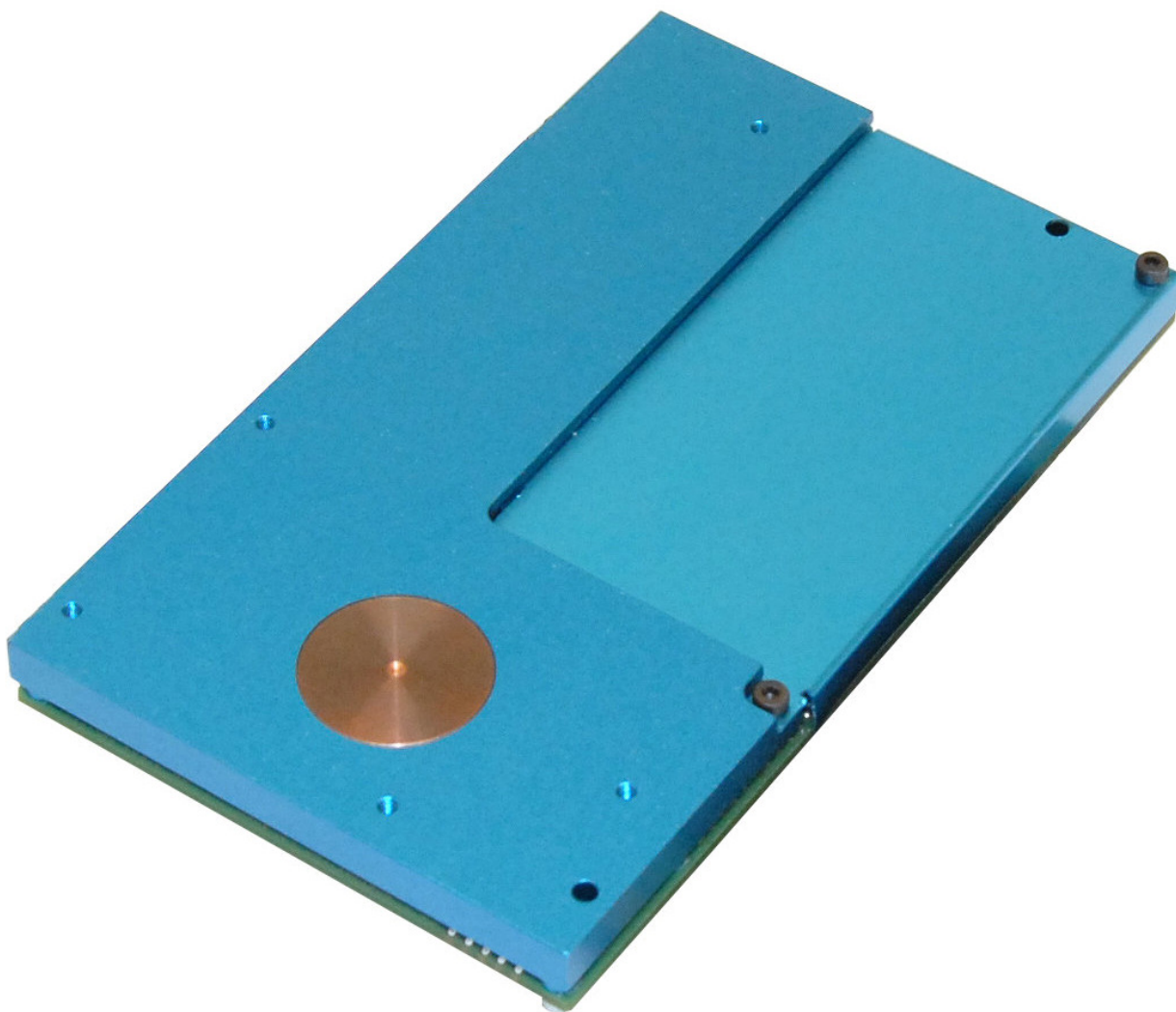


# DIGITAL-LOGIC

smart embedded computers

Condensed USER MANUAL FOR:

## SmartModule Express SMX945



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*For internal use only:*

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Path: R:\HANDBUCH\smart\SMX945\SMX945\_Condensed\_V1.0A.doc

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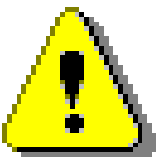
The software described herein, together with this document, are furnished under a license agreement and may be used or copied only in accordance with the terms of that agreement.

