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Technical Manual

ePanel-C3

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1.1. User Information

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1.3. General

For the circuits, descriptions and tables indicated no responsibility is assumed as far as patents or other rights of third parties are concerned. The information in the chapter Technical Descriptions describes the type of the boards and shall not be considered as assured characteristics.
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1.4. Warranty

Each board is tested carefully and thoroughly before being shipped. If, however, problems should occur during operation, please check your user specific settings of all boards included in your system. This is often the source of problems due to resource conflicts. If a board is defective, it can be sent to your supplier for repair. Please take care of the following steps:

1. The board returned should have the factory default settings since a test is only possible with these settings.
2. In order to repair your board as fast as possible we require some additional information from you (detailed description of how and when did the problem occur, what is exactly the problem and so on).
3. Upon receipt of returned boards please be aware that your user specific settings could have been changed during repair.

Within the warranty period the repair is free of charge as long as the warranty conditions are observed. Because of the high test expenditure you will be charged with the test cost if no fault is found. Repair after the warranty period will be charged.

This **Kontron** product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period **Kontron** will at its option either repair or replace defective products.

For warranty service or repair the product must be returned to a service facility designated by **Kontron**.

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

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

1.5. Support, problems and failure analysis

It is not in the responsibility of **Kontron** to provide you with information on standard PC technology. Please find a selection of different information sources for your convenience in chapter Literature, standards, links.

Before contacting **Kontron** please check first our web page for available information (newest manuals, application notes etc.). If you can't solve the problem on your own with this documents, do not hesitate to contact us by email or phone. Please prepare yourself to answer a few questions like

- which **Kontron** module(s) is(are) concerned?
- what serial numbers (xx???????)?
- what BIOS versions?
- since when is this problem known
- is this problem already reported (to whom?)
- and so on...

2. INTRODUCTION

2.1. Kontron ePanel-Concept

Time is something no one has enough. „Short time-to-market“ is a nightmare everybody suffers from. A new concept promises a lot of advantages, but how to use them in a non existent time span? Especially embedded boards are not always easy connectable, think of tangling cables or missing adapters. Kontron recognized this problem and developed the **ePanel**, a platform for OEM and ODM. Its main benefit is the high integration of mobile accessories and components in conjunction with mechanical fit and function. To build a mobile computer, just use a battery, TFT display, inverter and housing and you‘re set. Now system design and application development gets a great boost forward. Others still look for adapters while your project already started.
In order to stay close to state-of-the-art computer technologies of the desktop PC market, the ECT business (**E**mbedded **C**omputer **T**echnology) demands adequate processor performance for many applications. There are many standards for CPU boards with a lot of advantages or restrictions. Unfortunately none of these products care about the increasing customer specialization. A board, which fits exactly into a system, is nearly impossible to find but **ePanel** fits nearly for all mobile and space critical applications. Only a customized module will fulfill all requirements. But away from standard products, a customer has to tolerate long development cycles and costly problems with quick replacements or easy upgrades. The way out of this situation has to join two apparent opposites. The task is to create a customized PC board out of standard parts. Obviously the solution has to be modular. The answer of Kontron for the mobile business: **ePanel.**

Quick integration and nevertheless standard PC technology.
The **ePanel-C3** is a complete Pentium® III class PC with standard interfaces including USB and additional options such as Sound capabilities, PC-Card, Touch & Matrix controller, TV-In-and Output, Flatpanel interface, and 100 MBit Ethernet, etc.

Smallest Dimensions to meet smallest space requirements.
With 252 cm^2 the **ePanel-C3** uses only a little more space compared to a current slot CPU, which needs 219 cm^2. But the most surprising fact is the module height. The **ePanel-C3** measures only 21mm!

How about the ISA bus?
The only way to extend the capabilities of the board is to plug in PC-Cards or Mini-PCI-boards. No other bus systems are supported.

There must be replacements or upgrades for future requirements.
Kontron will expand and improve this innovative and handy ePanel concept. New PC technologies will be obtainable the same way as in other Kontron product families.

An **ePanel board** does not force you in excessive and expensive cabling. Only the really demanded interfaces are linked to the corresponding connectors. The decision is up to you, which one you call for or which one to skip. Evaluation adapters and kits are available.

The application requests low power Pentium® III performance.
Don‘t worry about that. Depending on OS and used options, the **ePanel-C3** consumes between 12..19 Watts depending on input voltage and CPU speed.

Finally the system passed all the tests and now?
Nothing special, just start mass production. **Kontron** knows about the short life cycles of PC products. Therefore we secured by suitable methods, that longevity is one of the most excellent characteristics of the **ePanel family**.

2.2. ePanel-C3

The **ePanel-C3** is an extreme compact VIA Eden based PC module with consistent low power design. It is now possible to create modular systems, combining exchangeable CPU performance with systems, carrying only the connectors and additional functions needed. This reduces development costs and speeds up application design. Despite the very little board dimensions, the **ePanel-C3** offers all standard interfaces such as Sound, Ethernet, USB and Graphic. The fully compliant AC97 soundchip is supported by most operating systems. For networking purposes the **ePanel-C3** comes with a 10/100 MBit Ethernet controller which allows an easy Intranet/Internet access. Total communication interfaces like 2 Serial TTL ports, an EPP/ECP Parallel port, Floppy-interface, Touch & Matrix controller, TV-Input and optional TV-Output, three USB 2.0 ports, PC-Card controller, 10/100 MBit Ethernet, Battery charger for smart batteries and a wide range DC Power supply. You‘re looking for a secure and EMI tolerant boot medium? A compact flash socket for commercial CF-cards is already integrated on the module. For further expansions one additional IDE port is available.

3. FEATURES

- **32 bit x86 processor**

  Available with VIA EDEN ESP3000 (300 MHz), ESP7000 (733 MHz) or ESP10000 (1 GHz) for low power applications, internal L1 Cache 128 kB and 64 kB L2 Cache

- **Chipset**

  VIA CLE266 North Bridge and VIA VT8235 SouthBridge

- **Power supply**

  Wide range power supply: 8V DC up to 28V DC
  Battery power supply with smart battery packs: 7V DC up to 18.4V DC
  Integrated charging unit for batteries up to 18V

- **Memory support, 64 bit DDR-RAM interface**

  One DDR-SO-DIMM socket max. 1 GB

- **Two serial ports (COM1 and COM2)**

  TTL signals only

- **One parallel port (LPT1)**

  EPP and ECP capability

- **Floppy interface**

  Supports all standard densities

- **EIDE PCI hard disk interface**

  2 x PCI Bus Master IDE ports (up to 3 IDE devices)
  Compact Flash socket as Primary Master
  44 pin IDE connector as Secondary Master/Slave

- **Three USB 2.0 ports , OpenHCI specification compliant**

  USB Legacy support
  USB Boot support

- **PS/2 keyboard and PS/2 mouse**

- **IrDA interface**

- **512 kByte FLASH for BIOS**

- **Real Time Clock**

- **Keyboard Controller**

- **NV-Storage for CMOS-Setup**

- **Onboard Ethernet 10BASE-T/100BASE-TX LAN**

  VIA VT6103 10/100 MBit Controller

- **Onboard VGA/LCD controller**

  VIA CLE266 with integrated VIA AGP Castle Rock engine with MPEG-2 decoder and 16, 32 or 64 MB shared memory

  Output:
  Single VGA/CRT
  1x TTL (FLEX32; 1x18 Bit)
  2x LVDS (JILI or JILI 30; 2 x 24 Bit)
  TV-Out (Composite-Video / S-Video)

  Resolution: VGA up to UXGA

- **Audio codec VIA VT1616 AC97, Line In, Line Out, Mic In**
- **Onboard compact flash socket for commercial Type II CF-cards (Master on Primary IDE)**
- **Onboard PC-Card socket for Wireless LAN, Bluetooth, ISDN or modem cards**
- **NTSC/PAL Philips SAA7118 multistandard video decoder with capture (max. 16 input)**
- **Power management, ACPI 1.0b / 2.0 compliant**
- **Onboard 4/5/8-wire touch controller**
- **Onboard 8x8 keyboard matrix controller**

4. RESOURCE LIST AND I/O MAP

IRQ #	Used for	available	comment
0	Timer0	No	
1	Keyboard	No	
2	Cascade	No	
3	COM2	Yes	Note (1). Default: disabled
4	COM1	No	Note (1)
5	PCI device	No	PCI interrupt. Note (2)
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	Cascade / ACPI	No	
10	PCI device	No	PCI interrupt. Note (2)
11	PCI device	No	PCI interrupt. Note (2)
12	PS/2 Mouse	Yes	Note (1). Default: disabled
13	FPU	No	
14	IDE0	No	Note (1)
15	IDE1	No	Note (1)

DMA #	Used for	available	comment
0		Yes	
1		Yes	
2	FDC	No	Note (1)
3		Yes	
4	Cascade	No	
5	IrDA	Yes	Note (1). Default: disabled
6		Yes	
7		Yes	

Upper Memory	used for	Available	comment
C0000h – CFFFFh	VGA BIOS	No	
D0000h – DFFFFh	Plug&Play	Yes	
E0000h – EFFFFh	System-BIOS	No	
F0000h – EC000h	System BIOS	No	

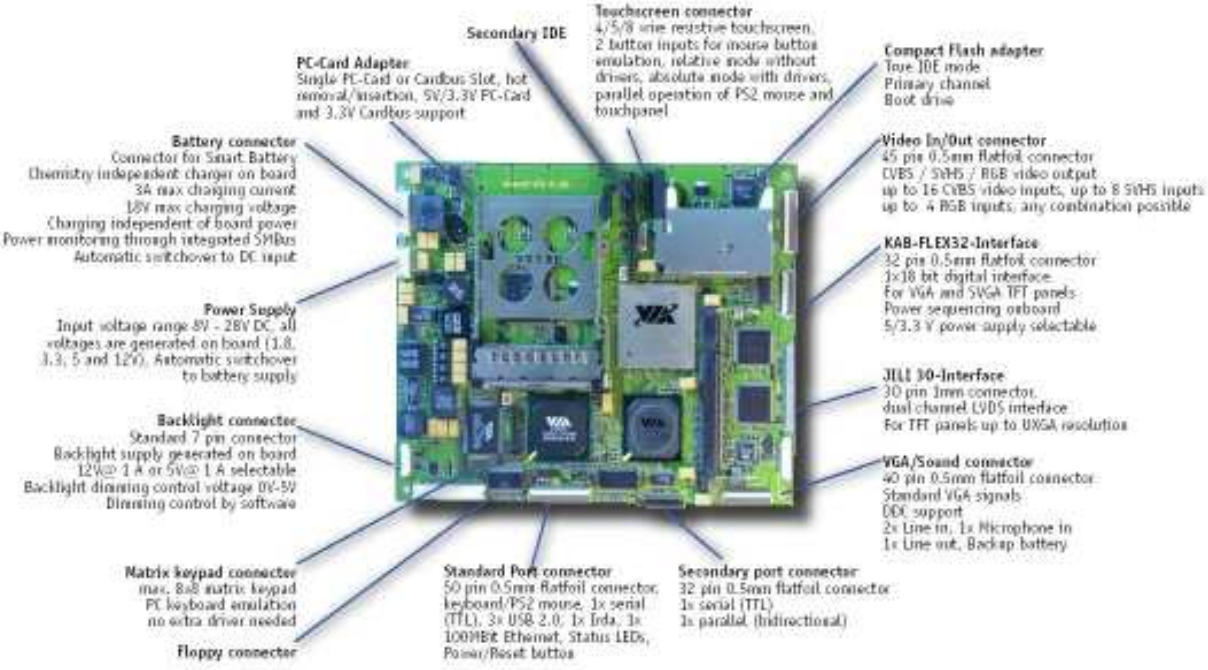
The I/O-port addresses of the ePanel-C3 are functionally identical with a standard PC/AT.
Following the additional I/O ports which are used on this board:

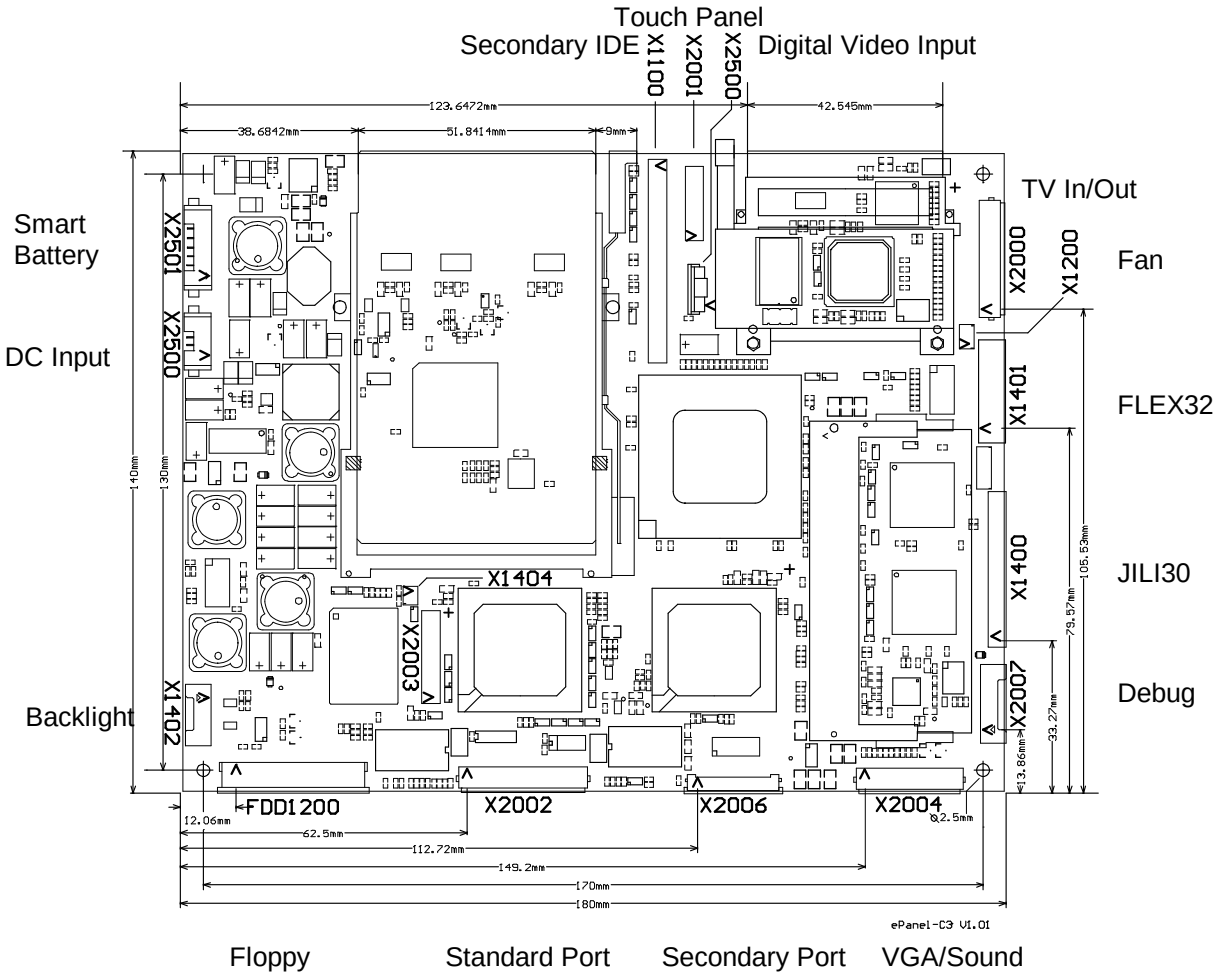
I/O addr.	used for	available	comment
00-FF	System devices (e.g. DMA, RTC, Keyboard)	No	
170-17F	Secondary IDE	No	Note (1)
1F0-1F7	Primary IDE	No	Note (1)
278-28F	LPT2	Yes	Note (1)
2E8-2EF	COM4	Yes	Note (1)
2F8-2FF	COM2	Yes	Note (1). Default: disabled
378-37F	LPT1	No	Note (1)
3B0-3DF	VGA	No	Note (3)
3E8-3EF	COM3	Yes	Note (1)
3F0-3F7	Disk controller	No	Note (1)
3F8-3FF	COM1	No	Note (1)
400-40F	Reserved	No	
4D0-4D1	Reserved	No	
680-68F	Reserved	No	
800-87F	Reserved	No	
A40-A47	TVIn interface	No	
CF8-CFF	PCI Configuration Address/Data	No	
E000-EFFF	Reserved	No	

Note 1: if the 'used for'-device is disabled in setup, the corresponding interrupt, DMA or I/O-address is available for other devices.
Note 2: if the corresponding interrupt is set to "Reserved" it cannot be used anymore by the internal PCI device.
Note 3: this I/O-Range is only decoded in 10 bits. That means the register will be mirrored in the memory every 1024 bytes.

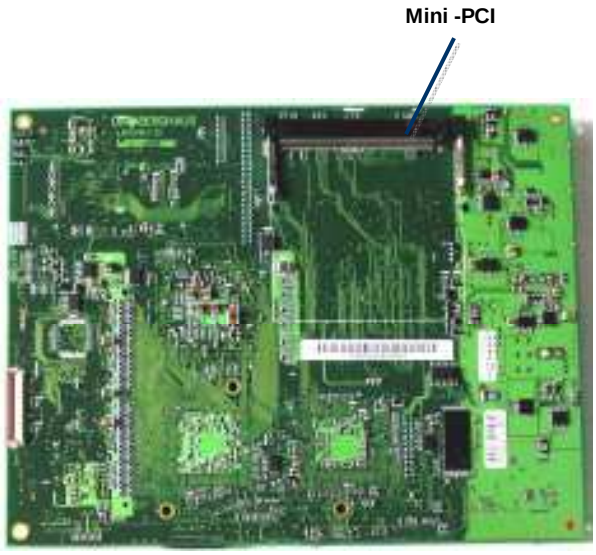
5. CONNECTOR LOCATIONS AND PINOUTS

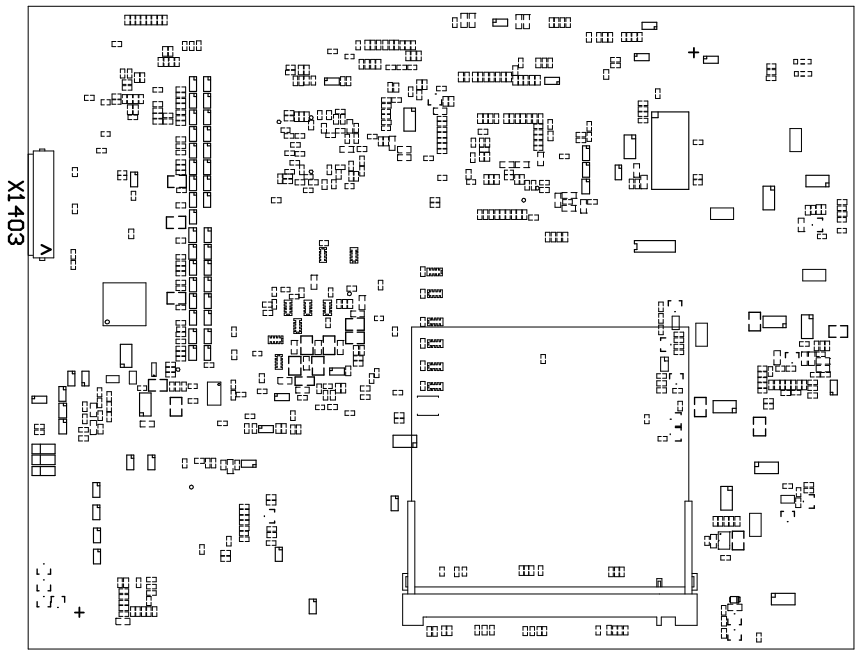
5.1. Connectors





Find more detailed information about the connectors in chapter "5.2 Connector Pinouts"





Find more detailed information about the connectors in chapter "5.2 Connector Pinouts"

5.2. Connector pinouts

Pin-No.	Smart Battery Connector	DC Input Connector	Backlight Connector	Floppy Connector	Matrix Keyboard Connector	Touch Panel Connector 4/5/8Wire	Debug Connector	Pin-No.
	X2501	**X2500**	**X1402**	**FDD1200**	**X2003**	**X2001**	**X2007**	**No.**
	Mirose DF3Z-7P-2H	Mirose DF3Z-4P-2H	Molex 53261-0771	Molex 52271-2679	Double row header - Pitch 2mm, 2x10 con.	Double row header - Pitch 2mm, 2x8 con.	Molex 53261-1071	
1	BAT+	+DCIN	NC	VCC5	GND	GND	GND	1
2	BAT+	+DCIN	BKLT_ADJ	INDEX#	VCC3	YB	+5VDUAL	2
3	BATT_SCL	GND	GND	VCC5	KB_DO0	SYB	+3V3DUAL	3
4	BATT_SDA	GND	BKLT_SW	DR0#	KB_DO1	GND	VCC5	4
5	THM		BKLT_SW	VCC5	KB_DO2	YT	VCC5	5
6	GND		GND	DSKCHG#	KB_DO3	SYT	DDC_SCL	6
7	GND		BKLT_ON	NC	KB_DO4	GND	DDC_SDA	7
8				NC	KB_DO5	XL	GND	8
9				NC	KB_DO6	SXL	VCC12	9
10				MTR0#	KB_DO7	GND	BCKBAT+	10
11				NC	GND	XR		11
12				FDIR#	VCC3	SXR		12
13				NC	KB_DI0	GND		13
14				STEP#	KB_DI1	TRB#		14
15				GND	KB_DI2	TLB#		15
16				WDATA#	KB_DI3	GND		16
17				GND	KB_DI4			17
18				WGATE#	KB_DI5			18
19				GND	KB_DI6			19
20				TRK0#	KB_DI7			20
21				GND				21
22				WRTPRT#				22
23				GND				23
24				RDATA#				24
25				GND				25
26				HDSEL#				26

