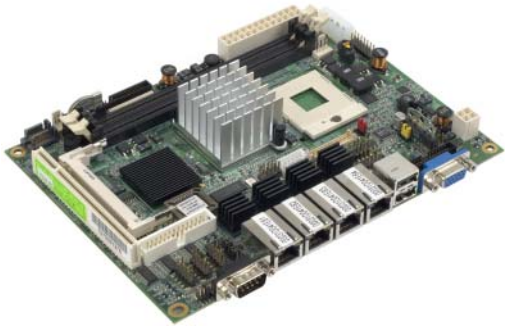
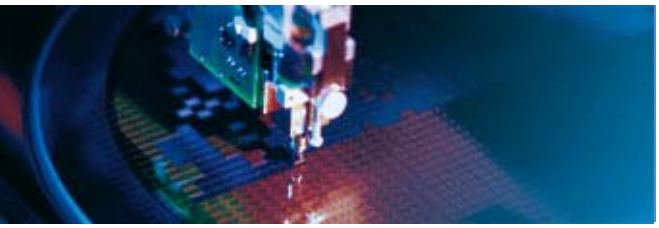
USER MANUAL





GEMINI

5¼" embedded miniboard

Rev. 4.0 - April 2009 - ETH_GEMINI_USM

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REVISION HISTORY

Issue no.	*PCB*	*Date*	*Comments*
A		21st July 2007	First full release of the manual.
B		1st October 2007	Minor updates, Eurotech rebranding.
C		12th May 2008	Minor updates.
D		2nd April 2009	Minor updates and new branding.

For contact details, see page 55.

Contents

Introduction

The GEMINI is an EBX format, high-performance, high-functionality PC-compatible processor board designed for embedding into OEM equipment. The board is based on the Intel® 945GME/ICH7-M chipset and supports a range of Intel Core 2 Duo / Core Duo / Core Solo / Celeron M 4xx (Merom/Yonah) processors to offer a combination of high performance computing features with low power dissipation.

GEMINI is a 5¼" embedded miniboard that provides:

- *Intel Yonah dual core processor support.*
  The board supports Intel Core Duo/Core Solo processors with 533/667MHz front side bus, 2MB L2 cache, to provide powerful performance.

- *Intel 945GME and ICH7-M chipset.*
  Based on the Intel 945GME and ICH7-M chipset, the board provides a new generation mobile solution offering:
  - Intel GMA950 graphics.
  - DDR2 533/667 memory.
  - Built-in high speed serial ATA interface.
  - AC97 Audio with 5.1 surround sound.

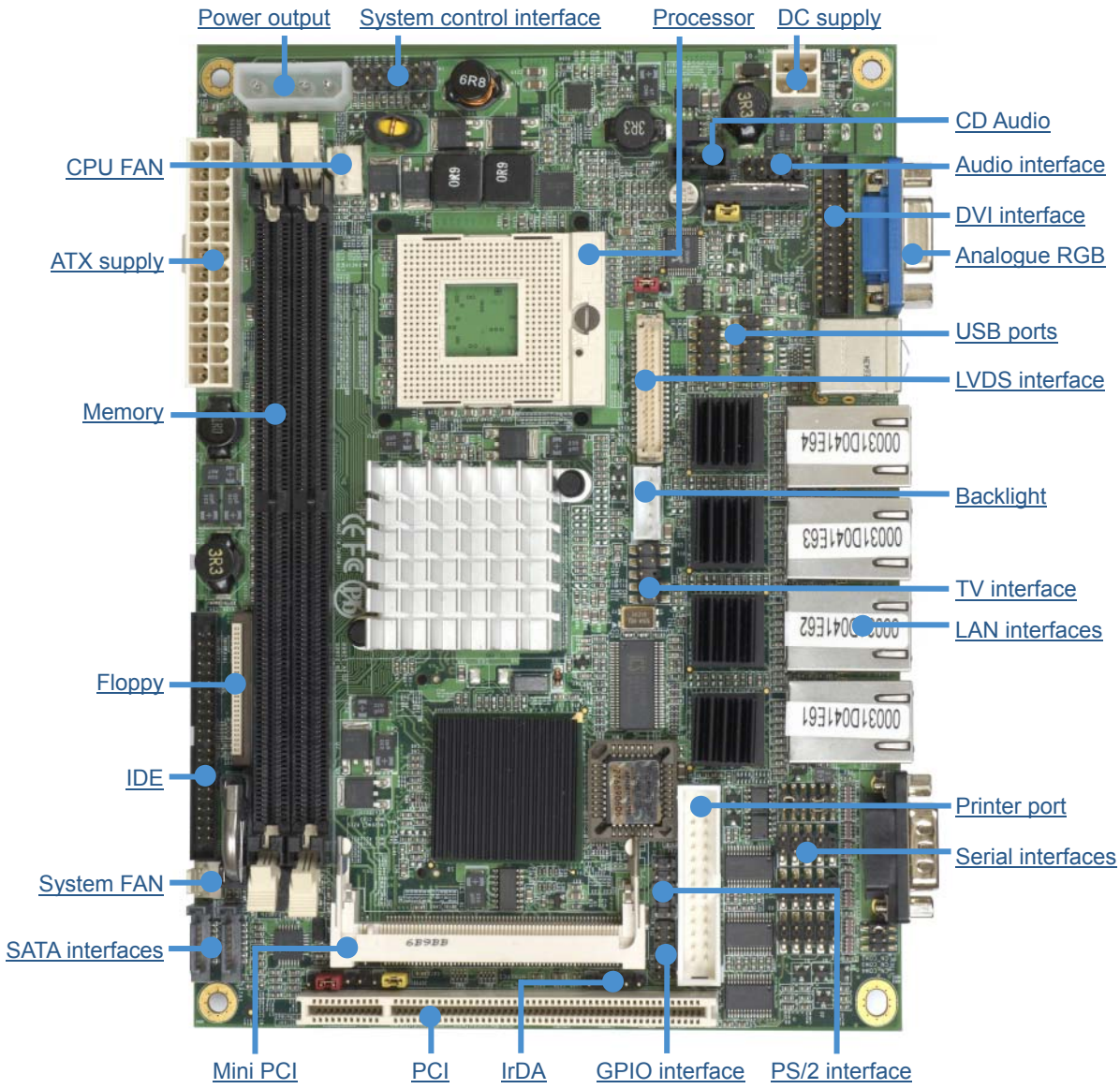
- *All-in-one multimedia solution.*
  The board provides high performance onboard graphics, 24-bit Dual channel LVDS interface, CRT, DVI and HDTV, to meet requirements of demanding multimedia applications.

- *Flexible Extension Interface.*
  A CompactFlash Type II socket and mini-PCI socket are available.

It also offers all standard features and connectors found on a PC motherboard including:

- PCI slot
- Floppy drive interface.
- Four Ethernet ports.
- Four serial ports, parallel port, IrDA port, PS/2 port.
- Secondary IDE interface.
- Six USB 2.0 compliant ports.
- General purpose IO.

GEMINI ‘at a glance’



Features

The features included in the GEMINI are described below:

Processor

- Intel Core 2 Duo / Core Duo / Core Solo / Celeron M 4xx Processor (Merom/Yonah) at 533 / 667MHz FSB.

Chipset

- Intel 945GME Northbridge and ICH7-M Southbridge.

BIOS

- Phoenix-Award v6.00PG 4Mb PnP flash BIOS.

System memory

- Two DDR2 533/667MHz SDRAM up to 3GB (Non-ECC, unbuffered memory is supported only).

Video

- Intel 945GME GMCH (Graphic Memory Controller Hub) integrated GMA (Graphic Media Accelerator) 950 Technology.
- Up to 224MB shared with system memory.
- VGA, DVI, LVDS and SD/HDTV outputs.

Integrated I/O

- Winbond W83627THG LPC Super I/O.

Audio

- Intel ICH7-M integrated with Realtek ALC655 5.1 Ch AC97 Codec.

Enhanced IDE

- Onboard 44-pin IDE (supports DOM).

Floppy port

- Supports two floppy drives 360kB, 720kB, 1.2MB, 2.88MB.

Parallel port

- Standard, Enhanced and Extended Parallel Port mode supported (SPP/EPP/ECP).

Serial ports

- Three RS-232 and one RS-232/422/485/IrDA serial ports.

USB interface

- Two external and four internal Hi-Speed USB 2.0 ports with 480Mbps of transfer rate.

Network support

- Four Intel 82573L Gigabit Ethernet controllers.
- Triple speed 10/100/1000Base-T, auto-switching Fast Ethernet, Full duplex, IEEE802.3U compliant.