## About this Manual and How to Use It

This manual is written for the original equipment manufacturer (OEM) who plans to build computer systems based on the single board MICROSPACE-PC. It is for integrators and programmers of systems based on the MICROSPACE-Computer family. This manual provides instructions for installing and configuring the board, and describes the system and setup requirements. This document contains information on hardware requirements, interconnections, and details of how to program the system. Please check the Product CD for further information and manuals.

## REVISION HISTORY:

Document Version	Date/Initials:	Modification: Remarks, News, Attention:
V1.0	05.2007 KUF	Initial Version
<b>V1.0A</b>	<b>07.2007 WAS</b>	<b>Control &amp; general corrections / Updated block diagram</b>



### **Attention!**

1. All information in this manual, and the product, are subject to change without prior notice.
2. Read this manual prior to installation of the product.
3. Read the security information carefully prior to installation of the product.

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# 1. PREFACE

The information contained in this manual has been carefully checked and is believed to be accurate; it is subject to change without notice. Product advances mean that some specifications may have changed. DIGITAL-LOGIC AG assumes no responsibility for any inaccuracies, or the consequences thereof, that may appear in this manual. Furthermore, DIGITAL-LOGIC AG does not accept any liability arising from the use or application of any circuit or product described herein.

## 1.1. Trademarks

DIGITAL-LOGIC, DIGITAL-LOGIC-Logo, MICROSPACE, and smartModule are registered trademarks owned worldwide by DIGITAL-LOGIC AG, Luterbach (Switzerland). In addition, this document may include names, company logos, and registered trademarks which are, therefore, proprietary to their respective owners.

## 1.2. 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.

## 1.3. 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.

## 1.4. Who should use this Product

- Electrical engineers with know-how in PC-technology.
- Because of the complexity and the variability of PC-technology, we cannot guarantee that the product will work in any particular situation or set-up. Our technical support will try to help you find a solution.
- Pay attention to electrostatic discharges; use a CMOS protected workplace.
- Power supply must be OFF when working on the board or connecting any cables or devices.

## 1.5. Recycling Information

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.

## 1.6. Technical Support

1. Contact your local DIGITAL-LOGIC Technical Support, in your country.
2. Use the Internet Support Request form at <http://support.digitallogic.ch/> → embedded products → New Support Request

**Support requests are only accepted with detailed information about the product (i.e., BIOS-, Board-version)!**

## 1.7. Limited Two Year Warranty

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

During the two 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, direct customers of DIGITAL-LOGIC AG, Switzerland are required to register a RMA (Return Material Authorization) number in the Support Center at <http://support.digitallogic.ch/>**

**All other customers must contact their local distributors for returning defective materials.**

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. Nor if the user has insufficient knowledge of these technologies or has not consulted the product manuals or the technical support of DIGITAL-LOGIC AG and therefore the product has been damaged.

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

Except, as directly 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.

## 1.8. Explanation of Symbols



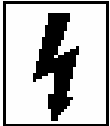
### **CE Conformity**

*This symbol indicates that the product described in this manual is in compliance with all applied CE standards.*



### **Caution, Electric Shock!**

*This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your equipment.*



### **Caution, Electric Shock!**

*This symbol and title warn of hazards due to electrical shocks (> 32V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your equipment*



### **Warning, ESD Sensitive Device!**

*This symbol and title inform that electronic boards and their components are sensitive to Electro Static Discharge (ESD). In order to ensure product integrity at all times, care must always be taken while handling and examining this product.*



### **Attention!**

*This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your equipment.*



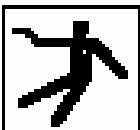
### **Note...**

*This symbol and title emphasize aspects the user should read through carefully for his, or her, own advantage.*



### **Warning, Heat Sensitive Device!**

*This symbol indicates a heat sensitive component.*



### **Safety Instructions**

*This symbol shows safety instructions for the operator to follow.*



*This symbol warns of general hazards from mechanical, electrical, and/or chemical failure. This may endanger your life/health and/or result in damage to your equipment.*

## 1.9. Applicable Documents and Standards

The following publications are used in conjunction with this manual. When any of the referenced specifications are superseded by an approved revision, that revision shall apply. All documents may be obtained from their respective organizations.