5.3. Connector pinouts

Pin-No.	Secondary IDE Connector	TV-Out/In Connector (SAA7118)	Flatpanel (FLEX32) Connector	Flatpanel (JILI) Connector	VGA/Sound Connector	COM2/LPT1 Connector	USB/COM1/ KEYB/PS2/ Ethernet Connector	Pin-No.
	X1100	**X2000**	**X1401**	**X1403**	**X2004**	**X2006**	**X2002**	**No.**
	Double row header - Pitch 2mm, 2x22 con.	Molex 54132-4597	Molex 54132-3297	Molex 54132-4097	Molex 54132-4097	Molex 54132-3297	Molex 54132-5097	
1	IDE_RST#	GND	GND	NC	GND	VCC5	VCC5	1
2	GND	CVBS_IN1 (AI11)	PCLK	FTX0-	AUX_L	GND	KBCLK	2
3	IDE_D7	GND	PHS	FTX0+	GND	DSR2#	KBDAT	3
4	IDE_D8	CVBS_IN2 (AI21)	PVS	FPVDD	AUX_R	DCD2#	GND	4
5	IDE_D6	GND	GND	FTX1-	GND	DTR2#	MDAT	5
6	IDE_D9	Y_IN1 (AI12)	PR0	FTX1+	VLINE_L	RTS2#	MCLK	6
7	IDE_D5	GND	PR1	NC	GND	CTS2#	GND	7
8	IDE_D10	C_IN1 (AI22)	PR2	FTX2-	VLINE_R	SIN2	DSR1#	8
9	IDE_D4	GND	PR3	FTX2+	GND	SOUT2	DCD1#	9
10	IDE_D11	Y_IN2 (AI31)	PR4	GND	CD_L	RI2#	DTR1#	10
11	IDE_D3	GND	PR5	FTXC-	GND	GND	RTS1#	11
12	IDE_D12	C_IN2 (AI41)	GND	FTXC+	CD_R	AFD#	CTS1#	12
13	IDE_D2	GND	PG0	GND	GND	STB	SIN1	13
14	IDE_D13	Y_IN3 (AI32)	PG1	FTX3-	MIC	ERR#	SOUT1	14
15	IDE_D1	GND	PG2	FTX3+	GND	PD0	RI1#	15
16	IDE_D14	C_IN3 (AI42)	PG3	JILI_SDA	LINE_L	INIT#	GND	16
17	IDE_D0	GND	PG4	STX0-	GND	GND	IRRX1	17
18	IDE_D15	RGB_SYNC1 (AI13)	PG5	STX0+	LINE_R	PD1	IRTX1	18
19	GND	GND	GND	JILI_SCL	GND	SLIN#	GND	19
20	NC	RGB_GREEN1 (AI23)	PB0	STX1-	VCC5	PD2	VCC5	20
21	IDE_DRQ	GND	PB1	STX1+	VCC5	PD3	VCC5	21
22	GND	RGB_BLUE1 (AI33)	PB2	NC	VCC5	GND	VCC5	22
23	IDE_IOW#	GND	PB3	STX2-	VCC5	PD4	VCC5	23
24	GND	RGB_RED1 (AI43)	PB4	STX2+	GND	PD5	VCC5	24
25	IDE_IOR#	GND	PB5	GND	VGA_GREEN	PD6	VCC5	25
26	GND	RGB_SYNC2 (AI14)	GND	STXC-	GND	PD7	OVRCUR#	26
27	IDE_IORDY	GND	PDE	STXC+	VGA_BLUE	GND	GND	27
28	IDE_SEL	RGB_GREEN2 (AI24)	PANEL_VCC	GND	GND	ACK#	USB0+	28
29	IDE_DACK#	GND	PANEL_VCC	STX3-	VGA_RED	BUSY#	USB0-	29
30	GND	RGB_BLUE2 (AI34)	R/L	STX3+	GND	PE	GND	30
31	IDE_IRQ	GND	U/D	VCC5	DDC_SDA	SLCT	USB1+	31
32	NC	RGB_RED2 (AI44)	RESERVED	VCC5	DDC_SCL	GND	USB1-	32
33	IDE_A1	GND	GND	VCC5	GND		GND	33
34	DIAG_P	GND		VCC5	VGA_VS		USB2+	34
35	IDE_A0	CVBS/RGB_B		BKLT_ON	GND		USB2-	35
36	IDE_A2	GND		GND	VGA_HS		GND	36
37	IDE_CS0#	SVC/RGB_R		GND	GND		RXD+	37
38	IDE_CS1#	GND		VCC12	SPDIF_OUT		RXD-	38

5.4. Connector pinouts

Pin-No.	IDE Connector	TV-Out/In Connector		Flatpanel (JILI) Connector	VGA/Sound Connector		USB/COM1/ KEYB/PS2/ Ethernet Connector	Pin-No.
	X1100	**X2000**		**X1403**	**X1402**		**X2002**	**No.**
	Double row header - Pitch 2mm, 2x22 con.	Molex 54132-4597		Molex 54132-4097	Molex 53261-0771		Molex 54132-5097	
39	NC	SVY/RGB_G		VCC12	NC		GND	39
40	GND	GND		VCC12	BCKBAT+		TXD+	40
41	VCC5	CVBS					TXD-	41
42	VCC5	GND					GND	42
43	GND	VCC3					LILED	43
44	NC	VCC3					SPEEDLED	44
45		VCC5					ACTLED	45
46							VCC3	46
47							PWR_LED#	47
48							MRESET#	48
49							PWRBTN#	49
50							GND	50

5.5. Connector pinouts

Pin-No.	Digital Video Input	Flatpanel (JILI30) Connector		Fan Connector	Backlight Compensation Input			Pin-No.
	X2005	**X1400**		**X1200**	**X1404**			**No.**
	Double row header - Pitch 2mm, 2x8 con.	JAE FI-X305-HF		Molex 53047-0310	Molex 53047-0210			
1	+3,3V	FTX0-		UFAN	VTIN			1
2	YUV0	FTX0+		FANIN	GND			2
3	YUV1	FTX1-		GND				3
4	YUV2	FTX1+						4
5	YUV3	FTX2-						5
6	YUV4	FTX2+						6
7	YUV5	GND						7
8	YUV6	FTXC-						8
9	YUV7	FTXC+						9
10	GND	FTX3-						10
11	RDY	FTX3+						11
12	CLK	STX0-						12
13	DQ	STX0+						13
14	RH	GND						14
15	RV	STX1-						15
16		STX1+						16
17		GND						17
18		STX2-						18
19		STX2+						19
20		STXC-						20
21		STXC+						21
22		STX3-						22
23		STX3+						23
24		GND						24
25		SDA						25
26		DATAENA						26
27		SCL						27
28		PANEL_VCC						28
29		PANEL_VCC						29
30		PANEL_VCC						30

5.6. Pin descriptions

5.6.1. Connector X2004 (VGA / Sound)

BCKBAT+
3V backup cell input. BATT should be connected to a 3V backup cell for RTC operation and storage register non-volatility in the absence of system power. (typ. VBATT = 3V to 3.3V)

VGA_HS
Horizontal Sync: This output supplies the horizontal synchronization pulse to the monitor. It is normally not needed for flat panels (TTL).

VGA_VS
Vertical Sync: This output supplies the vertical synchronization pulse to the monitor. It is normally not needed for flat panels (TTL).

VGA_RED, VGA_GREEN, VGA_BLUE
CRT analog video outputs. Max. output voltage is 0.7Vpp.

DDC_SCL, DDC_SDA
Bidirectional open collector DDC signals with TTL level.

AUX_L
Auxiliary input left. Max. input voltage is 0.7Vpp.

AUX_R
Auxiliary input right. Max. input voltage is 0.7Vpp.

VLINE_L
Line-level stereo input left. Max. input voltage is 0.7Vpp.

VLINE_R
Line-level stereo input right. Max. input voltage is 0.7Vpp.

LINE_L
Line-level stereo output left. Max. output voltage is 0.7Vpp.

LINE_R
Line-level stereo output right. Max. output voltage is 0.7Vpp.

CD_L
CD Line-level stereo input left. Max. input voltage is 0.7Vpp.

CD_R
CD Line-level stereo input right. Max. input voltage is 0.7Vpp.

CD_GND
CD Line input Ground.

MIC
Microphone input. Max. input voltage is 0.7Vpp.

SPDIF_OUT
Digital I/F output

5.6.2. Connector X1403 (JILI-Flatpanel-Interface)

JILI_SCL, JILI_SDA
These two pins are functionally suitable for a JILI interface between the graphics controller chip and the flatpanel cable. Open collector bidirectional signals (LVTTL).

FPVDD
Controls panel digital power. LVTTL output.

BKLT_ON
Backlight power control signal. LVTTL output.

FTX0..3
Differential LCD data output signals for LVDS support (First port LVDS output).

FTXC+-
Differential LCD clock pair output for LVDS support (First port LVDS output).

STX0..3
Differential LCD data output signals for LVDS support (Second port LVDS output).

STXC+-
Differential LCD clock pair output for LVDS support (Second port LVDS output).

5.6.3. Connector X1400 (JILI30-Flatpanel-Interface)

FTX0..3
Differential LCD data output signals for LVDS support (First port LVDS output).

FTXC+-
Differential LCD clock pair output for LVDS support (First port LVDS output).

STX0..3
Differential LCD data output signals for LVDS support (Second port LVDS output).

STXC+-
Differential LCD clock pair output for LVDS support (Second port LVDS output).

SCL, SDA
These two pins are functionally suitable for a JILI interface between the graphics controller chip and the flatpanel cable. Open collector bidirectional signals (LVTTL).

DATAENA
Data enable signal for flatpanel.

Panel_VCC
Switched Power supply for flatpanel. **Caution:** adjust correct voltage setting, default value R1410 = +5V

5.6.4. Connector X2002 (USB / COM1 / KEYB / PS2 / Ethernet)

DTR1#
Active low data terminal ready output for the serial port. Handshake output signal notifies modem that the UART is ready to establish data communication link (TTL).

RI1#
Active low input for the serial port. Handshake signal which notifies the UART that the telephone ring signal is detected by the modem (TTL).

SOUT1
Transmitter serial data output from serial port (TTL).

SIN1
Receiver serial data input (TTL).

CTS1#
Active low input for serial port. Handshake signal which notifies the UART that the modem is ready to receive data (TTL).

RTS1#
Active low output of serial port. Handshake signal notifies the modem that the UART is ready to transmit data (TTL).

DCD1#
Active low input for serial port. Handshake signal which notifies the UART that carrier signal is detected by the modem (TTL).

DSR1#
Active low input for serial port. Handshake signal which notifies the UART that the modem is ready to establish the communication link (TTL).

KBDAT
Keyboard data signal (TTL).

KBCLK
Keyboard clock signal (TTL).

MDAT
Mouse data signal (TTL).

MCLK
Mouse clock signal (TTL).

IRTX1, IRRX1
Infrared transmit and receive pin (LVTTL).

TXD-, TXD+
Analog Twisted Pair Ethernet Transmit Differential Pair. These pins transmit the serial bit stream for transmission on the Unshielded Twisted Pair (UTP) cable. The current-driven differential driver can be two-level (10BASE-T) or three-level (100BASE-TX) signals depending on the mode of operation. These signals interface directly with an isolation transformer.

RXD-, RXD+
Analog Twisted Pair Ethernet Receive Differential Pair. These pins receive the serial bit stream from the isolation transformer. The bit stream can be two-level (10BASE-T) or three-level (100BASE-TX) signals depending on the mode of operation.

ACTLED
The Activity LED pin indicates either transmit or receive activity. When activity is present, the Activity LED is on; when no activity is present, the Activity LED is off.

LILED

The Link Integrity LED pin indicates link integrity. If the link is valid in either 10 or 100 Mbps, the LED is on; if link is invalid, the LED is off.

SPEEDLED

The Speed LED pin indicates the speed. The speed LED will be on at 100 Mbps and off at 10 Mbps.

USB0+, USB0-

Universal Serial Bus Port 0. These are the serial data pairs for USB Port 0.

USB1+, USB1-

Universal Serial Bus Port 1. These are the serial data pairs for USB Port 1.

USB2+, USB2-

Universal Serial Bus Port 2. These are the serial data pairs for USB Port 2.

OVRCUR#

Over Current Detect Input. This pin is used to monitor the USB power over current. Max. input voltage is 3.3 VDC.

USBEN

This output enables the USB ports. This pin is used to enable the USB power switch.

PWRBTN#

Power Button Input. This input is used to support the ACPI power button function. Used to power up or down the board and to resume from suspend mode. Max. input voltage is 3.3 VDC.

PWR_LED#

The LED# pin indicates the power status of the board. The LED# pin is an open collector output and will sink current to the connected LED if the device is active, will blink in suspend mode or will be inactive if the device is switched off.

MRESET#

The Manual Reset Input Pin. Short to ground will reset the device. Max. input voltage is 3.3 VDC.

5.6.5. Connector X2006 (COM2 / LPT1)

All signals are TTL compatible.

STB
Active low pulse is used to strobe the printer data into the printer.

AFD#
Active low output causes the printer to automatically feed one line after each line is printed.

PD0..PD7
Bi-directional parallel data bus is used to transfer information between CPU and peripherals.

ERR#
Active low signal indicates an error situation at the printer.

INIT#
Active low signal used to initiate the printer when low.

SLIN#
Active low signal selects the printer.

ACK#
Active low output from the printer indicates it has received the data and is ready to receive new data.

BUSY#
Indicates the printer is busy and not ready to receive new data.

PE
Indicates that the printer is out of paper.

SLCT
Active high output from the printer indicates that it has power on.

DTR2#
Active low data terminal ready output for the serial port. Handshake output signal notifies modem that the UART is ready to establish data communication link.

RI2#
Active low input handshake signal which notifies the UART that the telephone ring signal is detected by the modem.

SOUT2
Transmitter serial data output from serial port.

SIN2
Receiver serial data input.

CTS2#
Active low input handshake signal which notifies the UART that the modem is ready to receive data.

RTS2#
Active low output handshake signal notifies the modem that the UART is ready to transmit data.

DCD2#
Active low input handshake signal which notifies the UART that carrier signal is detected by the modem.

DSR2#
Active low input handshake signal which notifies the UART that the modem is ready to establish the communication link.

5.6.6. Connector FDD1200 (Floppy)

All signals are TTL compatible.

DR0#
Drive select 0.

INDEX#
Active low Schmitt Trigger input signal senses from the disk drive that the head is positioned over the beginning of a track, as marked by an index hole.

TRK0#
Active low Schmitt Trigger input signal senses from the disk drive that the head is positioned over the outermost track.

WRTPRT#
Active low Schmitt Trigger input signal senses from the disk drive that a disk is write-protected.

RDATA#
Active low, raw data read signal from the disk is connected here. Each falling edge represents a flux transition of the encoded data.

DSKCHG#
Disk interface input indicates when the disk drive door has been opened. This active low signal is read from bit D7 of location base+7.

MTR0#
Active low output selects motor drives 0.

HDSEL#
Active low output determines which disk drive head is active (low = head 0, high (open) = head 1).

FDIR#
Active low output determines the direction of the head movement (low = step-in, high = step-out).

STEP#
Active low output signal produces a pulse at a software-programmable rate to move the head during a seek operation.

WDATA#
Active low output is a write- precompensated serial data to be written onto the selected disk drive. Each falling edge causes a flux change on the media.

WGATE#
Active low, high-drive output enables the write circuitry of the selected disk drive.

5.6.7. Connector X1100 (Secondary IDE)

All signals are LVTTL compatible.

IDE_D0..15
IDE ATA Data Bus. These are the data pins connected to Secondary Channel.

IDE_A0..2
IDE ATA Address Bus. These are the address pins connected to Secondary Channel.

IDE_CS0#
IDE Chip Select 1 for Secondary Channel 0. This is the Chip Select 1 command output pin to enable the Secondary IDE device to watch the Read/Write Command.

IDE_CS1#
IDE Chip Select 3 for Secondary Channel 1. This is the Chip Select 3 command output pin to enable the Secondary IDE device to watch the Read/Write Command.

IDE_DRQ
IDE DMA Request for IDE Master. This is the input pin from the IDE DMA request to do the IDE Master Transfer. It will active high in DMA or Ultra-33 mode and always be inactive low in PIO mode.

IDE_DACK#
IDE DACK for IDE Master. This is the output pin to grant the IDE DMA request to begin the IDE Master Transfer in DMA or Ultra-33 mode.

IDE_IORDY
IDE Ready. This is the input pin to indicate the IDE device is ready to terminate the IDE command in PIO mode. The IDE device can de-assert this input (logic 0) to expand the IDE command if the device is not ready. In Ultra-33 mode, this pin has different functions.

IDE_IOR#
IDE IOR Command. This is the IOR command output pin to notify the IDE device to assert the Read Data in PIO and DMA mode. In Ultra-33 mode, this pin has different functions.

IDE_IOW#
IDE IOW Command. This is the IOW command output pin to notify the IDE device that the available Write Data is already asserted by IDE Busmaster in PIO and DMA mode. In Ultra-33 mode, this pin is driven by IDE Busmaster to force IDE device to terminate current transaction.

DIAG_P
Output by the drive if it is jumpered in the slave mode; input to the drive if it is jumpered in the master mode. The signal indicates to a master that the slave has passed its internal diagnostic command. Necessary for using IDE master/slave-mode on Secondary IDE Channel.

IDE_SEL
IDE Cable Select. Used to configure this device as a Master or a Slave. When the pin is grounded, this device is configured as a Master. When the pin is open, this device is configured as a Slave.

IDE_RST#
Low active hardware reset.

IDE_IRQ
IDE Channel interrupt signal.

5.6.8. Connector X2501 (Smart Battery System)

BAT+
Connect to positive terminal of battery.

GND
Connect to negative terminal of battery.

BATT_SDA
Smart battery data bus signal. Open collector bidirectional (TTL).

BATT_SCL
Smart battery clock signal. Open collector bidirectional (TTL).

THM
Thermal monitor input signal. Analog input, max. input voltage is 4V DC.

5.6.9. Connector X2500 (DC Power Input)

+DCIN
Main power supply input (+8V up to +28V DC).

GND
Main power supply ground.

5.6.10. Connector X1402 (Backlight)

BKLT_ADJ
0V up to +5V DC brightness control signal.

BKLT_SW
Switched Backlight power supply. 5V or 12V selectable by J1400. default value 12V.

BKLT_ON
Backlight on/off control signal (TTL). Polarity selectable by J1402, default value active high.

5.6.11. Connector X1404 (Backlight Compensation)

VTIN
Optional (sense input for variable Resistor. Max. input voltage is 2.5 VDC).

5.6.12. Connector X1200 (FAN)

UFAN
+5V Fan power output, max. 250 mA.

FANIN
Sense input to detect fan speed, max. input voltage 5V DC.

5.6.13. Connector X2003 (Matrix Keyboard)

KB_DO 0..O7
Matrix keyboard outputs. Max. output voltage is 3.3V DC.

KB_DI 0..I7
Matrix keyboard inputs. Max. input voltage is 3.3V DC.

5.6.14. Connector X2001 (Touch Panel)

YB
Touchpanel bottom driving signal. SW (Southwest)) input for 5-wire touchpanels.

SYB
Touchpanel bottom sensing signal. For 4-wire touchpanels connect to YB.

YT
Touchpanel top driving signal. NE (Northeast)) input for 5-wire touchpanels.

SYT
Touchpanel top sensing signal. For 4-wire touchpanels connect to YT.

XL
Touchpanel left driving signal. NW (Northwest)) input for 5-wire touchpanels.

SXL
Touchpanel left sensing signal. For 4-wire touchpanels connect to XL.

XR
Touchpanel right driving signal. SE (Southeast) input for 5-wire touchpanels.

SXR
Touchpanel right sensing signal. For 4-wire touchpanels connect to XR.

TRB#
Touchpanel right mouse button. Open collector input. Max. input voltage is 5V DC.

TLB#
Touchpanel left mouse button. Open collector input. Max. input voltage is 5V DC. For 5-wire touchpanels connect to Sense.

