manufacture	Boot	Results
USB Floppies	TEAC Model FD-05PUB	✓	OK
USB Keyboards	Logitech, iTouch CHICONY, KU8933		OK
USB Mice	Logitech, Mini Wheel Mouse M-BE55		OK
USB CD-R-WRITERS	IOMEGA Predator USB 4x4x6 EU Acer CRW 6424MU	✓	OK
USB CD- ROMS	FREECOM FC-CD40		Failed
USB CD-R-WRITERS	HP CD-Writer 8230e		Failed
USB 2.0 CD-R-Writers	Teac DW-224PUK	✓	OK
USB-CD	TEAC-210	✓	OK
USB memory stick	ASUS BlackPerl 32MB	✓	OK
USB 2.0 memory stick	SanDisk cruzer mini (128MB – 1GB) SanDisk Micro (Misc size) SwissBit 128MB	✓ ✓	OK OK OK

This list is subject to a permanent update and extension.
The right column contains a not final list of the devices supported by PHOENIX
Possibly not all devices of the list are directly supported due to space problems. The service team of Digital-Logic is responsible for individual wishes of customers.

PHOENIX:

Device	Manufacturer	Interface
USB HUBS	D-Link DSB H7 (8 port) D_Link H4 (4 port) SANTE (4 port) USB MIN SIIG Hub (4 port) Belkin Express Bus (8 port) NCI Hub (4 port hub) ADS Ultra Hub (4 port hub) Friendly Net Hub (4 port hub)	Connect at least 6 USB Hub in to the Platform. Connect all USB devices to them. Most of them should be detected and function as usual.
USB Key-boards	USB BTC KB Model: 7932 USB Otronic M/N: Scorpius 980N NEC CHERRY M/N: G80_3400_100	Connect USB KB in to the USB Hub with PS/2 KB. It should function as usual.
USB Mice	USB MS InteliMouse 1.1A USB Belkin mouse USB AVB ID: HQXPC97010_06 Interex M/N: MOSXU Logitec M/N: M_UA3T InteliMouse Explorer	Connect USB Mouse in the a USB Hub with the PS/Mouse. It should function as usual.
USB Floppies	TEAK Model FD-05PUB TEAK Model FD-05PU Mitsumi (no model No.) Sony ITC Y-E DATA ver. 3.12 VST Model: FDUSB-M Y-E Data	Connect at least 2 USB FD in to the one of the USB Hub with the Legacy Floppy. They should function as usual.
USB ZIP Drives	IOMEGA 100 MB ZIP Drive IOMEGA 250 MB ZIP Drive	Connect both USB ZIP drives in to the USB Hub. One is functional.
USB Hard Drives	USB 2.2 GB ORB HDD USB DiskOnKey (DOK) Ver 21D	Connect both USB HDD drives in to the USB Hub and boot to DOS. They should function as usual.
USB CD-ROMS	Panasonic KXL-RW20AN 4X IOMEGA ZIP CD-ROM TEAK USB CD_ROM (CDWE54E) Addonics CD-ROM Addonics CD-RW Addonics DVD	Connect all USB CD-ROM and IDE CD-ROM as 1 st boot device and boot to DOS.
USB LS-120 Drive	Imation Super Disk LS-120 Matsushita Addonics Super Disk LS-240	Connect USB LS-120/240 and boot to DOS. Should be directly connected to the M/B.

8.9.2 Main

```
                    PhoenixBIOS Setup Utility
   Main     Advanced     Intel     Security     Power     Boot     Exit

                                                    Item Specific Help

   System Time:           [08:30:33]
   System Date:           [11/03/2005]
                                               <Tab>, <Shift-Tab>, or
   Legacy Diskette A:     [Disabled]           <Enter> selects field.

 > Primary Master         [20004MB]
 > Primary Slaveter       [CD-ROM]
 > Secondary Slave        [None]

   System Memory:         640 KB
   Extended Memory:       514048 KB




   F1   Help    ↓↑ Select Item   -/+    Change Values      F9   Setup Defaults
   Esc  Exit    ←  Select Menu   Enter  Select > Sub-Menu  F10  Save and Exit
```

8.9.2.1 HDD settings

```
                    PhoenixBIOS Setup Utility
   Main

        Primary Master   [20004MB]                   Item Specific Help


   Type:                    [Auto]               User = you enter
                         LBA Format               parameters of hard-disk
   Total Sectors:           39070080             drive installed at this
   Maximum Capacity:        20004MB              connection.
                            M]                   Auto = autotypes
   Multi-Sector Transfers:  [16 Sectors]         hard-disk drive
   LBA Mode Control:        [Enabled]            installed here.
   32 Bit I/O:              [Disabled]           1-39 = you select
   Transfer Mode:y:         [FPIO 4 / DMA 2]     pre-determined  type of
   Ultra DMA Mode:          [Mode 5]             hard-disk drive
                                                 installed here.
                                                 CD-ROM = a CD-ROM drive
                                                 is installed here.
                                                 ATAPI Removable =
                                                 removable disk drive is
                                                 installed here.
   F1   Help    ↓↑ Select Item   -/+    Change Va   s      F9   Setup Defaults
   Fsc  Exit    ←  Select Menu   Enter  Select > lue-Menu   F10  Save and Exit
```

8.9.3 Advanced

```
                    PhoenixBIOS Setup Utility
   Main    Advanced    Intel    Security    Power    Boot    Exit

                                              Item Specific Help

    Installed O/S:              [WinXP]
    Reset Configuration Data:   [No]
    Large Disk Access Mode:     [DOS]       Select the operating
    Local Bus IDE adapter:      [Both]      system installed
                                            on your system which
  > I/O Device Configuration                you will use most
  > Keyboard Features                       commonly.
    Cache Memory
                                            Note: An incorrect
  > PCI Configuration                       setting can cause
                                            some operating
    Legacy USB Support:         [Enabled]   systems to display
    Enable memory gap:          [Disabled]  unexpected behavior.
    Summary screen:             [Enabled]
    Boot-time Diagnostic Screen: [Enabled]
    QuickBoot Mode:             [Enabled]
    FirstWare Authentication Level [High]        v

  F1  Help   ↓↑  Select Item   -/+   Change Values      F9   Setup Defaults
  Esc Exit   ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

```
                    PhoenixBIOS Setup Utility
   Main    Advanced    Intel    Security    Power    Boot    Exit

                                              Item Specific Help

  > I/O Device Configuration
  > Keyboard Features
  > Cache Memory                            Additional setup
                                            menus to configure
  > PCI Configuration                       console

    Legacy USB Support:         [Enabled]
    Enable memory gap:          [Disabled]
    Summary screen:             [Enabled]
    Boot-time Diagnostic Screen:KB [Enabled]
    QuickBoot Mode:             [Enabled]
    FirstWare Authentication Level [High]
    FirstWare Video Mode        [1024x768]
    FirstWare Language:         [English]

  > Console Redirection

  F1  Help   ↓↑  Select Item   -/+   Change Values      F9   Setup Defaults
  Fsc Exit   ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

