kontron

» Kontron User's Guide «



MSM200X/XP/XU & SMA200

Document Revision 100

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1 User Information

1.1 About this Document

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1.2 Copyright Notice

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1.3 Trademarks

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The following lists the trademarks of components used in this product.

- IBM, XT, AT, PS/2 and Personal System/2 are trademarks of International Business Machines Corp.
- Microsoft is a registered trademark of Microsoft Corp.
- Intel is a registered trademark of Intel Corp.

All other products and trademarks mentioned in this manual are trademarks of their respective owners. For the circuits, descriptions and tables indicated, Kontron assumes no responsibility as far as patents or other rights of third parties are concerned.

1.4 Standards

Kontron AG is certified to ISO 9000 standards.

1.5 Warranty

This Kontron AG product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron AG will, at its discretion, decide to repair or replace defective products.

Within the warranty period, the repair of products is free of charge as long as warranty conditions are observed.

The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product's environmental specifications or improper installation or maintenance.

Kontron AG will not be responsible for any defects or damages to other products not supplied by Kontron AG that are caused by a faulty Kontron AG product.

Empty batteries (external and onboard), as well as all other battery failures, are not covered by this manufacturer's limited warranty.

1.6 Technical Support

Technicians and engineers from Kontron AG and/or its subsidiaries are available for technical support. We are committed to making our products easy to use and will help you use our products in your systems.

For technical support, please consult our technical support department:

Web: http://support.kcc-ag.ch
Tel.: +41 (0) 32 681-5848
Fax: +41 (0) 32 681-5801

For the latest product documentation, utilities, drivers, additional tools and software please consult our website:

Web: http://kontron.com

1.7 Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements wherever possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations. All components within this product fulfill the requirements of the RoHS (Restriction of Hazardous Substances Directive). The product is soldered with a lead free process.

1.8 RoHS Commitment

Kontron Compact Computers AG (Switzerland) is committed to developing and producing environmentally friendly products according to the Restriction of Hazardous Substances (RoHS) Directive (2002/95/EC) and the Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) established by the European Union. The RoHS directive was adopted in February 2003 by the European Union and came into effect on July 1, 2006. It is not a law but a directive, which restricts the use of six hazardous materials in the manufacturing of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC, which has set targets for the collection, recycling and recovery of electrical goods, and is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste.

Each European Union member state is adopting its own enforcement and implementation policies using the Directive as a guide. Therefore, there could be as many different versions of the law as there are Member States in the EU. Additionally, non-EU countries like China, Japan, or states in the U.S. such as California, may have their own regulations for green products, which are similar, but not identical, to the RoHS directive.

RoHS is often referred to as the "lead-free" directive but it restricts the use of the following substances:

- Lead
- Mercury
- Cadmium
- Chromium VI
- PBB and PBDE

The maximum allowable concentration of any of the above mentioned substances is 0.1% (except for cadmium, which is limited to 0.01%) by weight of homogeneous material. This means that the limits do not apply to the weight of the finished product, or even to a component but to any single substance that could (theoretically) be separated mechanically.

1.8.1 RoHS Compatible Product Design

All standard products from Kontron Compact Computers (KCC) AG comply with RoHS legislation.

Since July 1, 2006, there has been a strict adherence to the use of RoHS compliant electronic and mechanical components during the design-in phase of all KCC standard products.

1.8.2 RoHS Compliant Production Process

KCC selects external suppliers that are capable of producing RoHS compliant devices verified by:

- A confirmation from the supplier indicating that their production processes and resulting devices are RoHS compliant.
- If there is any doubt of the RoHS compliancy, the concentration of the previously mentioned substances in a produced device will be measured. These measurements are carried out by an accredited laboratory.

1.8.3 WEEE Application

The WEEE directive is closely related to the RoHS directive and applies to the following devices:

- Large and small household appliances
- IT equipment
- Telecommunications equipment (although infrastructure equipment is exempt in some countries)
- Consumer equipment
- Lighting equipment – including light bulbs
- Electronic and electrical tools
- Toys, leisure and sports equipment
- Automatic dispensers

It does not apply to fixed industrial plants and tools. Compliance is the responsibility of the company that brings the product to market, as defined in the Directive. Components and sub-assemblies are not subject to product compliance. In other words, since Kontron Compact Computers AG does not deliver ready-made products to end users the WEEE directive is not applicable for KCC. Users are nevertheless encouraged to properly recycle all electronic products that have reached the end of their life cycle.

1.9 Swiss Quality

- 100% Made in Switzerland
- This product was not manufactured by employees earning piecework wages
- This product was manufactured in humane work conditions
- All employees who worked on this product are paid customary Swiss market wages and are insured
- ISO 9000:2001 (quality management system)

1.10 The Swiss Association for Quality and Management Systems

The Swiss Association for Quality and Management Systems (SQS) provides certification and assessment services for all types of industries and services. SQS certificates are accepted worldwide thanks to accreditation by the Swiss Accreditation Service (SAS), active membership in the International Certification Network, IQNet, and co-operation contracts/agreements with accredited partners.

www.sqs.ch

The SQS Certificate ISO 9001:2008 has been issued to Kontron Compact Computers AG in the field of development, manufacturing and sales of embedded computer boards, embedded computer modules and computer systems. The certification is valid for three years at which time an audit is performed for recertification.

2 Introduction

2.1 MSM200X/XP/XU & SMA200 Ordering Information

Part / Option	Part Nr.	Description
MSM200X	802370	PCI/104 board, without SMA200
MSM200XP	802372	PCI/104express board, without SMA200
MSM200XU	802371	PCI/104express board, without SMA200
Option WLAN MCex	807414	PCIexpress MiniCard assembled, with antenna cable
Option GSM/UMTS MCex	807413	PCIexpress MiniCard assembled, with antenna cable
MSM200-CKON	803070	Cable kit with PCB for USB, audio, LAN
MSM200-LANCON	803024	1G LAN cable with PCB, RJ45 and 900mAh battery
Option L+	807006	PC/104plus long connector
Option P+	807005	PC/104plus short connector
SMA200-1.1GHz-0.5GB RAM	805800	smartCore®Express ATOM Z510 1.1GHz with 0.5GB DDR2 RAM, LPC, 8x USB, 1x PATA, 2x PCIex, HDA, SDVO, LVDS
SMA200-1.1GHz-1.0GB RAM	805801	smartCore®Express ATOM Z510 1.1GHz with 1.0GB DDR2 RAM, LPC, 8x USB, 1x PATA, 2x PCIex, HDA, SDVO, LVDS
SMA200-1.1GHz-2.0GB RAM	805802	smartCore®Express ATOM Z510 1.1GHz with 2.0GB DDR2 RAM, LPC, 8x USB, 1x PATA, 2x PCIex, HDA, SDVO, LVDS
SMA200-1.6GHz-1.0GB RAM	805811	smartCore®Express ATOM Z530 1.6GHz with 1.0GB DDR2 RAM, LPC, 8x USB, 1x PATA, 2x PCIex, HDA, SDVO, LVDS
SMA200-1.6GHz-2.0GB RAM	805812	smartCore®Express ATOM Z530 1.6GHz with 2.0GB DDR2 RAM, LPC, 8x USB, 1x PATA, 2x PCIex, HDA, SDVO, LVDS
SMA200-HS1	805840	Normal heat spreader (40g)
Passive Cooler	540185	Passive heat sink without screws

Note: These are only examples; for current ordering codes, please see the current price list.

2.2 MSM200X/XP/XU & SMA200 Applications

» Video entertainment in cars and airplanes

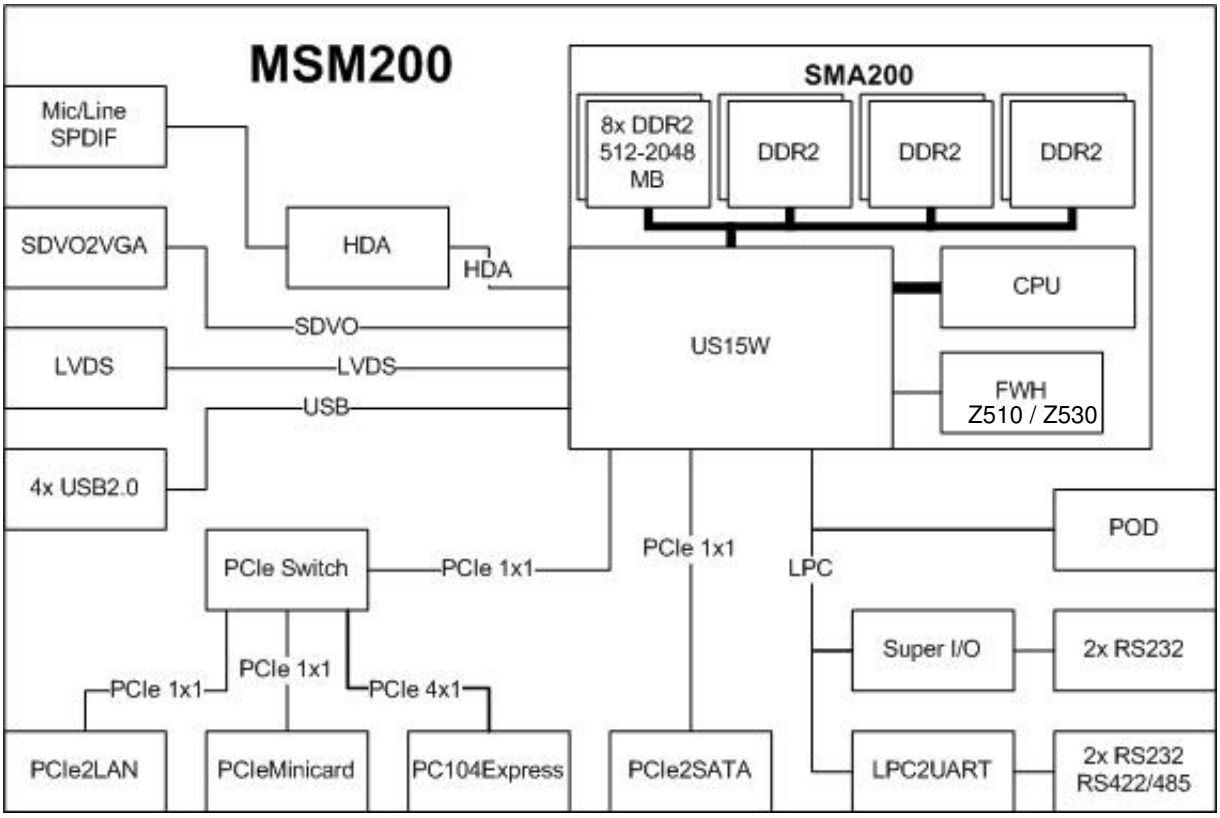
» Information terminals with live video

» Game systems with music output

» Battery driven data capture

» Ultra-mobile multimedia PC

2.3 Block Diagram

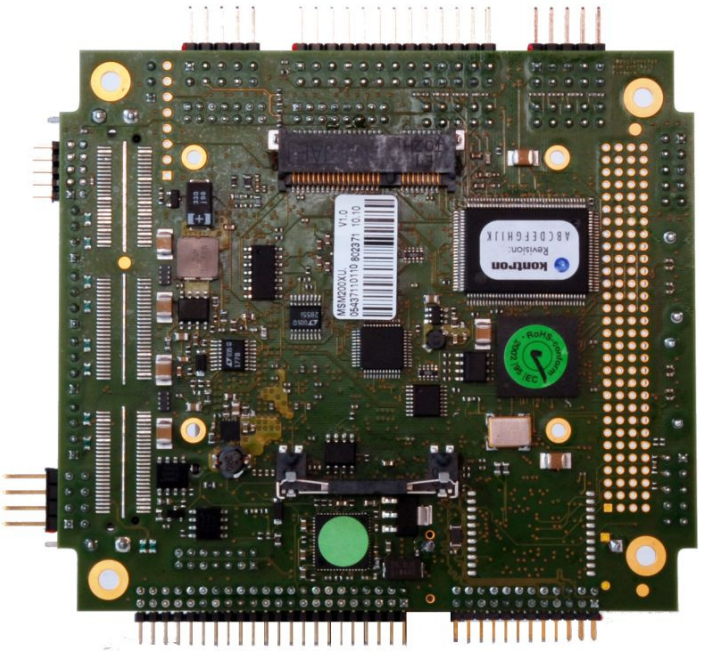


2.4 Product Photos

2.4.1 Top View, MSMXP with SMA200 and Heat Spreader HS1



2.4.2 Bottom View, MSMXU



2.5 Standards

This MICROSPACE product meets all standards for personal computer architecture.