5.6.15. Connector X2007 (Aux Interface)

DDC_SCL, DDC_SDA

These two pins are functionally suitable for a DDC interface between the graphics controller chip and the CRT monitor. Open collector bidirectional signals with TTL level (Pulled up).

BCKBAT+

3V backup cell input. BATT should be connected to a 3V backup cell for RTC operation and storage register non-volatility in the absence of system power. (VBATT = 3V to 3.3V DC).

5.6.16. Connector X1401 (FLEX32 Interface)

All signals are LVTTL compatible.

PR0-PR5

Red color data lines for flatpanel.

PG0-PG5

Green color data lines for flatpanel.

PB0-PB5

Blue color data lines for flatpanel.

PCLK

Data shift clock for flatpanel.

PHS

Horizontal sync pulse for flatpanel.

PVS

Vertical sync pulse for flatpanel.

PDE

Data enable signal for flatpanel.

Panel_VCC

Switched Power supply for flatpanel. **Caution:** Adjust correct voltage setting, default value R1410 = +5V.

R/L

Rotate image in right or left direction. Adjust correct setting with JP1400.

U/D

Rotate image up or down. Adjust correct setting with JP1401.

5.6.17. Connector X2005 (Extended Digital Video Port)

Reserved.

5.6.18. Connector X2000 (TV-Out / In)

CVBS_IN1
Video input signal for CVBS, channel 1. Max input voltage is 1Vpp.

CVBS_IN2
Video input signal for CVBS, channel 2. Max input voltage is 1Vpp.

Y_IN1
Video input signal for Y component, channel 1. Max input voltage is 1Vpp.

C_IN1
Video input signal for C component, channel 1. Max input voltage is 1Vpp.

Y_IN2
Video input signal for Y component, channel 2. Max input voltage is 1Vpp.

C_IN2
Video input signal for C component, channel 2. Max input voltage is 1Vpp.

Y_IN3
Video input signal for Y component, channel 3. Max input voltage is 1Vpp.

C_IN3
Video input signal for C component, channel 3. Max input voltage is 1Vpp.

RGB_SYNC1
Sync pulse for RGB video input signal, channel 1. Max input voltage is 1Vpp.

RGB_SYNC2
Sync pulse for RGB video input signal, channel 2. Max input voltage is 1Vpp.

RGB_RED1
Red input signal, channel 1. Max input voltage is 1Vpp.

RGB_RED2
Red input signal, channel 2. Max input voltage is 1Vpp.

RGB_GREEN1
Green input signal, channel 1. Max input voltage is 1Vpp.

RGB_GREEN2
Green input signal, channel 2. Max input voltage is 1Vpp.

RGB_BLUE1
Blue input signal, channel 1. Max input voltage is 1Vpp.

RGB_BLUE2
Blue input signal, channel 2. Max input voltage is 1Vpp.

CVBS/RGB_G
Second Composite video out / Green Component video out. Max output voltage is 1Vpp. (optional).

SVC/RGB_B
Chrominance video out / Component BLUE video out. Max output voltage is 1Vpp. (optional).

SVY/RGB_R
Luminance video out / Component RED video out. Max output voltage is 1Vpp. (optional).

CVBS
Composite video out. Max output voltage is 1Vpp. (optional).

6. BIOS-DESCRIPTION

The ***ePanel-C3*** is equipped with an AMI Software BIOS which is located in a Flash EPROM on board. This device has 8 bit wide access. Faster access is provided by the shadowing to BIOS to RAM.

6.1. The Setup Guide

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of the computer. The setup program uses a number of menus for making changes and turning the special features on or off.

6.1.1. General Information

To start the BIOS setup utility press <DEL> when the string `Press <Del> to enter Setup` is displayed during bootup. The Main Menu will be displayed.

- **The Menu Bar**

The Menu Bar at the top of the window lists all the different menus. Use the up/down arrows to make a selection.

- **The Legend Bar**

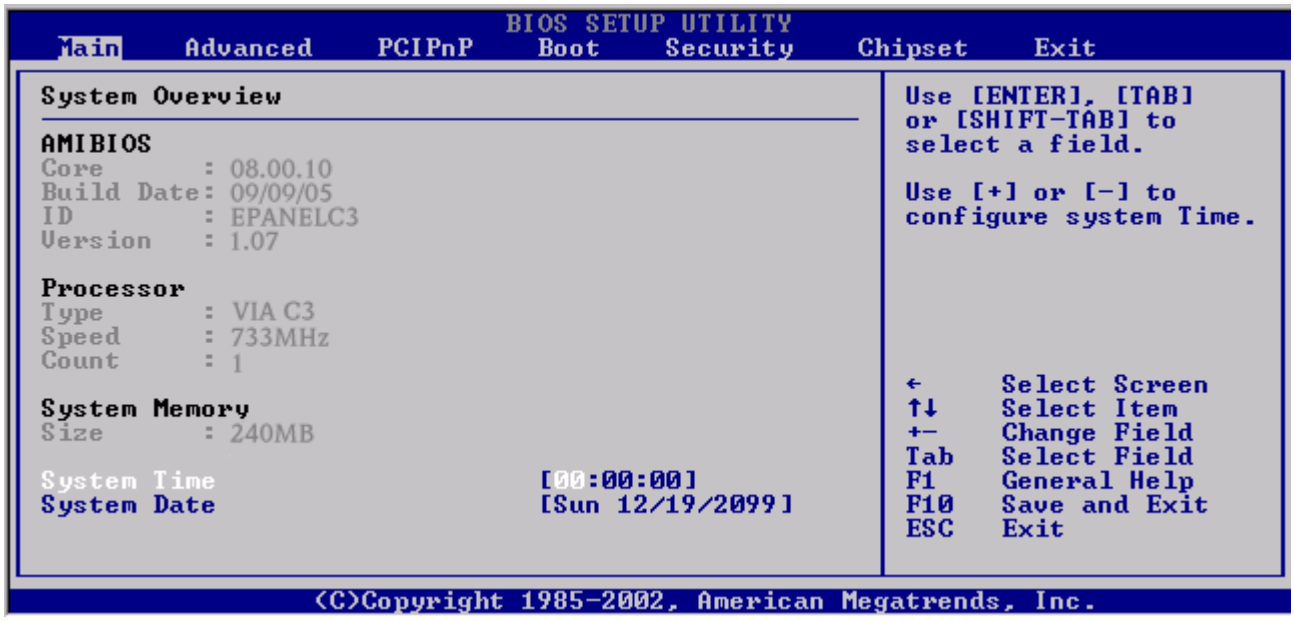
Use the keys listed in the legend bar on the bottom to make your selection or exit the current menu. The table below describes the legend keys and their alternates:

Key	Function
<Esc>	Exit this menu
↑ or ↓ arrow key	Move cursor up and down
<Enter>	Execute command or select submenu
+ or - key	Change selected value

To select an item, simply use the arrow key to move the cursor to the field you want. Then use the Enter key to select a value for that field. The **Save Value and Exit** command in the Exit Menu saves the values currently displayed in all the menus.

To display a setup menu, use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>.

6.1.2. System Overview



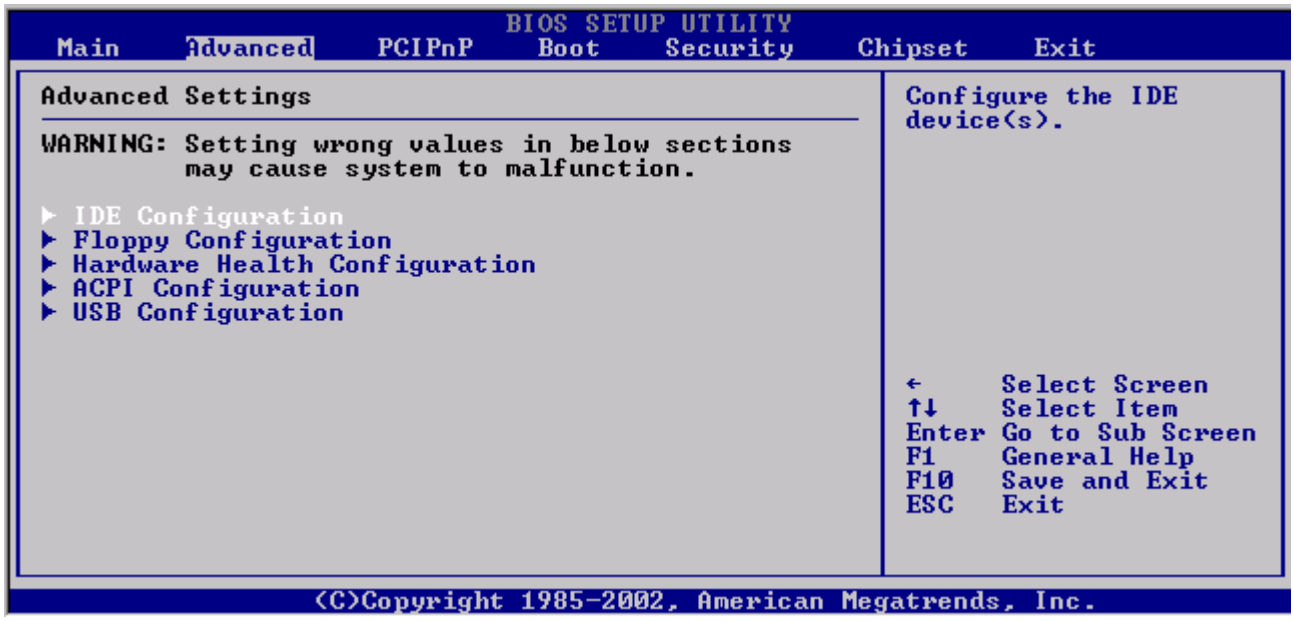
Version
This entry gives information about the current System-BIOS version. The BIOS version should be known, if you have a technical inquiry to the support.

Processor Type / Speed
Here you will find information about the processor type and processor speed.

System Memory Size
This is the total size of available system memory. This will vary depending on how much graphic memory is shared with the system memory.

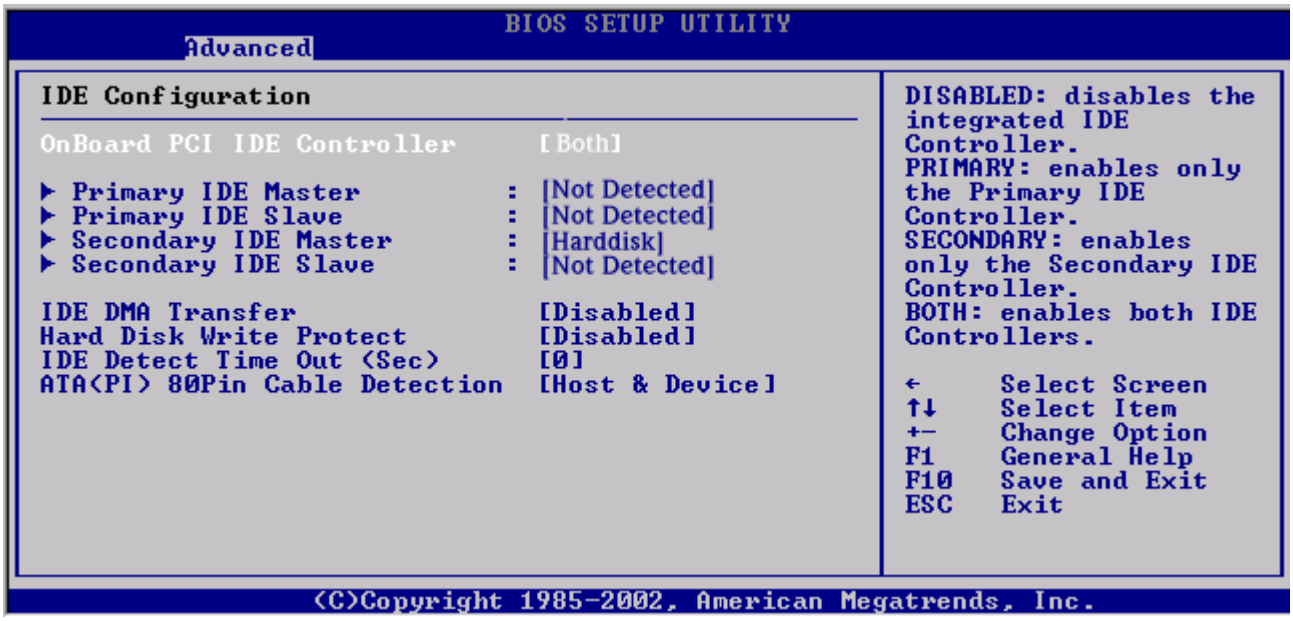
System Time / System Date
Here you can change the system time and date. Highlight **System Time** or **System Date** using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.
Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

6.1.3. Advanced BIOS Setup



Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as USB Configuration, to go to the sub menu for that item.

IDE CONFIGURATION SCREEN



From the IDE Configuration screen, press <Enter> to access the sub menu for the Primary and Secondary IDE Master and Slave drives. Use this screen to select options for the Primary and Secondary IDE drives.

OnBoard PCI IDE Controller

Should it be necessary, you can disable the onboard PCI IDE Controller entirely or per channel. This can be helpful if you need more free system interrupts or I/O addresses.

IDE DMA Transfer

This entry can activate DMA-Mode (default is: PIO-Mode) for IDE devices. Please ensure that your operating system will work correctly when this option is enabled.

Hard Disk Write Protect

Allows you to write protect the hard disk if the device is accessed through the BIOS.

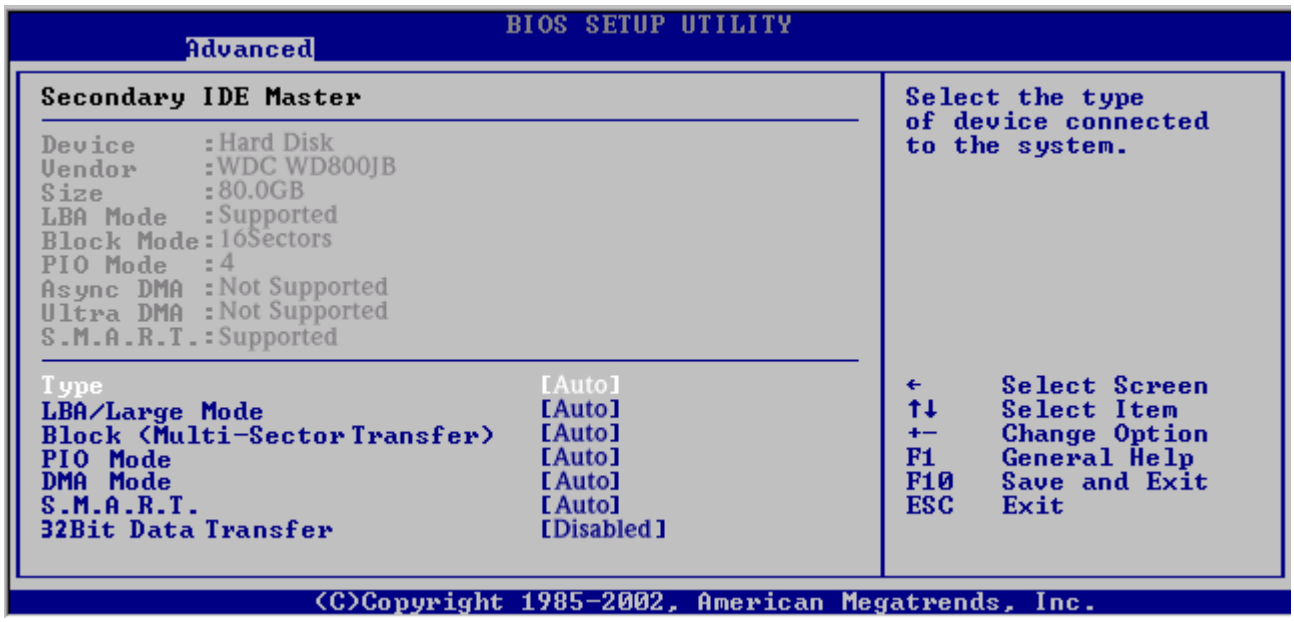
IDE Detect Time Out

With this option you can set the timeout for ATAPI devices (e.g CDROM-Drives) during the boot process.

ATA(PI) 80Pin Cable Detection

If DMA-Mode is enabled for IDE devices and a high DMA-Mode is being used, it is recommended that you use an 80 pin cable. **Host** means the ePanel C3 and **Device** means the hard disk.

Configure drive mode



Drive Parameters
The “grayed-out” items in the left frame are the IDE disk drive parameters taken from the firmware of the IDE disk drive selected.

Type
This option sets the type of device that the AMIBIOS attempts to boot from after the Power On Self Test (POST) has completed. ARMD means ATAPI Removable Media Device (LS120, MO (Magneto-Optical), or Iomega Zip drives). If you want to boot up from media on an ARMD, you must emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot up DOS.

LBA/Large Mode
LBA (Logical Block Addressing) is a method of addressing data on a disk drive.

Block (Multi-Sector Transfer)
This option sets the block mode multi sector transfers option.

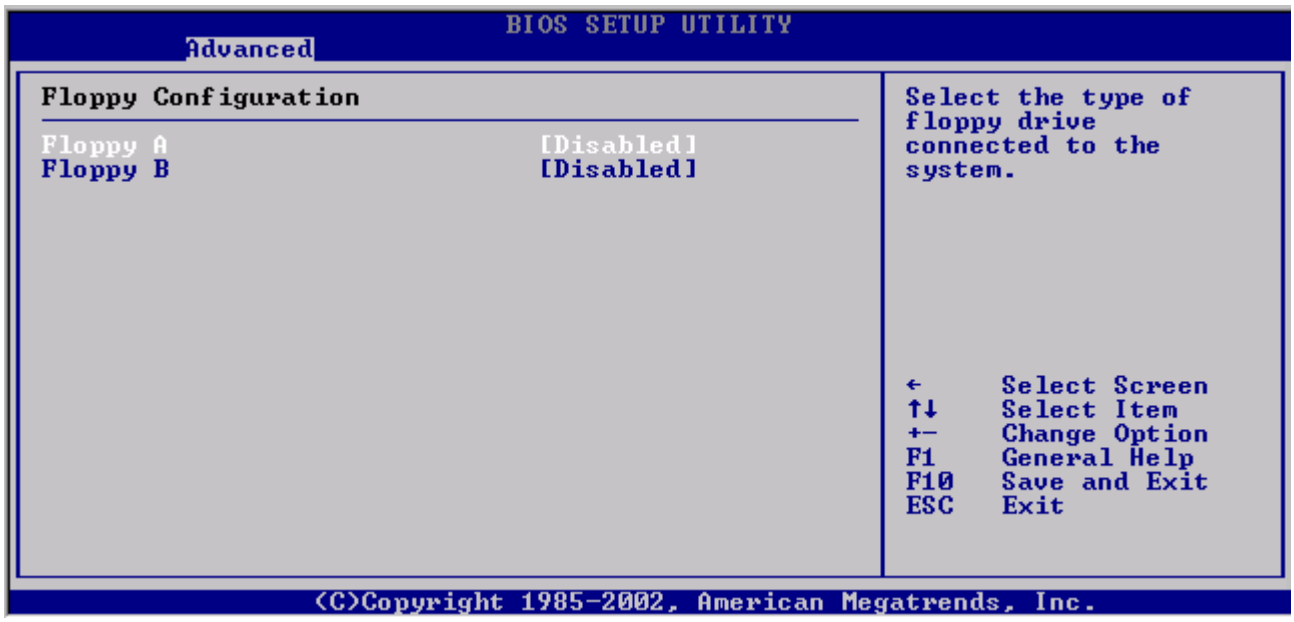
PIO Mode
IDE PIO (Programmable I/O) mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

DMA Mode
This setting allows you to adjust the DMA mode options. SWDMAn means Single-Word, MWDMAn Multi-Word-DMA-Mode. UDMAn means Ultra-DMA.

S.M.A.R.T.
Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.