Expansion

- One 8-bit programmable I/O interface (x8 Global Purpose Digital I/O's).
- One PCI slot supports up to two PCI devices through riser card.
- One Mini PCI socket.
- One CompactFlash socket

Size

- EBX compatible footprint 5.75" x 8.00" (146mm x 203mm).

Support products

The GEMINI is supported by the following optional product:

- *1U 19" wide GEMINI ICE (Industrial Compact Enclosure)*
  Provides easy-to-use system solutions for embedded SBC applications. It is manufactured from 0.9mm (20 SWG) finished mild steel. The enclosure conforms to the 19" 1EC6O297-1/2 DIN 41494 and MEP IEC 60917-2-1 standards and therefore meets the 19" 1U specification in height and width. Depth is approximately 13.8 inches (350mm).

  The GEMINI ICE contains:

  - 180W AC ATX PSU: Auto-ranging 100-240V AC at 47 - 63Hz.
  - DC input PSU option available, please contact Eurotech sales.
  - Standard I/O connections from rear panel.
  - On/Off and reset switch and power and HDD activity LEDs on a front panel.
  - Front panel connections for four USB ports.
  - PCI riser card with two card expansion slots.
  - Hard disk drive and CD/DVD reader/writer.
  - Two system fans.
  - Front panel LCD display with navigation keys and user LEDs.

- *LCD display*
  An AU Optronics 15" XGA (1024x768) colour TFT LCD display interfaces directly with the LVDS signals provided by the GEMINI. The display has a 400:1 contrast ratio, 16ms response time and a dual CCFL backlight providing 350nits of screen brightness.

- *TSC1 (TouchScreen Controller)*
  The Eurotech TSC1 can be used to provide analogue resistive touchscreen support for the GEMINI. The TSC1 is designed to directly interface between four-, five- or eight-wire analogue touchscreens and a serial connection. A custom cable can be used to connect directly to one of the RS232 ports on the GEMINI. A separate +5V connection is also required.

- *15" Touchscreen*
  Glass-backed 15" touchscreens are available for use in conjunction with the 15" LCD display. Two touchscreens are available: a four-wire option and an eight-wire option. These interface directly with the Eurotech TSC1 touchscreen controller.

For more details about any optional products, please go to www.eurotech.com or contact the Eurotech sales team (see page 55).

Development kits

Eurotech offers a development kit for the GEMINI board. Two configurations are available:

- Windows XP Embedded contained on 2GB USB Flash® disk module.
- Embedded Linux contained on 2GB USB Flash® disk module.

With this configuration the GEMINI board is supplied with an Intel Core 2 Duo T7400 2.16 GHz processor and a 1GB PC5300 DDR2 SDRAM DIMM.

For more details about any of the above options, please go to www.eurotech.com or contact the Eurotech sales team (see page 55).

Product handling and environmental compliance

Anti-static handling

This board contains CMOS devices that could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling the board. This includes storing the board in appropriate anti-static packaging and wearing a wrist strap when handling the board.

Battery

The board contains a Lithium non-rechargeable battery. Do not short-circuit the battery or place on a metal surface where the battery terminals could be shorted.

When disposing of the board or battery, take appropriate care. Do not incinerate, crush or otherwise damage the battery.

Packaging

Please ensure that should a board need to be returned to Eurotech it is adequately packed, preferably in the original packing material.

Electromagnetic compatibility (EMC)

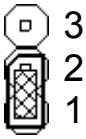
The GEMINI is classified as a component with regard to the European Community EMC regulations and it is the user's responsibility to ensure that systems using the board comply with the appropriate EMC standards.

RoHS Compliance

The European RoHS Directive (Restriction on the use of certain Hazardous Substances – Directive 2002/95/EC) limits the amount of 6 specific substances within the composition of the product. The GEMINI and associated accessory products are available as RoHS-6 compliant options only. A full RoHS Compliance Materials Declaration Form is included in this manual - see Appendix D – RoHS-6 Compliance - Materials Declaration Form on page 53. Further information about RoHS compliance is available on the Eurotech web site at www.eurotech.com/RoHS_and_WEEE.

Conventions

The following symbols are used in this guide:

Symbol	Explanation
	Note - information that requires your attention.
	Tip - a handy hint that may provide a useful alternative or save time.
	Caution – proceeding with a course of action may damage your equipment or result in loss of data.
	Jumper is fitted.
	Jumper is not fitted.
	Jumper fitted on pins 1-2.
	Jumper fitted on pins 2-3.

Getting started with your GEMINI

Once you have a working GEMINI system, you can start adding other peripherals to enable you to start development. In this section we guide you through setting up and using peripherals and some of the features of the GEMINI.

The GEMINI uses a Phoenix-Award BIOS (Basic Input-Output System) to provide support for the board as standard. BIOS defaults have been selected to enable the board to operate with a minimum of devices connected. If you want to change these default settings, you use the Phoenix-Award BIOS setup program.

The setup parameters are stored in the CMOS RAM and are retained when the power is switched off, providing the battery backup supply is connected. If no battery is installed or the CMOS settings are corrupted then the BIOS will restore them from an onboard CMOS EEPROM.

What's in the box?

The GEMINI product includes one GEMINI motherboard and a cable kit. The cable kit includes the following items:

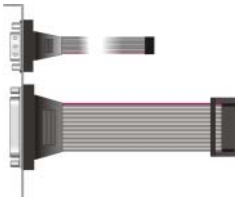
ATA33 IDE cable x 1

PS/2 cable x 1

SATA cable x 2

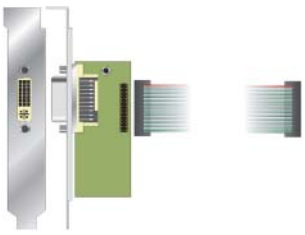
Power cable x 1

26-pin slim type floppy cable x 1

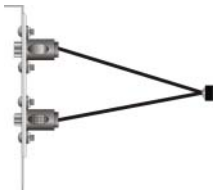


COM and printer port cable x 1

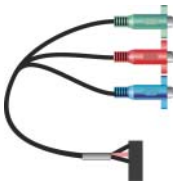
COM port cable x 1



DVI/SDTV module with bracket x 1



SDTV cable x 1



YPbPr cable x 1

Audio port cable x 1

CPU cooler x 1

USB cable x 1

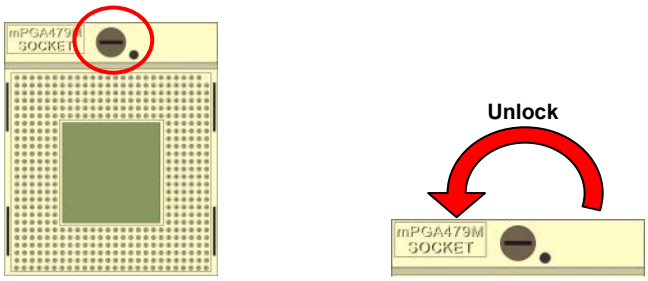
CPU configuration

The GEMINI board has been specifically designed to support a range of Intel processors. The appropriate voltage and speed selections are configured during the boot process. No user configuration is required.

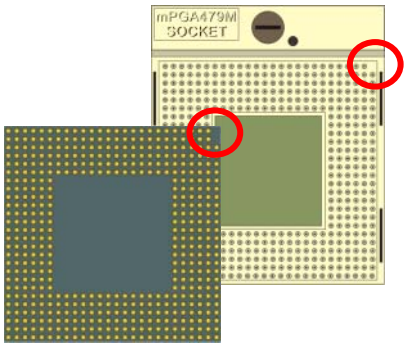
Installing the processor and the memory

To install the CPU, follow these steps:

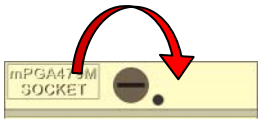
1 Use the flat-type screw drive to unlock the CPU socket.



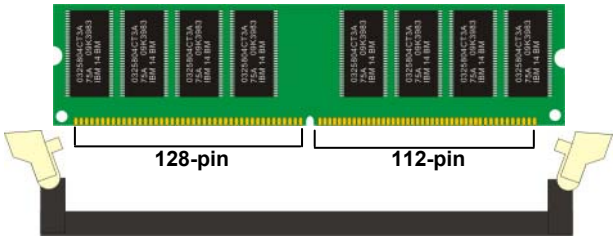
2 Follow the pin direction to install the processor on the socket.