Standard	Contact to the organization	Remarks
PCI/104Express	www.pc104.org	
USB	www.usb.org	
PCI	www.pcisig.com	
PCI Express	www.pcisg.com	
SMB	www.smbus.org	
WfM	www.intel.com /labs/manage/wfm	Wired for management baseline
ALC882	www.developer.intel.com/ial/scalableplatforms/audio	
LPC	www.developer.intel.com/design/chipset/industry/lpc.htm	
ATA/ATAPI-6	www.t13.org	
ACPI	www.acpi.info	Power management

2.6 Peripheral Incompatibilities

The following peripherals are incompatible with the MSM200X/XP/XU & SMA200.

- **MSMMX104ex**
- **MSMG104ex**
- **MSMG104+**
- **MSMJ104+**

3 Specifications

CPU	
CPU	Intel Atom Z510 1.10GHz with 0.5MB L2-cache Intel Atom Z530 1.60GHz with 0.5MB L2-cache
Clock	1.1 or 1.6GHz
1st Level Cache	2x 32kByte
2nd Level Cache	0.54MByte (on die)
Technology	40nm
VCCCore @ 1.6GHz	1.050V
VCCCore @ 1.1GHz	0.844V
VCCCore @ Deep Sleep	0.748V
CPU BUS	CMOS
AGTL+ Termination	Not needed
FSB	400MHz (Z510) or 533MHz (Z530) quad-pumped synchronous BUS

Intel US15W Graphics Memory Controller Hub	
Socket	DDR2 soldered memory
Technology	DDR2-667
Capacity	512MByte up to 2GByte
Voltage	1.8V
Termination	0.9V
Width	64bit
ECC-Support	No

Intel US15W Graphics Memory Controller Hub	
Maximum Video Memory	128MByte with Intel GMA
Graphics Core Frequency	250MHz
SDVO Port	1 channel 1x 200 Mpixel/sec Support for up to 1x DVI, 1x VGA and 1x LVDS Dotclock = 165MHz Compliant with DVI Specification 1.5
Flat Panel Interface	1 channel LVDS interface 1x 18, 1x 24, bpp TFT Dotclock = up to 1x 112MHz Resolutions 640 x 480 up to 1600 x 1200 (UXGA) Automatic panel detection via VESA EDID 1.3
LVDS 24bit	200 Mpixel/sec

Intel US15W	
PCIe BUS	2x x1 lane
EIDE BUS	1x Ultra PATA 100
SATA BUS	-
USB V2.0	8 channel USB
APIC	Intel I/O APIC
SMB	V2.0 SMBus controller
FWH	FirmWare Hub for BIOS devices
LPC	Serialized BUS (no ISA) used for external SuperI/O
Sound	2.3 HDA interface with 192kHz sampling rate and 8 channels
IRQ Controller	8259 compatible
Timers	8254 compatible
Power Management	Integrated

Reset & Power Management	
Controller	Atmel
Power Modes	S5, S3
ACPI	V3.0

External Interfaces	
Video Interfaces	CRT, LVDS
USB V1.1/2.0	5 channels (1 on the LVDS connector)
LPT1	IEEE1293 printer
COM1	RS232
COM2	RS232
COM4	RS232 or RS422/485
COM5	RS232 or RS422/485
Keyboard	PS/2
Mouse	PS/2
Parallel Hard Disk	44pin RM2.0mm PATA-IDE-cable
Serial Hard Disk	2 channel SATA300 with SIL3132 controller
Sound	SPDIF, 2x stereo
PCI-Bus	PC/104+, optional
PCIe	PCI/104express only available on MSM200XP/XU

Power Supply	
DC Input	5.0V +/-5%, max. 200mV ripple
Inrush Current	5.0V up to 3Amp for 100qs
Standby Power	0.1W
Onboard Voltages	VCC Core, 1.05V, 1.8V, 0.9V, CoreVCC, 1.5V
Power Consumption	9W

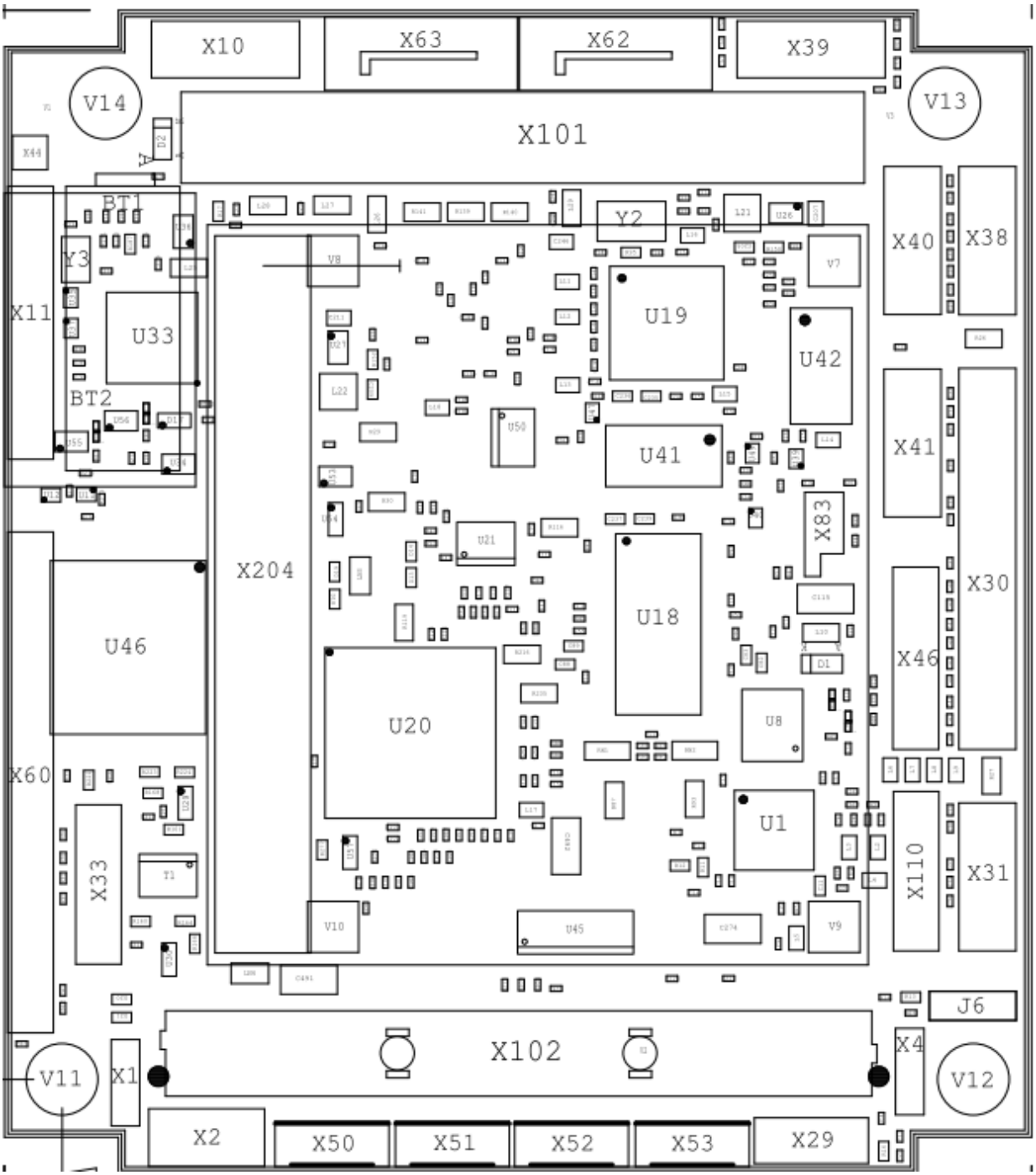
Physical Characteristics	
Dimensions	Length: 102mm Depth: 90mm Height: 33.5mm maximum with all options
Weight	250 grams

Operating Environment	
Relative Humidity	5-90% non-condensing
Operating Temperature	Depends on the CPU and the cooling concept. See Section 6.3. Standard (with heat spreader): -25°C - +70°C
Maximum Copper Temperature	90°C
Storage Temperature	-55°C to +85°C

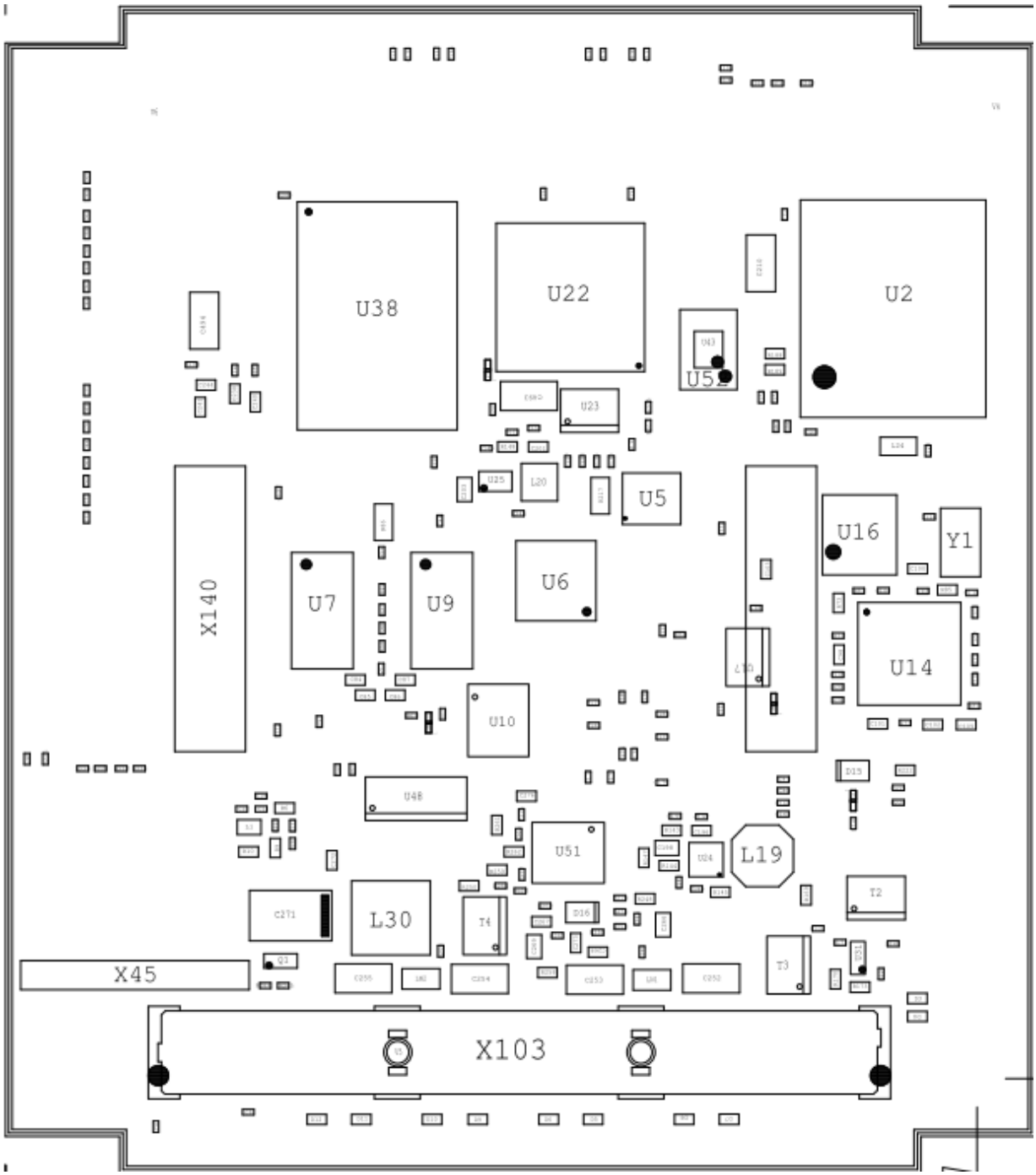
4 Connectors & Jumpers

4.1 Assembly Views

4.1.1 Top Side, MSMX Version 1.0



4.1.2 Bottom Side, MSMX Version 1.0



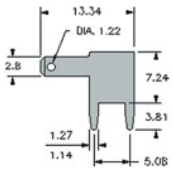
4.2 Connector References

Connector	Structure	Pin	Remarks
X1	Power Input 5V		
X2	Power Connector	2x4	2.54mm
X4	Power Input GND		
X10	VGA Connector	5 x 2	2.54mm
X11	LVDS Interface 6/8bit	15 x 2	2mm
X29	Sound Port	5 x 2	2mm
X30	Printer (LPT1)	13 x 2	2.54mm
X31	Utility / Keyboard & Mouse (PS2)	5 x 2	2.54mm
X33	LAN	7x 2	2mm
X38	COM1	5 x 2	2.54mm
X39	COM2	5 x 2	2.54mm
X40	COM4	5 x 2	2.54mm
X41	COM5	5 x 2	2.54mm
X45	Connector for SIM card	1 x 8	2.54mm
X46	SDIO	2 x 8	2mm
X50	USB Port 0	1 x 4	2.54mm
X51	USB Port 1	1 x 4	2.54mm
X52	USB Port 2	1 x 4	2.54mm
X53	USB Port 3	1 x 4	2.54mm
X60	PATA-IDE	2 x 22	2mm
X62	SATA Port 0	SATA	
X63	SATA Port 1	SATA	
X101	PC/104 BUS (PCI Signals)		
X102	PC/104express Connector, Top		
X103	PC/104express Connector, Bottom		
X110	LPC POD	2 x 7	2mm
X140	PCIexpress MiniCard		