- Advanced Configuration and Power Interface Specification Revision 2.0c, August 25, 2003 Copyright © 1996-2003 Compaq Computer Corporation, Intel Corporation, Microsoft Corporation, Phoenix Technologies Ltd., Toshiba Corporation. All rights reserved. <http://www.acpi.info/>
- ANSI/TIA/EIA-644-A-2001: Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits, January 1, 2001. <http://www.ansi.org/>
- ANSI INCITS 361-2002: AT Attachment with Packet Interface - 6 (ATA/ATAPI-6), November 1, 2002. <http://www.ansi.org/>
- ANSI INCITS 376-2003: American National Standard for Information Technology – Serial Attached SCSI (SAS), October 30, 2003. <http://www.ansi.org/>
- Audio Codec '97 Revision 2.3 Revision 1.0, April 2002 Copyright © 2002 Intel Corporation. All rights reserved. <http://www.intel.com/labs/media/audio/>
- Display Data Channel Command Interface (DDC/CI) Standard (formerly DDC2Bi) Version 1, August 14, 1998 Copyright © 1998 Video Electronics Standards Association. All rights reserved. <http://www.vesa.org/summary/sumddcci.htm>
- ExpressCard Standard Release 1.0, December 2003 Copyright © 2003 PCMCIA. All rights reserved. <http://www.expresscard.org/>
- IEEE 802.3-2002, IEEE Standard for Information technology, Telecommunications and information exchange between systems–Local and metropolitan area networks–Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. <http://www.ieee.org>
- IEEE 802.3ae (Amendment to IEEE 802.3-2002), Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications, Amendment: Media Access Control (MAC) Parameters, Physical Layers, and Management Parameters for 10 GB/s Operation. <http://www.ieee.org>
- Intel Low Pin Count (LPC) Interface Specification Revision 1.1, August 2002 Copyright © 2002 Intel Corporation. All rights reserved. <http://developer.intel.com/design/chipsets/industry/lpc.htm>
- PCI Express Base Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI Express Card Electromechanical Specification Revision 1.1, March 28, 2005, Copyright © 2002-2005 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI Local Bus Specification Revision 2.3, March 29, 2002 Copyright © 1992, 1993, 1995, 1998, 2002 PCI Special Interest Group. All rights reserved. <http://www.pcisig.com/>
- PCI-104 Specification, Version V1.0, November 2003. All rights reserved. <http://www.pc104.org>
- PICMG® Policies and Procedures for Specification Development, Revision 2.0, September 14, 2004, PCI Industrial Computer Manufacturers Group (PICMG®), 401 Edgewater Place, Suite 500, Wakefield, MA 01880, USA, Tel: 781.224.1100, Fax: 781.224.1239. <http://www.picmg.org/>
- Serial ATA: High Speed Serialized AT Attachment Revision 1.0a January 7, 2003 Copyright © 2000-2003, APT Technologies, Inc, Dell Computer Corporation, Intel Corporation, Maxtor Corporation, Seagate Technology LLC. All rights reserved. <http://www.sata-io.org/>

- Smart Battery Data Specification Revision 1.1, December 11, 1998. [www.sbs-forum.org](http://www.sbs-forum.org)
- System Management Bus (SMBus) Specification Version 2.0, August 3, 2000 Copyright © 1994, 1995, 1998, 2000 Duracell, Inc., Energizer Power Systems, Inc., Fujitsu, Ltd., Intel Corporation, Linear Technology Inc., Maxim Integrated Products, Mitsubishi Electric Semiconductor Company, Power-Smart, Inc., Toshiba Battery Co. Ltd., Unitrode Corporation, USAR Systems, Inc. All rights reserved. <http://www.smbus.org/>
- Universal Serial Bus Specification Revision 2.0, April 27, 2000 Copyright © 2000 Compaq Computer Corporation, Hewlett-Packard Company, Intel Corporation, Lucent Technologies Inc., Microsoft Corporation, NEC Corporation, Koninklijke Philips Electronics N.V. All rights reserved. <http://www.usb.org/>

## 1.10. For Your Safety

Your new DIGITAL-LOGIC product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long, fault-free life. However, this life expectancy can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and for the correct operation of your new DIGITAL-LOGIC product, please comply with the following guidelines.