3 Lock the socket.



When installing the memory module, check that the pin number matches the slot side:



Connecting a floppy disk drive

To connect a floppy device to the board, follow these steps:

1. Lift up the plastic bar on the rear of the floppy device.
2. Slot in the 26-pin ribbon cable provided (blue paste for outside).
3. Press back the plastic bar.
4. On the GEMINI board, lift up the brown plastic bar.
5. Slot in the cable (blue paste for brown bar side). (See Jumpers and connectors on page 18 for the location of the floppy port.)
6. Press back the plastic bar.

Connecting a hard disk drive

The GEMINI provides an Integrated Serial ATA Host Controller, enabling up to two SATA devices to be connected. There is also a single secondary IDE controller, enabling up to two IDE devices to be connected. Down to one only if the CF socket is in use.

When connecting SATA peripherals to the GEMINI, the BIOS automatically sets the following configuration:

Primary Master: Device connected to the onboard connector SATA1.

Primary Slave: Device connected to the onboard connector SATA2.

Secondary Master: Device connected the IDE port and set-up as a MASTER.

Secondary Slave: Device connected the IDE port and set-up as a SLAVE.

The BIOS automatically detects the hard disk drive(s) during the POST processes and configures the hardware correctly. The BIOS allows either a master or slave device to be the boot device.

Connecting a CD-ROM (IDE Type)

If a CD-ROM drive is required in the system, it may be connected in place of a secondary drive (as detailed above). The CD-ROM should be configured as a ‘master’ device.

Drivers are required to support a CD-ROM drive under DOS. If a bootable CD is inserted in the drive, the BIOS can be configured to automatically boot from this CD.

Connecting a CompactFlash® card

The GEMINI has a single CF+ version 2.0 Type II CompactFlash® socket that supports both Type I and Type II CompactFlash cards.

The CompactFlash socket is interfaced to the IDE controller. If a CompactFlash card is plugged into the socket it acts as a normal hard disk drive and is detected by the BIOS during the POST process. If the card has an operating system loaded and is correctly configured to be bootable, it can be selected as a boot device from the BIOS boot menu.

The CompactFlash card can only be inserted into the socket one way. The correct orientation is for the top of the card (i.e. the normal printed side) to be faced down to the PCB.

For further details about the CompactFlash socket, see Enhanced IDE and CompactFlash interface on page 43.

Connecting a keyboard

A PS/2 keyboard can be connected to the PS/2 MiniDIN Connector via the PS/2 cable supplied. A USB keyboard can also be connected to any USB port available. See CN_PS2: PS/2 connector on page 36 for more information.

Connecting a mouse

A PS/2 mouse can be connected to the PS/2 MiniDIN Connector via the PS/2 cable supplied. A USB mouse can also be connected to any USB port available. See CN_PS2: PS/2 connector on page 36 for more information.

Using the serial interfaces (RS232/422/485)

The four serial port interfaces on the GEMINI are fully PC compatible. COM1 to COM4 are decoded at standard PC address locations. PC applications can use these ports without any special configuration.

The BIOS setup screens are used to configure the operation of each of the serial ports.

Connection to COM1 is via a standard DB9-M connector mounted on the PCB. COM2 to COM4 are interfaced via a 10-way boxed header. The pin assignment of these headers matches the standard 9-way D-Type plug one (pin to pin connection). A suitable cable is provided in the box. The D-type connector is compatible with the standard 9-way connector on a desktop machine.

See JSEL1/2: COM2 RS232/422/485 mode setting on page 22 for further details about the serial port interface, and page 28 for pin details.

Connecting a printer

An enhanced printer port is incorporated into the GEMINI. This port can be used to support a Centronics-compatible printer or ECP/EPP bi-directional device. The port signals are available on a 26 way boxed header and the pin assignment has been arranged to allow 1:1 connection with a 25-way IDC D-Type socket. A suitable cable is provided in the box. The D-type socket is compatible with a standard printer port connector on a desktop machine.

See page 36 for pin details.

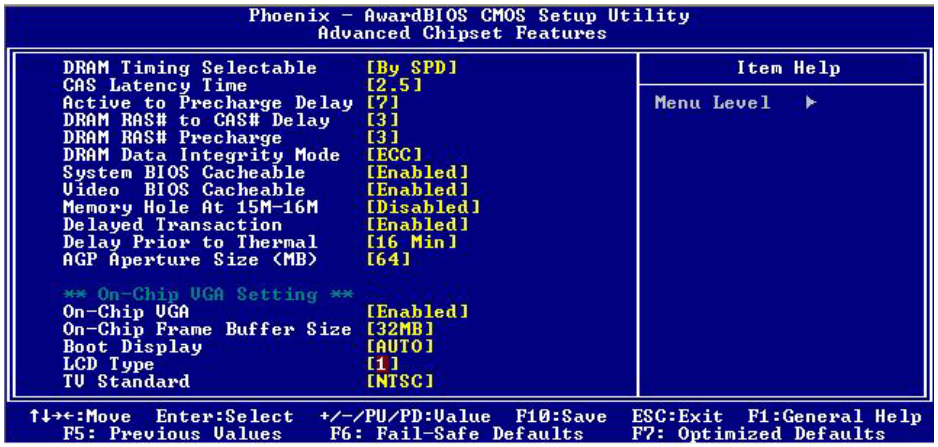
Using the audio features

The GEMINI provides an AC97 audio codec that supports standard line in, line out, microphone functionality, or alternatively can be configured in software to support the 5.1 speaker output format. The audio input/outputs are available through a 10 pin header. An onboard CD audio input connector is also available.

See Audio connector on page 26 for further details.

Using the flat panel interface

The GEMINI provides a dual channel LVDS LCD display header that can be used to directly interface to LVDS LCD displays up to a maximum resolution of 1600x1200. The display type is selected from the BIOS video setup menu:



The panel type mapping options are listed below:

18 bits Single channel		24 bits Single channel		24 bits Dual channel	
No.	Output format	No.	Output format	No.	Output format
1	640 x 480	4	1280 x 768	9	1024 x 768
2	800 x 600	5	1280 x 1024	10	1280 x 768
3	1024 x 768	6	1366 x 768	11	1280 x 1024
		7	1280 x 800	12	1366 x 768
		8	1600 x 1200	13	1400 x 1050
		14	1024 x 768	15	1600 x 1200

Using the USB ports

USB ports 1 and 2 are standard USB Type A connectors. USB Ports 3&4 and USB ports 5&6 are provided on a 10-way header (CN_USB1/2) designed to be compatible with PC expansion brackets that support two USB sockets.

See pages 27, 38 and 46 for further details.

Using the Ethernet interface

The GEMINI provides four 10/100/1000 Ethernet ports as standard, thus providing Gigabit Ethernet capability.

Ethernet interfaces are capable of supporting network boot features. Four rear panel RJ-45 pin connectors provide the Ethernet interface. To support Gigabit Ethernet capabilities, a cable rated to CAT5e or above with four signals pairs should be used.

Further information on the Ethernet interfaces is available on page 44.

Connecting a monitor

Connect the CRT or analogue LCD monitor with DB15 male plug to the onboard DB15 female connector on rear I/O port. You can also use a DVI monitor connected to the DVI-I connector available on the DVI/SDTV breakout board provided in the kit.

Connecting a television

The GEMINI supports both SDTV and HDTV. You can either use the S-Video or composite cable supplied to connect to a standard television or use the YPrPb component cable to connect to a High Definition TV for better resolution performance. The DVI/SDTV breakout board also provides S-Video and composite interfaces.