4.2.1 X1/X4 or X2 Power Supply

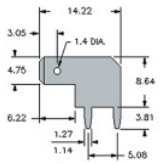
Recommended:

X1 Power Supply VCC 5V (mounting tab 2.8mm)



Pin	Signal	Information
1	Main supply +5V	www.compona.ch Part Nr. 236 712-1

X4 Power Supply GND (mounting tab 4.75mm)



Pin	Signal	Information
1	GND	www.compona.ch Part Nr. 236 713-1

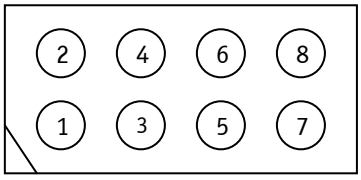
Alternative:

X2 Power Input

Pin	Signal	Pin	Signal
1	GND	2	VCCSUS +5Volt input supply
3	Main_SW (push button to switch on the board)	4	(+12V input)
5	SMB_DAT	6	SMB_CLK
7	GND	8	VCCSUS +5Volt input supply

VCCSUS = 5Volt Main Supply Input

Pin placement:



Note: If the MSM200 is supplied with 5V, it is **not** necessary to also supply 12V to the board, unless a peripheral board on the PCI/104e BUS needs to be supplied with 12V.

4.2.2 Main Button / Automatically Power On Button

Pin	Signal	Pin	Signal
1	GND	3	Main button

If you want to push a button to start the system:

» A push button (Main Button) must be connected to **X2, Pin 1/3**

» After pushing the Main Button the board will start.

» If the Main Button is pressed for more than 4 seconds, the power will be switched off.

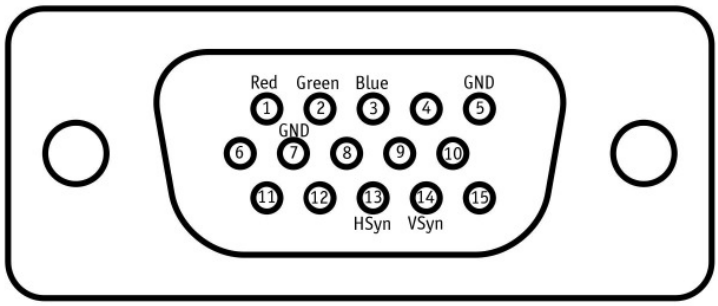
4.2.3 X10 VGA Monitor (CRT-signals)

10 Pin-M		15 Pin HiDensity DSUB	
Pin	Signal	Pin	Signal
2	VGA red	1	Red
4	VGA green	2	Green
6	VGA blue	3	Blue
8	Horizontal Synch	13	H-Synch
9	Vertical Synch	14	V-Synch
		5 + 11	Bridged
1	Ground	5, 6, 7, 8	Ground
3	**NC**		
5	**NC**		
7	Serial_Data	12	DDC-SDA
10	Serial_Clock	15	DDC-SCL

The VGA-CRT signals from **X10** must be wired to a standard VGA HiDensity DSub connector (female):

The LCD signals must be wired panel specific.

Solder-side view of the female 15pin HiDSub



4.2.4 X11 LVDS

Terminated: 100 Ohm on each differential pair

EMI-Protection: None

Pin	Signal	Pin	Signal
1	LVDS_DATA0-	2	LVDS_DATA0+
3	LVDS_DATA1-	4	LVDS_DATA1+
5	LVDS_DATA2-	6	LVDS_DATA2+
7	LVDS_DATA3-	8	LVDS_DATA3+
9	GND	10	GND
11	LVDS_CLK-	12	LVDS_CLK+
13	5V Output	14	3.3V Output
15	LVDS_DDC_CLK	16	LVDS_DDC_DATA
17	PCIE_RST#	18	LVDS_Backlight_Enable
19	LVDS_Backlight_Control	20	LVDS_VDD_Enable
21	12V (VDC) Output	22	12V (VDC) Output
23	USB_D-	24	USB_D+

Detailed Signal Description

Signal	Description
LVDS_CLK [+/-]	Output, LVDS, voltage: 1.25V±225mV Channel x differential clock pair output (compliment): 245-800MHz.
LVDS_Backlight_Control	Output, CMOS LVDS LCD Flat Panel Backlight Brightness Control: This signal is used as the Pulse Width Modulated (PWM) control signal to control the backlight inverter.
LVDS_Backlight_Enable	Output, CMOS LVDS LCD Flat Panel Backlight Enable: This signal is used to enable the backlight inverter (BLI).
LVDS_VDD_Enable	Output, CMOS LVDS LCD Flat Panel Power Control: This signal is used to enable power to the panel interface.
LVDS_DATA [0-3] +/-	Output, LVDS, voltage: 1.25V±225mV Channel x differential data pair 3:0 output (true): 245-800MHz.

4.2.5 X29 Sound Interface

Pin	Signal	Pin	Signal
1	Line_R	2	GND (signal)
3	Line_L	4	SPDIF_OUT
5	GND (signal)	6	GND (digital)
7	MIC_R	8	SPDIF_IN
9	MIC_L	10	GND (digital)

4.2.6 X30 Printer Port (Centronics)

The printer connector provides an interface for 8bit Centronics printers.

Protection: None

Header onboard	D-SUB connector	Signal
Pin 1	Pin 1	Strobe
Pin 3	Pin 2	Data 0
Pin 5	Pin 3	Data 1
Pin 7	Pin 4	Data 2
Pin 9	Pin 5	Data 3
Pin 11	Pin 6	Data 4
Pin 13	Pin 7	Data 5
Pin 15	Pin 8	Data 6
Pin 17	Pin 9	Data 7
Pin 19	Pin 10	Acknowledge
Pin 21	Pin 11	Busy
Pin 23	Pin 12	Paper end
Pin 25	Pin 13	Select
Pin 2	Pin 14	Autofeed
Pin 4	Pin 15	Error
Pin 6	Pin 16	Init printer
Pin 8	Pin 17	Shift in (SI)
Pins 10, 12, 14, 16, 18, 26	Pin 18-22	Left open
Pins 20, 22, 24	Pin 23-25	GND

4.2.7 X31 PS/2 Keyboard & Mouse Utility

The speaker must be connected to VCC, to have a low, inactive current in the speaker.

Pin	Signal	Pin	Signal
1	Speaker Out	2	Ground (for speaker)
3	Reset_in#	4	VCC
5	Keyboard Data	6	Keyboard Clock
7	Ground	8	External 3.6V lithium battery
9	PS/2 Mouse Clock	10	PS/2 Mouse Data

4.2.8 X33 LAN Interface

Termination: 1000Base-T compliant
EMI Protection: None
Overvoltage Protection: None

Pin	Signal	Pin	Signal
1	MDI_A-X	2	MDI_A+X
3	MDI_B-X	4	MDI_B+X
5	LED0	6	+V3.3A_RTC
7	GND	8	VCC3 (+3.3V_82574)
9	LED1	10	LED2
11	MDI_C-X	12	MDI_C+X
13	MDI_D-X	14	MDI_D+X

4.2.9 X38 Serial Port COM1

Protection: None

Header onboard	D-SUB connector	Signal
Pin 1	Pin 1	DCD
Pin 2	Pin 6	DSR
Pin 3	Pin 2	RxD
Pin 4	Pin 7	RTS
Pin 5	Pin 3	TxD
Pin 6	Pin 8	CTS
Pin 7	Pin 4	DTR
Pin 8	Pin 9	RI
Pin 9	Pin 5	GND
Pin 10		**NC**

4.2.10 X39 Serial Port COM2

Protection: None

Header onboard	D-SUB connector	Signal
Pin 1	Pin 1	DCD
Pin 2	Pin 6	DSR
Pin 3	Pin 2	RxD ★
Pin 4	Pin 7	RTS
Pin 5	Pin 3	TxD ★
Pin 6	Pin 8	CTS
Pin 7	Pin 4	DTR
Pin 8	Pin 9	RI
Pin 9	Pin 5	GND
Pin 10		**NC**

★ Com 3 GPS

4.2.11 X40 Serial Port COM4

Protection: None

Pin 1	Pin 1	DCD
Pin 2	Pin 6	DSR
Pin 3	Pin 2	RxD
Pin 4	Pin 7	RTS
Pin 5	Pin 3	TxD
Pin 6	Pin 8	CTS
Pin 7	Pin 4	DTR
Pin 8	Pin 9	RI
Pin 9	Pin 5	GND
Pin 10		**NC**

Pin	RS422	RS485
1	A	A
3	B	B
5	Y	
7	Z	

For termination see Section 4.3.1.

4.2.12 X41 Serial Port COM5

Protection: None

Header onboard	D-SUB connector	Signal
Pin 1	Pin 1	DCD
Pin 2	Pin 6	DSR
Pin 3	Pin 2	RxD
Pin 4	Pin 7	RTS
Pin 5	Pin 3	TxD
Pin 6	Pin 8	CTS
Pin 7	Pin 4	DTR
Pin 8	Pin 9	RI
Pin 9	Pin 5	GND
Pin 10		**NC**

Pin	RS422	RS485
1	A	A
3	B	B
5	Y	
7	Z	

For termination see Section 4.3.1.