8.9.3.1 Advanced IO

```
                    PhoenixBIOS Setup Utility
         Advanced

        I/O Device Configuration                  Item Specific Help

    Serial port A:              [Enabled]      Configure serial port A
      Base I/O address:         [3F8]          using options:
      Interrupt:                [IRQ 4]
    Serial port B:              [Enabled]      [Disabled]
      Mode:                     [Normal]         No configuration
      Base I/O address:         [2F8]
      Interrupt:                [IRQ 3]        [Enabled]
    Parallel port:              [Enabled]        User configuration
      Base I/O address:         [378]
      Interrupt:                [IRQ 7]        [Auto]
      Mode:                     [ECP]            BIOS or OS chooses
      DMA channel:              [DMA 3]          configuration
    Floppy disk controller:     [Disabled]
                                               (OS Controlled)
                                                 Displayed when
                                                 controlled by OS

    F1   Help   ↓↑  Select Item   -/+    Change Values     F9    Setup Defaults
    Fsc  Exit   ←   Select Menu    Enter  Select > Sub-Menu F10   Save and Exit
```

8.9.3.2 Advanced KB

```
                    PhoenixBIOS Setup Utility
         Advanced

        Keyboard Features                        Item Specific Help

    NumLock:                     [On]          Selects Power-on state
    Key Click:                   [Disabled]    for NumLock
    Keyboard auto-repeat rate:   [30/sec]
    Keyboard auto-repeat delay:  [1/2 sec]




    F1   Help   ↓↑  Select Item   -/+    Change Values     F9    Setup Defaults
    Fsc  Exit   ←   Select Menu    Enter  Select > Sub-Menu F10   Save and Exit
```

8.9.3.3 Advanced Cache

```
                    PhoenixBIOS Setup Utility
        Advanced

 ┌────────────────────────────────────────────┬──────────────────────────┐
 │           Cache Memory                      │    Item Specific Help    │
 │                                             │                          │
 │  Memory Cache:              [Enabled]       │  Sets the state of the   │
 │  Cache System BIOS area:    [Write Protect] │  memory cache.           │
 │  Cache Video BIOS area      [Write Protect] │                          │
 │  Cache Base 0-512k:         [Write Back]    │                          │
 │  Cache Base 512k-640k:      [Write Back]    │                          │
 │  Cache Extended Memory Area: [Write Back]   │                          │
 │  Cache A000 - AFFF:         [Disabled]      │                          │
 │  Cache B000 - BFFF:         [Disabled]      │                          │
 │  Cache C800 - CBFF:         [Disabled]      │                          │
 │  Cache CC00 - CFFF:         [Disabled]      │                          │
 │  Cache D000 - D3FF:         [Disabled]      │                          │
 │  Cache D400 - D7FF:         [Disabled]      │                          │
 │  Cache D800 - DBFF:         [Disabled]      │                          │
 │  Cache DC00 - DFFF:         [Disabled]      │                          │
 │  Cache E000 - E3FF:         [Disabled]    v │                          │
 ├────────────────────────────────────────────┴──────────────────────────┤
 │ F1   Help   ↓↑ Select Item   -/+  Change Values    F9  Setup Defaults  │
 │ Esc  Exit   ←  Select Menu   Enter Select > Sub-Menu  F10 Save and Exit │
 └────────────────────────────────────────────────────────────────────────┘
```

ATTENTION!
If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.

8.9.3.4 PCI Configuration

```
                    PhoenixBIOS Setup Utility
        Advanced

 ┌────────────────────────────────────────────┬──────────────────────────┐
 │           PCI Configuration                 │    Item Specific Help    │
 │                                             │                          │
 │                                             │  Reserve specific IRQs   │
 │  > PCI/PNP ISA IRQ Resource Exclusion       │  for use by legacy ISA   │
 │  > PCI/PNP ISA UMB Region Exclusion         │  devices                 │
 │  > PCI/PNP ISA DMA Resource Exclusion       │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 │                                             │                          │
 ├────────────────────────────────────────────┴──────────────────────────┤
 │ F1   Help   ↓↑ Select Item   -/+  Change Values    F9  Setup Defaults  │
 │ Esc  Exit   ←  Select Menu   Enter Select > Sub-Menu  F10 Save and Exit │
 └────────────────────────────────────────────────────────────────────────┘
```

8.9.3.5 PCI/PNP ISA IRQ Exclusion

```
                    PhoenixBIOS Setup Utility
          Advanced

                   source Exclusion                Item Specific Help

      IRQ 3:    [Available]               Reserves the specified
      IRQ 4:    [Available]               IRQ for use by legacy
      IRQ 5:    [Available]               ISA devices
      IRQ 7:    [Available]
      IRQ 9:    [Available]
      IRQ 10:   [Reserved]
      IRQ 11:   [Reserved]




   F1   Help    ↓↑  Select Item   -/+   Change Values      F9   Setup Defaults
   Fsc  Exit    ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

8.9.3.6 PCI/PNP ISA UMB Region Exclusion

```
                    PhoenixBIOS Setup Utility
          Advanced

        PCI/PNP ISA UMB Region Exclusion           Item Specific Help

      C800 - CBFF:   [Available]          Reserves the specified
      CC00 - CFFF:   [Available]          block of upper memory
      D000 - D3FF:   [Available]          for use by legacy ISA
      D400 - D7FF:   [Available]          devices
      D800 - DBFF:   [Available]
      DC00 - DFFF:   [Available]




   F1   Help    ↓↑  Select Item   -/+   Change Values      F9   Setup Defaults
   Fsc  Exit    ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

ATTENTION!
If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.

8.9.3.7   PCI/PNP ISA DMA Exclusion

```
                          PhoenixBIOS Setup Utility
              Advanced

         PCI/PNP ISA DMA Resource Exclusion              Item Specific Help

      DMA 0:   [Available]                         Reserves the specified
      DMA 1:   [Available]                         DMA channel for use by
               [Available]                          on-Plug-and-Play ISA
      DMA 3:   [Available]                         devices.
      DMA 5:   [Available]
      DMA 6:   [Available]
      DMA 7:   [Available]




   F1   Help    ↓↑  Select Item   -/+   Change Values      F9    Setup Defaults
   Fsc  Exit    ←   Select Menu    Enter Select > Sub-Menu  F10   Save and Exit
```

8.9.3.8   Advanced Console

```
                          PhoenixBIOS Setup Utility
                 Advanced

            Console Redirection                        Item Specific Help

   Com Port Address            [On-board COM A]     If enabled, it will
                                                    use a port on the
   Baud Rate                   [38.4K]              motherboard.
   Console Type                [PC ANSI]
   Flow Control                [XON/XOFF]
   Console connection:         [Direct]
   Continue C.R. after POST:   [On]




   F1   Help    ˆⱱ  Select Item   -/+   Change Values      F9    Setup Defaults
   Esc  Exit    <   Select Menu    Enter Select > Sub-Menu  F10   Save and Exit
```