Setting up the BIOS

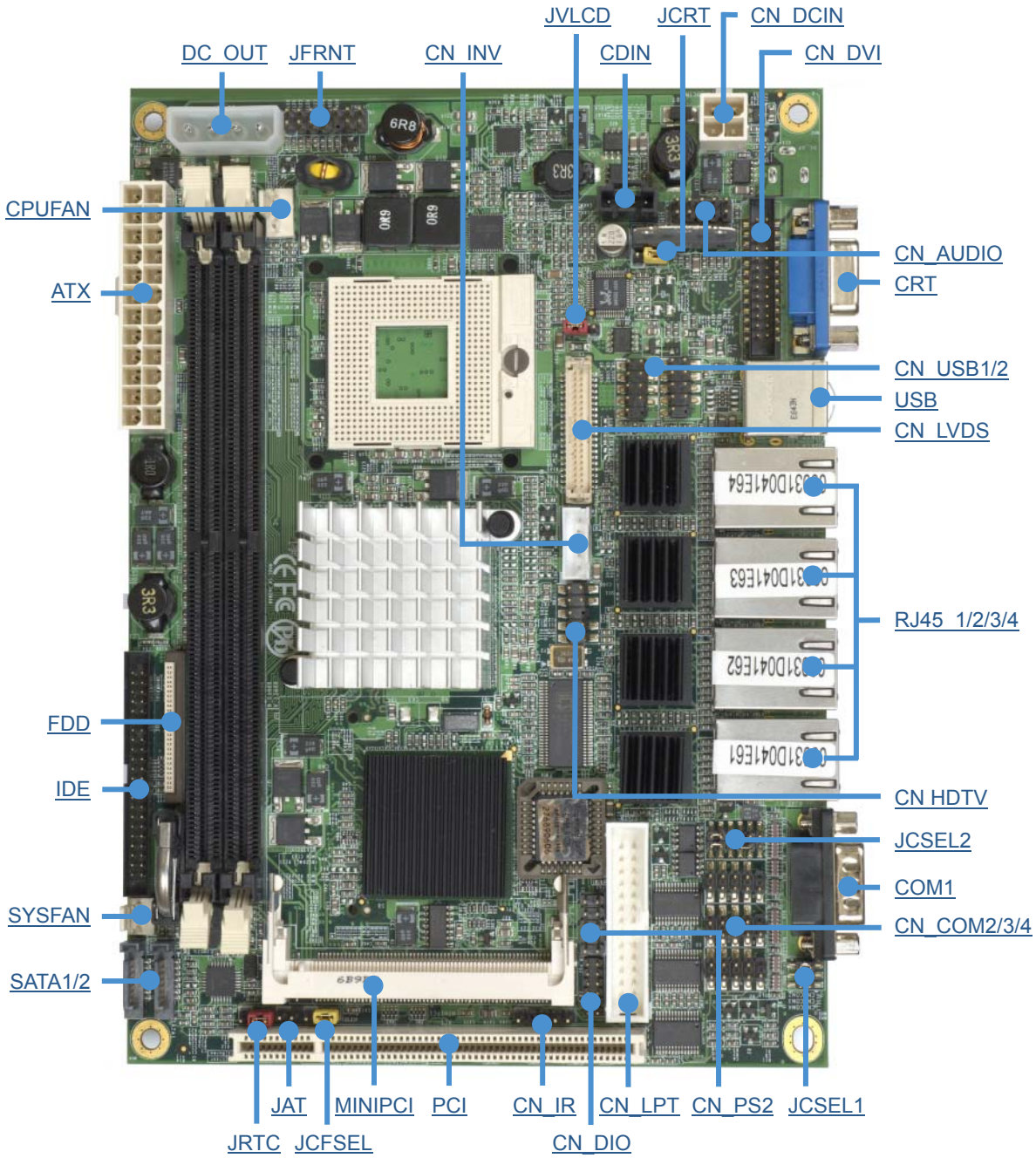
The motherboard uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer lets the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retaining the information when power is turned off. If the battery runs out of the power, the BIOS settings will be set to the default programmed values.

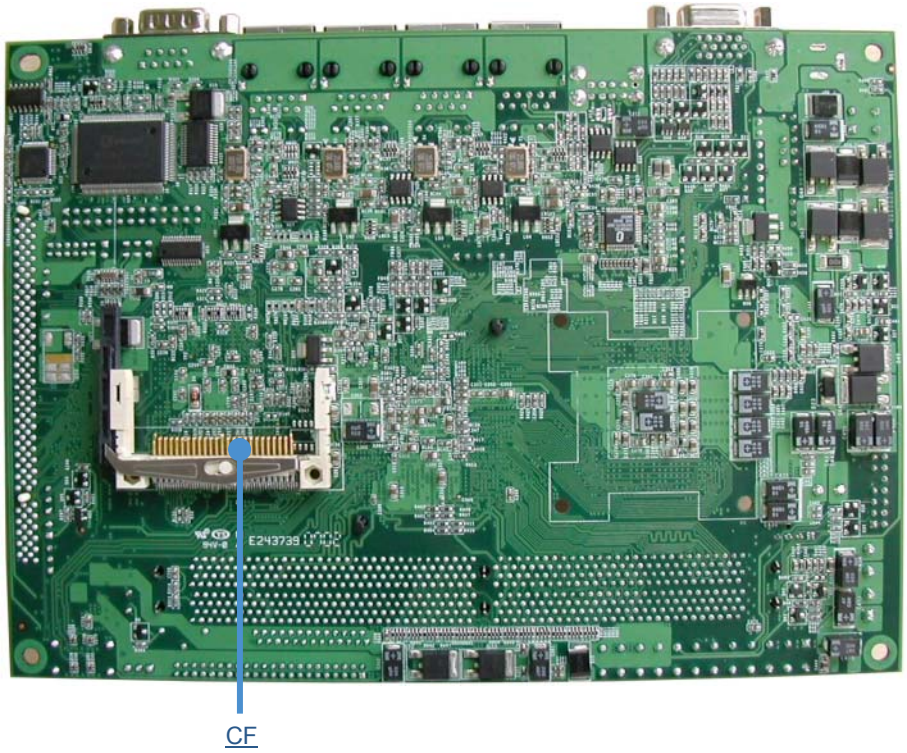
To activate the CMOS Setup program, press DEL immediately after you turn on the system. The following message ‘Press DEL to enter SETUP’ should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu is displayed. You can use arrow keys to select the required menu, press Enter to accept the selection and enter the sub-menu.

Jumpers and connectors

The following diagram shows the jumpers and connectors on the top side of the GEMINI. Click on the name of any jumper or connector for details:



The following diagram shows the Compact Flash socket location on the bottom side of the GEMINI. Click on the name of the connector for details:

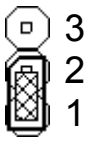
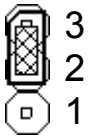


Jumpers

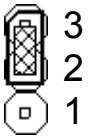
Jumper	Function	Further information ...
JRTC	CMOS operating/clear setting	See below.
JCFSEL	CompactFlash mode setting	See below.
JVLCD	LCD panel voltage setting	See the next page.
JCRT	CRT attach select setting	See the next page.
JAT	Power mode select	See the next page.
JCSEL1/2	COM2 RS232/422/485 mode setting	See page 22.

JRTC: CMOS operating/clear setting

Used to clear the contents of the CMOS RAM.

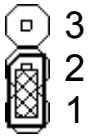
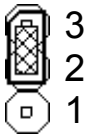
JRTC	Explanation
	Clear CMOS
	Normal operation

Default setting:

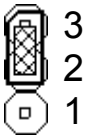


JCFSEL: CompactFlash mode setting

Used to specify whether the CompactFlash Type II socket is operating in Slave or Master mode on the secondary IDE channel.

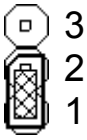
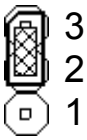
JCFSEL	Explanation
	Master
	Slave

Default setting:

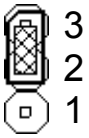


JVLCD: LCD panel voltage setting

Used to specify the LCD panel voltage setting.

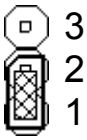
JVLCD	Explanation
	5V
	3.3V

Default setting:

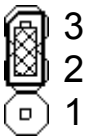


JCRT: CRT attach select setting

Used to specify the CRT detection setting.

JCRT	Explanation
	1-2 CRT always enabled
	2-3 CRT auto detected (VGA controller disabled if CRT monitor not plugged in)

Default setting:



JAT: power mode select

Used to specify the power mode required.

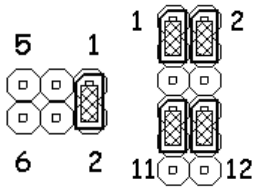
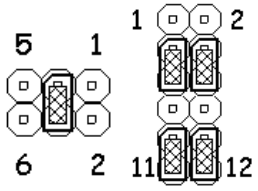
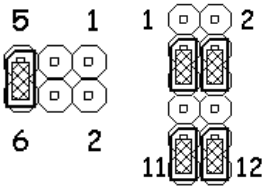
JAT	Explanation
	AT mode
	ATX mode

Default setting:

Select the AT mode to allow the GEMINI to boot automatically when power is applied.

JCSEL1/2: COM2 RS232/422/485 mode setting

Used to select the operation of COM2.