4.2.13 X46 SDIO Interface

Pin	Signal	Pin	Signal
1	DATA 0	2	3.3V Out
3	DATA 1	4	GND
5	DATA 2	6	CMD
7	DATA 3	8	CLK
9	DATA 4	10	GND
11	DATA 5	12	CD#
13	DATA 6	14	WP
15	DATA 7	16	GND

4.2.14 X50/X51/X52/X53 USB0/USB1/USB2/USB3

Termination: None
EMI-filtered: Yes, with bifilar choke
Overvoltage protection: Suppress or diode to GND

Pin	Signal
1	VCC
2	USB-PX0-
3	USB-PX+
4	GND

Remarks:

Use twisted pair USB cables for USB V2.0 compatibility

Components assembled on MSM200	Dubox™ 4 pole	no. 246 562
Cable	Dubox™ 4 pole	no. 246 552
Crimp Contacts	Dubox™	no. 246 513

Contact: www.compona.ch

4.2.15 X60 IDE Interface

Pin	Signal	Pin	Signal
1	Reset (active low)	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	**NC**
21	DREQ	22	GND
23	IOW (active low)	24	GND
25	IOR (active low)	26	GND
27	IORDY	28	SPSYNC
29	DACK	30	GND
31	IRQ14	32	**NC**
33	ADR1	34	PDIAG
35	ADR0	36	ADR2
37	CS0 (active low)	38	CS1 (active low)
39	LED (active low) asp	40	GND
41	VCC Logic	42	VCC Motor
43	GND	44	**NC**

4.2.16 X62 / X63 SATA0/SATA1

Termination: None
EMI-filtered: None
Overvoltage protection: None

Pin	Signal	Pin	Signal
1	GND	2	TX_DATA+
3	TX_DATA-	4	GND
5	RX_DATA-	6	RX_DATA+
7	GND		

4.2.17 X101 PC/104+ BUS Interface

Pin	A	B	C	D
1	GND/5.0V KEY2	Reserved	+5V	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0 ★	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1 ★	AD15	+3.3V
9	SERR ★	GND	**NC**	PAR
10	GND	PERR#	+3.3V	**NC**
11	STOP ★	+3.3V	LOCK#	GND
12	+3.3V	TRDY ★	GND	DEVSEL ★
13	FRAME ★	GND	IRDY ★	+3.3V
14	GND	AD16	+3.3V	C/BE2 ★
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3 ★	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0 ★	GND	REQ1 ★	VI/O
24	GND	REQ2 ★	+5V	GNT0 ★
25	GNT1 ★	VI/O	GNT2 ★	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD ★	+5V	RST ★
29	+12V	INTA ★	INTB ★	INTC ★
30	**NC**	REQ3#	GNT3#	GND

Notes: ★ denotes power or ground signals.
The **KEY** pins are to guarantee proper module installation. **PinA1** will be removed and the female side plugged for 5.0V I/O signals and **PinD30** will be modified in the same manner for 3.3V I/O. It is recommended that both **KEY** pins (**A1** and **D30**) be electrically connected to GND for shielding.
KCC boards have them as NC (not connected).

4.2.18 X102 PCI/104express BUS (Top View Signal Assignment)

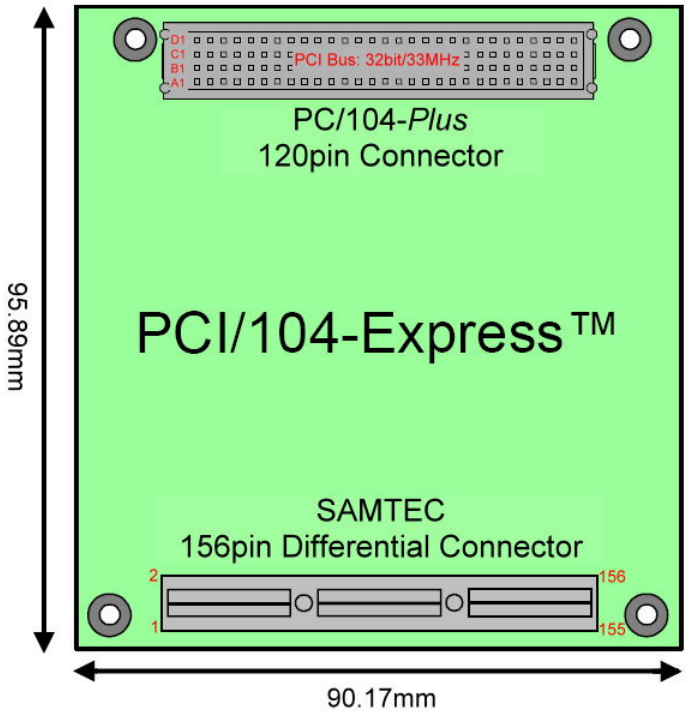
Pin	Signal		Signal	Pin
1	Reserved (GPIO0)		PE_RST#	2
3	3.3V		3.3V	4
5	USB1+		USB0+	6
7	USB1-		USB0-	8
9	GND		GND	10
11	PEx1_1T+		PEx1_0T+	12
13	PEx1_1T-		PEx1_0T-	14
15	GND		GND	16
17	PEx1_2T+		PEx1_3T+	18
19	PEx1_2T-		PEx1_3T-	20
21	GND		GND	22
23	PEx1_1R+	+5 Volts	PEx1_0R+	24
25	PEx1_1R-		PEx1_0R-	26
27	GND		GND	28
29	PEx1_2R+		PEx1_3R+	30
31	PEx1_2R-		PEx1_3R-	32
33	GND		GND	34
35	PEx1_1CLK+		PEx1_0CLK+	36
37	PEx1_1CLK-		PEx1_0CLK-	38
39	5V_Always		5V_Always	40
41	PEx1_2CLK+		PEx1_3CLK+	42
43	PEx1_2CLK-		PEx1_3CLK-	44
45	CPU_DIR		PWRGOOD	46
47	SMB_DAT		PEx16_x8_x4_CLK+	48
49	SMB_CLK		PEx16_x8_x4_CLK-	50
51	SMB_ALERT		PSON#	52
53	Reserved / Wake#		PEG_ENA#	54
55	GND		GND	56
57	PEx16_0T(8)+		PEx16_0T(0)+ / SDVO0R+	58
59	PEx16_0T(8)-		PEx16_0T(0)- / SDVO0R-	60
61	GND		GND	62
63	PEx16_0T(9)+		PEx16_0T(1)+ / SDVO1G+	64
65	PEx16_0T(9)n-		PEx16_0T(1)- / SDVO1G-	66
67	GND		GND	68
69	PEx16_0T(10)+		PEx16_0T(2)+ / SDVO0B+	70
71	PEx16_0T(10)-		PEx16_0T(2)- / SDVO0B-	72
73	GND		GND	74
75	PEx16_0T(11)+		PEx16_0T(3)+ / SDVO0CLK+	76
77	PEx16_0T(11)-	+5 Volts	PEx16_0T(3)- / SDVO0CLK-	78
79	GND		GND	80
81	PEx16_0T(12)+		PEx16_0T(4)+ / SDVO1R+	82
83	PEx16_0T(12)-		PEx16_0T(4)- / SDVO1R-	84
85	GND		GND	86
87	PEx16_0T(13)+		PEx16_0T(5)+ / SDVO1G+	88
89	PEx16_0T(13)-		PEx16_0T(5)- / SDVO1G-	90
91	GND		GND	92
93	PEx16_0T(14)+		PEx16_0T(6)+ / SDVO1B+	94
95	PEx16_0T(14)-		PEx16_0T(6)- / SDVO1B-	96
97	GND		GND	98
99	PEx16_0T(15)+		PEx16_0T(7)+ / SDVO1CLK+	100
101	PEx16_0T(15)-		PEx16_0T(7)- / SDVO1CLK+	102
103	GND		GND	104

Pin	Signal		Signal	Pin
105	SDVO_DAT (PENA#)	+12 Volts	SDVO_CLK	106
107	GND		GND	108
109	PEx16_0R(8)+		PEx16_0R(0)+ / SDVO_TVCI+	110
111	PEx16_0R(8)-		PEx16_0R(0)- / SDVO_TVCI-	112
113	GND		GND	114
115	PEx16_0R(9)+		PEx16_0R(1)+ / SDVO_INT+	116
117	PEx16_0R(9)-		PEx16_0R(1)- / SDVO_INT-	118
119	GND		GND	120
121	PEx16_0R(10)+		PEx16_0R(2)+ / SDVO_STALL+	122
123	PEx16_0R(10)-		PEx16_0R(2)- / SDVO_STALL-	124
125	GND		GND	126
127	PEx16_0R(11)		PEx16_0R(3)+	128
129	PEx16_0R(11)-		PEx16_0R(3)-	130
131	GND		GND	132
133	PEx16_0R(12)+		PEx16_0R(4)+	134
135	PEx16_0R(12)-		PEx16_0R(4)-	136
137	GND		GND	138
139	PEx16_0R(13)+		PEx16_0R(5)+ / SDVO1_INT+	140
141	PEx16_0R(13)-		PEx16_0R(5)- / SDVO1_INT-	142
143	GND		GND	144
145	PEx16_0R(14)+		PEx16_0R(6)+	146
147	PEx16_0R(14)-		PEx16_0R(6)-	148
149	GND		GND	150
151	PEx16_0R(15)+		PEx16_0R(7)+	152
153	PEx16_0R(15)-		PEx16_0R(7)-	154
155	GND		GND	156

4.2.19 X103 PCI/104express BUS (Bottom View Signal Assignment)

Pin	Signal		Signal	Pin
2	PE_RST#		Reserved (GPI00)	1
4	3.3V		3.3V	3
6	USB0+		USB1+	5
8	USB0-		USB1-	7
10	GND		GND	9
12	PEx1_0T+		PEx1_1T+	11
14	PEx1_0T-		PEx1_1T-	13
16	GND		GND	15
18	PEx1_3T+		PEx1_2T+	17
20	PEx1_3T-		PEx1_2T-	19
22	GND		GND	21
24	PEx1_0R+	+5 Volts	PEx1_1R+	23
26	PEx1_0R-		PEx1_1R-	25
28	GND		GND	27
30	PEx1_3R+		PEx1_2R+	29
32	PEx1_3R-		PEx1_2R-	31
34	GND		GND	33
36	PEx1_0CLK+		PEx1_1CLK+	35
38	PEx1_0CLK-		PEx1_1CLK-	37
40	5V_Always		5V_Always	39
42	PEx1_3CLK+		PEx1_2CLK+	41
44	PEx1_3CLK-		PEx1_2CLK-	43
46	PWRGOOD		CPU_DIR	45
48	PEx16_x8_x4_CLK+		SMB_DAT	47
50	PEx16_x8_x4_CLK-		SMB_CLK	49
52	PSON#		SMB_ALERT	51
54	PEG_ENA#		Reserved / Wake#	53
56	GND		GND	55
58	PEx16_0T(0)+ / SDVO0R+		PEx16_0T(8)+	57
60	PEx16_0T(0)- / SDVO0R-		PEx16_0T(8)-	59
62	GND		GND	61
64	PEx16_0T(1)+ / SDVO1G+		PEx16_0T(9)+	63
66	PEx16_0T(1)- / SDVO1G-		PEx16_0T(9)n-	65
68	GND		GND	67
70	PEx16_0T(2)+ / SDVO0B+		PEx16_0T(10)+	69
72	PEx16_0T(2)- / SDVO0B-		PEx16_0T(10)-	71
74	GND		GND	73
76	PEx16_0T(3)+ / SDVO0CLK+		PEx16_0T(11)+	75
78	PEx16_0T(3)- / SDVO0CLK-	+5 Volts	PEx16_0T(11)-	77
80	GND		GND	79
82	PEx16_0T(4)+ / SDVO1R+		PEx16_0T(12)+	81
84	PEx16_0T(4)- / SDVO1R-		PEx16_0T(12)-	83
86	GND		GND	85
88	PEx16_0T(5)+ / SDVO1G+		PEx16_0T(13)+	87
90	PEx16_0T(5)- / SDVO1G-		PEx16_0T(13)-	89
92	GND		GND	91
94	PEx16_0T(6)+ / SDVO1B+		PEx16_0T(14)+	93
96	PEx16_0T(6)- / SDVO1B-		PEx16_0T(14)-	95
98	GND		GND	97
100	PEx16_0T(7)+ / SDVO1CLK+		PEx16_0T(15)+	99
102	PEx16_0T(7)- / SDVO1CLK+		PEx16_0T(15)-	101
104	GND		GND	103

Pin	Signal		Signal	Pin
106	SDVO_CLK		SDVO_DAT (PENA#)	105
108	GND		GND	107
110	PEx16_0R(0)+ / SDVO_TVCI+		PEx16_0R(8)+	109
112	PEx16_0R(0)- / SDVO_TVCI-		PEx16_0R(8)-	111
114	GND		GND	113
116	PEx16_0R(1)+ / SDVO_INT+		PEx16_0R(9)+	115
118	PEx16_0R(1)- / SDVO_INT-		PEx16_0R(9)-	117
120	GND		GND	119
122	PEx16_0R(2)+ / SDVO_STALL+		PEx16_0R(10)+	121
124	PEx16_0R(2)- / SDVO_STALL-		PEx16_0R(10)-	123
126	GND		GND	125
128	PEx16_0R(3)+	+12 Volts	PEx16_0R(11)	127
130	PEx16_0R(3)-		PEx16_0R(11)-	129
132	GND		GND	131
134	PEx16_0R(4)+		PEx16_0R(12)+	133
136	PEx16_0R(4)-		PEx16_0R(12)-	135
138	GND		GND	137
140	PEx16_0R(5)+ / SDVO1_INT+		PEx16_0R(13)+	139
142	PEx16_0R(5)- / SDVO1_INT-		PEx16_0R(13)-	141
144	GND		GND	143
146	PEx16_0R(6)+		PEx16_0R(14)+	145
148	PEx16_0R(6)-		PEx16_0R(14)-	147
150	GND		GND	149
152	PEx16_0R(7)+		PEx16_0R(15)+	151
154	PEx16_0R(7)-		PEx16_0R(15)-	153
156	GND		GND	155