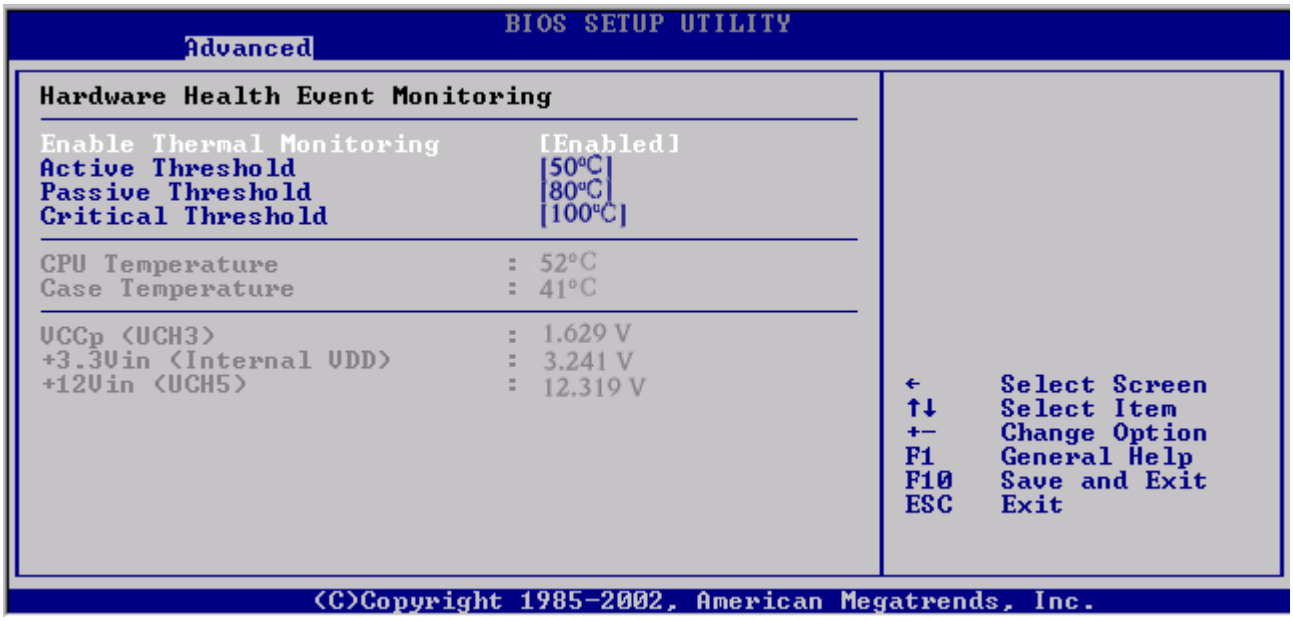
32Bit Data Transfer
This option sets the 32-bit data transfer option.

Floppy Configuration Settings



Floppy Drive A: and B:
Move the cursor to these fields via up and down <arrow> keys. Select the floppy type.

Hardware Health Screen



Enable Thermal Monitoring

Enable temperature monitoring of the CPU. If you disable Thermal Monitoring please ensure that the cooling method is sufficient enough to prevent damage to the device.

Active Threshold

Threshold temperature to turn on active cooling (fan). Activating and deactivating the fan is controlled by a hysteresis of 5 degrees Celsius. That means if the temperature rises above, say 50 degrees Celsius, the fan will turn on. It will be deactivated at a temperature of 45 degrees Celsius.

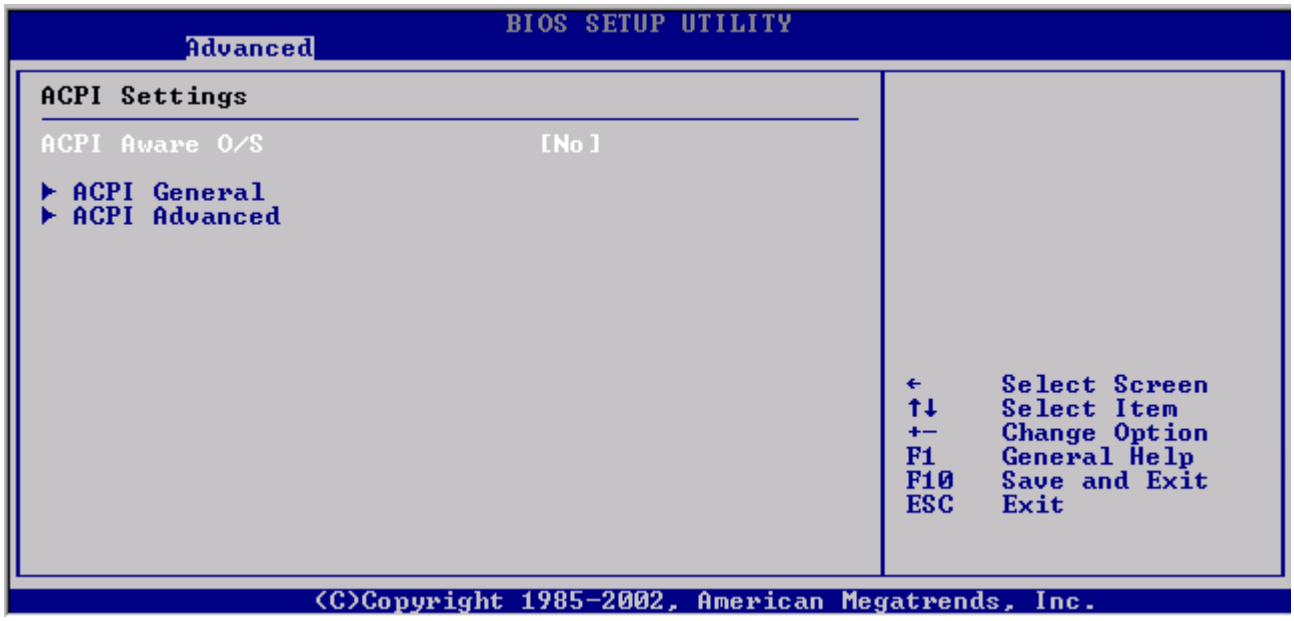
Passive Threshold

Threshold temperature to turn on passive cooling by throttling the CPU. This function is also controlled by a hysteresis (5 degrees Celsius). If the given passive threshold is reached, the CPU will be throttled down to half clock frequency.

Critical Threshold

Threshold temperature shutdown the board. The board will not start automatically if the temperature falls below the Critical Threshold.

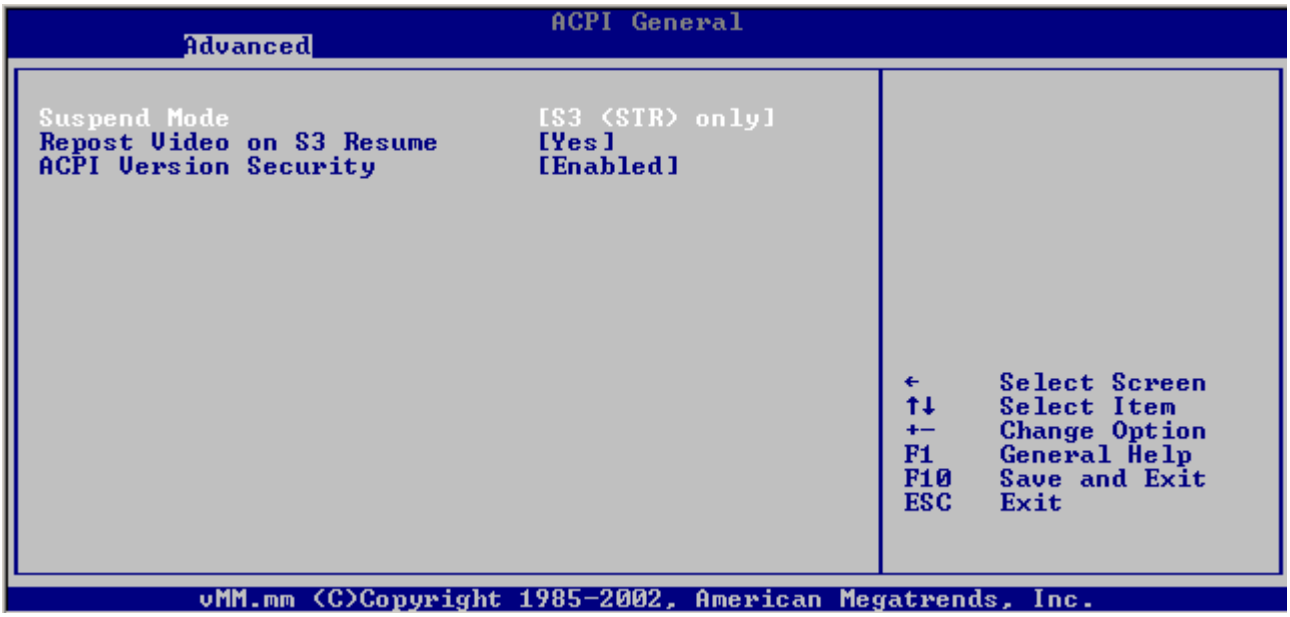
ACPI Setup



ACPI Aware O/S

Set this value to allow the system to utilize the Intel ACPI (Advanced Configuration and Power Interface) specification.

ACPI General Configuration



Suspend Mode

Only S3 mode (Suspend to RAM = STR) is supported. Most of the components are powered down. Therefore the power consumption is nearly 100 mA at 12V. It is only possible to get out of the S3 mode by pressing the power button. This feature will be implemented with Hardware Revision 1.03 and BIOS Version 2.00 or higher.

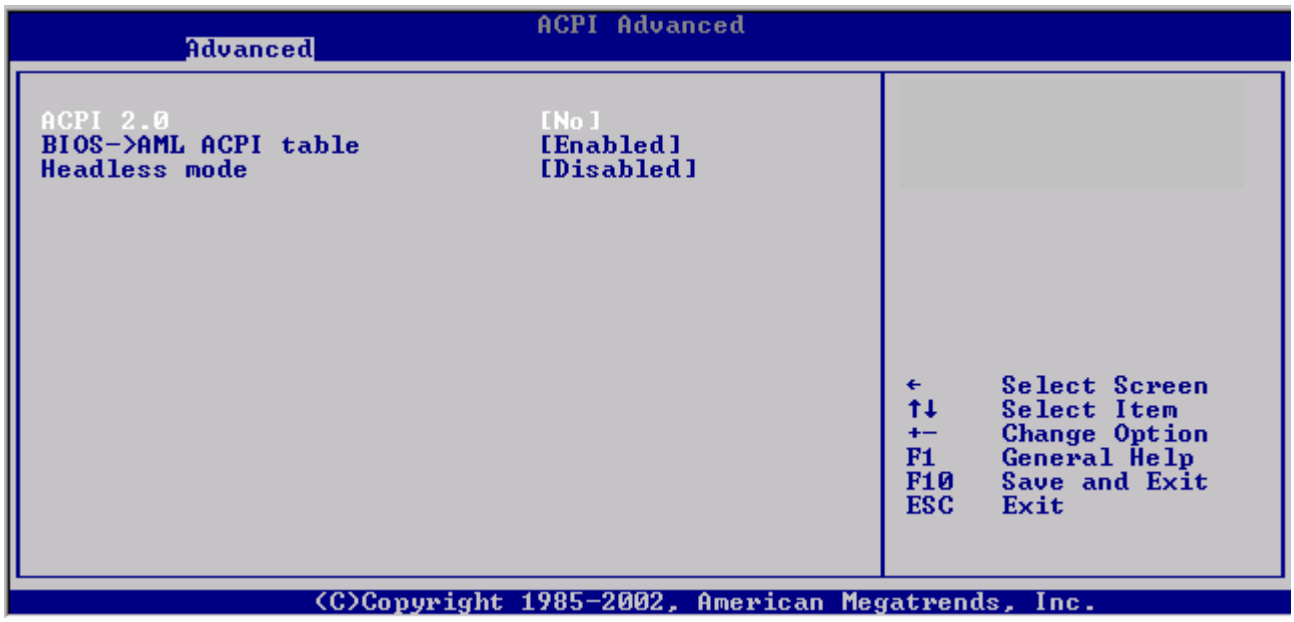
Repost Video on S3 Resume

Set this value to allow video repost support. The default setting is **Yes**. If this option is disabled you could have faulty displayed graphics mainly on the LCD panel.

ACPI Version Security (from BIOS version 2.02)

By default the power management is disabled when 'CRT only' or 'CRT+TVOut' selected. From hardware revision 1.03 on, using this setting the power management may be enabled.
Attention: Never activate this on a hardware revision 1.01.

ACPI ADVANCED CONFIGURATION



ACPI 2.0 Support

Set this value to allow or prevent the system to be complaint with the ACPI 2.0 specification, otherwise ACPI 1.0b will be activated.

BIOS-> AML ACPI Table

Set this value to allow the ACPI BIOS to add a pointer to the AML Exchange Buffer into the Root System Description Table (RSDT) and into the Extended System Description Table (XSDT). This option should only be disabled if ACPI 2.0 is not used.

Headless Mode

This option is used to update the ACPI FACP table to indicate headless operations. That means the board runs without graphic controller and input devices (e.g. keyboard and mouse). This feature should only be used in special cases.

USB CONFIGURATION

Legacy USB Support
Legacy USB Support refers to the USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB drivers loaded on the system.

USB Keyboard Legacy Support
Enable or disable support for legacy keyboard devices.

USB Mouse Legacy Support
Enable or disable support for legacy mouse devices.

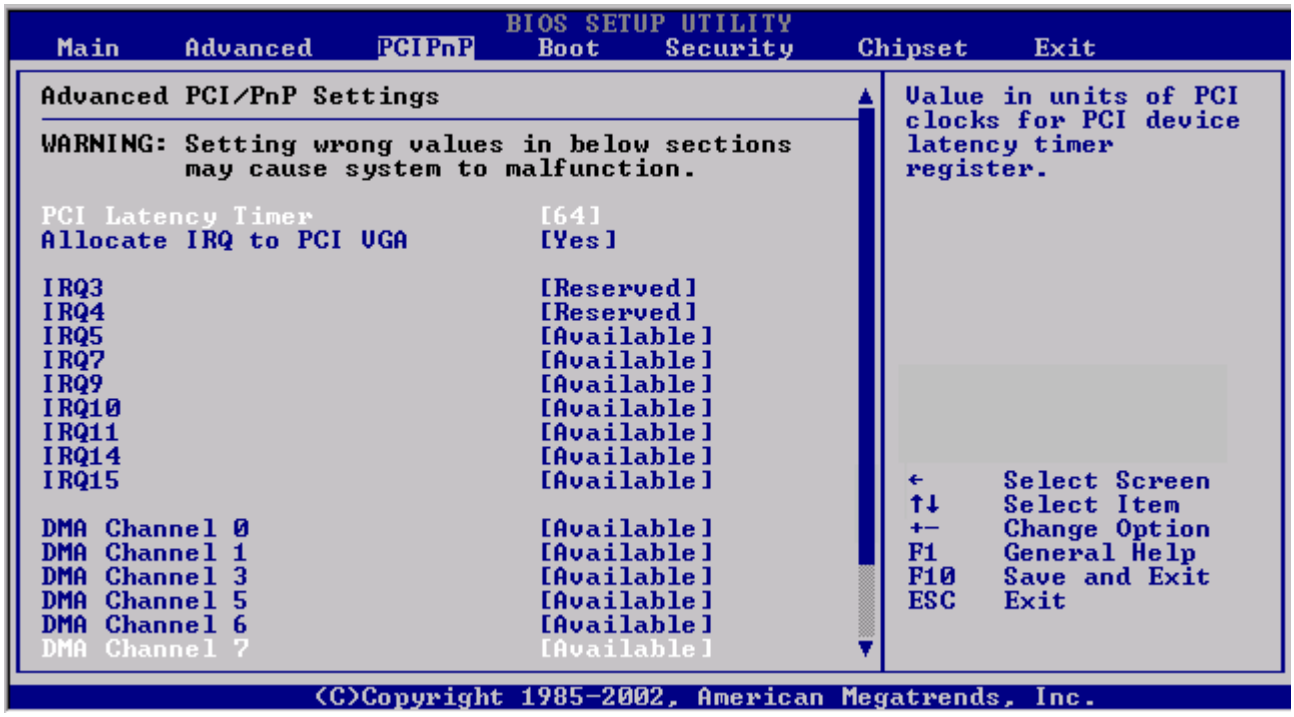
USB Storage Device Support
Enable or disable support for USB bootable media (e.g. Floppy, Harddisk, CDROM, USB-Stick).

Port 64/60 Emulation
If an operating system doesn't support USB function and you want to use a USB keyboard, this function will allow the use of a USB keyboard. This option should not be enabled if the matrix keyboard is also used.

USB 2.0 Controller Mode (canceled from BIOS version 2.02)
Set the USB 2.0 host controller either to Full Speed Mode (12 MBit) or to High Speed Mode (480 MBit) for legacy mode (unpersuasively WINDOWS or LINUX functionality).

BIOS EHCI Hand-Off (canceled from BIOS version 2.02)
If enabled this provides a simple semaphore-based mechanism for exchanging EHCI ownership. The BIOS and operating system can exchange information via two 32 bit registers. Please see the Intel Enhanced Host Controller Interface Specification for the Universal Serial Bus.

6.1.4. PCI/PnP Setup



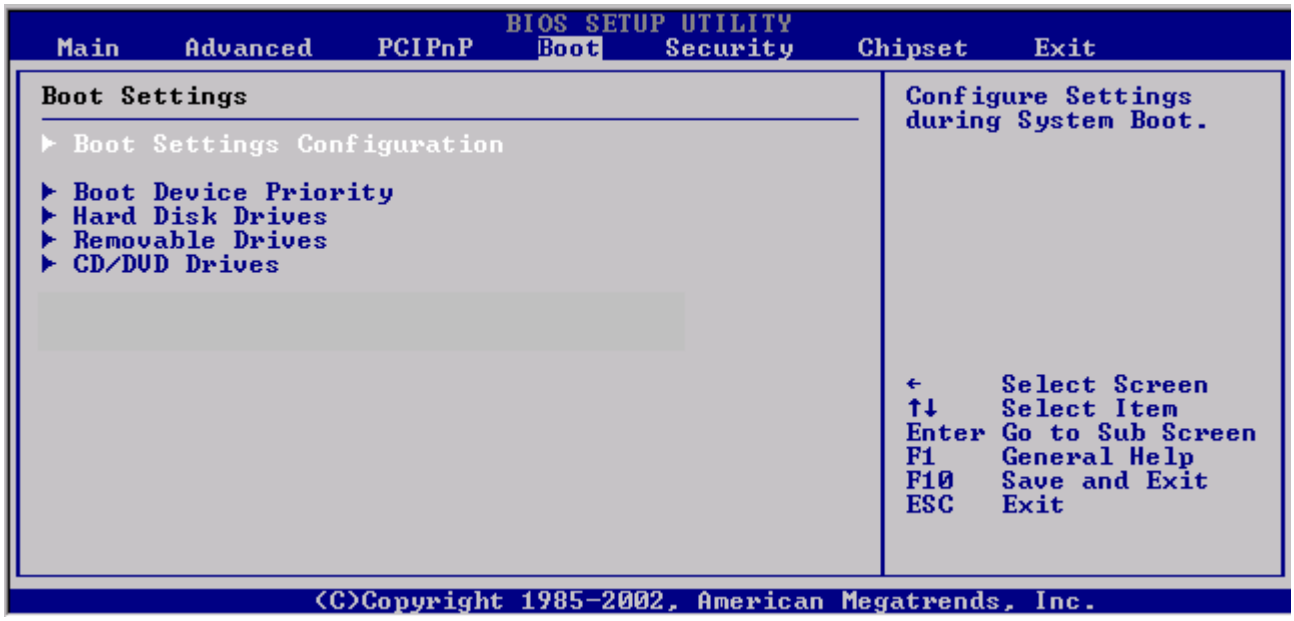
PCI Latency Timer
Set this value to allow the Master Latency Timer to be adjusted. This option sets the Master Latency of most PCI devices (Exception: Bridges e.g. PCI-To-ISA-Bridge, IDE and Audio Controller) on the PCI bus.

Allocate IRQ to PCI VGA
Allows you to assign an interrupt for the VGA Controller. If this option is deactivated graphic errors could occur while running a Windows operating system.

IRQx
Set this value to allow the IRQ settings to be modified. **Reserved** means that this interrupt is a legacy interrupt (e.g. 16 bit PC-Cards). **Available** means that this interrupt can be used as a PCI interrupt.

DMA Channel x
Set this value to allow the DMA setting to be modified. **Reserved** means that this DMA channel is legacy DMA. **Available** means that this DMA channel can be used as PCI DMA.

6.1.5. Boot Setup



Select the **Boot** tab from the setup screen to enter the Boot Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device priority, to go to the sub menu for that item.

Boot Settings Configuration
Use this screen to select options for the Boot Settings Configuration.