JCSEL1	JCSEL2	COM2 operation
		**RS-232**
		**RS-485**
		**RS-422**

Default setting: RS-232

Connectors

Internal connectors

Connector	Function	Further information ...
IDE	44pin IDE connector	Page 24
FDD	Slim type floppy connector	Page 25
SATA1/2	Serial ATA connectors	Page 25
ATX	ATX power supply connector	Page 26
CN_AUDIO	Audio connector	Page 26
CDIN	CD-ROM audio input connector	Page 27
CN_DIO	GPIO connector	Page 27
CN_USB1/2	USB connectors	Page 27
CPUFAN	CPU fan connector	Page 28
SYSFAN	System fan connector	Page 28
CN_COM2/3/4	Serial port connectors	Page 28
CN_IR	IrDA connector	Page 29
CF	CompactFlash Type II socket	Page 30
CN_LVDS	LVDS connector	Page 31
CN_HDTV	SD/HDTV connector	Page 32
CN_INV	LCD inverter connector	Page 32
DC_OUT	Power output connector	Page 32
PCI	32bit PCI slot	Page 33
MINIPCI	Mini-PCI socket	Page 34
CN_LPT	Printer connector	Page 36
CN_PS2	PS/2 Keyboard/Mouse connector	Page 36
CN_DVI	DVI-I interface	Page 37
JFRNT	System connector	Page 37

External connectors

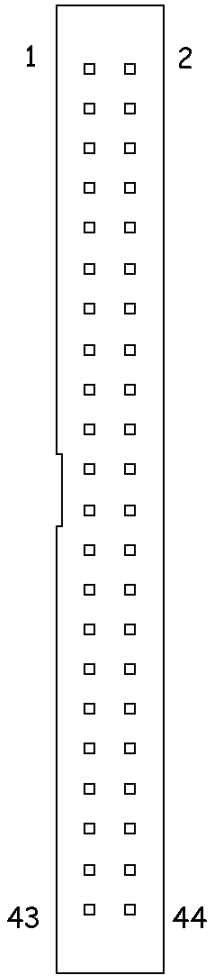
Connector	Function	Further information ...
CRT	DB15 VGA connector	Page 38
USB	Dual USB 2.0 connector	Page 38
COM1	DB9 serial port connector	Page 38
RJ45_1/2/3/4	RJ45 LAN connectors	Page 39
CN_DCIN	DC power supply connector	Page 39

IDE: 44pin IDE connector

44-way, 2.00mm x 2.00mm boxed header.

Mating Connector: AMP-LATCH 2.00mm 2-111623-5.

Pin	Description	Pin	Description
1	RESET	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	Ground	20	N/C
21	REQ	22	Ground
23	IOW-/STOP	24	Ground
25	IOR-/HDMARDY	26	Ground
27	IORDY/DDMARDY	28	Ground
29	DACK-	30	Ground
31	IRQ	32	N/C
33	A1	34	SD
35	A0	36	A2
37	CS1	38	CS3
39	ASP1	40	Ground
41	VCC	42	VCC
43	Ground	44	Ground



FDD: Floppy port

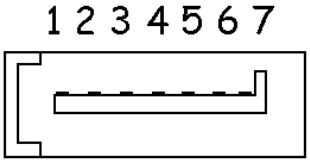
26-pin connector for slim ribbon cable.

Pin	Description	Pin	Description
1	VCC	2	INDEX
3	VCC	4	DRV0
5	VCC	6	DSKCHG
7	DRV1	8	N/C
9	MTR1	10	MTR0
11	RPM	12	DIR
13	N/C	14	STEP
15	Ground	16	WRITE DATA
17	Ground	18	WRITE GATE
19	N/C	20	TRACK 0
21	N/C	22	WRPTR
23	Ground	24	RDATA-
25	Ground	26	SEL

SATA1/2: Serial ATA port

7-pin wafer connector.

Pin	Description
1	Ground
2	RSATA_TXP1
3	RSATA_TXN1
4	Ground
5	RSATA_RXN1
6	RSATA_RXP1
7	Ground



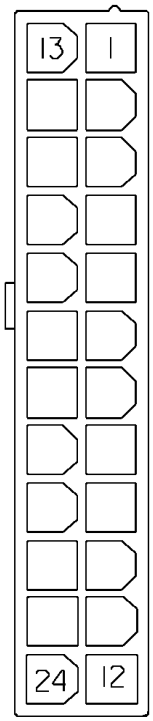
ATX: Power supply connector

Molex 44206-0007, 24-way, dual row header. (20 pin housing compatible).

Mating connector: 24-way crimp housing Molex 39-01-2240 or 20-way crimp housing Molex 39-01-2200.

Mating connector crimps: Molex 44476-1112.

Pin	Signal name	Pin	Signal name
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	Ground	3	Ground
16	/PS_ON	4	+5V
17	Ground	5	Ground
18	Ground	6	+5V
19	Ground	7	Ground
20	-5V (NC)	8	PWR_OK
21	+5V	9	+5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	Ground	12	+3.3V



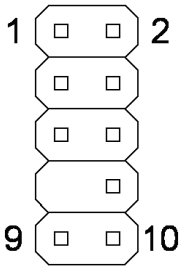
CN_AUDIO: Audio connector

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.

Mating connector: Harwin M20-1070500.

Mating connector crimps: Harwin M20-1180042.

Pin	Description	Pin	Description
1	Line In/Rear - Left	2	Ground
3	Line In/Rear - Right	4	MIC1/Center
5	MIC2/LFE	6	Ground
7	N/C (key)	8	Line Out - Left
9	Line Out - Right	10	Ground



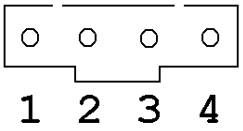
CDIN: CD-ROM audio connector

4-way, 2.54mm (0.1") single row pin boxed header.

Mating connector: Harwin M20-1060400.

Mating connector crimps: Harwin M20-1180042.

Pin	Description
1	CD – Left
2	Ground
3	Ground
4	CD – Right



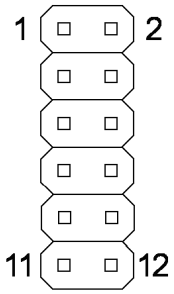
CN_DIO: GPIO connector

12-way, 2.00mm x 2.00mm dual row pin header.

Mating connector: Harwin M22-3020600.

Mating connector crimps: Harwin M22-3040042.

Pin	Description	Pin	Description
1	Ground	2	Ground
3	GP0	4	GP4
5	GP1	6	GP5
7	GP2	8	GP6
9	GP3	10	GP7
11	+5V	12	+12V



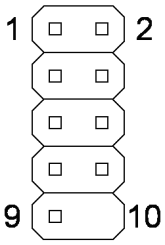
CN_USB: USB 2.0 port

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.

Mating connector: Harwin M20-1070500.

Mating connector crimps: Harwin M20-1180042.

Pin	Description	Pin	Description
1	VBUS	2	VBUS
3	Data0-	4	Data1-
5	Data0+	6	Data1+
7	Ground	8	Ground
9	Ground	10	N/C (key)



For error free data transmission, cable certified for USB 2.0 operation should be used.

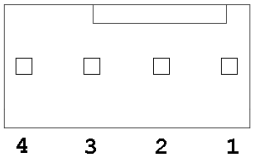
CPUFAN: Processor fan connector

4-pin 2.54mm (0.1") PWM fan connector.

Mating connector: Molex 0470-54-1000.

Mating connector crimps: Molex 08-55-0110.

Pin	Description
1	Ground
2	+12V
3	Fan speed detect
4	Fan control



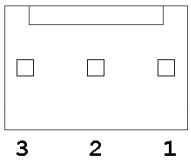
SYSFAN: System fan connector

3-way 2.54mm (0.1") friction lock pin header.

Mating connector: Molex 22-01-2035.

Mating connector crimps: Molex 08-55-0110.

Pin	Description
1	Ground
2	+12V
3	Fan speed detect



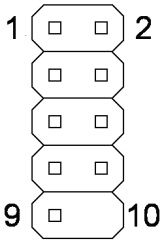
CN_COM2/3/4: Serial port connector

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.

Mating connector: Harwin M20-1070500.

Mating connector crimps: Harwin M20-1180042.

Pin	Description	Pin	Description
1	DCD/422TX-/485-	2	RXD/422TX+/485+
3	TXD/422RX+	4	DTR/422RX-
5	Ground	6	DSR
7	RTS	8	CTS
9	RI	10	N/C (key)



RS422/485 mode is available on COM port 2 only

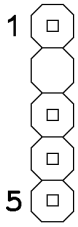
CN_IR: IrDA port

5-way, 2.54mm (0.1") single row pin header.

Mating connector: Harwin M20-1060500.