8.9.4 Intel

```
                        PhoenixBIOS Setup Utility
    Main     Advanced    Intel    Security    Power     Boot     Exit

                                                    Item Specific Help

  > CPU Control Sub-Menu
  > MCH Control Sub-Menu
  > Video (Intel IGD) Control Sub-Menu             These items control
  > ICH Control Sub-Menu                           various CPU parameters.

  > ACPI Control Sub-Menu
  > APM Control Sub-Menu

    CK-408 Clock Initialization:        [66Mhz]
      CK-408 Spread Spectrum:           [Disabled]




    F1   Help   ↓↑  Select Item   -/+    Change Values        F9   Setup Defaults
    Fsc  Exit   ←   Select Menu    Enter  Select > Sub-Menu    F10  Save and Exit
```

8.9.4.1 Intel CPU

```
                        PhoenixBIOS Setup Utility
                              Intel

          CPU Control Sub-Menu                        Item Specific Help


   Speed Step Technology:    [GV3]               Select the type of
   Thermal Control Circuit:  [TM2]               Geyserville support
   DBS Cycling Temperature:  [70  C]             desired.

                                                 If GV3 is selected,
                                                 then the GV1 selection
                                                 represents GV1 Plus.

                                                 Manual = IST Disabled,
                                                 CPU set to desired
                                                 Voltage/Frequency.




    F1   Help   ↓↑  Select Item   -/+    Change Values        F9   Setup Defaults
    Fsc  Exit   ←   Select Menu    Enter  Select > Sub-Menu    F10  Save and Exit
```

8.9.4.2   Intel MCH

```
                        PhoenixBIOS Setup Utility
                            Intel

         MCH Control Sub-Menu                     Item Specific Help

  > MCH Power Management Sub-Menu                 This Sub-Menu
                                                  contains Setup Items
    Feature Set:                    [MGM]         which control the
    DDR CAS Latency:                [Auto]        Power Management
    DDR Burst Length:               [4]           Features of the MCH.
    DDR ECC Operation:              [Enabled]
    DIMM Clock Gating:              [Enabled]
    MGM Core Frequency:             [Auto Max]
    GFX Priority Auto-Precharge:    [Disabled]
    Global WR Cache Lazy WR(B17):   [Disabled]
    Global WR Cache Priority WR(B18): [Disabled]
    IOQ Normal RD Auto-Precharge(B19): [Disabled]
    IOQ Early RD Auto-Precharge(B20):  [Disabled]


  F1   Help    ↓↑  Select Item    -/+   Change Values      F9   Setup Defaults
  Fsc  Exit    ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

```
                        PhoenixBIOS Setup Utility
                            Intel

         MCH Power Management Sub-Menu              Item Specific Help

    Thermal Model Usage:   [Disabled]             Determine if the
       Lock Bits:          [Locked]               Static Thermal
                                                  Model should be
                                                  enabled for testing.








  F1   Help    ↓↑  Select Item    -/+   Change Values      F9   Setup Defaults
  Fsc  Exit    ←   Select Menu    Enter Select > Sub-Menu  F10  Save and Exit
```

8.9.4.3 Intel Video

```
                    PhoenixBIOS Setup Utility
                        Intel

     Video (Intel IGD) Control Sub-Menu          Item Specific Help

                                                <Enter> selects field.
   Default Primary Video Adapter:   [PCI]       Select 'PCI' to have
                                                a PCI video card,
   IGD - CRTFixe                  [Disabled]    if installed,
   IGD - Onboard VGA:             [Enabled]     used for the boot
   IGD - Graphics Controller:     [Enabled]     display device.
   IGD - Memory type:             [UMA = 8MB]
   IGD - Boot Type:               [VBIOS Default]  Select 'IGD' to have
   IGD - LCD Panel Type:          [1024x768   LVDS]  the IGD internal video
   IGD - Panel Scaling:           [Auto]        used for the boot
                                                display device.



 F1   Help   ^v  Select Item   -/+   Change Values    F9   Setup Defaults
 Esc  Exit   <   Select Menu    Enter Select > Sub-Menu F10  Save and Exit
```

ATTENTION!
If you change the red marked settings, the board will not start up anymore! Only with a external VGA board it is possible to access the bios setup to set the default values.
Exception: If you want to install a external VGA card on the PC104 or PC104+ BUS.

8.9.4.4 Intel ICH

```
                    PhoenixBIOS Setup Utility
                        Intel

         ICH Control Sub-Menu                    Item Specific Help

                                                These items determine
   > Integrated Device Control Sub-Menu         whether the integrated
                                                PCI Devices will be
   CPU Sleep:                     [Enabled]     Enabled in PCI Config
   Deeper Sleep in S1M:           [Disabled]    Space.
   PCI Clock Run:                 [Disabled]






 F1   Help   ↓↑  Select Item   -/+   Change Values    F9   Setup Defaults
 Fsc  Exit   ←   Select Menu    Enter Select > Sub-Menu F10  Save and Exit
```

8.9.4.4.1   Intel ICH Integrated

```
                    PhoenixBIOS Setup Utility
                          Intel

      Integrated Device Control Sub-Menu          Item Specific Help

   USB - Device 29, Function 7:    [Enabled]      Control USB 2.0
                                                  functionality through
   IDE   - Device 31, Function 1:  [Enabled]      this Setup Item.
   SMBus - Device 31, Function 3:  [Enabled]
   AC97A - Device 31, Function 5:  [Enabled]

   Internal LAN - Device 8:        [Enabled]
     PXE OPROM:                    [Disabled]




   F1   Help    ↓↑  Select Item   -/+    Change Values    F9   Setup Defaults
   Esc  Exit    ←   Select Menu   Enter  Select > Sub-Menu F10  Save and Exit
```

8.9.4.5   Intel ACPI

```
                    PhoenixBIOS Setup Utility
                          Intel

         ACPI Control Sub-Menu                    Item Specific Help

   Active Trip Point:              [Disabled]     This value controls
   Passive Cooling Trip Point:     [Disabled]     the temperature of
   Critical Trip Point:            [100 C]        the ACPI Active Trip
                                                  Point - the point
   Native C-State Support:         [Enabled]      in which the OS will
   FACP - C2 Latency Value:        [Enabled]      turn the CPU Fan on.
   FACP - C3 Latency Value:        [Enabled]
   FACP - RTC S4 Flag Value:       [Enabled]

   APIC - IO APIC Mode:            [Enabled]
   HPET - High Performance Event Timer: [Enabled]
     Base Address:                 [0xFED0000]