4.2.20 X110 LPC-Port

Pin	Signal	Pin	Signal
1	VCC 3.3V	2	LPC AD0
3	LFRAME#	4	LPC AD1
5	PCI_RESET#	6	LPC AD2
7	VCC 3.3V	8	LPC AD3
9	VCC 5V	10	PCIE_RST#
11	LPC_Clock (33MHz)	12	BIOS_Enable
13	GND	14	**NC**

4.2.21 X140 PCIexpress MiniCard

Pin	Signal	Pin	Signal
1	PCIE_WAKE#	2	+V3.3_MiniCard
3	**NC**	4	GND
5	**NC**	6	+V1.5S
7	CLKREQ_MINIPCIE#	8	USIM_PWR
9	GND	10	USIM_DATA
11	CLK_PCIE_MINICARDA#	12	USIM_CLK
13	CLK_PCIE_MINICARDA	14	USIM_RESET
15	GND	16	USIM_VPP
17	USIM_SW2	18	GND
19	USIM_SW1	20	**NC**
21	GND	22	BUF_RST#
23	PCIE_RXN_MINI	24	+V3.3_MiniCard
25	PCIE_RXP_MINI	26	GND
27	GND	28	+V1.5S
29	GND	30	SMB_CLK
31	PCIE_TXN_MINI	32	SMB_DATA
33	PICE_TXP_MINI	34	GND
35	GND	36	USB_MINI_N
37	GND	38	USB_MINI_P
39	+V3.3_MiniCard	40	GND
41	+V3.3_MiniCard	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	**NC**	46	LED_WPAN#
47	**NC**	48	+V1.5S
49	**NC**	50	GND
51	**NC**	52	+V3.3_MiniCard

4.3 Jumpers

The following table shows the location of all jumper blocks on the MSM200X/XP/XU & SMA200 board. The numbers shown in this figure are silk screened on the board so that the pins can easily be located. This section refers to the individual pins for these jumpers.

Settings written in bold are defaults!

Jumper	Signal	1-2 / open	2-3 / closed	Remarks
J2	LVDS_ENAVCC	**+V3.3S**	+V5S	
J3	BCK_ENA	**+V5S**	+V12	
R232	LAN_DEV_OFF#	**OFF**	LAN_DEV_OFF	
J5	LAN_POWER	+V3.3A	**+V3.3S**	
J6	KB/MS Power	+V5	**+V5S**	
J7	VBat Super IO	+V3.3_RTC	**+V3.3A**	
J8	RS485 termination (COM4)	**OFF**	ON	See Section 4.3.1
J9	RS485 termination (COM5)	**OFF**	ON	See Section 4.3.1
J10	+V3.3_MiniCard	+V3.3A	**+V3.3S**	
J11	PCIe Switch Power Fix	PM-SLP_S3#	**PM_SLL_S2_5#**	

4.3.1 Termination for RS422 / RS485

COM4

J8 is located on the top side of the board, marked in green on Page 32. The default setting is no termination (up to board V0.4 this is **Pins 2-3**; from board V0.5 this is **Pins 1-2**).



3 3.3V
2 Termination enable ✶
1 GND

✶ A high input will connect a termination resistor (120Ω typical) between **Pins A** and **B** on **X40**.

COM5

J9 is located on the top side of the board, marked in blue on Page 33. The default setting is no termination (up to board V0.4 this is **Pins 2-3**; from board V0.5 this is **Pins 1-2**).

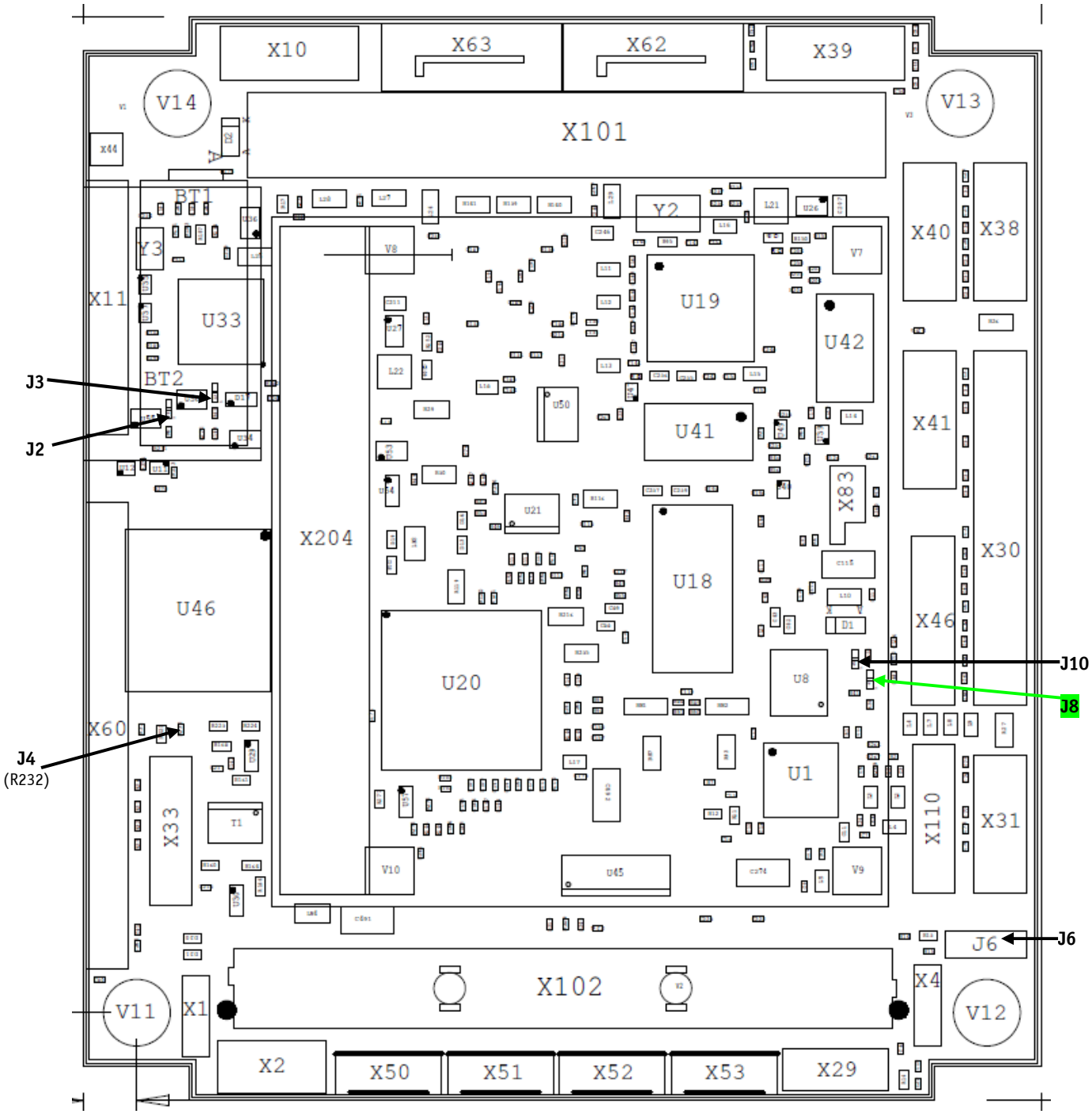


3 3.3V
2 Termination enable ✶
1 GND

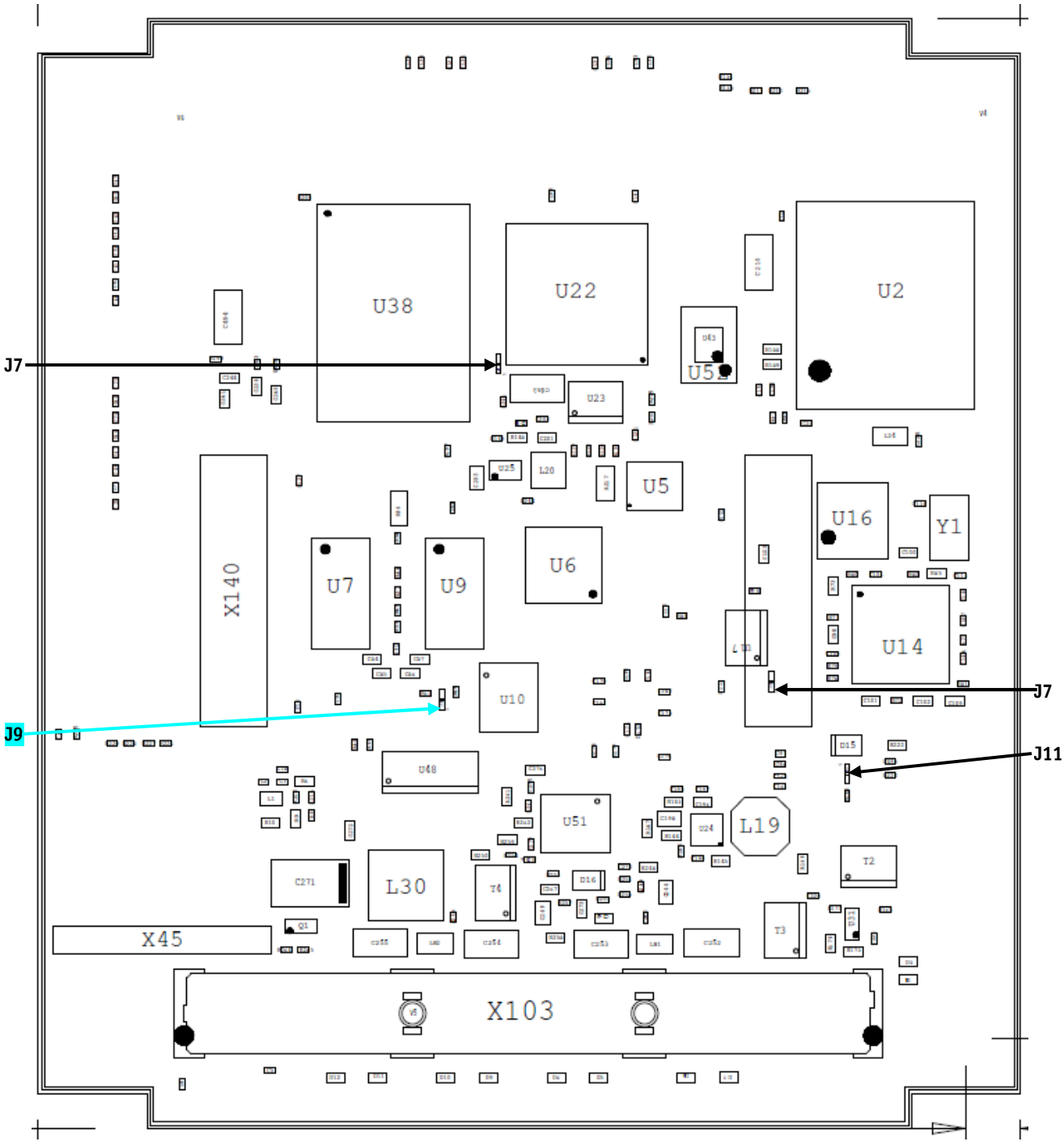
✶ A high input will connect a termination resistor (120Ω typical) between **Pins A** and **B** on **X41**.

4.3.2 The Jumpers on the MSM200X V1.0

Top View



Bottom View


J7
J9
J7
J11
U38
U22
U2
U52
U23
U5
U16
Y1
U7
U9
U6
X140
U14
U10
U48
U51
L19
L30
T2
T3
T4
X45
X103

5 Detailed System Description

5.1 External Battery Assembly

The external battery must be a 3.6Volt type.