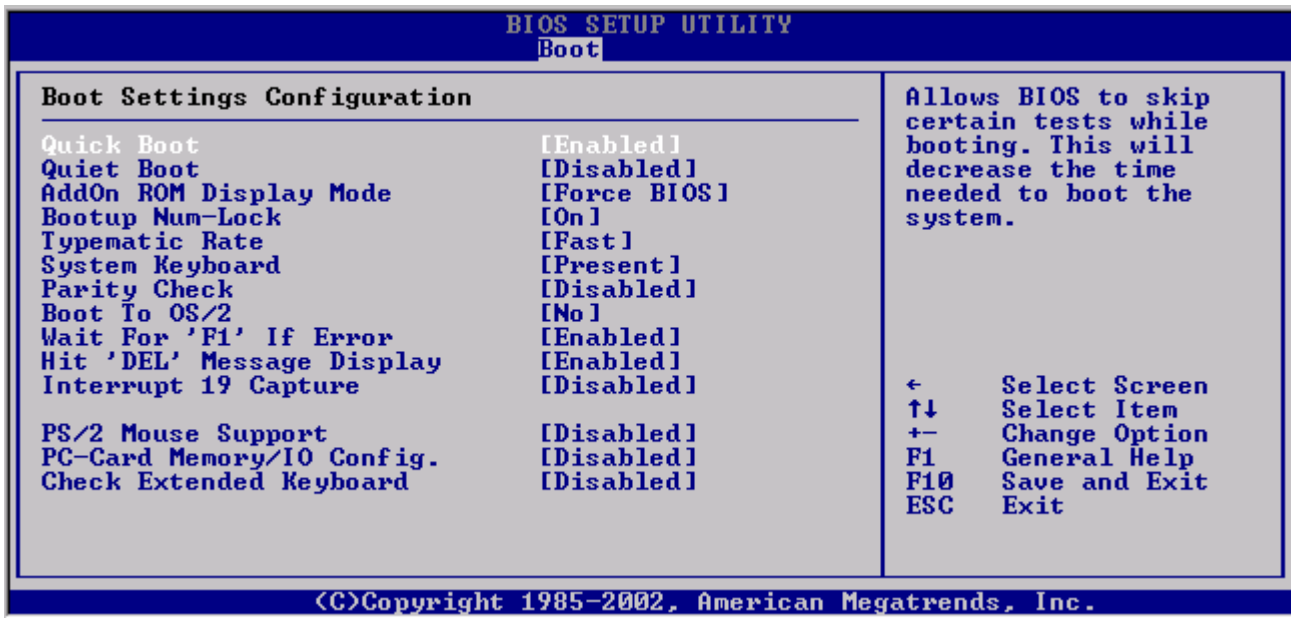
Boot Device Priority
Use this screen to specify the order in which the system checks for the device to boot from.

Hard Disk Drives
Use this screen to view the hard disk drives in the system.

Removable Devices
Use this screen to view the removable drives attached to the system.

CD/DVD Drives
Use this screen to view the ATAPI drives in the system.

Boot Settings Configuration



Quick Boot
Disabled allow the BIOS to perform all POST tests. **Enabled** allow the BIOS to skip certain POST tests to boot faster (Default).

Quiet Boot
Disabled allow the BIOS to display the POST messages (Default). **Enabled** allow the BIOS to display the OEM logo.

AddOn ROM Display Mode
Keep Current keeps the current display mode, **Force BIOS** switches to BIOS mode before an Add-On ROM is called (Default).

Bootup Num-Lock
Off does not enable the keyboard Num-Lock automatically. To use the 10 keys on the keyboard, press the Num-Lock key located on the upper left-hand corner of the 10 key pad. The Num-Lock LED on the keyboard will light up when the Num-Lock is engaged. **On** allow the Num-Lock on the keyboard to be enabled automatically when the system is boot up (Default).

Typematic Rate
Slow sets the rate the computer repeats a key to under 8 times per second. **Fast** sets the rate the computer repeats a key to over 20 times per second (Default).

System Keyboard
Absent prevent the computer system from using a keyboard. Use this option if there is no keyboard attached to the computer system. **Present** must be set if a keyboard is to be used (Default).

Boot To OS/2
Yes allows the computer system to boot up to an IBM OS/2 environment when more than 64 MB of system memory is installed. **No** is the standard setting for all other operationg systems (Default).

Wait For 'F1' If Error
Enabled allows the system BIOS to wait for any error (Default). If an error is detected, pressing <F1> will enter Setup and the BIOS setting can be adjusted to fix the problem. This normally happens when the system BIOS is updated. **Disabled**, on the other hand, continues the boot process without waiting.

Hit 'DEL' Message Display
Enabled allows the system to display Hit Del to enter Setup during memory initialization (Default). **Disabled** suppresses this message.

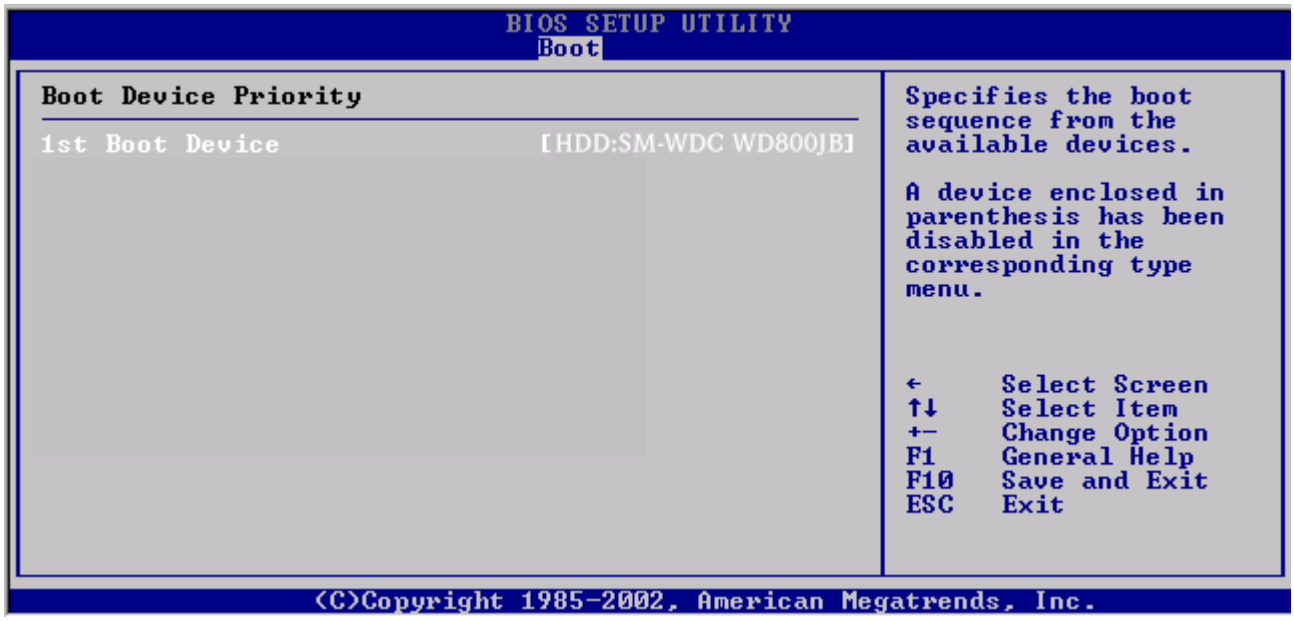
Interrupt 19 Capture
Enabled allows Add-On ROMs to trap interrupt 19 (Boot-IRQ). This option would make sense when using a PXE Add-On ROM (Network Boot). **Disabled** prohibits the Capture function (Default).

PS/2 Mouse Support
Enabled allows the system to use a PS/2 mouse. **Disabled** frees up IRQ12 (Default).

PC-Card Memory/IO Config.
If **Enabled** the System BIOS enables all Memory and I/O registers of the PC-Card Controller. Most operating systems do not require this option, so the Default setting is **Disabled**.

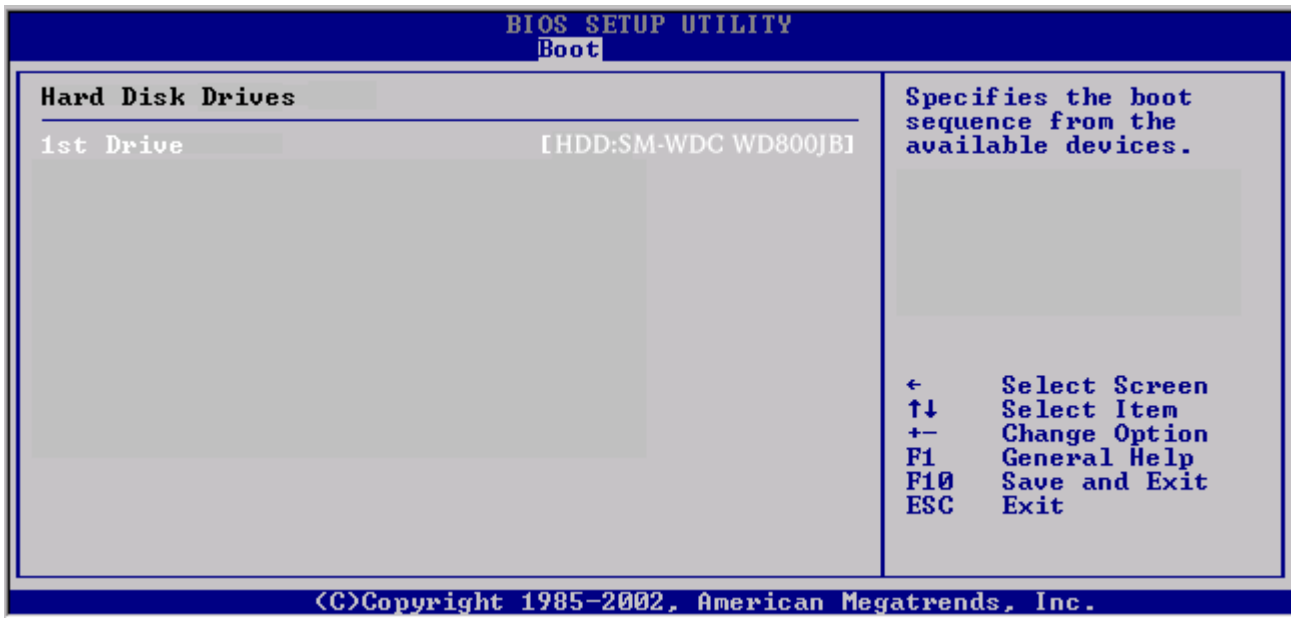
Check Extended Keyboard
Enabled allows the System BIOS to query an Extended keyboard. With some CHERRY keyboards, however, this causes a problem (hang during POST). **Disabled** prevents this from happening (Default).

Boot Device Priority



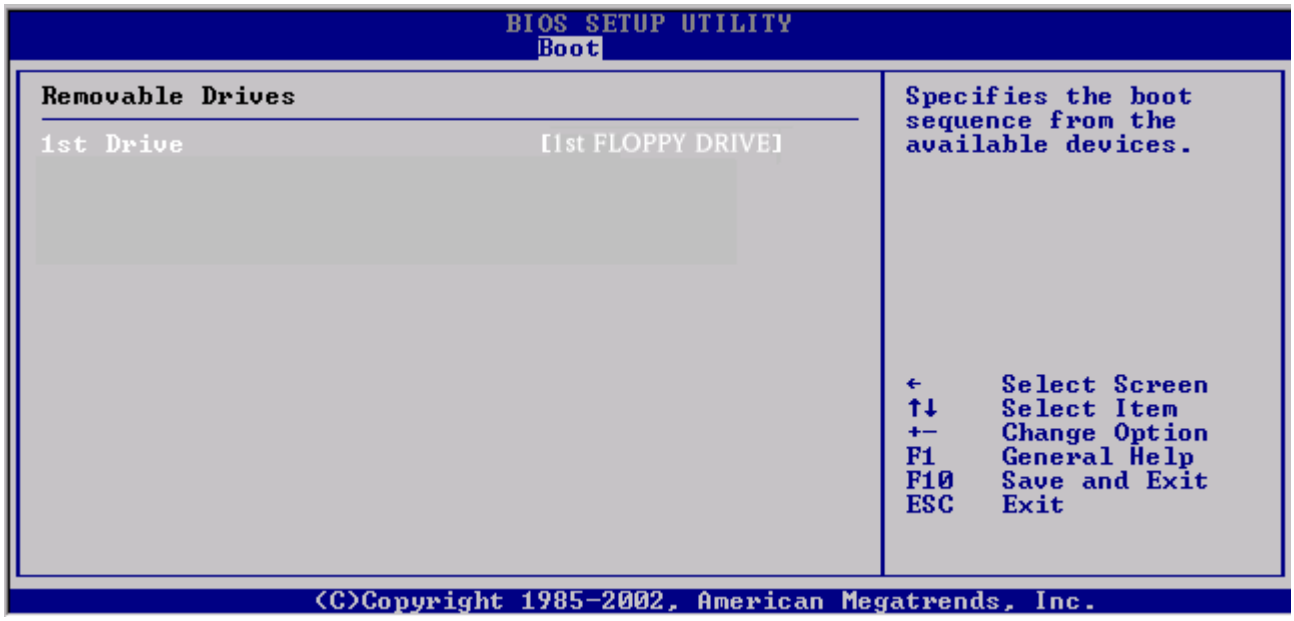
Use this screen to specify the order in which the system checks for the device to boot from.

Hard disk drives



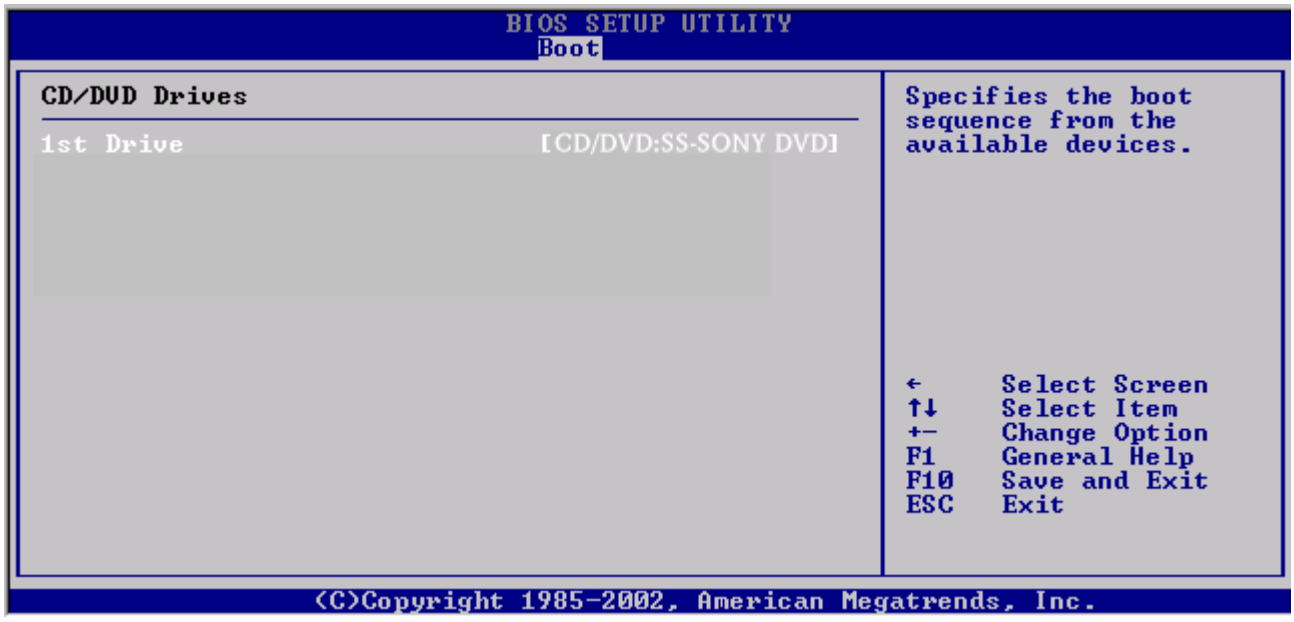
Use this screen to view the hard disk drives in the system.

Removable Drives



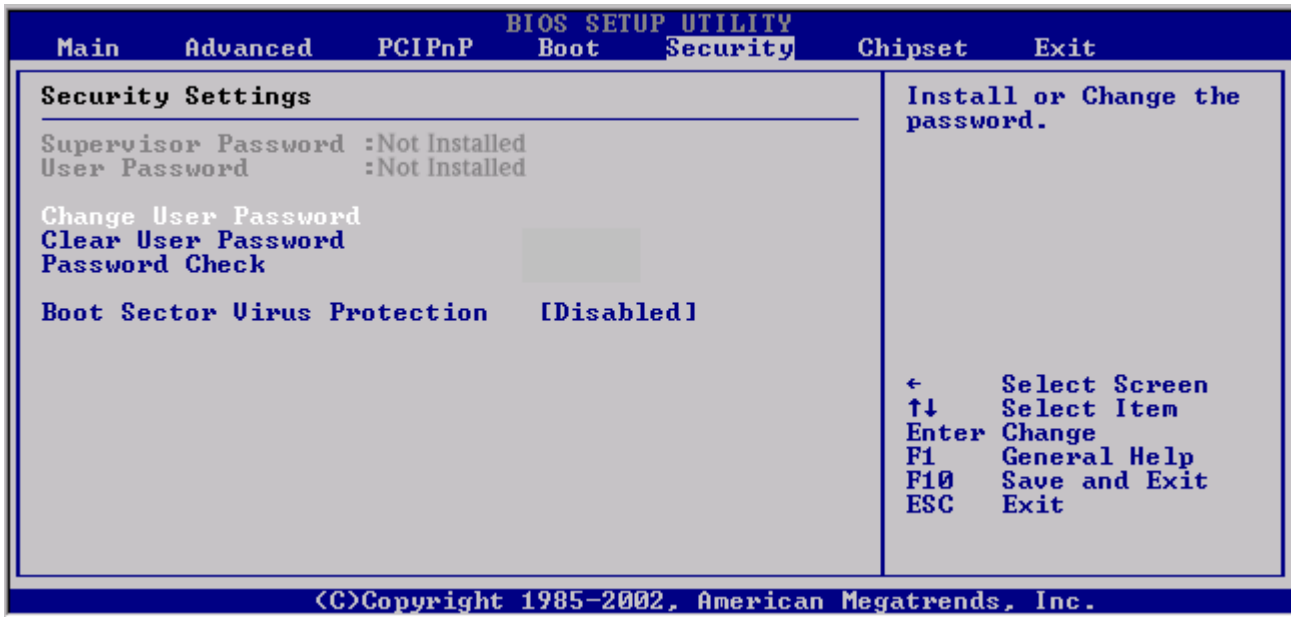
Use this screen to view the removable drives attached to the system.

CD/DVD Drives



Use this screen to view the CD/DVD drives attached to the system.

6.1.6. Security Setup



Two Levels of Password Protection
The setup provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first. The system can be configured so that all users must enter a password every time the system boots or when Setup is executed. If you forget it, you must clear the NVRAM and reconfigure the system.

Supervisor Password
Indicates whether a supervisor password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

User Password
Indicates whether a user password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

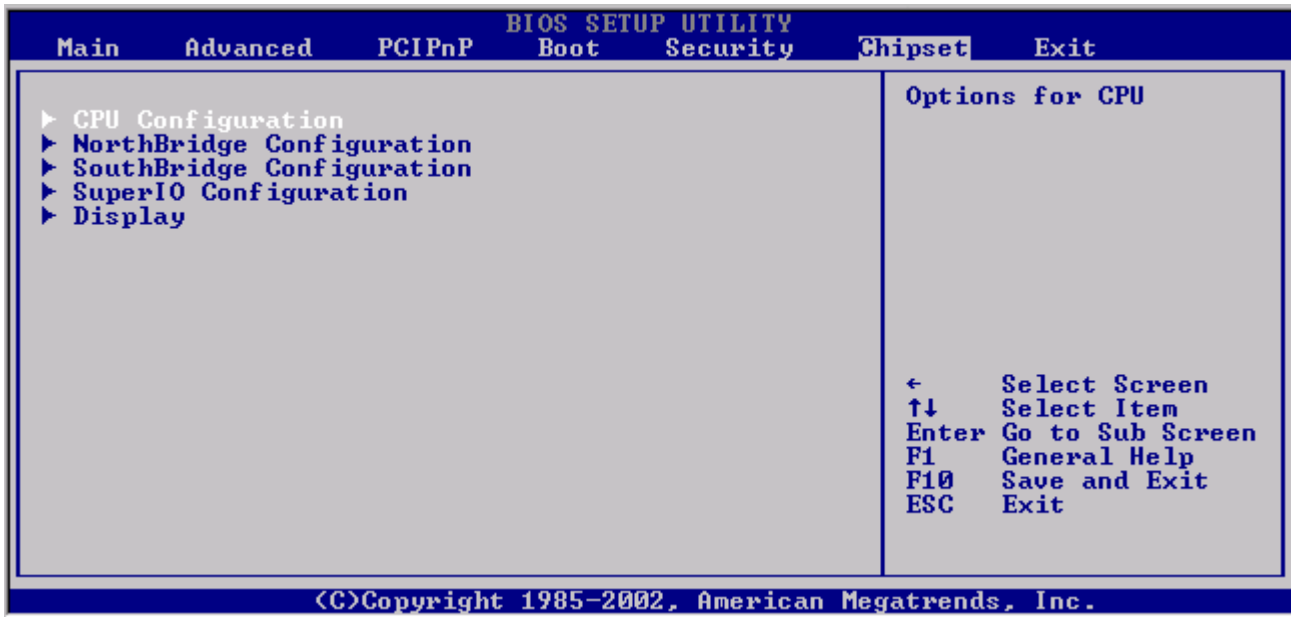
Change Supervisor Password
Select this option and press <Enter> to access the sub menu and change the supervisor password. The password is stored in NVRAM after the setup completes.

Change User Password
Select this option and press <Enter> to access the sub menu and change the user password. The password is stored in NVRAM after the setup completes.

Clear User Password
Select this option and press <Enter> to access the sub menu and clear the user password in the NVRAM.

Boot Sector Virus Protection
If a program or a virus accesses the boot sector of the hard disk, a warning appears if the option is set to **Enabled**, otherwise nothing happens (**Disabled**).