### **Attention!**

All work on this device must only be carried out by sufficiently skilled personnel.



### **Caution, Electric Shock!**

Before installing your new DIGITAL-LOGIC product, always ensure that your mains power is switched off. This applies also to the installation of piggybacks or peripherals. Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltage before performing work.



### **Warning, ESD Sensitive Device!**

Electronic boards and their components are sensitive to static electricity. In order to ensure product integrity at all times, be careful during all handling and examinations of this product.

## 1.11. RoHS Commitment

DIGITAL-LOGIC AG is committed to develop and produce 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 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 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.

### **1.11.1. RoHS Compatible Product Design**

All DIGITAL-LOGIC standard products 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 DIGITAL-LOGIC standard products.

### **1.11.2. RoHS Compliant Production Process**

DIGITAL-LOGIC selects external suppliers that are capable of producing RoHS compliant devices. These capabilities are verified by:

1. A confirmation from the supplier indicating that their production processes and resulting devices are RoHS compliant.
2. 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.

### **1.11.3. 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. The 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 DIGITAL-LOGIC does not deliver ready-made products to end users the WEEE directive is not applicable for DIGITAL-LOGIC. Users are nevertheless encouraged to properly recycle all electronic products that have reached the end of their life cycle.

## 2. OVERVIEW

### 2.1. Standard Features

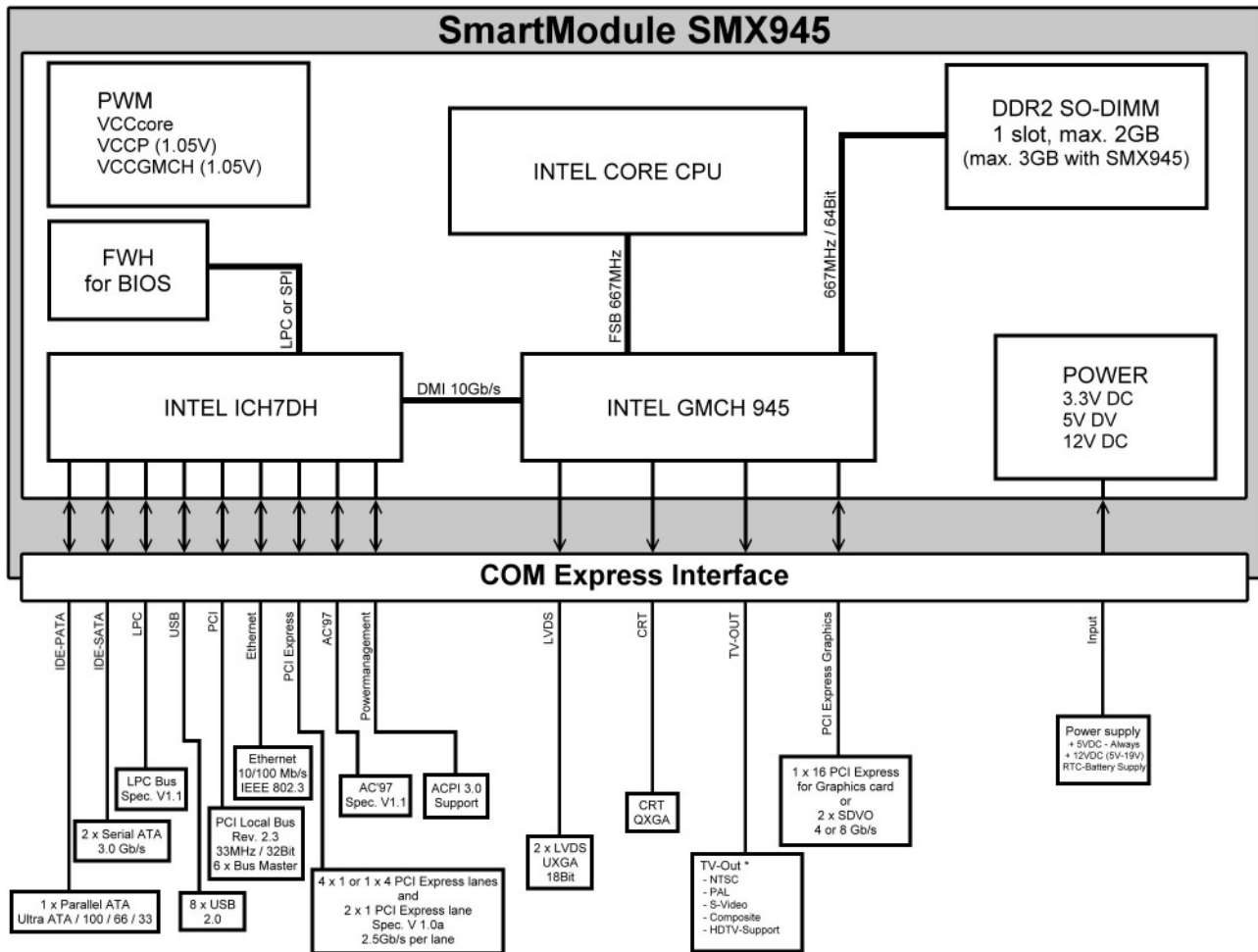
The smartModuleExpress945 is a miniaturized PC system on chip unit incorporating the major elements of a PC/AT compatible computer. It includes standard PC/AT compatible elements, such as:

- Powerful Core Duo, Core 2 Duo, Core Solo CPU
- DDR2 SODIMM socket for 256MByte to 2GByte RAM-Module
- Dual 220pin connectors (1<sup>st</sup> Connector: Rows A-B and 2<sup>nd</sup> Connector: Rows C-D, 440pins total)
- COMexpress Bus Type 2
- 32bit PCI interface
- IDE port (to support legacy ATA devices as CD-ROM and CompactFlash)
- Up to 6 PCI Express general purpose lanes
- One, 1x16 PCI Express Graphics (PEG) slot
- SDVO option (pins shared with PCI Express Graphics)
- Maximum module input power capability extended to 80W
- Maximum Thermal Design Power up to 40W
- Up to 8 USB 2.0 ports; 4 shared over-current lines
- Up to 2 Serial ATA ports
- Dual 24bit LVDS channels
- Analog VGA
- Powerful internal Graphic controller GMA950
- Intel High Definition Audio (Azalia) and AC '97 digital audio interface (external CODEC)
- Single Ethernet interface 100/10Mbit/s with integrated PHY
- AMI BIOS
- LPC Bus for SuperIO (COM1/2, LPT, FD), diagnostics, BIOS device

### 2.2. Unique Features

- EEPROM for setup and configuration
- UL approved parts
- Remote Function
- Thermal Interface with a very low thermal resistance (copper core)
- Very ruggedized, withstands highest mechanical vibration and shock
- Very low power consumption → no active cooling required
- Extended wide range power input for single 5Volt supply applications
- Power Management Microcontroller

## 2.3. Block Diagram



\* This function is disabled.  
 A Macrovision license is required to enable it.

## 2.4. Specifications

CPU	Specification
CoreDuo / Celeron M	Intel Core Duo L2400 LV 2x 1.66GHz with 2MB L2-cache Intel Core 2 Duo L7400 LV 2x 1.66GHz with 4MB L2-cache Intel Celeron M423 ULV 1x 1.06GHz with 1MB L2-cache Intel Celeron M440 1x 1.86GHz with 1MB L2-cache
Clock	1GHz up to 1.86GHz
1 <sup>st</sup> Level Cache	2x 32kByte
2 <sup>nd</sup> Level Cache	1, 2, 4 MByte (on die)
Technology	65nm
VCCCore @ 1.6GHz	1.308V
VCCCore @ 0.6GHz	0.844V
VCCCore @ deep sleep	0.748V
CPU-Bus	AGTL+
AGTL+ Termination	Integrated
FSB	533/666MHz quad-pumped synchron bus