If the customer wants to connect an external battery (check for the appropriate connector in Chapter 4), some precautions must be taken:

Note:	Measure the discharging current in both System-OFF and System-ON cases to calculate the actual lifetime of the battery.

5.2 Power Requirements

Attention:	Be sure the power plug is wired correctly before supplying power to the board!

Board uses a 5.0V DC single supply only.

Tolerance of the supply: 5Volt ±5%

Test environment for the power consumption measurement:

Peripherals: Hard disk, monitor, PS/2-KB, PS/2-MS

Software: MS-DOS V6.22
WinXP

Current consumption @ 5Volt supply at -40°C/+25°C/+85°C:

Mode	Memory	-40°C	+25°C	+85°C
SMA200-16G		[mA]	[mA]	[mA]
DOS: C:\	1GB		1600	
Win2000: Desktop	1GB		1600	

5.3 CPU, Boards and RAMs

5.3.1 CPUs of this MICROSPACE® Product

Product	Processor	Clock
SMA200-11G	Atom Z510	1.1 GHz
SMA200-16G	Atom Z530	1.6 GHz

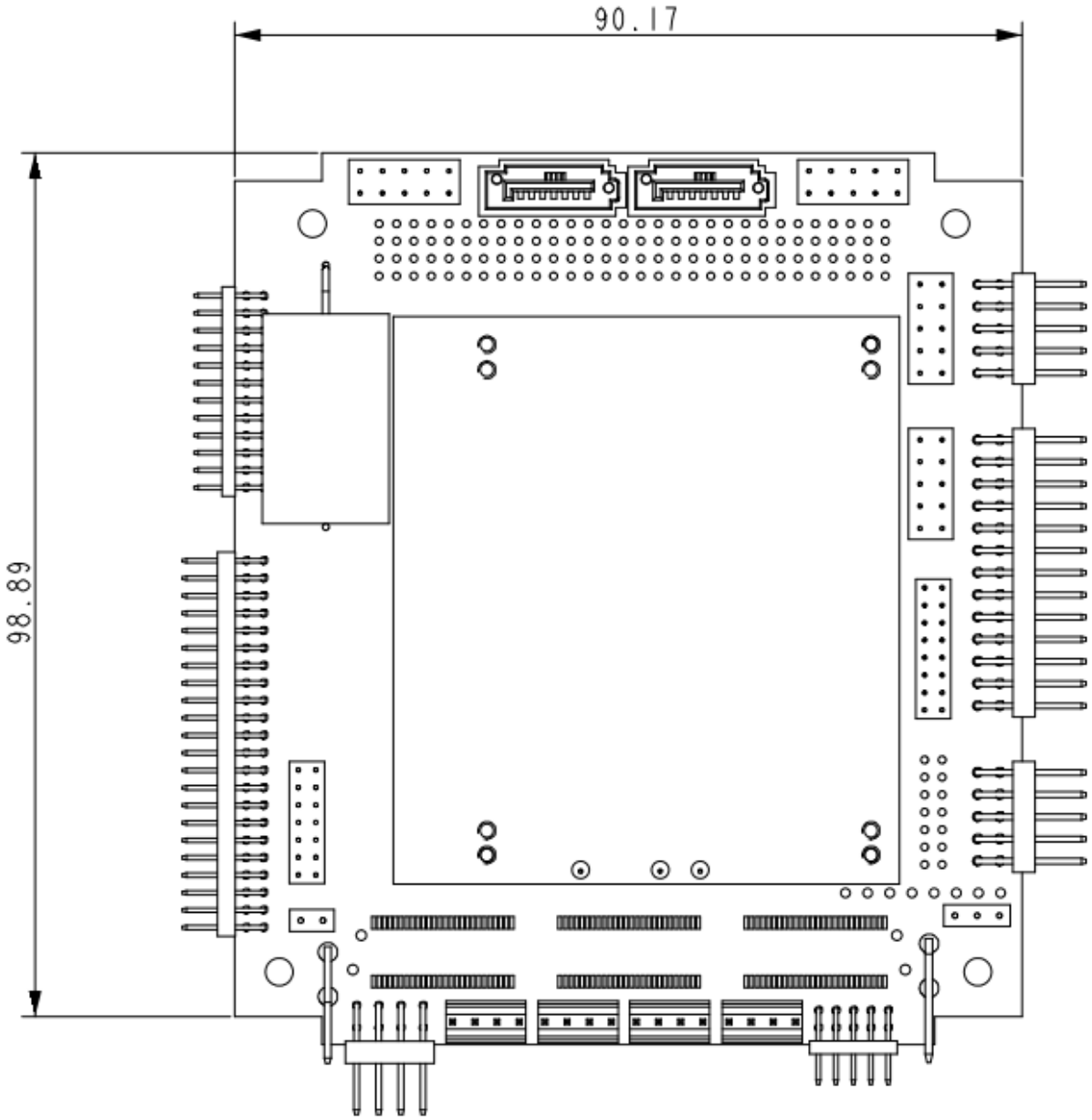
5.3.2 DDRAM Memory on SMA200

DDRAM	Specification
Socket	DDR2 soldered memory
Technologies	DDR2-667
Capacity	512MByte up to 2GByte
Voltage	1.8V
Termination	0.9V
Width	64bit
EEC-Support	No