6.1.7. Chipset Setup



CPU Configuration
You can use this screen to select options for the CPU Configuration.

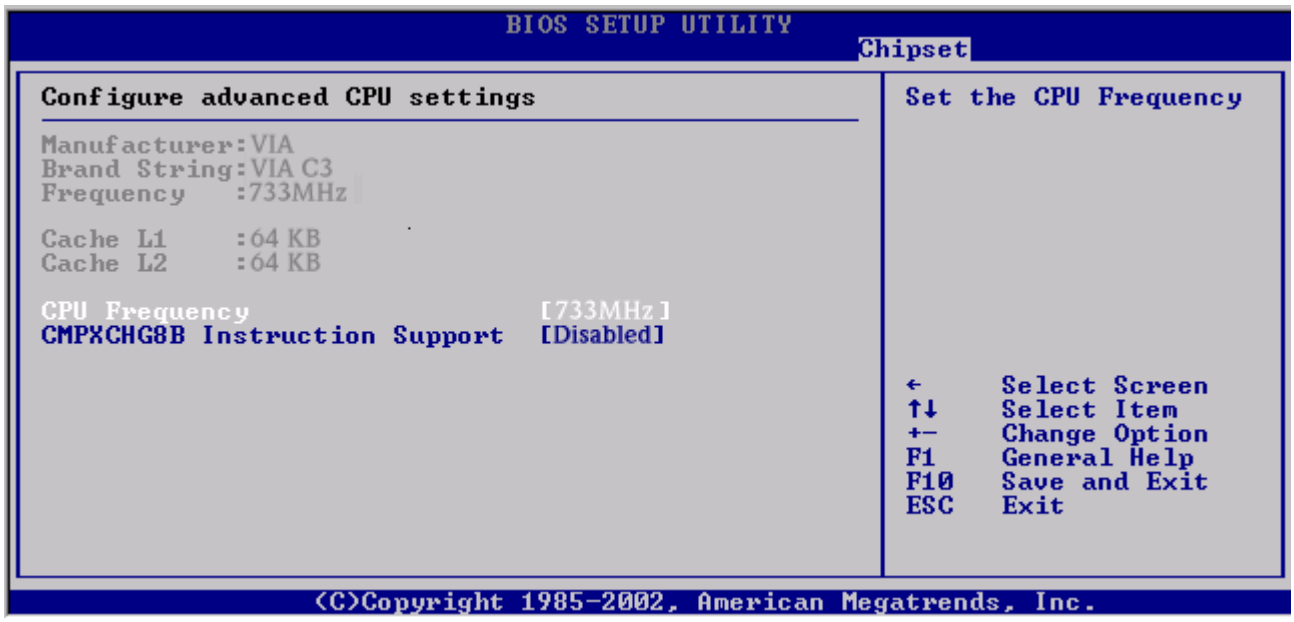
NorthBridge Configuration
You can use this screen to select options for the North Bridge Configuration.

SouthBridge Configuration
You can use this screen to select options for the South Bridge Configuration.

SuperIO Configuration
You can use this screen to select options for the Super I/O Configuration.

Display
You can use this screen to select options for the Display devices.

CPU Configuration



CPU Frequency

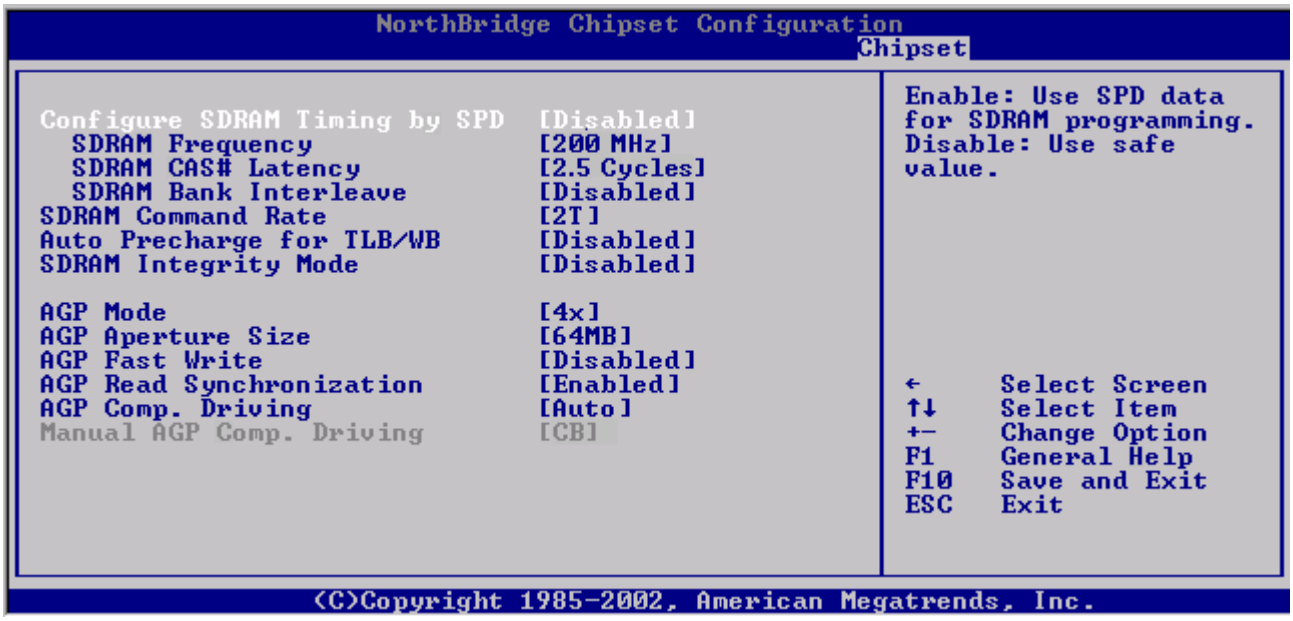
Using the <+> and <-> keys, you can decrease the CPU basic frequency or reset it to its original value (only 733 MHz and 1 GHz CPU version)

Attention: with Hardware Version 1.03 and higher, the board frequency must be set to 733 MHz or 300 MHz using this menu point, since in general only the 1 GHz variant is available. The power consumption sinks accordingly.

CMPXCHG8B Instruction Support

Under WIN NT 4.0 this command can cause the operating system to hang. Only rebooting fixes the problem. Therefore, this option must be set to **Disabled** when using NT 4.0.

North Bridge Configuration



Configure SDRAM Timing by SPD

Disabled deactivates the reading of data from the Serial Presence Detect (SPD) EEPROM of the RAM module (Default). Most notably low-cost modules often have faulty parameters, so a safe start-up is assured with the default setting. If a branded module is installed this option should be set to **Enabled**.

SDRAM Frequency

The memory controller only supports PC1600 and PC2100 DDR SDRAM modules. This results in the two frequencies 200 (PC1600) and 266 MHz (PC2100).

SDRAM CAS# Latency
SDRAM Bank Interleave
SDRAM Command Rate
Auto Precharge for TLB/WB
SDRAM Integrity Mode

This option should only be changed by experts, since an incorrect setting can quickly lead to a start-up error. It is only possible to reset this error by deleting the NVRAM.

AGP Mode

The Default setting is 4x. Under normal circumstances, it is not necessary to reset this to 2x or 1x.

AGP Aperture Size

Aperture size expands the existing graphics memory. This feature is only used if there is no space left in the actual graphics memory (e.g. when using textures). The rule of thumb is: Aperture size should be at least one quarter and at most one half of the main memory.

AGP Fast Write

This option activates fast data transfer (**Enabled**), i.e. the route through the system memory is avoided. If there are problems, the option should be reset to the setting **Disabled** (Default).

AGP Read Synchronization

When **Enabled**, the Northbridge waits until the write procedure in the system memory is completed before a new access to the AGP Bus Master takes place (Default). Setting this to **Disabled** increases performance but can cause problems.

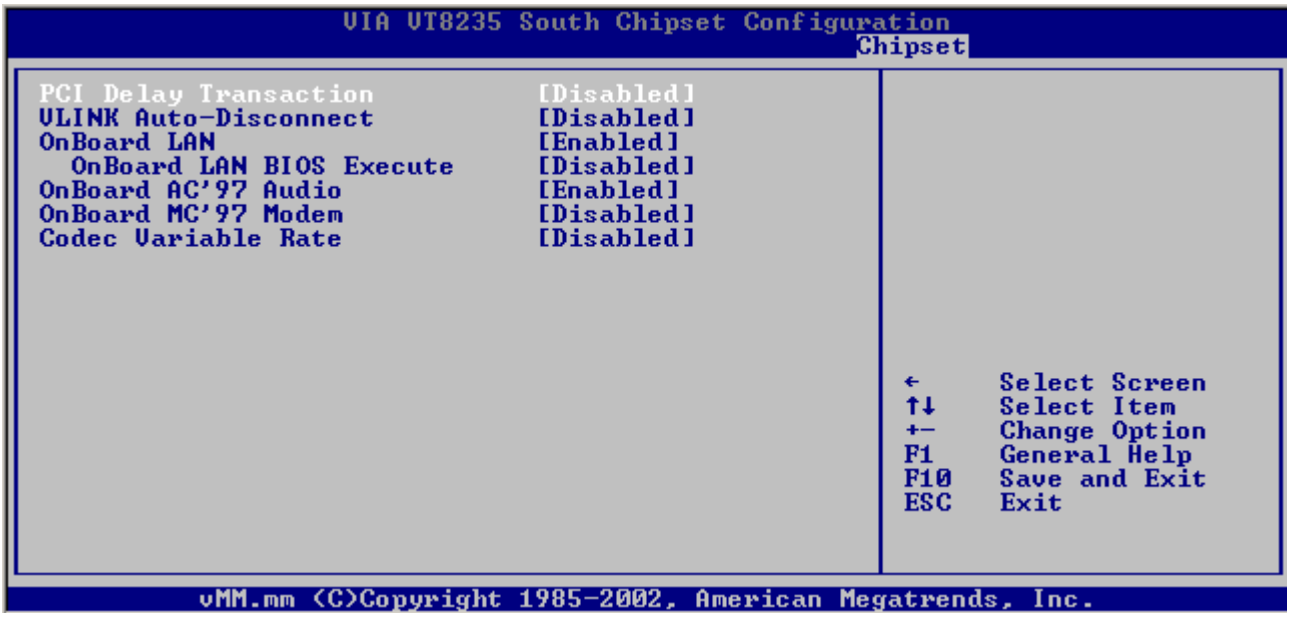
AGP Comp. Driving

Adjusts the AGP driving force. Setting this to **Manual** allows precise adjustment of the AGP bus drive strength. Normally the setting **Auto** offers the best adjustment (Default).

Manual AGP Comp. Driving

If AGP Comp. Driving is set to Manual, the value (0 – 255) can be changed using the <+> and <-> keys. A higher value represents stronger signals.

South Bridge Configuration



PCI Delay Transaction
The PCI 2.1 specification expects sequential read accesses within a certain time-slot pattern. When this is exceeded, the cycle is canceled (terminated). To avoid this, the option can be set to **Enabled**, which will also lead to better performance.

VLINK Auto-Disconnect (from BIOS version 2.02)
In case you encounter problems during DMA operation of a harddisk or USB 2.0, enabling this option might improve the situation.

OnBoard LAN
Enabled activates the 10/100 MBit Fast Ethernet Controller located in the Southbridge.

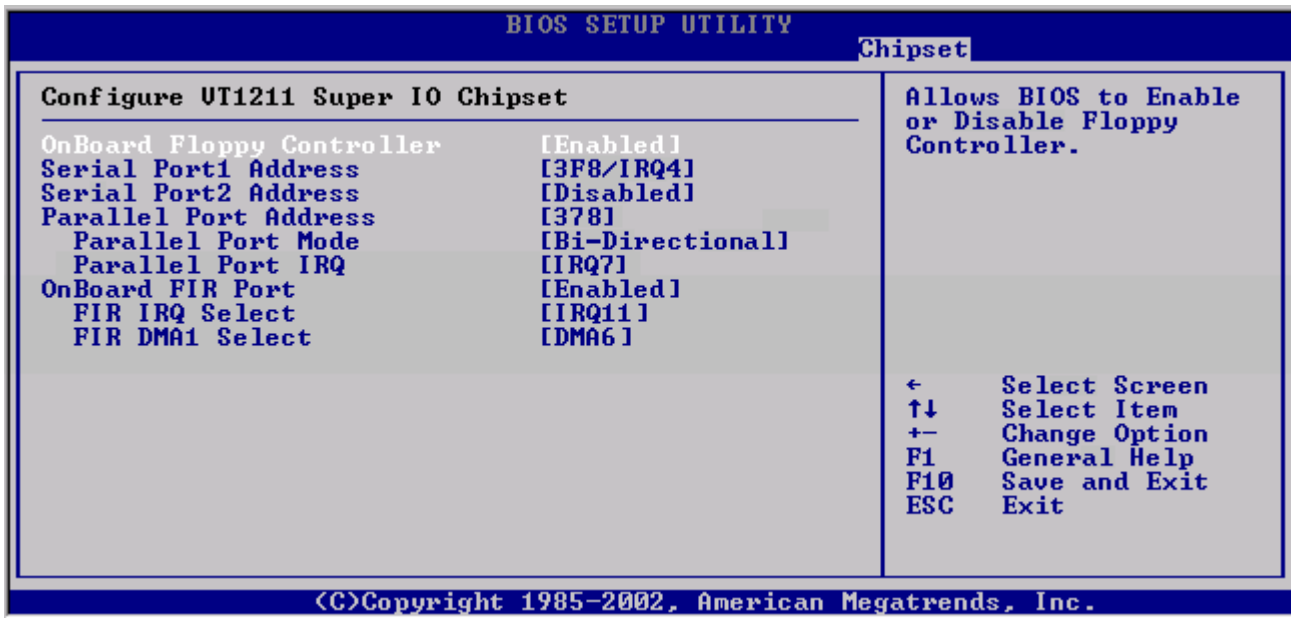
OnBoard LAN BIOS Execute
Should the System BIOS include a PXE Boot ROM, this option must be set to **Enabled** in order to execute a successful network boot process.

OnBoard AC'97 Audio
Enabled activates the Audio Controller located in the Southbridge.

OnBoard MC'97 Modem
Enabled activates the Modem Controller located in the Southbridge. An MC'97 compatible modem can be installed in the miniPCI-Slot.

Codec Variable Rate
Enabled activates the variable bitrate in the Audio Controller, i.e. data are only sent if the codec sents a request. **Disabled** creates a constant data rate.

SUPER I/O CONFIGURATION SCREEN



OnBoard Floppy Controller
Enabled activates the Floppy Controller. **Disabled** releases the corresponding resources (IRQ6, DMA2).

Serial Port1 Address
This option specifies the base I/O port address and interrupt request address of Serial port 1.

Serial Port2 Address
This option specifies the base I/O port address and interrupt request address of Serial port 2.

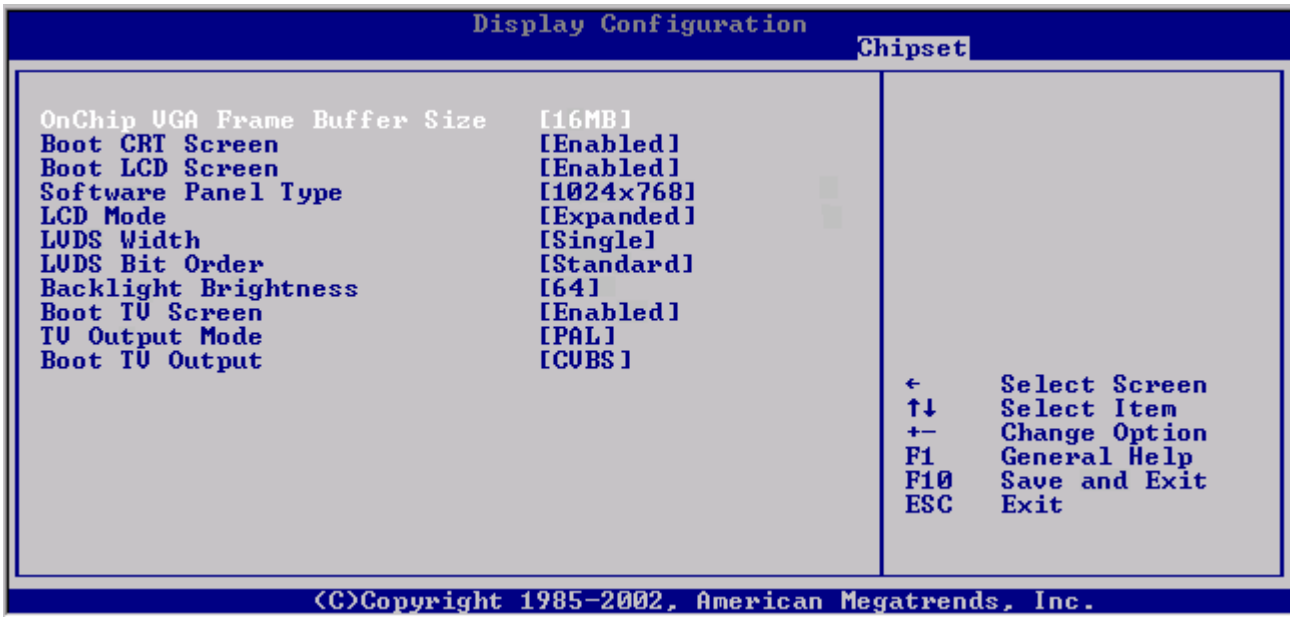
Parallel Port Address
This option specifies the I/O address used by the parallel port.

Parallel Port Mode
This option specifies the parallel port mode (Normal = Uni-Directional, Bi-Directional and EPP).

Parallel Port IRQ
This option specifies the IRQ used by the parallel port.

Onboard FIR Port
Enabled activates the Fast Infrared Port. As additional resources, FIR requires an interrupt and a DMA channel (16 Bit).

Display Configuration



The ePanel C3 offers three display output options: analog CRT, LVDS Interface for LCD panels and an analog TVOut output. However, only **two** output options can be used at a time. Example: the use of an LCD panel and the TVOut output inevitably requires the analog CRT output to be disabled.

OnChip VGA Frame Buffer Size
With this option the size of the Frame Buffer can be defined. By default, this is **16 MByte**. If the TVIn-Interface is being used, the Frame Buffer must be increased to **32 MByte**.

Boot CRT Screen
Enables or **Disables** the analog CRT output (Default: Enabled).

Boot LCD Screen
Enables or **Disables** the LVDS Interface for LCD panels (Default: Disabled). Upon changing to Enabled, the five following options appear (Software Panel Type to Backlight Brightness).

Software Panel Type
This option represents the available resolutions (e.g. **800x600** or **1024x768** pixels). This selection must match the resolution of the LCD panel.

LCD Mode
Expanded displays the screen content always at the maximum size (Default), **Centered** centers the screen content (e.g. in DOS mode).

LVDS Width
Single defines Single-Clock (Default), **Dual** defines Dual-Clock. This setting must be made according to the specifications of the panel datasheet.

LVDS Bit Order
The term **Standard** defines FPDI and **Shifted** LDI. Smaller panels of up to XGA resolution work normally with FPDI, while LDI is commonly used for larger panels. An incorrect setting results in a rough mismatch of colors.

Backlight Brightness
The Brightness value (0 – 255) can be changed using the <+> und <-> keys. A higher value means higher voltage. The output is immediate, i.e. you can already see the Brightness adjustments during setup.

Boot TV Screen

Enables or **Disables** the analog TVOut output (Default: Disabled). Upon changing to Enabled, the two following options appear (TV Output Mode to Boot TV Output).

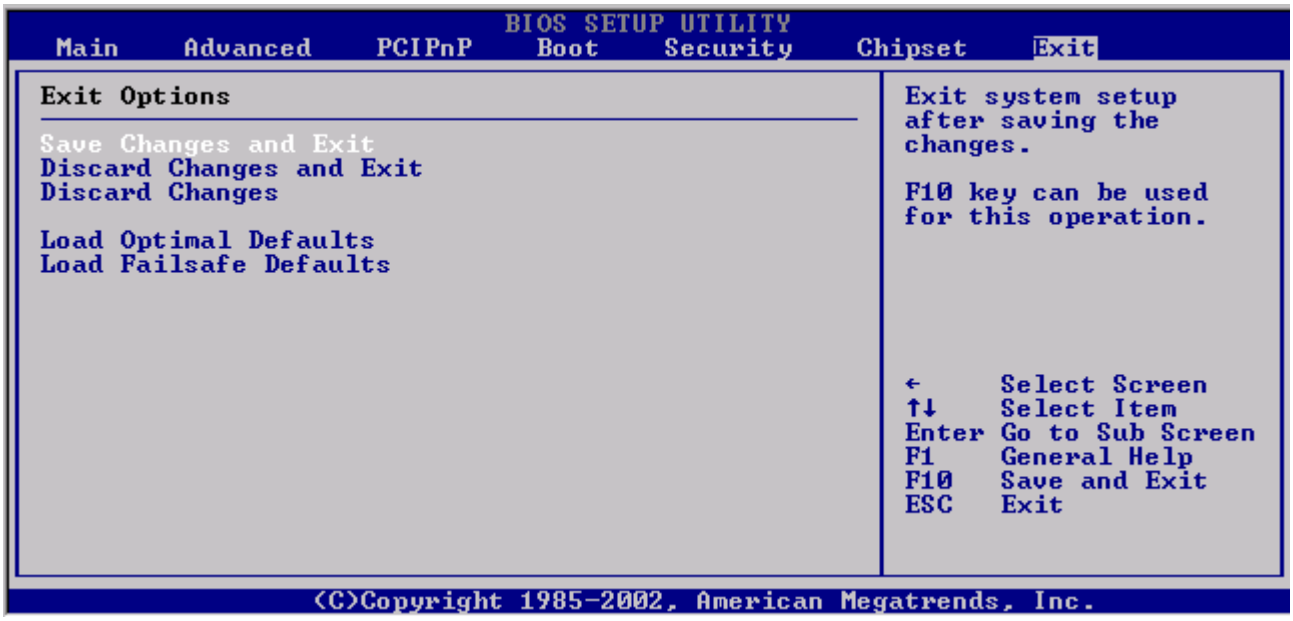
TV Output Mode

Defines the Video Mode as **PALx** (diverse PAL standards) or **NTSC** (Default: PAL).