Mathematics Coprocessor	
	Available on the PENTIUM CPU

Intel 945GME Graphics Memory Controller Hub	
Memory Controller	Specification
Supports	PC1600 / PC2100 / PC2700
Socket	DDR2 SODIMM 200pin
Technologies	DDR2-667
Capacity	256MByte up to 2GByte (3GByte with SMX945B)
Voltage	2.5V
Termination	1.25V
Width	64bit
ECC-Support	No

Intel 945GME Graphics Memory Controller Hub	
Graphic Controller Alternative to the PEG Interface	Specification
Max. Video memory	224MByte with Intel GMA950
Graphic Core Frequency	400MHz
3D Graphic Engine	3D-setup and rendering engine Zone rendering Texture engine
Direct-X Compatibility	Direct-X9
Analog CRT	400MHz RAMDAC with 24bit Resolution up to 2048 x 1536 @ 70Hz (QXGA) Hardware cursor support I2C and DDC channels Dual independent display
SDVO Port	2 channels (multiplexed with the PEG signals) 2x 200 Mpixel/sec Support for up to 2x DVI, 1x TV and 2x LVDS Dotclock = 165MHz Compliant with DVI Spec.1.5
Flat Panel Interface	2 channel LVDS interface 1x 18, 2x 18, 1x24, 2x24bpp TFT Dotclock = up to 2x 112 MHz Resolutions 640 x 480 up to 1600 x 1200 (UXGA) Automatic panel detection via VESA EDID 1.3
TV Out	Disabled. A Macrovision license is required.

<b>Intel 945GME Graphics PEG</b>	
<b>PEG Controller</b>	<b>Specification</b>
Alternative to the internal graphic controller Multiplexed with the SDVO signals	
Support	PEG
Mode	16 lanes
Voltage	1.5Volt
Signals	Differential 2.5Gbit/sec

<b>Intel 82801DBM (ICH7DH)</b>	<b>Specification</b>
PCI-Bus	Supports PCI 2.2 with 6 resources
EIDE-Bus	1x Ultra P-ATA 100
SATA-Bus	2 channels 150MByte/sec
USB V2.0	8 channels USB
APIC	INTEL I/O APIC
SMB	V2.0 SMBus controller
FWH	Firm Ware Hub for BIOS devices
LPC	Serialized BUS (no ISA) used for external SuperIO (COM1/2, MS, KB, FD and LPT)
Sound	AC97 2.3 HDA Interface with 192kHz sampling rate and 8 channels
IRQ Controller	8259 compatible
Timers	8254 compatible
Power Management	Integrated

<b>Reset &amp; Power Management</b>	<b>Specification</b>
Controller	PIC 16C870
Power Modes	S5, S4, S3, S1
ACPI	V3.0

<b>BUS</b>	<b>Specification</b>
PCI	PCI 2.2 33MHz 32bit
LPC	8bit 33MHz
PClexpress	6x 1 lane, PEG

<b>Power Supply</b>	<b>Specification</b>
DC Input	5.0V up to maximum 18V, max. 200mV ripple up to 30 Watts peak for VCCCore, 2.5V and 1.25V generation
Inrush current	5.0V up to 10Amp for 100µs ★ 18.0V up to 30Amp for 20µs ★
5.0Volt	0.1Amp (VCC5ALW)
Onboard Voltages	VCC-Core, 1.05V, 1.2V, 1.25V, 1.3V, 1.5V, 1.8V, 2.5V, 3.3V
Power Consumption	800MHz: approx. 6Watts @ 512MByte DDR2-RAM, Desktop load 1.6GHz: approx. 24Watts @ 512MByte DDR2-RAM, 100% workload

★ use inductors in series to reduce the maximum inrush current!