Mating connector crimps: Harwin M20-1180042.

Pin	Description
1	VCC_IrDA (+5V)
2	N/C (key)
3	IRRX
4	Ground
5	IRTX

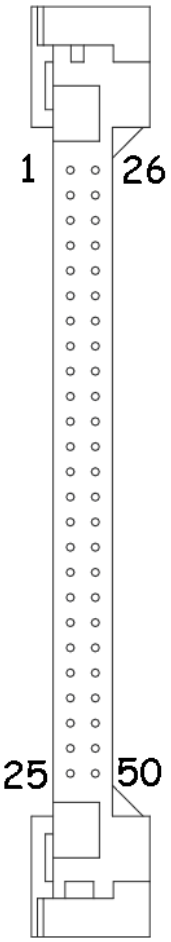


CF: CompactFlash Type II socket

Compact Flash CF+ type I/II socket.

Connector: 50 pin right angle CompactFlash.

Pin	Signal name	Pin	Signal name
1	Ground	2	D3
3	D4	4	D5
5	D6	6	D7
7	/CE1	8	A10
9	/OE	10	A9
11	A8	12	A7
13	VCC	14	A6
15	A5	16	A4
17	A3	18	A2
19	A1	20	A0
21	D0	22	D1
23	D2	24	/IOCS16
25	/CD2	26	/CD1
27	D11	28	D12
29	D13	30	D14
31	D15	32	/CE2
33	/VS1	34	/IORD
35	/IOWR	36	/WE
37	/INTRQ	38	CF VCC
39	A25	40	/VS2
41	RESET	42	/WAIT
43	/INPACK	44	/REG
45	/BVD2	46	/BVD1
47	D8	48	D9
49	D10	50	Ground



CN_LVDS: LVDS connector

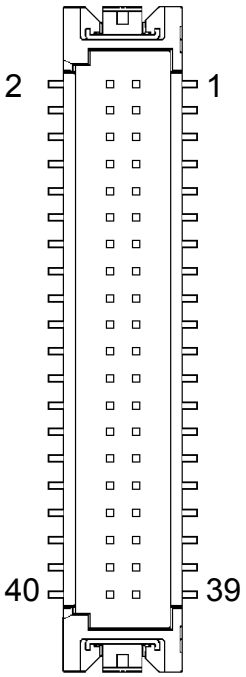
40-way 2mm Hirose DF13-40DP-1.25V.

Mating connector: Hirose DF13-40DS-1.25C.

Mating connector crimps: Hirose DF13-2630SCFA.

For optimum performance of the LVDS interface a shielded twisted pair cable should be used.

Pin	Signal	Pin	Signal
2	LCDVCC	1	LCDVCC
4	Ground	3	Ground
6	ATX0-	5	BTX0-
8	ATX0+	7	BTX0+
10	Ground	9	Ground
12	ATX1-	11	BTX1-
14	ATX1+	13	BTX1+
16	Ground	15	Ground
18	ATX2-	17	BTX2-
20	ATX2+	19	BTX2+
22	Ground	21	Ground
24	ACLK-	23	BTX3-
26	ACLK+	25	BTX3+
28	Ground	27	Ground
30	ATX3-	29	BCLK-
32	ATX3+	31	BCLK+
34	Ground	33	Ground
36	N/C	35	N/C
38	N/C	37	N/C
40	N/C	39	N/C

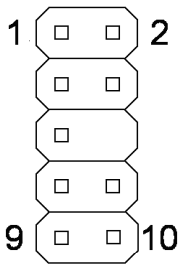


Ensure the voltage on LCDVCC is set correctly before connecting the display. (See JVLCD: LCD panel voltage setting on Page 21)

CN_HDTV: SD/HDTV connector

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.
Mating connector: Harwin M20-1070500.
Mating connector crimps: Harwin M20-1180042.

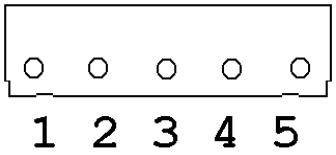
Pin	Signal	Pin	Signal
1	Ground	2	Y/Y
3	C/Pr	4	Ground
5	Ground	6	N/C (key)
7	CVBS/Pb	8	Ground
9	N/C	10	N/C



CN_INV: LCD inverter connector

5-pin LVDS backlight inverter driver header.
Mating connector: JST XHP-5.
Mating connector crimps: JST SXH-002T-P0.

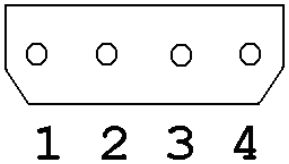
Pin	Description
1	+12V
2	Ground
3	Ground
4	Ground
5	ENABKL (TTL 0/5V)



DC_OUT: Power output

4-pin P-type connector for +5V/+12V.
Mating connector: TYCO 1-480424-0.
Mating connector crimps: TYCO 61314-1.

Pin	Description
1	+12V
3	Ground
3	Ground
4	+5V



Maximum output rating: 12V/5A & 5V/3A.

PCI: 32bit PCI slot

32-bit card edge connector. Two clk/grant/request lines routed.

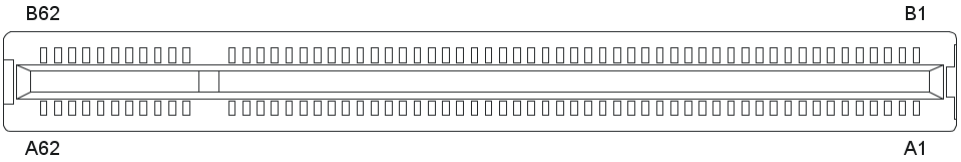
Connector: 120-way PCI card edge connector (5V 32-bit 66MHz PCI socket).

Pin	SideB	SideA	Pin	SideB	SideA
1	-12V	N/C	32	AD17	AD16
2	N/C	+12V	33	/CBE2	+3.3V
3	Ground	N/C	34	Ground	/FRAME
4	/GNT1	N/C	35	/IRDY	Ground
5	+5V	+5V	36	+3.3V	/TRDY
6	+5V	/INTA	37	/DEVSEL	Ground
7	/INTB	/INTC	38	Ground	/STOP
8	/INTD	+5V	39	/PLOCK	+3.3V
9	N/C	IDSEL1	40	/PERR	Ground
10	/REQ1	+5V(I/O)	41	+3.3V	N/C
11	N/C	N/C	42	/SERR	Ground
12	Ground	Ground	43	+3.3V	/PAR
13	Ground	Ground	44	/CBE1	AD15
14	CLK2	+3.3VAUX	45	AD14	+3.3V
15	Ground	/RST	46	Ground	AD13
16	CLK1	+5V(I/O)	47	AD12	AD11
17	Ground	/GNT0	48	AD10	Ground
18	/REQ0	Ground	49	Ground	AD9
19	+5V(I/O)	/PME	50	Key	Key
20	AD31	AD30	51	Key	Key
21	AD29	+3.3V	52	AD8	/CBE0
22	Ground	AD28	53	AD7	+3.3V
23	AD27	AD26	54	+3.3V	AD6
24	AD25	Ground	55	AD5	AD4
25	+3.3V	AD24	56	AD3	Ground
26	/CBE3	IDSEL0	57	Ground	AD2

continued…

Pin	SideB	SideA
27	AD23	+3.3V
28	Ground	AD22
29	AD21	AD20
30	AD19	Ground
31	+3.3V	AD18

Pin	SideB	SideA
58	AD1	AD0
59	+5V(I/O)	+5V(I/O)
60	/ACK64	/REQ64
61	+5V	+5V
62	+5V	+5V



-12V is not supplied to the PCI slot when powering the GEMINI using the DC input supply (CN_DCIN connector)