Boot TV Output

The TVOut output is already active during boot-up. This option defines the type of signal: either CVBS (Composite), S-Video or RGB (found on SCART connectors).

Exit Menu



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

Discard Changes

Deletes all previous changes to the setup without exiting Setup.

Load Optimal Defaults

The Setup automatically sets all parameters to a complete set of default settings when you select this option. The Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use these option if your computer is experiencing system.

Load Failsafe Defaults

The Setup automatically sets all parameters to a complete set of default settings when you select this option. The Failsafe Defaults are designed for maximum system stability, but not maximum performance. Select the Failsafe option if your computer is experiencing system configuration problems.

6.2. BIOS Update

The Update Tool is available for three Operating Systems: DOS, WINDOWS 98 / 2000 / XP and LINUX (for more details read the ***ReadMe.txt*** file in the folder ***UpdateTools***). The Windows tool is a console application and should be started from within the Command Prompt.
For Windows and DOS there are two batch files (***UpdDOS.bat*** and ***UpdWIN.bat***). The reason is that only certain parameters guarrantee error-free execution of the System-BIOS after an update.
For example: If you only use the Switch **/I** in combination with the file name, a message that the CMOS data is corrupted will appear after each power up.

Using the Update Tools
Only the following combination of command line arguments has been tested and should be used for the update. The example shows the use of the DOS Update tool in combination with these arguments. The arguments are the same for the Windows and the LINUX tool.
Example:

AFUDOS **/I**<BIOS filename> **/pbnc**

p = Use additional parameters
b = Overwrite Boot Block
n = Overwrite NVRAM
c = Clear CMOS values

6.3. Power Management

Power Management is only available from Hardware Revision 1.03 and BIOS Version 2.00. Supported are ACPI 1.0b and 2.0. The only Sleep State the board is capable of is S3 (Suspend to RAM). In this case, the power consumption is reduced to the absolute minimum required to operate certain parts of the chipset and the DDR-RAM (power consumption drops to approx. 1 W).
In order to go into or come out of suspend mode, you can use the Power-Button

It is recommended to close all applications before activating suspend mode, because some programs does not support this operation mode (e.g. query of the message WM_POWERBROADCAST under Windows). It cannot be guaranteed that a program will automatically continue to run after power-up.

Approval exists for the following operating systems:
Microsoft WINDOWS 2000 (with exception of Audio driver)
Microsoft WINDOWS XP Professional
Microsoft WINDOWS XP Embedded
LINUX SUSE 9.3 (X11 graphics system with KDE desktop)

Notice for LINUX SUSE: the boot line should contain the following parameters (example SXGA resolution, 16 bit color depth = VESA mode 0x11A). In certain cases, the vga entry can also be left out.

vga = 0x31A acpi_sleep = s3_mode

Note: with all other operating systems, no guarantee can be made on error-free functioning of the Power Management.

6.4. Important Information on LINUX

Due to BIOS limitations you should take care that GRUB bootloader files are located within the first 1023 cylinders (less than 8GB). Otherwise Linux generates the message:
Error 18: Selected cylinder exceeds maximum supported by BIOS
This can be circumvented by creating a boot partition at the beginning of the disk that is completely within the first 1023 cylinders of the harddrive. This partition will contain the kernel.

7. HARDWARE DESCRIPTION

VIA Eden™ ESP processor family

The ***ePanel*-C3** Board operates with the VIA Eden™ ESP processor family.

The VIA Eden™ Platform is a low power, high performance, and highly integrated x86 platform that provides the most flexible, compatible, and cost-effective solution for building the emerging new generation of connected digital information & entertainment devices. It combines a proven ultra low power sixth generation pro-cessor core with a choice of a variety of highly integrated North Bridge and South Bridge chips, as well as a broad spectrum of expansion options for enhanced communications, connectivity, and multimedia functions.

The VIA Eden™ Embedded System Platform Processor (VIA Eden ESP for short) is based upon a unique internal architecture and is manufactured using advanced 0.15µ / 0.13µ CMOS technology. The VIA Eden ESP architecture and companion chips provide a highly compatible, high-performance, low-cost, and low-power solution for the embedded, mini-notebook, embedded, and Internet Appliance markets. The VIA Eden ESP is available in several operating frequencies.

The VIA Eden ESP processor is initially available on ePanel-C3 in following variety of models:

VIA Eden ESP 3000 (4.5 x 66-MHz bus)

VIA Eden ESP 7000 (5.5 x 133-MHz bus)

VIA Eden ESP 10000 (7.5 x 133-MHz bus)

Feature	*Benefits*
Fanless operation	Ultra reliable, silent and low power
Highly efficient CoolStream architecture	Increased performance and ultra low power consumption
Clock speeds of 733MHz and beyond	Superior digital media and productivity application performance
16 Pipeline Stages	Faster CPU speed and efficiency
StepAhead Advanced Branch Prediction	Looks ahead and gathers the data needed to optimally run applications
Efficiency enhanced 64KB Full-Speed Exclusive L2 cache with 16-way associativity	Greater memory optimization for enhanced digital media streaming and over all performance
SSE Instructions	Enhanced 3D and multimedia performance
Full Speed FPU	Additional processing power for 3D graphics, multimedia, and streaming functions
Industry leading 0.13 micron manufacturing process	Minimizes power consumption and heat generation while allowing smaller, lighter processor coolers and maximizing total system power efficiency
Ultra low power consumption	Industry leading max power consumption of a mere 6 watts at 733MHz
Ultra low heat	Requires less cooling and less space
PadLock Data Encryption Engine	Power efficient on-die Hardware Random Number Generator (RNG)
EBGA package	Lower profile, higher speed, greater efficiency, better heat dissipation, requires less system real estate
Full x86 Operating System & software application compatibility	Leverages the richest and most cost-effective software development platforms, including Microsoft® Windows® and Linux

Feature and benefit chart for VIA EDEN ESP7000

North Bridge:

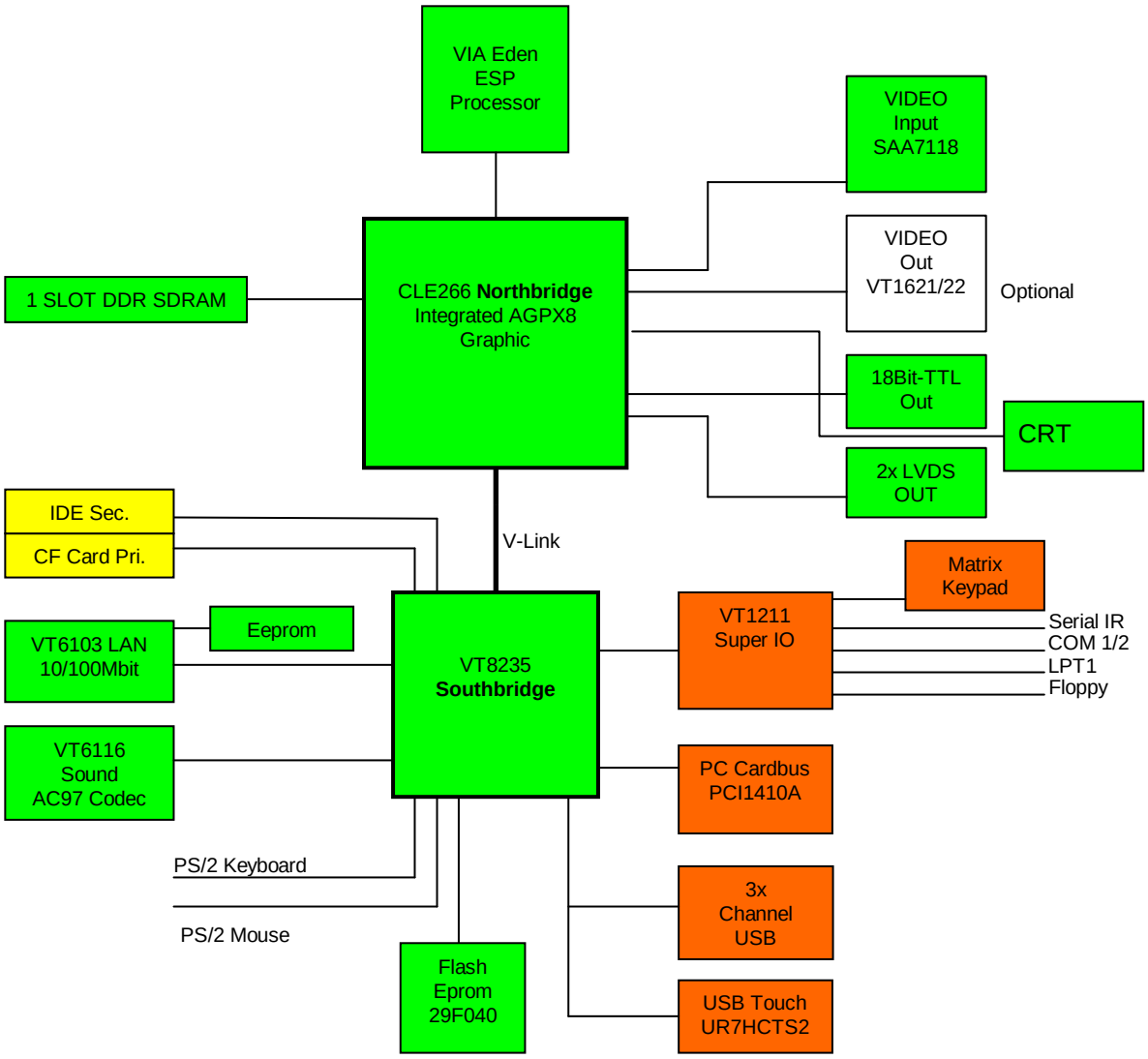
Market-leading x86 North Bridge technology featuring:

- Integrated MPEG-2 Hardware Acceleration and Motion Compensation
- Advanced high performance DDR 266 SDRAM memory controller with support for up to 1GB of memory
- Dual View support
- Two video stream with on-the-fly Alpha Blending
- Integrated low power AGP 4x equivalent graphics with high performance 3D acceleration, and full 2D video
- acceleration including motion compensation and up to 64MB Frame Buffer
- CRT and TFT Flat Panel Support (TTL and LVDS)
- High bandwidth V-Link Host Controller
- Advance System Power Management

South Bridge:

Proven x86 South Bridge technology with highly integrated multimedia, communications, and connectivity features, including:

- AC 97 audio
- USB 1.1 / 2.0
- Super I/O
- ATA-33/66/100/133 support
- 10/100 Mbps Ethernet



Audio

VT1616
- AC'97 Codec
- 2 Line Level Inputs
- 2 Line Level Outputs
- S/PDIF Output

Video

Optional VT1622AM
- NTSC / PAL system
- CVBS, S-Video, Component
- Up to 1024x768

Super IO

VT1211
- Super I/O
- Hardware Monitoring

LAN

VT6103
- 10/100 Base-T LAN

7.1. Memory configuration

The ***ePanel-C3*** uses only DDR-RAM (SO-DIMMs). One socket is available for 3.3 Volt (power level) unbuffered Synchronous Double Data Rate (DDR), Small Outline Dual In-Line Memory Module (DDR SDRAM SO-DIMMs). Specification of the PC2100 Module is using 133 MHz clock of either 64Mb, 128MB, 256MB, 512MB, 1GB.

7.2. Compact Flash Socket (True IDE compatible)

A compact flash socket for commercial CF cards (Type I+II) is already integrated on the module. This socket can serve as boot drive and is not hot-pluggable.

7.3. Ethernet 10BASE-T/100BASE-TX LAN

The Ethernet controller is a physical Layer device for 10Base-T and 100Base-TX using category 5 Unshielded and Type 1 Shielded cables. Autonegotiation for:
Dual Speed: 10 / 100Mbps
Half and Full Duplex
Meets IEEE 802.3 10Base-T and 100Base-TX Standards.

7.4. Smart battery charger

The Smart Battery Charger is a charging circuit that provides the Smart Battery with charging current and charging voltage to match the Smart Battery's requested requirements. This allows the battery to control its own charge cycle, thus providing a chemistry independent interface to the battery system. Optionally, the Smart Battery Charger may not allow the Smart Battery to supply power to the rest of the system when the Smart Battery is fully charged and the system is connected to AC power thus prolonging the life of the battery. The Smart Battery Charger will also receive critical events from the Smart Battery when it detects a problem. These include alarms for charging conditions or temperature conditions which exceed the limits set within the particular Smart Battery. Charging of the battery is independent of state of the CPU, thus allowing the battery to be charged even if the CPU is powered down. Minimum/Maximum charging voltage is 8V/18.4V and minimum/maximum charging current 7mA/3A. Supply voltage has to be 12% higher as peak charging voltage.

7.5. Video Input / Output

The SAA7118E is a combination of a four-channel analog preprocessing circuit including source selection, anti-aliasing filter and ADC, an automatic clamp and gain control, a Clock Generation Circuit (CGC), a digital multistandard decoder containing two-dimensional chrominance/luminance separation by an adaptive comb filter and a high performance scaler, including variable horizontal and vertical up and downscaling and a brightness, contrast and saturation control circuit. The target application for the SAA7118E is to capture and scale video images, to be provided as digital video stream through the image port of the VGA controller for overlay purposes. Up to 16 CVBS (Composite), 8 S-Video or 4 Component (RGB) inputs are supported. Software control is integrated in the system BIOS and sample applications are available.

7.6. Wide range DC power supply

The power supply of the board has an input range from 8V to 28V DC. The power supply switches over to battery supply, if the main power supply voltage falls below 8V. All internal supply voltages are generated on board.

7.7. PC-Card Interface

The PCI1410A device integrated onboard the ePanel-C3 is a high-performance PCI-to-PC Card controller that supports a single PC Card socket compliant with the PC Card Standard. The PC Card Standard retains the 16-bit PC Card specification defined in PCI Local Bus Specification and defines the new 32-bit PC Card, CardBus, as being capable of full 32-bit data transfers at 33 MHz. The PCI1410A device supports both 16-bit and CardBus PC Cards, powered at 5V or 3.3V, as required. All card signals are buffered internally to allow hot insertion and removal.

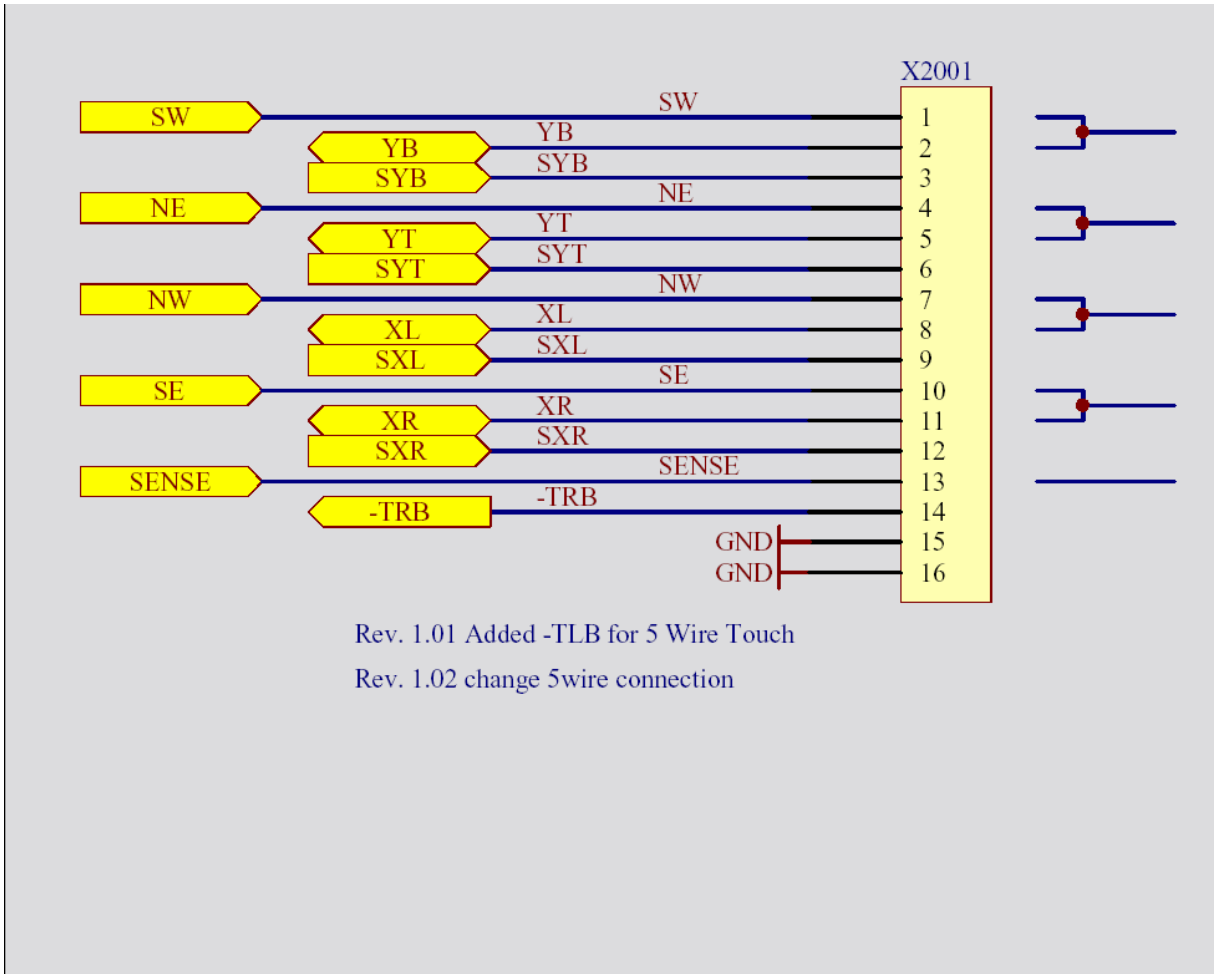
7.8. Flatpanel Interface

The display controller supports LVDS and digital RGB TFT flatpanels from 640 x 480 up to 1600 x 1200 pixels and up to 16 Mio. colors. The resolution and the type of flatpanel interface supported can be setup in the BIOS. Please refer to the BIOS section in this manual.