   F1   Help    ↓↑  Select Item   -/+    Change Values    F9   Setup Defaults
   Esc  Exit    ←   Select Menu   Enter  Select > Sub-Menu F10  Save and Exit
```
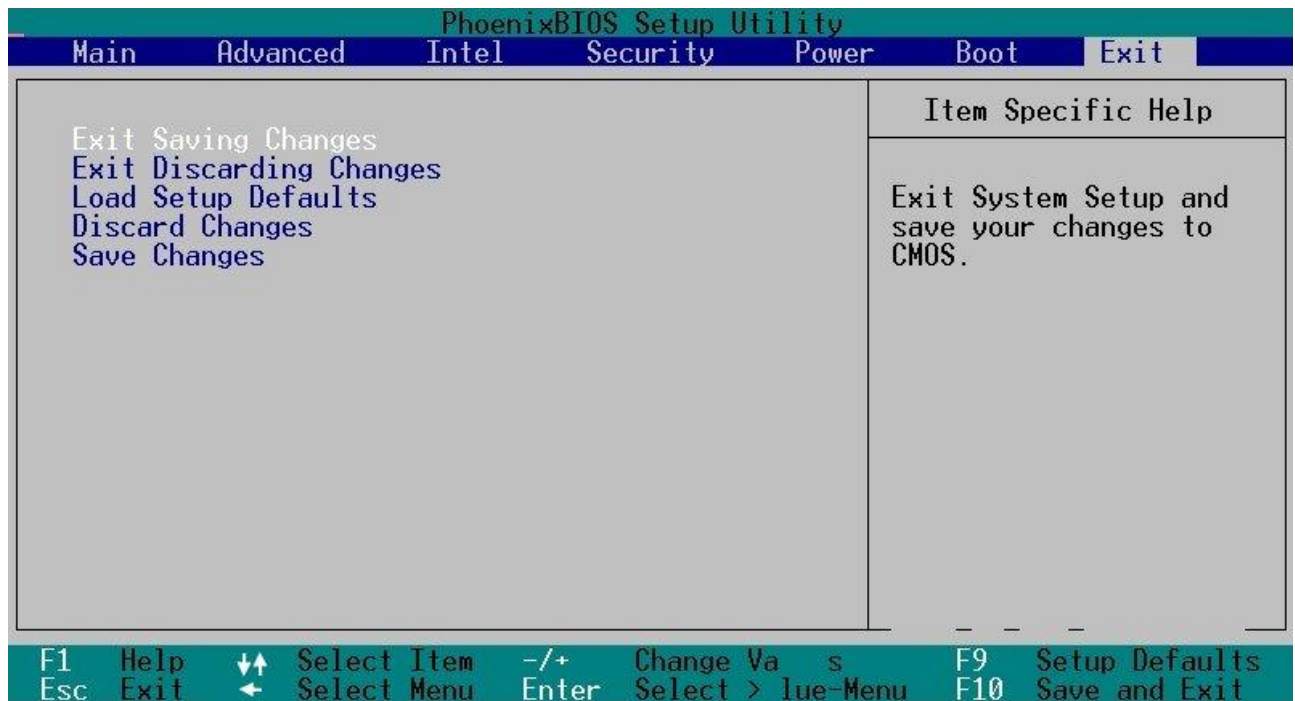
8.9.4.6 Intel APM

```
                   PhoenixBIOS Setup Utility
                  Intel

      APM Control Sub-Menu                    Item Specific Help

    Cx States:   [Enabled]                  Control the ability
                                            to enter into CPU
                                            C-States when running
                                            an APM OS.




 F1   Help    ↓↑  Select Item   -/+    Change Values     F9    Setup Defaults
 Fsc  Exit    ←   Select Menu    Enter  Select > Sub-Menu  F10   Save and Exit
```

8.9.5 Security

```
                   PhoenixBIOS Setup Utility
   Main     Advanced    Intel    Security   Power    Boot    Exit

                                              Item Specific Help
    Set User Password          [Enter]
    Set Supervisor Password    [Enter]
                                           Supervisor Password
    Password on boot:          [Disabled]  controls access to the
    Fixed disk boot sector:    [Normal]    setup utility.
    Diskette access:           [Supervisor]

    Virus check reminder:      [Disabled]
    System backup reminder:    [Disabled]




 F1   Help    ↓↑  Select Item   -/+    Change Va   s     F9    Setup Defaults
 Esc  Exit    ←   Select Menu    Enter  Select > lue-Menu  F10   Save and Exit
```

8.9.6 Power

```
                        PhoenixBIOS Setup Utility
   Main      Advanced     Intel     Security     Power      Boot      Exit

                                                      Item Specific Help
   Power Savings:           [Disabled]
                                                  Maximum Power Savings
   Auto wakeup time         [Off]                 conserves the greatest
                                                  amount of system power.
   Resume On Time:          [Off]                 Maximum Performance
   Resume Time:             [00:00:00]            conserves power but
                                                  allows greatest system
   Resume On Modem Ring:    [Off]                 performance. To alter
                                                  these settings, choose
   Power Button Function:   [Sleep]               Customized. To turn off
   Suspend Mode:            [Suspend]             power management,
                                                  choose Disabled.




   F1   Help    ↓↑  Select Item   -/+    Change Va  s    F9   Setup Defaults
   Esc  Exit    ←   Select Menu    Enter  Select > lue-Menu F10  Save and Exit
```

8.9.7 Boot

```
                        PhoenixBIOS Setup Utility
   Main      Advanced     Intel     Security     Power      Boot      Exit

                                                      Item Specific Help
       Removable Devices
      +Hard Drive                                 Keys used to view or
       CD-ROM Drive                               configure devices:
       Network Boot                               <Enter> expands or
                                                  collapses devices with
                                                  a + or -
                                                  <Ctrl+Enter> expands
                                                  all
                                                  <Shift + 1> enables or
                                                  disables a device.
                                                  <+> and <-> moves the
                                                  device up or down.
                                                  <n> May move removable
                                                  device between Hard
                                                  Disk or Removable Disk
                                                  <d> Remove a device
                                                  that is not installed.
   F1   Help    ↓↑  Select Item   -/+    Change Va  s    F9   Setup Defaults
   Esc  Exit    ←   Select Menu    Enter  Select > lue-Menu F10  Save and Exit
```

8.9.8 Exit

```
                    PhoenixBIOS Setup Utility
   Main    Advanced    Intel    Security    Power    Boot    Exit

                                              Item Specific Help

   Exit Saving Changes
   Exit Discarding Changes
   Load Setup Defaults                        Exit System Setup and
   Discard Changes                            save your changes to
   Save Changes                               CMOS.