Physical Characteristics	Specification
Dimensions	Length: 117 mm +/- 0.1mm Depth: 70 mm +/- 0.1mm Height: 15 mm +/- 0.2mm (with 5mm bus connectors) 18 mm +/- 0.2mm (with 8mm bus connectors) The connector height is selected by the connector on the carrier board.
Weight	120 gr / 12 ounces
PCB Thickness	1.6 mm / 0.0625 inches nominal
PCB Layer	Multilayer

Operating Environment	Specification
Relative Humidity	5-90% non-condensing
Vibration	5 to 2000 Hz
Shock	10 G
Operating Temperature	Standard: T.B.D. (depends on the CPU and the cooling concept) Extended Range: T.B.D.
Maximum Copper Temperature	90 °C
Storage Temperature	-55 °C to +85 °C

EMI / EMC (IEC1131-2 refer MIL 461/462)	Specification
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, IEEEE587, VDE 0843 Part 5 Supply: 2kV, 6 pulse/minute I/O: 500V, 2 pulse/minute FD, CRT: None
High-Frequency Radiation	EN55022

**All information is subject to change without notice.**

## 2.5. Examples of Ordering Codes

Product Name	Part Number	Description
SMX945-C423	805360	smartModuleExpress945, Celeron M 423, 0MB RAM
SMX945-C440	805354	smartModuleExpress945, Celeron M 440, 0MB RAM
SMX945-L2400	805350	smartModuleExpress945, Core Duo L2400, 0MB RAM
SMX945-L7400	805352	smartModuleExpress945, Core 2 Duo L7400, 0MB RAM

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

## 2.6. Related Application Notes

Application Notes are available at <http://www.digitallogic.com> → support, or on any DIGITAL-LOGIC Application CD.

#	Description

## 3. PREPARATION



**Warning, ESD Sensitive Device!**

Place the embedded computer board on an isolated, ESD-protected surface. Also ensure that all equipment, tools and people are fully protected against ESD.

### 3.1. Print Detailed Manuals from the CD



**Note...**

Place the Product-CD into the CD-Drive of a personal computer with a connected printer. Open the CD; open the directory SMX945.

Printout the following detailed manuals:

1. The technical/hardware manual: SMX945\_Detailed.pdf
2. The driver/software/BIOS manual: SMX945\_BIOS.pdf



## 3.2. Connect Peripherals to the Board

Prepare the following peripherals:

- VGA Monitor (LCD or CRT) with a resolution up to 1024x768pixel
- PS2 Keyboard
- USB Mouse
- LAN-Cable, if available
- Hard disk or CompactFlash
- USB CD-Drive or Floppy drive
- Power supply with 12Volt and min. 30Watts

1. Connect the VGA-Monitor to the 15pin high density DSub-connector.
2. Connect the Keyboard to the PS/2 connector.
3. Connect the USB-Mouse to one of the USB-connectors.
4. Connect the hard disk with a 44pin cable to the IDE-connector.

Alternatively to the hard disk, the CompactFlash-Card may be inserted into the CF-socket.



**The polarity must be correct.** Pin1 of the cable must go to Pin1 of the connector, which has a red mark next to it (not visible in the photo). Otherwise the hard disk and/or the computer may be destroyed.

5. Connect a USB CD-Drive or a USB Floppy drive to one of the USB connectors.
6. Connect the 12Volt power supply to the power input of the computer board.



**The polarity must be correct.** Otherwise the electronic board may be destroyed.

7. Insert a boot device: USB-Stick, Floppy or bootable CF.

## 3.3. The Development Kit, Part Nr. 805390

The Development Kit (DK) is currently unavailable but would allow for an immediate start-up with the embedded system. The hard disk includes a DOS and a LINUX kernel V2.6 boot partition.

The material which will be included in the SMX945PC-DK (Development Kit) is not yet decided.

Item	Part Nr.

## 4. START UP / POWER OFF THE BOARD

With the PWRBTN# signal, the system can be started. Activating this signal a second time will shut the system down.