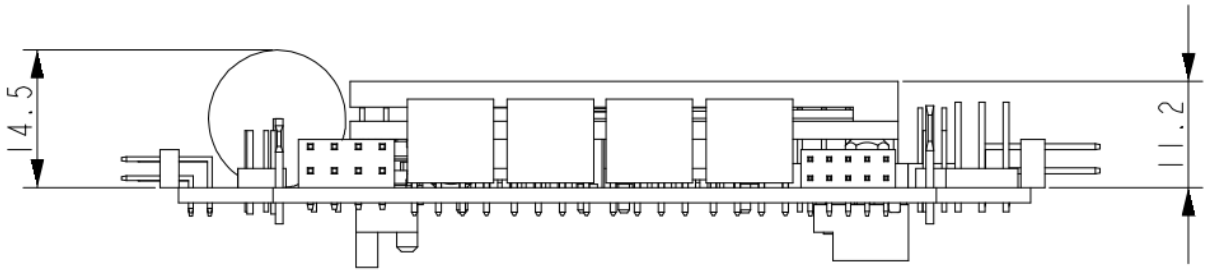
6 Design Considerations

6.1 Dimensions and Diagrams

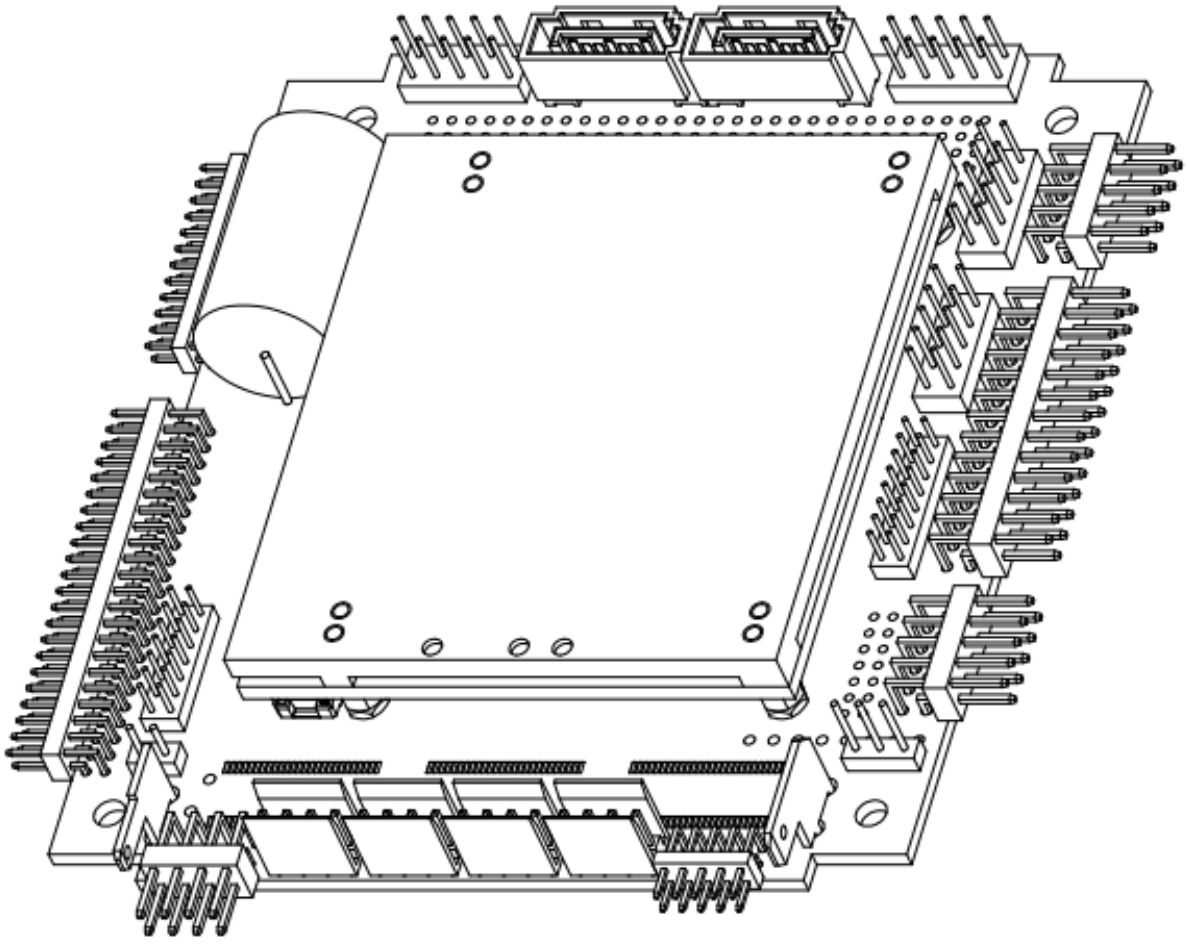
6.1.1 Top of the MSM200X with SMA200



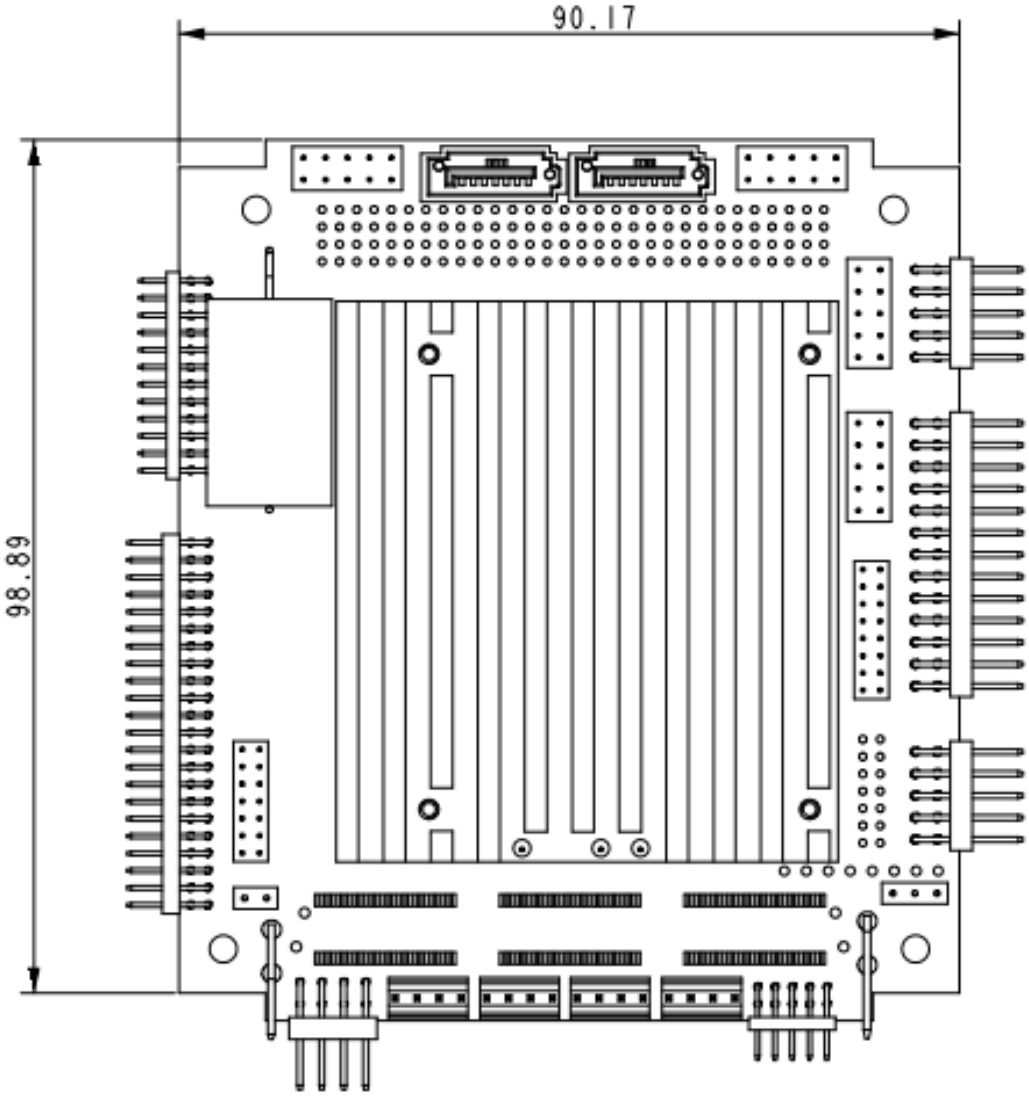
6.1.2 Front of the MSM200X with SMA200



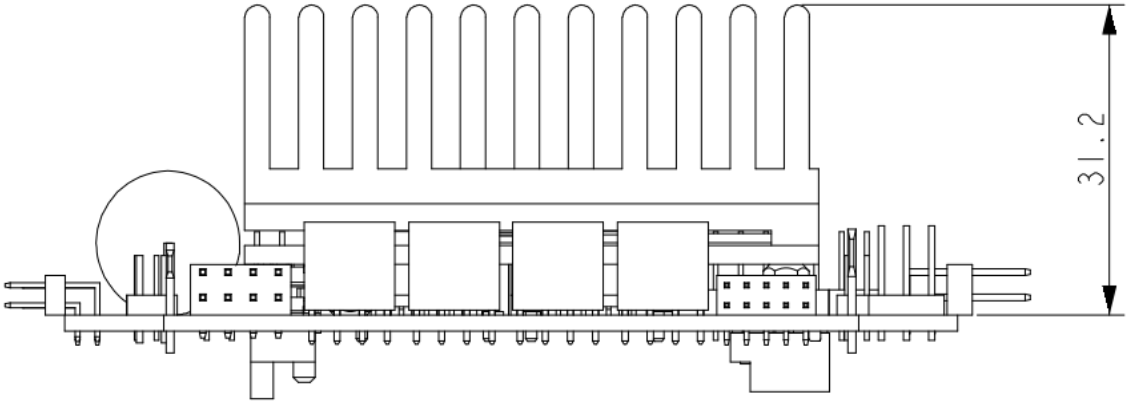
6.1.3 3D Perspective of the MSM200X with SMA200



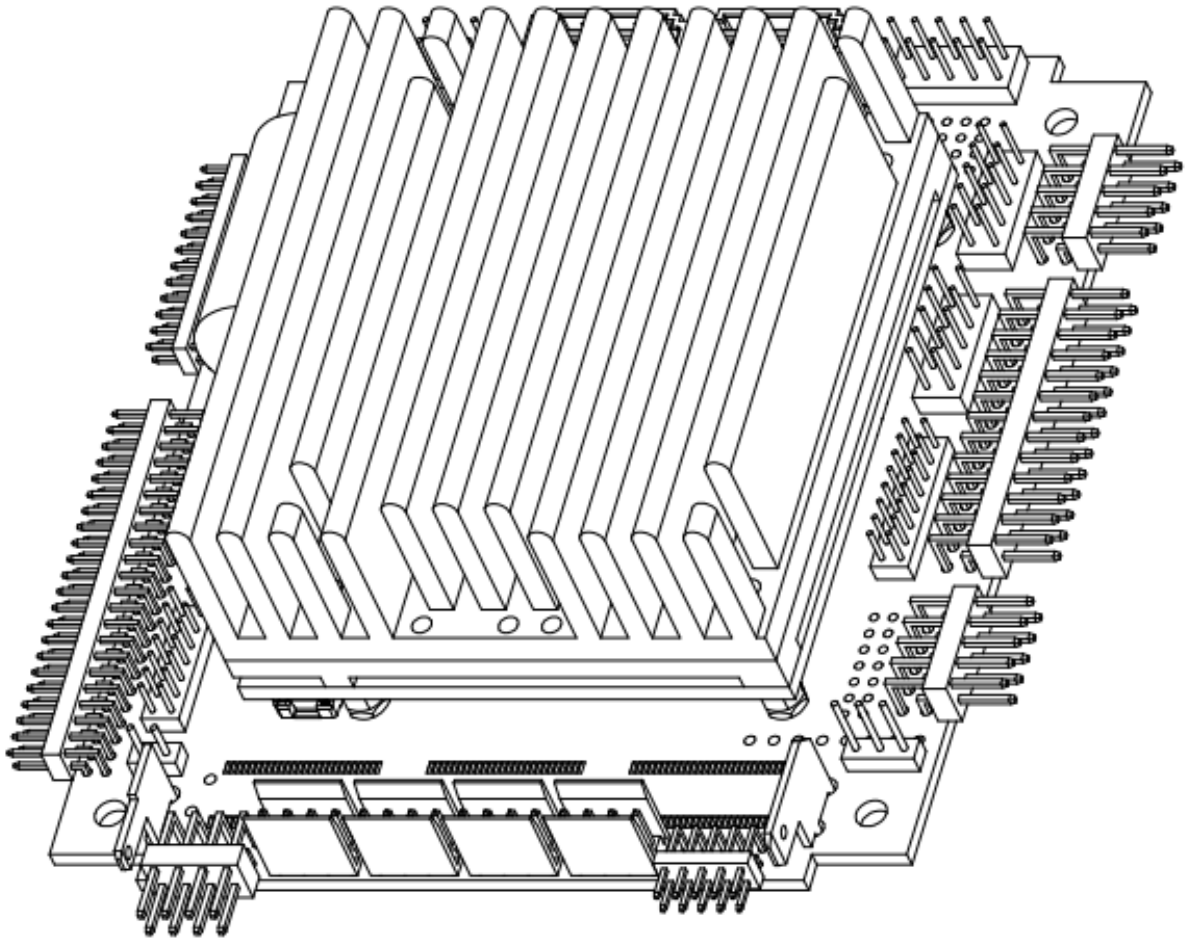
6.1.4 Top of the MSM200X with SMA200 and Passive Cooler



6.1.5 Front of the MSM200X with SMA200 and Passive Cooler

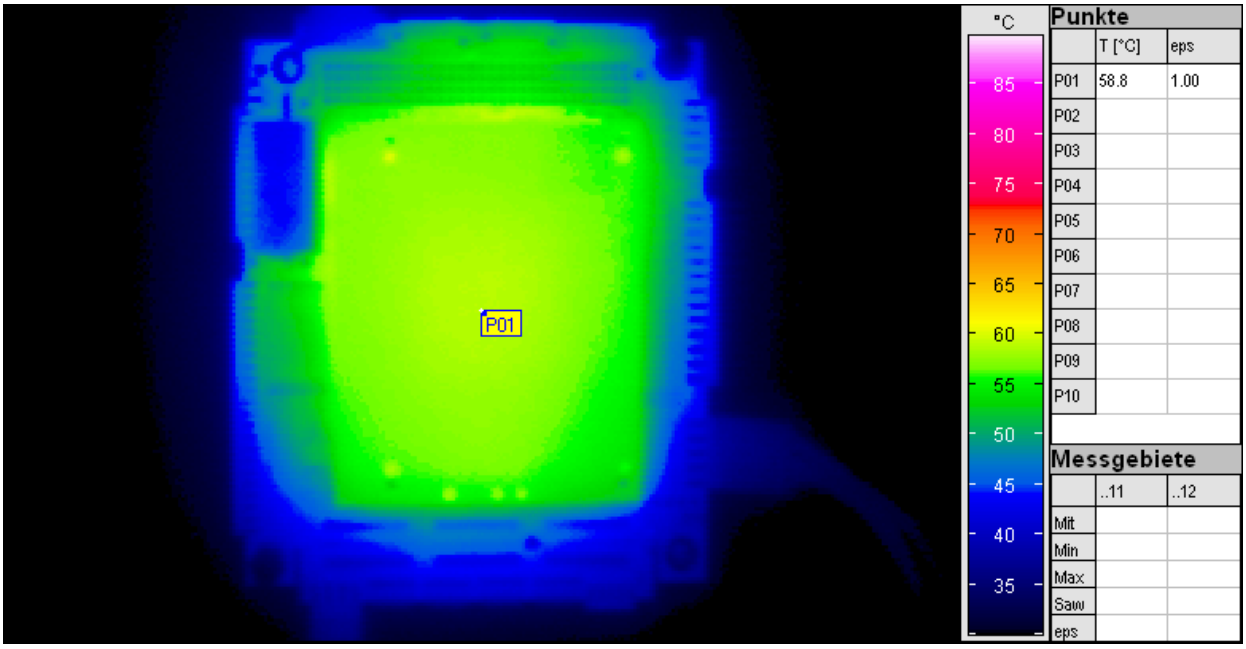


6.1.6 3D Perspective of the MSM200X with SMA200 and Passive Cooler

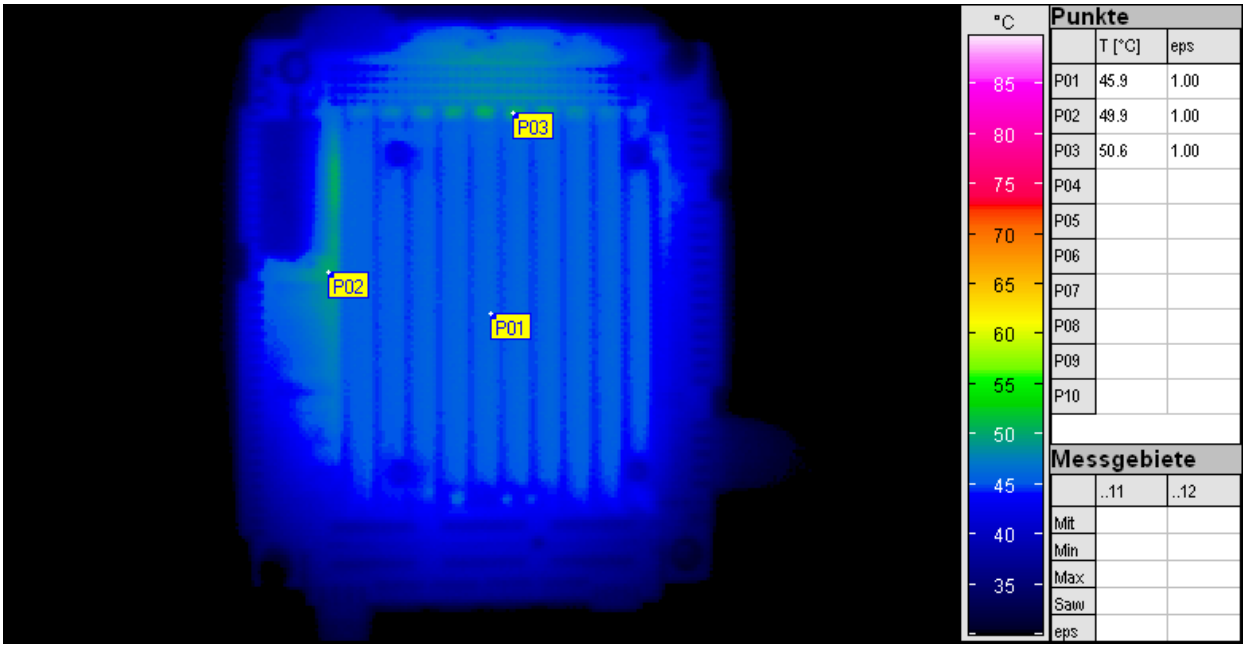


6.2 Thermoscans

6.2.1 60 Minutes with Heat Spreader (Part Nr. 805840)



6.2.2 60 Minutes with Heat Spreader (Part Nr. 805840) and Passive Cooler (Part Nr. 540185)



6.3 Thermal Specifications

The temperature is specified at 90°C for the BGA case. The MSM200 heat spreader can be used with your own cooling solution or the KCC heat sink can be used.