 F1   Help    ↓↑  Select Item   -/+    Change Va    s    F9   Setup Defaults
 Esc  Exit    ←   Select Menu    Enter  Select > lue-Menu  F10  Save and Exit
```

9   INTERFACES AND ADDRESSMAP

9.1   Digital 3Bit Outputs (Relais Option)

The 3 digital outputs are fully software controlled and are coupled with the relays.

DIGITAL OUTPUT Specs:

Type:	Latchable output
Channels:	3
Output:	Relais-isolated
Isolation voltage:	1500V
Switch:	Relays
Max. Current:	2 Amp
Contact voltage:	60VAC
Max. frequency:	100Hz
Current protection:	none

Schematic of each output channel:
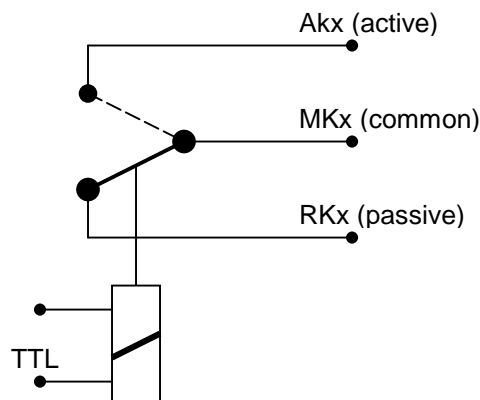
Contact description:
Akx   Workingcontacts AK0 to AK2 close with a logic "1"
RKx   Quietcontact RK0 to RK2
MKx   Commoncontact

Programming the digital outputs:

NEW FOR MPCX48!

(Port 378h)   Bit 0 for digital output 0
                                     „„

                                     Bit 1 for digital output 1 (1= ON , 0=OFF)
                                     Bit 2 for digital output 2 (1= ON, 0=OFF)

Read back the status of the digital output with reading the adress 378h.

9.2   *Digital 3Bit Inputs (Option)*

The 3 digital input are readed by the software.