### How to Activate PWRBTN#

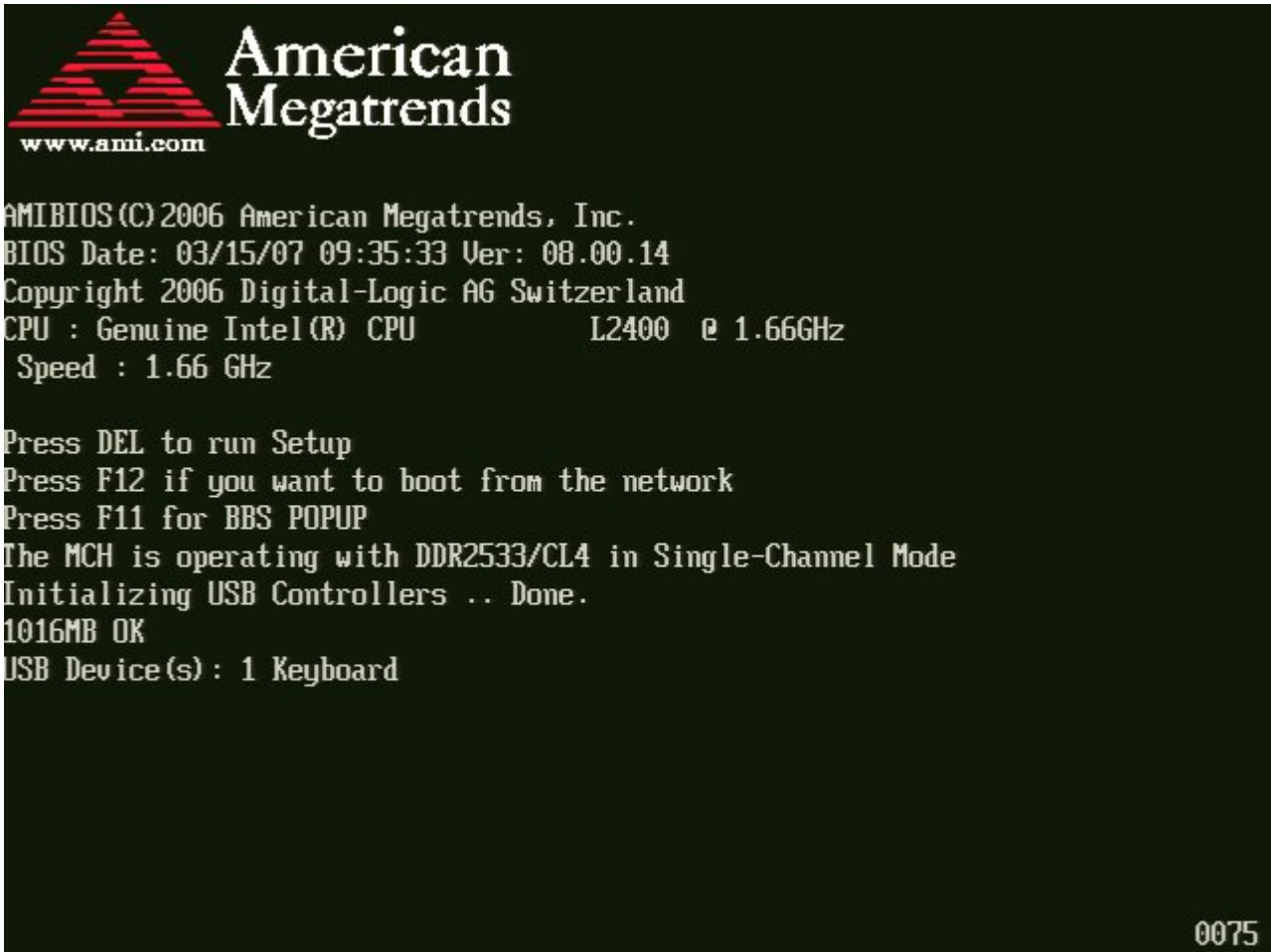
- The PWRBTN# signal must be connected to a ground to be activated.
- Minimum activation time is 3 seconds for the controller to start/stop the system.

A few seconds after powering up the board, the screen should display the BIOS initial messages/pictures.



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## 4.1. BIOS Setup

Since the BIOS is auto-configuring during the start-up procedure, normally the user does not enter the BIOS setup. Manual setup is needed only to change the default settings. Please refer to the driver/software/BIOS manual "SMX945\_BIOS" printed from the CD for the BIOS setup details.

## 4.2. Boot Up the Operating System and Install the Drivers

Depending on which boot drive is available, boot up the operating system from the CompactFlash, hard disk, or floppy disk.

To install the drivers, see the driver/software/BIOS manual "SMX945\_BIOS" on the Product CD.

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