CPU: SMA200 / T (case) = 90°C / Power Consumption: 6-8W

Photo of Heat Sink	Heat Sink Type Part Nr.	Remarks
	Heat Spreader 805840	
	Passive Cooler 540185	Mounts on the Heat Spreader (805840)

7 BIOS Operation

The module is equipped with a Phoenix® BIOS, which is located in an onboard flash memory. The BIOS can be updated using a Flash utility.

7.1 Determining the BIOS Version

The Phoenix® BIOS version can be determined on the BIOS Setup screen.

7.2 Setup Guide

System behavior can be modified by changing the BIOS configuration.

Note:	Selecting incorrect values may cause system boot failure. Load setup default values to recover by pressing <**F9**>.

7.2.1 Start Phoenix® BIOS Setup Utility

Press <**F2**> during boot up to start the Phoenix® BIOS setup utility. The Main Menu then appears.

The Setup Screen is composed of several sections:

Setup Screen	Location	Function
Menu Bar	Top	Lists and selects all top level menus.
Legend Bar	Bottom	Lists setup navigation keys.
Item Specific Help Window	Right center	Help for selected item.
Menu Window	Left center	Selection fields for current menu.

Menu Bar

The menu bar at the top of the window lists different menus. Use the left/right arrow keys to make a selection.

Legend Bar

Key	Function
→ or ← Arrow Key	Select Screen
↑ or ↓ Arrow Key	Select Item
Enter	Select
+/-	Change Option
<F1>	General Help
<F9>	Optimized Defaults
<F10>	Save and Exit
<ESC>	Exit

Selecting an Item

Use the ↑ or ↓ key to move then use the + and – keys to select a value.

Displaying Submenus

Use the ↑ or ↓ key to move the cursor to the submenu then press **<Enter>**. A pointer (▸) marks all submenus.

Item Specific Help Window

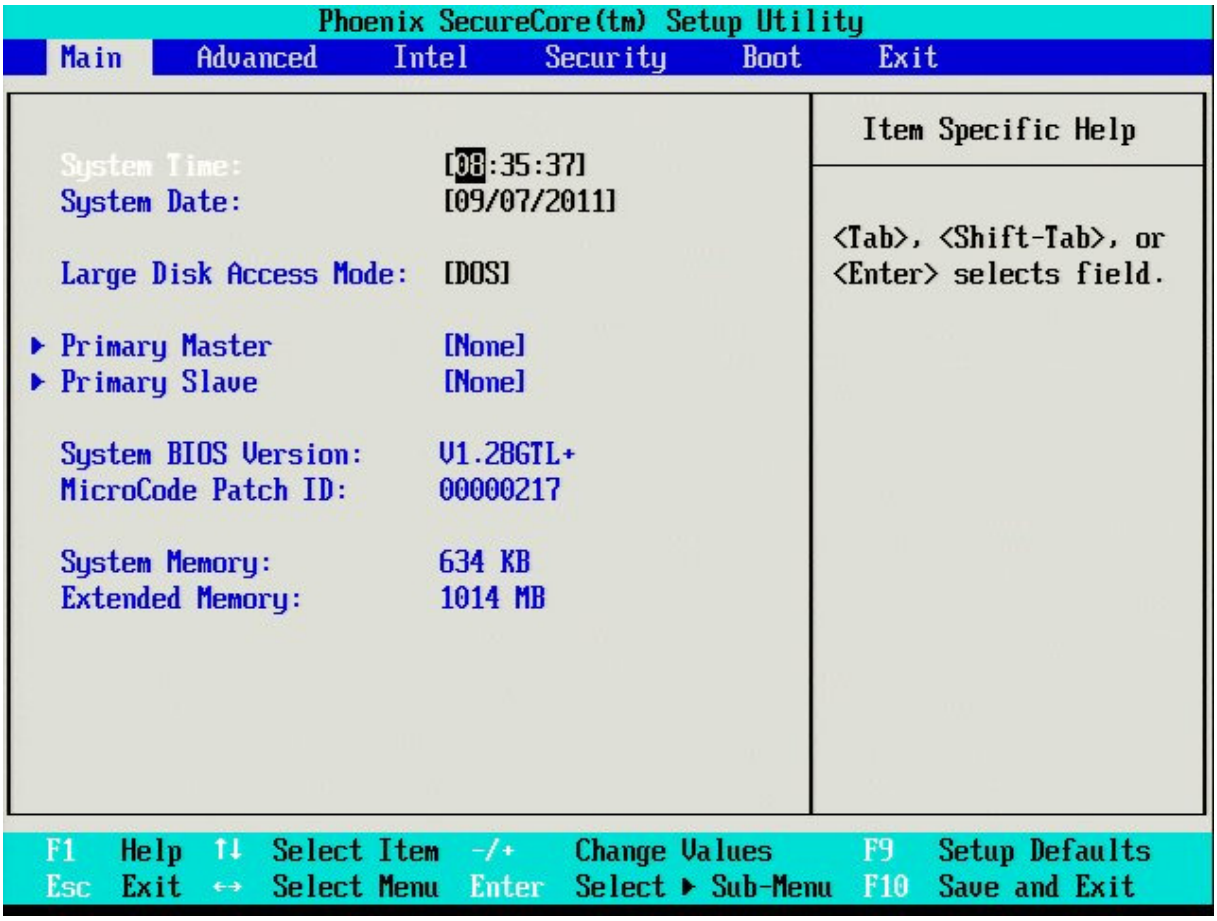
The Help window on the right side of each menu displays the Help text for the selected item.

General Help Window

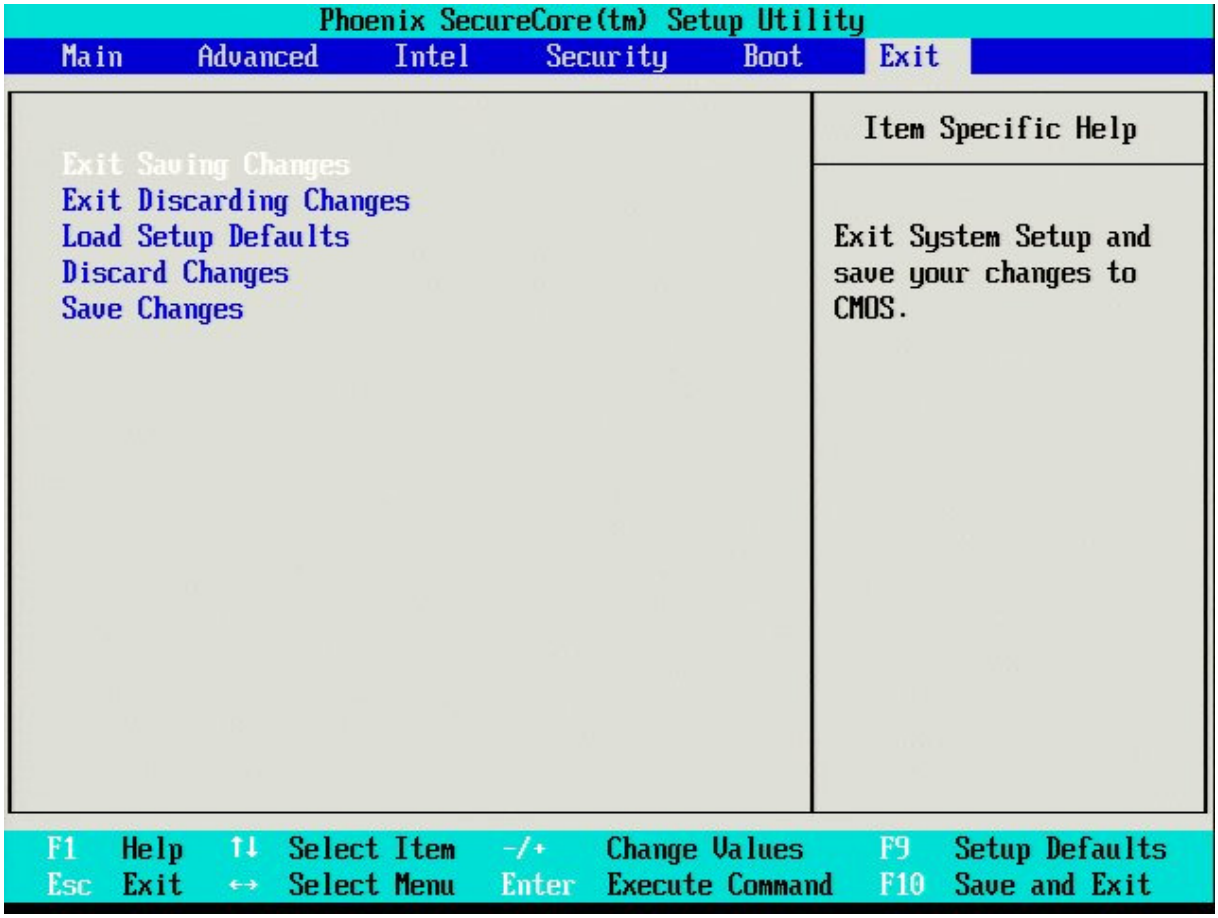
Pressing **<F1>** on a menu brings up the general Help. Press **<Esc>** to exit.

7.3 BIOS Setup

7.3.1 Main Menu



7.3.2 Exit Menu



Feature	Description
Exit Saving Changes	Exit utility and save changes to CMOS.
Exit Discarding Changes	Exit utility without saving setup data to CMOS.
Load Setup Defaults	Load default values for all setup items.
Discard Changes	Load previous values from CMOS for all setup items.
Save Changes	Save setup data to CMOS.

7.4 BIOS Update

Before downloading a BIOS, please check the following:

Make a bootable diskette which includes the following files:

- » DELEP200.exe
- » Phlash16.exe
- » Core BIOS (SM200_xxx_FLASHABL.ROM)
- » Rename the SM200_xxx_FLASHABL.ROM file to bios.rom

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

Notes: Disable the EMM386 or other memory managers in the CONFIG.SYS of your boot disk.
Make sure that the Phlash.exe program and the BIOS are in the same path and directory!
Boot DOS without config.sys and autoexec.bat. (Press **F5** while starting the DOS boot).

Start the DOWNLOADING process:

1. Start the system with the bootable diskette.
2. Run DLDELEP.exe to clear the CMOS and the EEPROM.

Warning If you do not run DLDELEP.exe, the system will be destroyed during the BIOS upgrade!

3. Run PHLASH16.EXE BIOS.ROM /BBL
4. Reboot system and press **F2** to enter the setup mode. Set the default values with **F9**.
5. "Save and leave" the setup with **F10**.
6. Reboot system

7.5 Driver Installation Instructions

7.5.1 Windows XP SP3 Fresh Installation

Follow the instructions in this section if you are performing a new installation of Windows XP SP3 onto the SATA drive. Expand all Files in the 3132_x86_1.0.22.0_logo.zip filer to a diskette and connect a USB Floppy drive to the MSM200.

1. Put your Windows XP SP3 CD into the CD/DVD-ROM drive.
2. Press **F6** for third party SCSI or driver installation at the beginning of text mode installation. Insert the SATA and USB TXT driver diskette and press "**s**" ("**z**" on German versions) when setup asks if you want to specify an additional device.
3. At the next menu, select "Silicon Image SiI 3132 SATALink Controller for Windows XP" and press **Enter**.
4. When prompted, press **Enter** again to continue on with text mode setup.
5. Follow the setup instructions to select your choice for partition and file system.
6. After setup examines your disks, it will copy files from the CD to the hard drive selected above and restart the system. After restart the setup process will resume to finish the installation.

8 Appendix A: Document Revision History

Revision	Date	Edited by	Changes
100	07.Sep.2011	WAS	First release of manual.

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