7.9. Backlight control and power supply

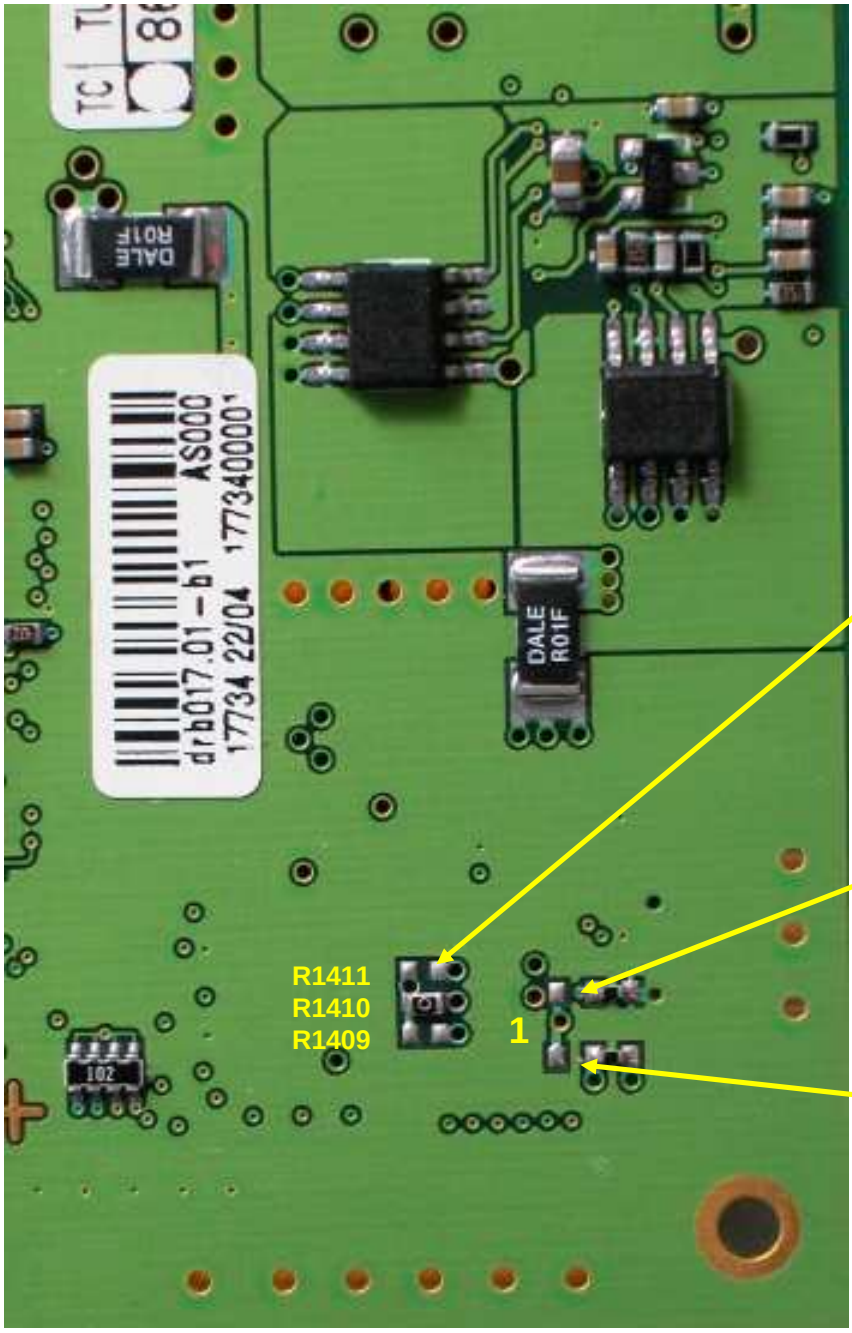
A connector (X1402) to drive a backlight inverter for flat panels is provided onboard. Power supply for the backlight can be either 5V@1000mA or 12V@1000mA. A software controlled voltage (0V-5V) is provided for dimming purposes.

7.10. Touch Interface



	5-Wire	4-Wire	8-Wire	
SW	1/2			Top
NE	4/5			Left
NW	7/8			Right
SE	10/11			Bottom
SENSE	13			Sense
YB		2/3	2	Bottom
S-YB			3	Sense Bottom
YT		5/6	5	Top
S-YT			6	Sense Top
XL		8/9	8	Left
S-XL			9	Sense Left
XR		11/12	11	Right
S-XR			12	Sense Right

8. JUMPER SETTINGS



Panel VCC

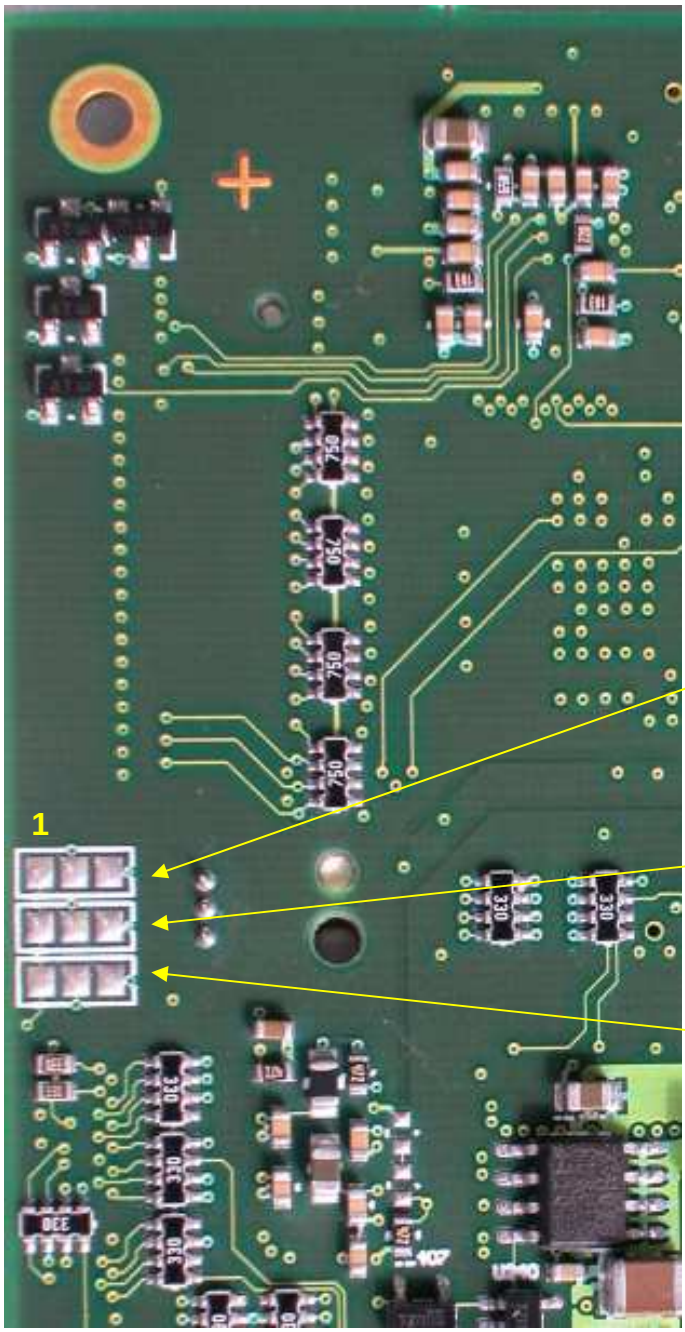
R1411 +12V
R1410 +5V
R1409 +3,3V

Backlight ON
(J1402)

1 – 2 /ON
2 – 3 ON

Backlight VCC
(J1400)

1 – 2 +5V
2 – 3 +12V

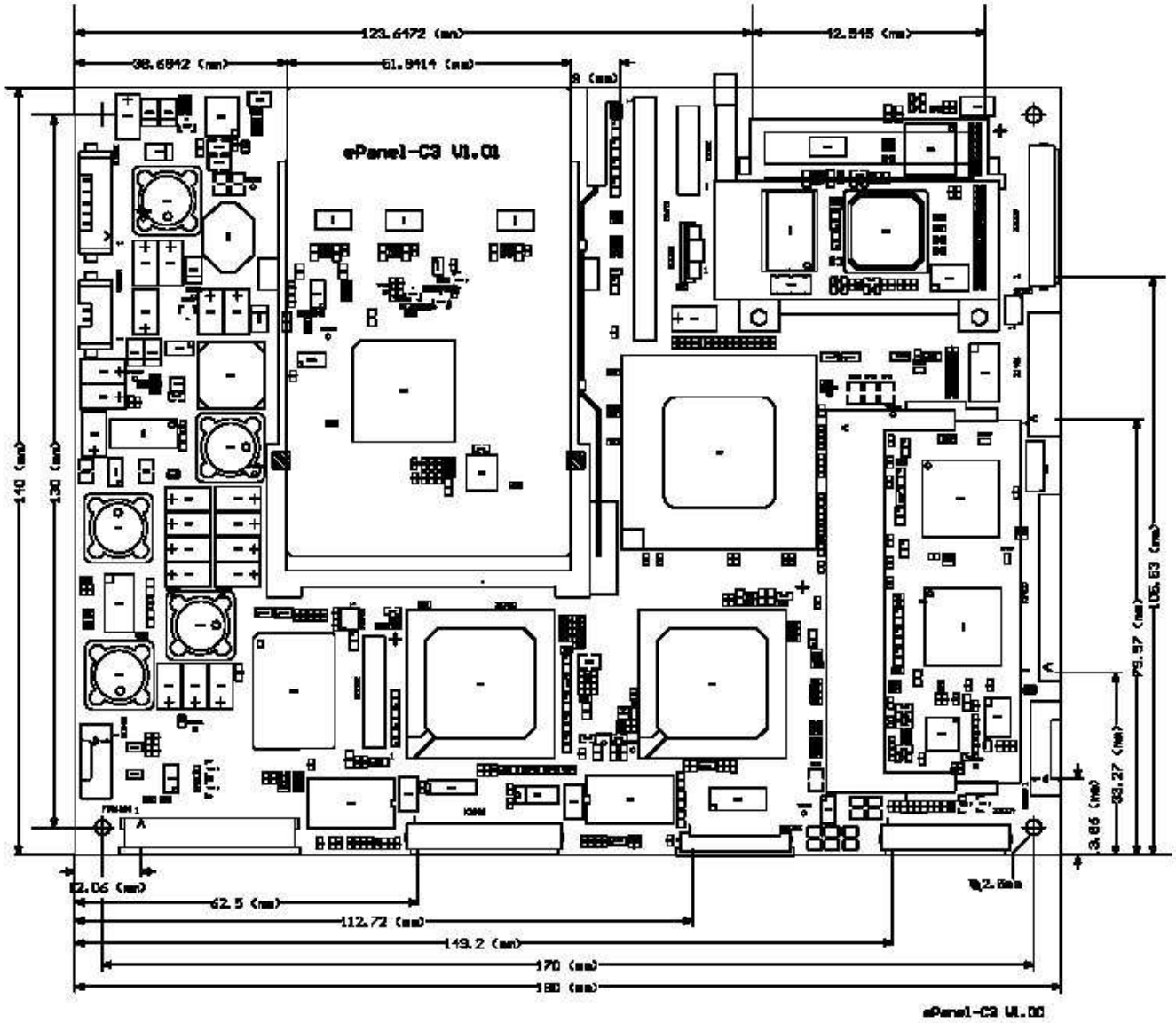


Left/Right
(JP1400)
Rotate image in right or left
Default open

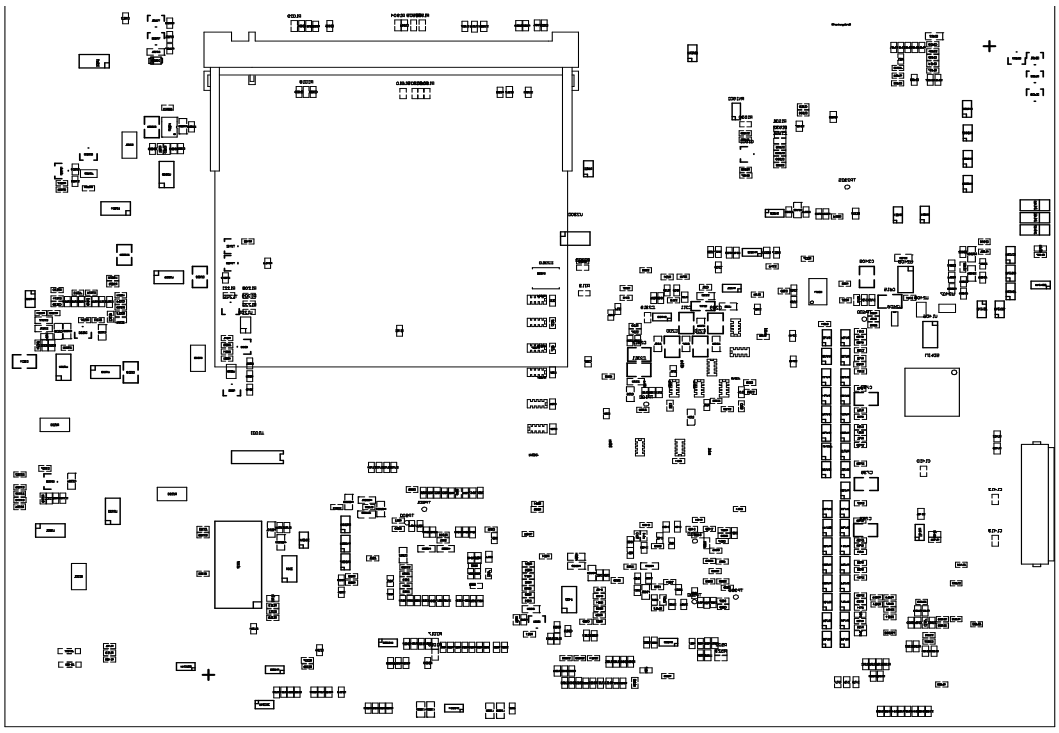
Up/Down
(JP1401)
Rotate image up or down
Default open

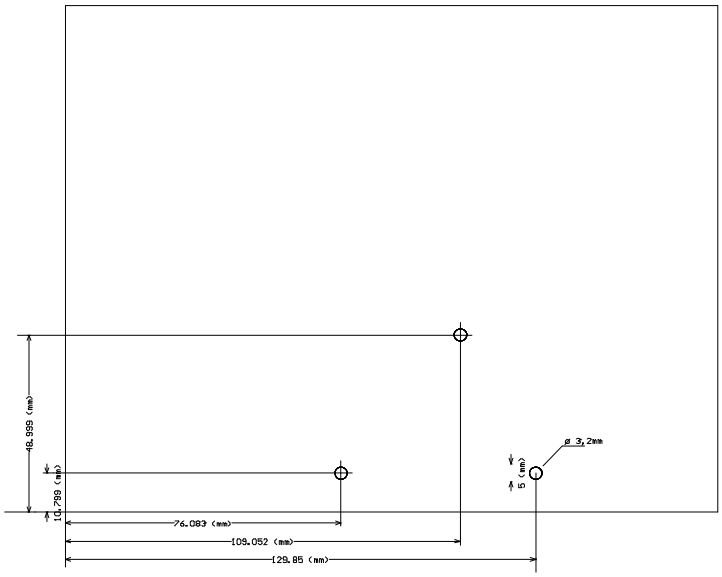
Reserved
(JP1402)

9. MECHANICAL DIMENSIONS



NOTE: all dimensions in [mm]





Frontside positions of mounting holes for heatspreader

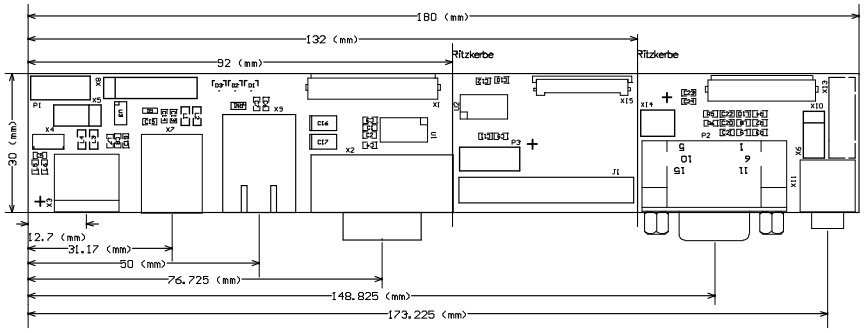
10. EVALUATION I/O-ADAPTERS

Kontron provides you with the evaluation I/O-adapters which makes all interfaces supported by ***ePanel-C3*** easy accessible.

Following interfaces are accessible on **ePanel-ADAPT**:

Sound output (Stereo)
Sound input (Stereo)
Microphone input (Mono)
Three USB-ports
Printer port LPT1
VGA-CRT
Two serial ports COM1/COM2 (RS232C)
Ethernet
PS/2-Mouse
PS/2-Keyboard
IrDA
Feature connector with Reset-Input, Power-On-Button, Power-On-LED
Backup battery input (3V DC)
Mechanical dimension: 180,00 x 30,00 mm

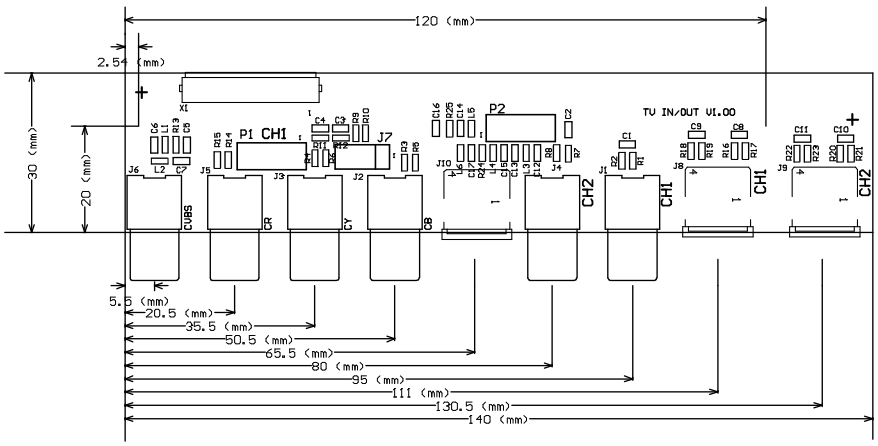
The schematics of the I/O-adapter ePanel-ADAPT is available as PDF-file on the support page www.kontron-emea.com.



Following interfaces are accessible on **ePanel-ADAPT-TV**:

Video inputs (2x Composite, 2x S-Video, 1x RGB)
Video Outputs (1x Composite, 1x S-Video, 1x RGB)
Mechanical dimension: 140,00 x 30,00 mm

The schematics of the I/O-adapter ePanel-ADAPT-TV is available as PDF-file on the support page www.kontron-emea.com.



11. SPECIFICATIONS

11.1. Mechanical specifications

Dimensions (length x width):	180,0 x 140,0 mm
Height:	approx. 15 mm (21mm with Heatspreader and Fan)

11.2. Electrical specifications

Supply voltage:	8V DC up to 28V DC +/- 10%	
Supply voltage ripple:	100 mV peak to peak 0 - 20 MHz	
Supply current 1 GHz (typical, see Note 1):	2325mA @ 8V DC	(ca. 18.6 W)
	1550mA @ 12V DC	(ca. 18.6 W)
	780mA @ 24V DC	(ca. 18.8 W)
Supply current 733 MHz (typical, see Note 1):	2070mA @ 8V DC	(ca. 16.5W)
	1370mA @ 12V DC	(ca. 16.4 W)
	695mA @ 24V DC	(ca. 16.7W)
Supply current 300 MHz (typical, see Note 1):	1550mA @ 8V DC	(ca. 12,4W)
	1030mA @ 12V DC	(ca. 12.3 W)
	520mA @ 24V DC	(ca. 12.5W)

Note 1: with 256 MB DDR-RAM, w/o Flatpanel and Backlight Inverter, Prompt at System BIOS Setup

11.3. Environmental specifications

Temperature:	operating: +5 °C to +55 °C (Note 2)
	non operating: -10 °C to +85 °C
Humidity:	operating: 10% to 90% (non-condensing)
	non operating: 5% to 95% (non-condensing)

Note 2: The maximum operating temperature is the maximum measurable temperature on any spot on the modules surface. It is the user's responsibility to maintain this temperature within the specification, which is set by the IC manufacturer.

12. LITERATURE, STANDARDS, LINKS

It is not in the responsibility of **Kontron** to provide you with information on standard PC technology. Please find below a selection of different information sources for your convenience.

12.1. ISA-Bus, standard connectors

- **ISA System Architecture, Addison-Wesley Publishing Company ISBN 0-201-40996-8**
- **AT BUS Design IEEE P996 Compatible, Edward Solari, Annabooks San Diego CA. ISBN 0-929392-08-6,** www.annabooks.com
- **PC Handbook, Sixth Edition, John P. Choisser and John O. Foster, Annabooks San Diego CA. ISBN 0-929392-36-1,** www.annabooks.com
- **AT IBM Technical Reference Vol 1&2, 1985**
- **ISA Bus Specifications and Application Notes, January 30, 1990, Intel**
- **Technical Reference Guide, Extended Industry Standard Architecture Expansion Bus, Compaq 1989**
- **Personal Computer Bus Standard P996, Draft D2.00, January 18, 1990, IEEE Inc**
- **Embedded PCs, Markt&Technik GmbH, ISBN 3-8272-5314-4 (german)**

12.2. PCI specifications

- **PCI Special Interest Group, c/o Intel Corporation**
- **PCI System Architecture, Addison-Wesley Publishing Company, ISBN 0-201-40993-3**

12.3. RS232C

- **EIA-232-E Interface between data terminal equipment and data circuit-terminating equipment employing serial binary data interchange (ANSI/IEA-232-D)**

12.4. USB

The USB specification maybe obtained from the USB Implementers Forum web site at www.usb.org

12.5. Smart Battery System Specification (SBS)

The Smart Battery System specification maybe obtained from the Smart Battery System Implementers Forum web site at www.sbs-forum.org

13. DOCUMENT REVISION HISTORY

Filename	Date	Edited by	Alteration to previous document revision
ePanel-C3_M100.DOC	09/01/04	D.Piper, L.Trotter	Initial Release
ePanel-C3_M101.DOC	09/13/04	L.Trotter	Preliminary Release
ePanel-C3_M102.DOC	06/01/06	M. Hüttmann, V. Irion	Update BIOS Release 2.00
ePanel-C3_M103.DOC	01/10/07	S. Moritz	Change connector pinout description for X2000 and add SAA7118 pin description at X2000
ePanel-C3_M104.DOC	02/19/07	M. Hüttmann	Supplement of BIOS 2.02 features and chapter 6.4