MINIPCI: Mini-PCI socket

Mini PCI Card Type III system connector.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	TIP	32	Ground	64	FRAME#	96	AD[00]
-	Key	33	AD[31]	65	CLKRUN#	97	5V
2	RING	34	PME#	66	TRDY#	98	RESERVED _WIP5
3	8PMJ-3	35	AD[29]	67	SERR#	99	AD[01]
4	8PMJ-1	36	RESERVED	68	STOP#	100	RESERVED _WIP5
5	8PMJ-6	37	Ground	69	Ground	101	Ground
6	8PMJ-2	38	AD[30]	70	3.3V	102	Ground
7	8PMJ-7	39	AD[27]	71	PERR#	103	AC_SYNC
8	8PMJ-4	40	3.3V	72	DEVSEL#	104	M66EN
9	8PMJ-8	41	AD[25]	73	C/BE[1]#	105	AC_SDATA _IN
10	8PMJ-5	42	AD[28]	74	Ground	106	AC_SDATA _OUT
11	LED1_ GRNP	43	RESERVED	75	AD[14]	107	AC_BIT _CLK
12	LED2_ YELP	44	AD[26]	76	AD[15]	108	AC_CODEC _ID0#
13	LED1_ GRNN	45	C/BE[3]#	77	Ground	109	AC_CODEC _ID1#

continued…

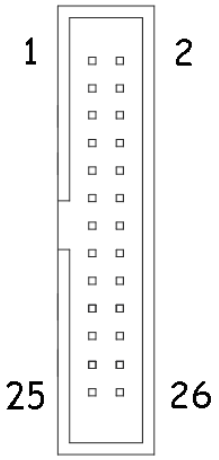
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
14	LED2_ YELN	46	AD[24]	78	AD[13]	110	AC_RESET#
15	CHSGND	47	AD[23]	79	AD[12]	111	MOD_AUDIO _MON
16	RESERVED	48	IDSEL	80	AD[11]	112	RESERVED
17	INTB#	49	Ground	81	AD[10]	113	AUDIO_GND
18	5V	50	Ground	82	Ground	114	Ground
19	3.3V	51	AD[21]	83	Ground	115	SYS_AUDIO _OUT
20	INTA#	52	AD[22]	84	AD[09]	116	SYS_AUDIO _IN
21	RESERVED	53	AD[19]	85	AD[08]	117	SYS_AUDIO _OUT GND
22	RESERVED	54	AD[20]	86	C/BE[0]#	118	SYS_AUDIO _IN GND
23	Ground	55	Ground	87	AD[07]	119	AUDIO_GND
24	3.3VAUX	56	PAR	88	3.3V	120	AUDIO_GND
25	CLK	57	AD[17]	89	3.3V	121	RESERVED
26	RST#	58	AD[18]	90	AD[06]	122	MPCIACT#
27	Ground	59	C/BE[2]#	91	AD[05]	123	VCC5VA
28	3.3V	60	AD[16]	92	AD[04]	124	3.3VAUX
29	REQ#	61	IRDY#	93	RESERVED	-	-
30	GNT#	62	Ground	94	AD[02]		
31	3.3V	63	3.3V	95	AD[03]		

CN_LPT: Printer connector

26-way, 2.54mm (0.1") x 2.54mm (0.1") boxed header.

Mating connector: FCI 71600-026LF.

Pin	Description	Pin	Description
1	STROBE#	2	AUTOFEED#
3	D0	4	ERROR#
5	D1	6	INIT#
7	D2	8	SELECT_IN#
9	D3	10	Ground
11	D4	12	Ground
13	D5	14	Ground
15	D6	16	Ground
17	D7	18	Ground
19	ACKNOWLEDGE#	20	Ground
21	BUSY	22	Ground
23	PAPER_EMPTY	24	Ground
25	SELECT	26	N/C



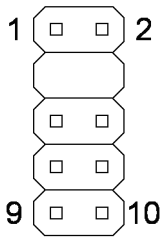
CN_PS2: PS/2 connector

10-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.

Mating connector: Harwin M20-1070500.

Mating connector crimps: Harwin M20-1180042.

Pin	Signal name	Pin	Signal name
1	KB DATA	2	MS DATA
3	N/C (key)	4	N/C (key)
5	Ground	6	Ground
7	+5V	8	+5V
9	KB CLOCK	10	MS CLOCK

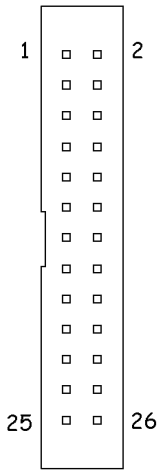


CN_DVI: DVI-I interface

26-way, 2.00mm x 2.00mm boxed header.

Mating Connector: AMP-LATCH 2.00mm 2-111623-2.

Pin	Signal	Pin	Signal
1	TX1+	2	TX1-
3	Ground	4	Ground
5	TXC+	6	TXC-
7	Ground	8	PVDD
9	N/C	10	N/C
11	TX2+	12	TX2-
13	Ground	14	Ground
15	TX0+	16	TX0-
17	N/C	18	HPDET
19	DDCDATA	20	DDCCLK
21	Ground	22	RED
23	GREEN	24	BLUE
25	HSYNC	26	VSYNC



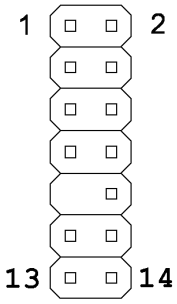
JFRNT: System connector

14-way, 2.54mm (0.1") x 2.54mm (0.1") dual row pin header.

Mating connector: Harwin M20-1070700.

Mating connector crimps: Harwin M20-1180042.

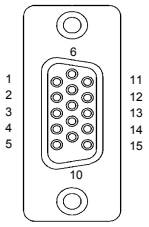
Pin	Signal name	Pin	Signal name
1	HDLED+	2	PWRLED+
3	HDLED-	4	N/C
5	RESET+	6	PWRLED- (Ground)
7	RESET- (Ground)	8	SPK+
9	N/C (key)	10	N/C
11	PWRBT+	12	N/C
13	PWRBT- (Ground)	14	SPK-



CRT: CRT port

15-pin D-sub VGA female connector.

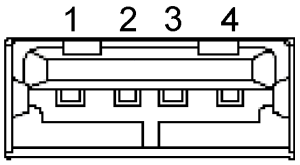
Pin	Description	Pin	Description	Pin	Description
1	RED	6	Ground	11	N/C
2	GREEN	7	Ground	12	5VCDA
3	BLUE	8	Ground	13	HSYNC
4	N/C	9	LVGA5V	14	VSYNC
5	Ground	10	Ground	15	5VCLK



USB: Dual USB 2.0 connector

USB type A connector.

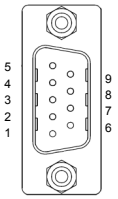
Pin	Signal name
1	VBUS
2	Data-
3	Data+
4	Ground



COM1: Serial port

9-pin D-sub male connector.

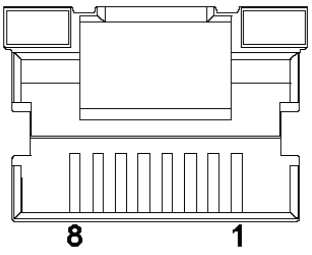
Pin	Description	Pin	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground		



RJ45_1/2/3/4: LAN port

Connector type: RJ45 connector with connect and activity LED's.

Pin	Description (10/100 / GEth)
1	TX+ / MD0+
2	TX- / MD0-
3	RX+ / MD1+
4	N/C / MD2+
5	N/C / MD2-
6	RX- / MD1-
7	N/C / MD3+
8	N/C / MD3-



For a Gigabit Ethernet connection the network cable should be a CAT5 or above and include all four pairs.

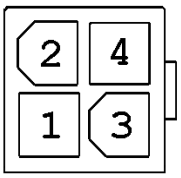
CN_DCIN: DC power input

+12VDC power connector, Molex 39-29-9042.

Mating connector: Molex 39-01-2040.

Mating connector crimps: Molex 44476-1112.