DIGITAL INPUT Specs:

Type:	74HCT244
Channels:	3
Output:	Opto-isolated
Isolation voltage:	1500V
High voltage:	5-28V
Switching point:	4,4V
Low voltage:	0-2 V
Max. Input frequency:	1kHz
Current protection:	none
Invers current protection:	yes
Voltage source / max. Voltage:	12/24Volt

Schematics of each input channel:
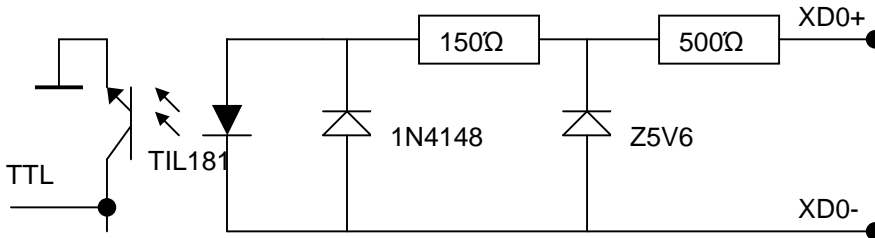
Read the digital inputs:

NEW FOR MPCX48
Port 379h: Bit 0 for digital input 0

LPT1 base address +1   Input0: Error = Bit3
                                              Input1: ACK = Bit6
                                              Input2: Busy = Bit7
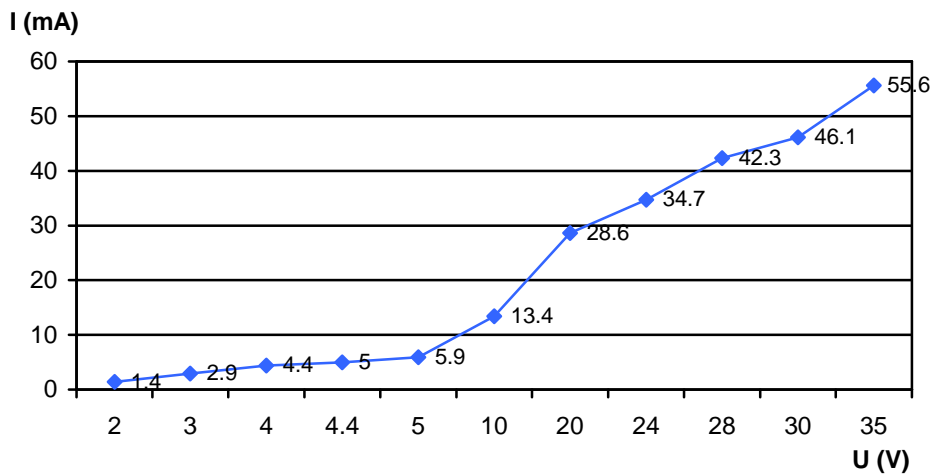
9.2.1   Ignition Input sensitivity

The ignition input is very senitive.

The switching point is at 1.4volt.

I (mA)
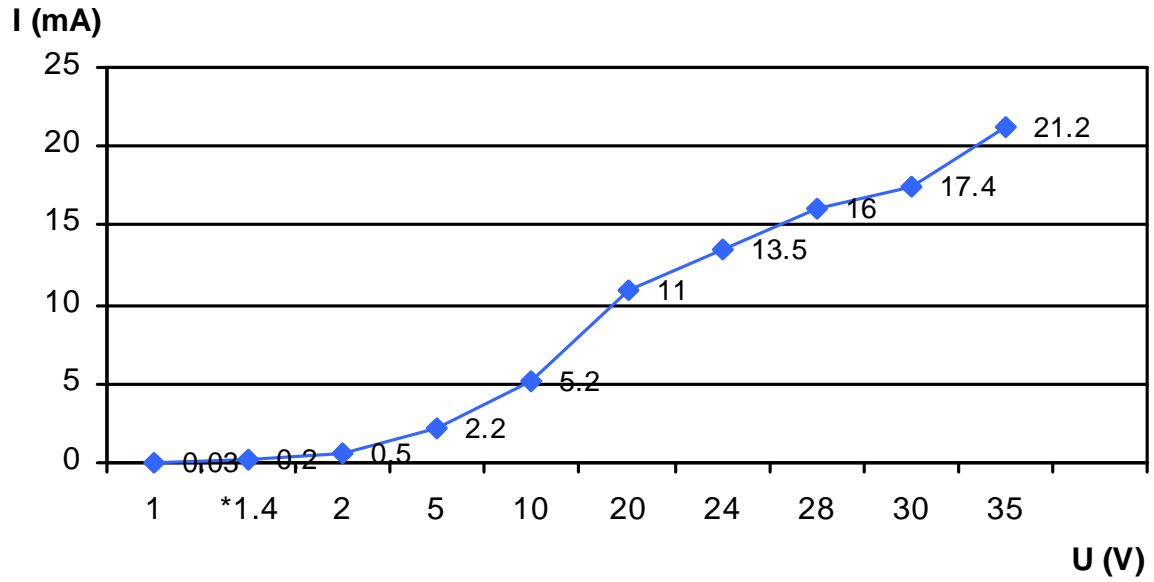
10   <u>DIMENSIONS</u>

10.1   <u>Dimensions length</u>
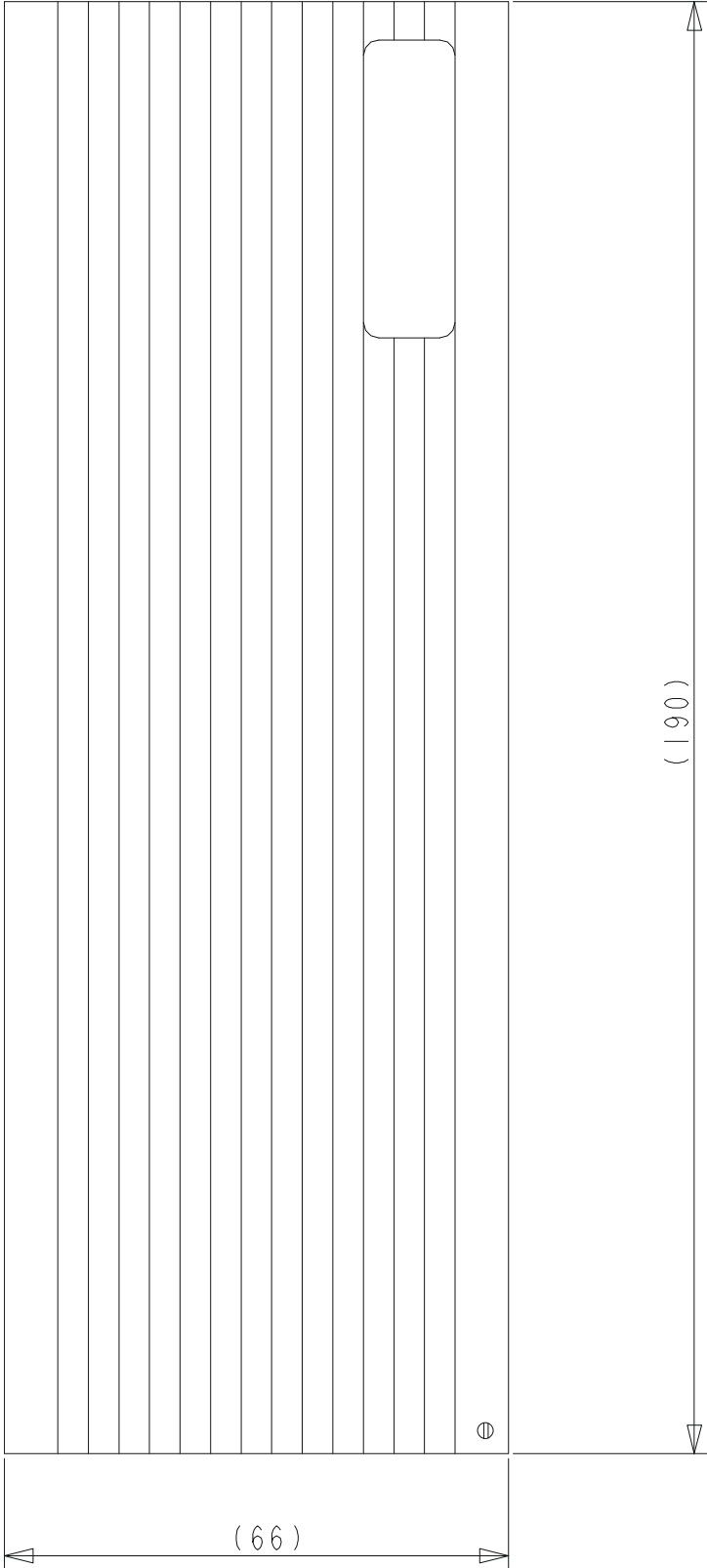
10.2 *Dimensions top view*

(159)

190
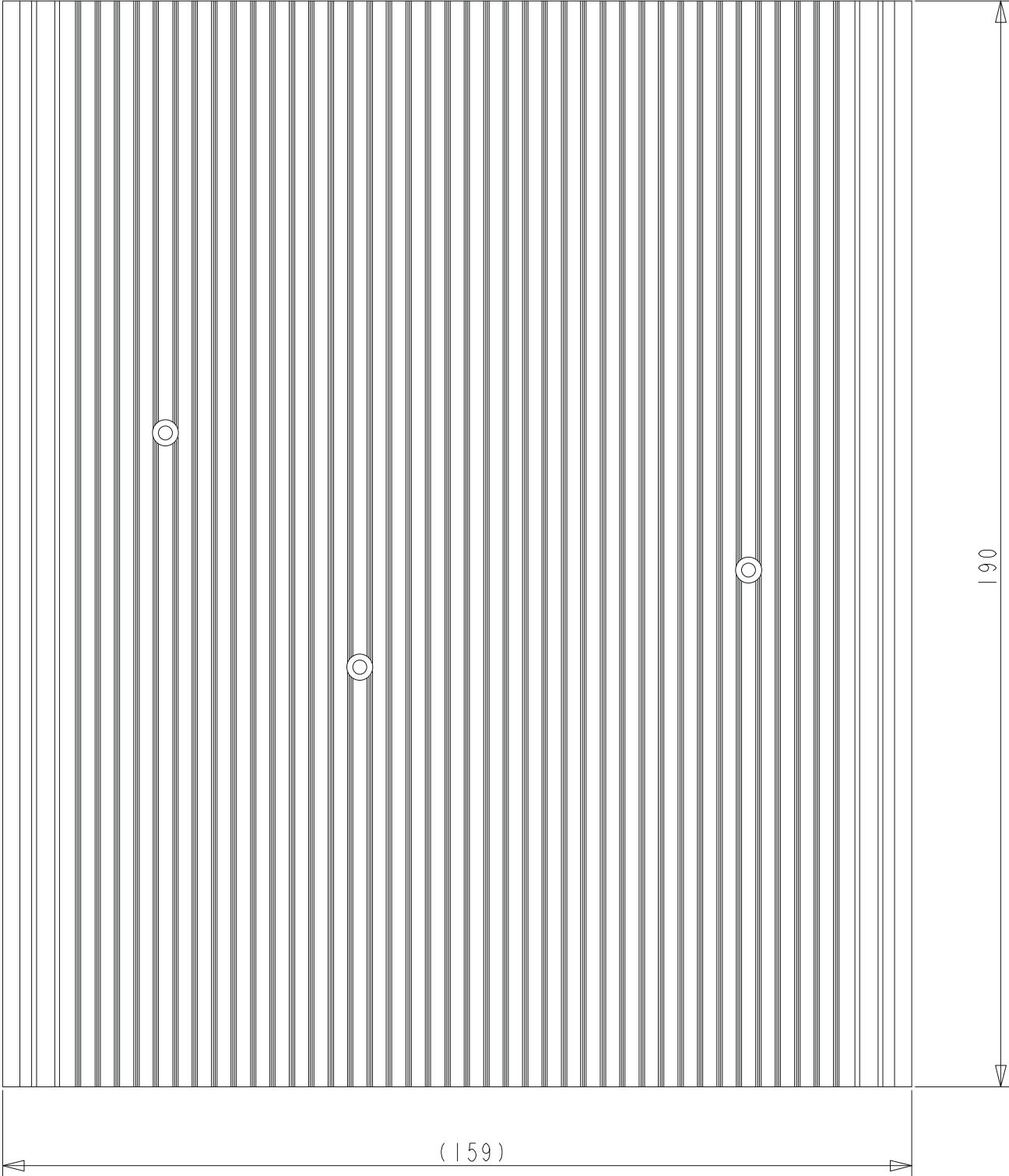
10.3 Dimensions mounting holes

Will be added in a later version of thjis manual.

10.4 Dimensions front view
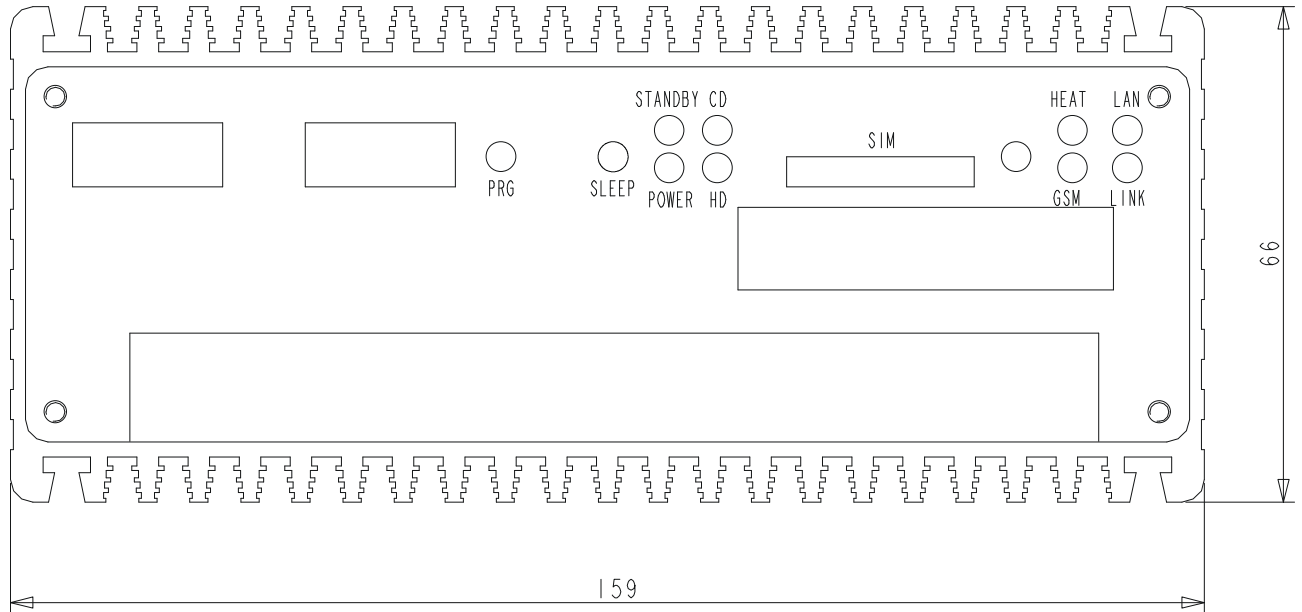
10.5 Dimensions rear view
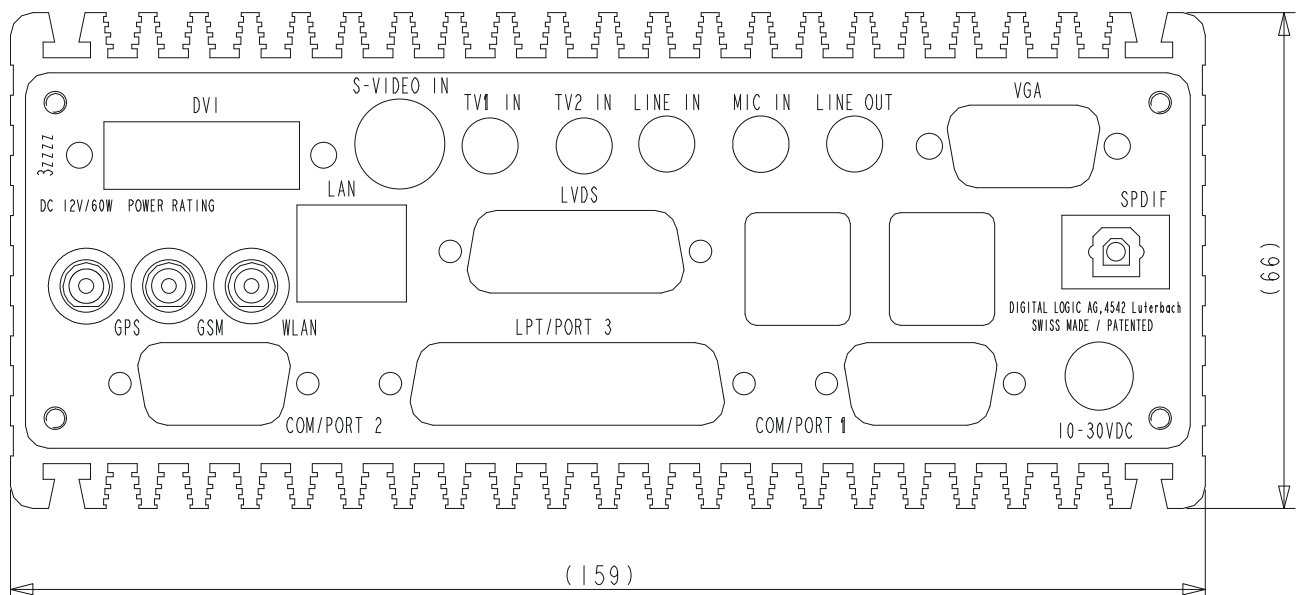
10.6   *Dimensions mounting nuts*

4.87

3.21

2.1

6.3

6
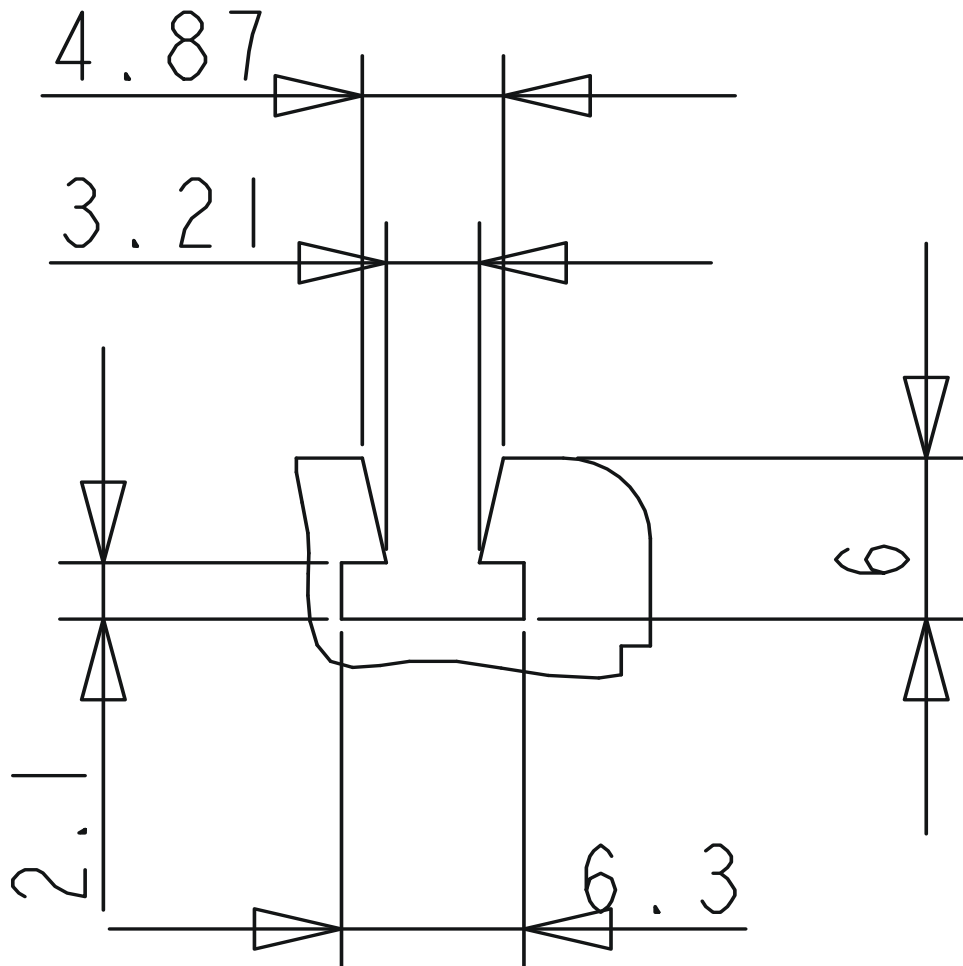
10.7   *Dimensions holder plate for nut*
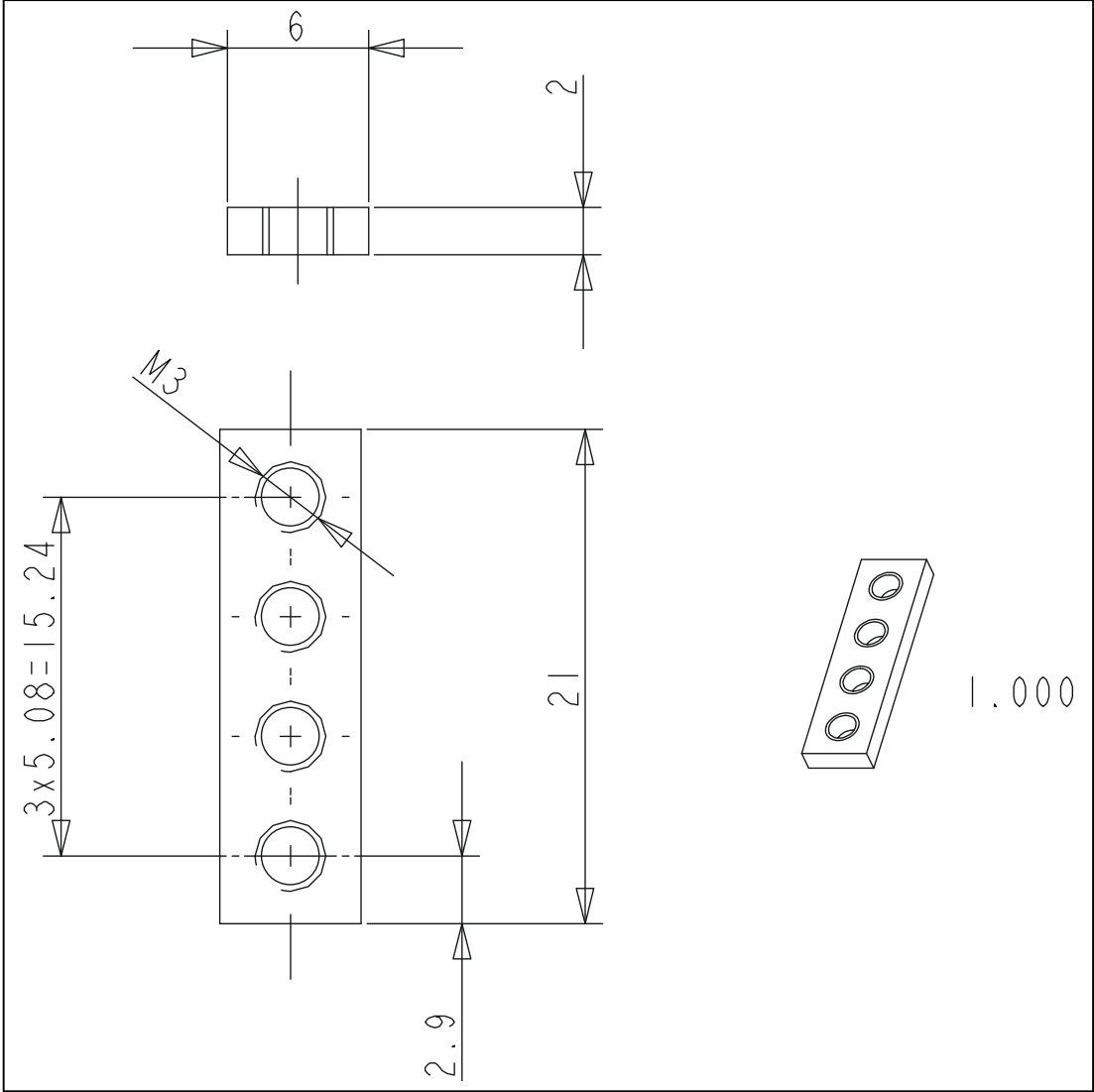
11   Q&A – QUESTIONS AND ANSWERS:

Question / Problem:	Solution:
There is no picture after changing values in the menu "DISPALY PROPERTIES -> Settings":	You have to press the following key combination to get a picture again: CTRL+ALT+Fx Fx: F1 = VGA F2 or F3 = SVIDEO F4 = DVI We recommend to change the settings in the Intel garphic menu: "DISPLAY PROPERTIES -> Settings -> Advanced -> Intel -> device properties"
The computer does start up automatically after connecting the VCC	Please refer to chapter 4.2 Startup modes
The computer does not start up automatically after connecting the VCC	Check the startup mode (chapter 4.2) and if the ignition voltage is >8V
The computer does not start up after connecting the VCC	Please refer to chapter 4.2 Startup modes
It is not possible to install a operating system with my USB 2.0 CD-Rom	- Connect the USB 2.0 CD-Rom to the front USB connectors - Check if the USB cable is not too long
Option COM3/4 does not work / is not installed in the operating system	- Depending the OS you have to install COM3 and COM4 manually in the device manager - Depending the OS you have to set the IRQ and/or the base address manually in the device manager - You have to reserve the IRQ 10 and IRQ 11 to ISA in the bios setup.
COM1 / COM 2 does not work	Please refer to chapter 7.2. The COMSWITCH must be set correctly
The sound quality is bad	Please configure the sound driver as described in chapter
The power button does not work	You have to enable the hibernation function int the Windows energy options
Strange behaivor of the system during the boot up the OS or during using the system	Enter the bios setup and set the primary IDE channel to "user" (instead "auto"). Change the value "Ultra DMA Mode" = "2"
After changing the hardware to a newer revision or version with the IHC4, Windows get a blue screen during the boot up	You have to install the Windows again (New installation of the OS)
Sound Quality	Note: To have a better sound quality please configure the "Sound" as follows: - enter the menu settings - enable the "AUX" input in the playback device area Mute the following inputs: AUX, CD-Player, Phone, Line IN

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12 <u>INDEX</u>