Pin	Description
1	Ground
2	Ground
3	+12V
4	+12V



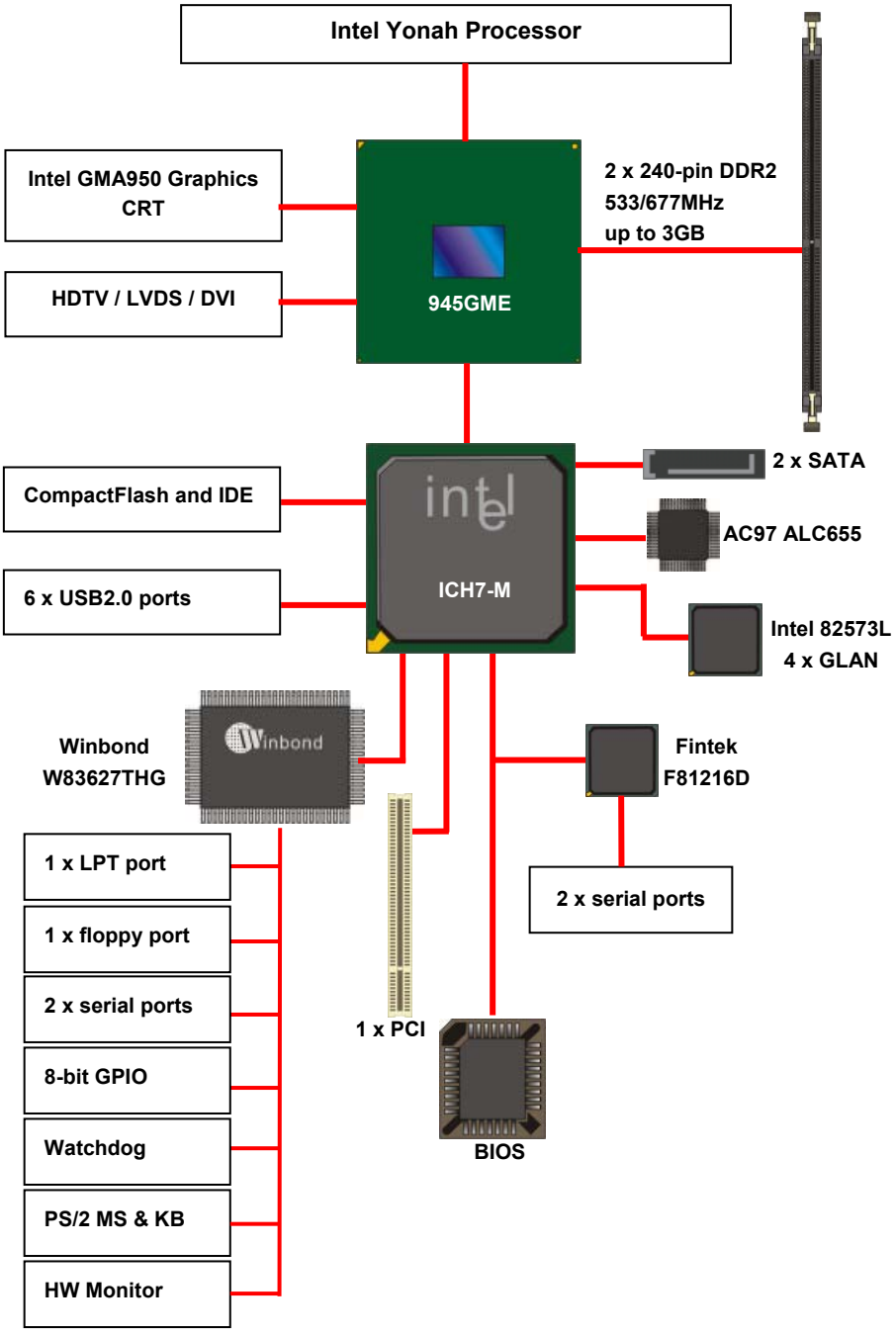
Input voltage range is 8 to 24VDC.

Detailed hardware description

The following section provides a detailed description of the functions provided by the GEMINI. This information may be required during development once you have started adding extra peripherals or are starting to use some of the embedded features.

GEMINI block diagram

The diagram below illustrates the functional organization of the GEMINI:



Processor

The standard GEMINI board variant is supplied with a Micro-FCPGA478 socket and supports Intel Core 2 Duo/Duo/Solo processors with 533/667MHz of front side bus and 2MB L2 cache and Intel Celeron M processors that utilize socketable micro Flip-Chip Pin Grid Array (micro FCPGA) package technology.

The Intel processors are currently supported by the Intel Embedded Architecture, and hence with embedded life cycle, are listed in the following table.

Product number	Core speed (GHz)	L2 cache (MB)	External bus speed (MHz)	Thermal Design Power (max)	VID (V)	T_j	Device
LF80538NE0361M	1.86	1	533	27W	1.26	100°C	Celeron ® M
LF80539GF0412M	2.0	2	667	31W	1.1625	100°C	Core Duo T2500
LF80537GF0484M	2.16	4	667	34W	1.1625	100°C	Core 2 Duo T7400

478 µFC-PGA Core (2) duo and Celeron ® M processors supported by the Intel Embedded Architecture

Other Intel processors supporting a 533/667MHz FSB can also be used, although Intel does not guarantee their long-term availability.

GEMINI chipset

The GEMINI chipset is based on the Intel 945GME graphics and memory controller hub and ICH7-M IO controller hub components.

Graphics and Memory Controller Hub

The 945GME Graphics and Memory Controller Hub (GMCH) contains four main components:

- An FSB interface to the Intel Core Duo/Core Solo processor.
- A system memory interface to DDR2 SDRAM.
- A hub interface to the IO controller hub (ICH7-M).
- An Integrated Graphics Device.

The GMCH supports the new generation of Intel processors with a front side bus (FSB) frequency of 533/667MHz. See the Processor section on the previous page for details of processor options.

Memory interface

The memory interface on the GEMINI board provides support for two non-ECC only DDR2 (Double Data Rate) SDRAM 240-pin 1.8V unbuffered DIMMs (Dual Inline Memory Module). Speeds up to PC5400 (533/667MHz) are supported with memory up to 3GB of capacity. The BIOS automatically reads the parameters of the inserted memory module via its SPD (Serial Presence Device) and configures the memory interface accordingly. No user interaction is required.

While applying two of the same modules, dual channel technology is enabled automatically for higher performance.

Onboard display interface

Based on Intel 945GME chipset with built-in GMA (Graphic Media Accelerator) 950 graphics, the board provides high graphic performances with high bandwidth memory interface and dual independent pipe supporting multiple display modes. The board provides dual display function with clone mode and extended desktop mode for CRT, LCD, DVI and TV monitor.

Display interfaces

The GEMINI board supports a range of display interfaces. Details of these are provided in the following sections:

Analogue RGB

A standard progressive scan analogue CRT interface is provided from the GMCH. This is interfaced to a high density DB15 VGA connector mounted on the board. It is also available on the DVI-I interface. A 400MHz integrated RAMDAC provides support for resolutions up to 2048x1536 (QXGA) at 75Hz refresh rate. For connector details, see page 23.

LVDS interface

The board provides one 40-pin LVDS interface for 18/24-bit single/dual channel panels to support FPD up to 1600 x 1200 (UXGA) of resolution. The GEMINI also supports a 5-pin LCD backlight inverter connector and one jumper for panel voltage setting.

DVI interface

The GEMINI board includes a Chrontel CH7307C DVI transmitter interfaced on the internal 945GME SDVO port. The GEMINI DVI interface supports single link DFP displays with resolution up to 1600x1200 (UXGA).

TV-out interface

A 480p/720p/1080i/1080p HDTV interface is provided from the GMCH. The GEMINI supports PAL and NTSC TV systems, and outputs either YPrPb or S-Video or composite signals thanks to three integrated 10-bit DAC's.

Enhanced IDE and CompactFlash interface

The GEMINI provides:

- One Ultra DMA33 IDE interface to support up to 2 ATAPI devices.
- One CompactFlash Type II socket on the solder side with jumper-selectable slave/master mode on secondary IDE channel (see page 20).

Serial ATA interface

Based on Intel ICH7-M, the GEMINI provides two Serial ATA interfaces with up to 150MB/s of transfer rate.

LAN interface

The GEMINI provides four Intel 82573L LAN interfaces which support the triple speed of 10/100/1000Base-T, with IEEE802.3 compliance and Wake-On-LAN capability.

Two LEDs on each RJ-45 port provide information about its operation, as follows:

- The dual colour (green/orange) LED on the left (as you look at the connector) shows you the speed the port is currently operating at.
- The yellow LED on the right (as you look at the connector) shows you whether the connector is currently linked to the network, and indicates when activity takes place via that link, i.e. when data is passing through.

The information provided by each LED is explained in the following table:

Left LED (speed)	Right LED (link/activity)
Orange: 1000Mb/s Green: 100Mb/s Off: 10Mb/s	Yellow: Link connected Flashes: Activity is taking place

Serial ports

The GEMINI provides four high speed 16C550 compatible UARTs, two via the W83627THG SuperIO and a further two via the PCI based UART Fintek F81216D.

COM1 and COM2 are interfaced via the SuperIO. COM1 can only be used as standard RS232 serial interface but COM2 is selectable between RS232, RS422, RS485 and IrDA operation.

COM3 and COM4 are interfaced via the PCI UART F81216D and provide standard RS232 serial interfaces.

Super IO

An Winbond W83627THG Super IO controller provides legacy IO support. The SuperIO resides on the LPC bus and provides:

- Two serial ports.
- Keyboard and mouse PS/2 interface.
- Parallel port.
- Floppy drive.
- IrDA.
- Hardware monitor.
- Watchdog.
- General purpose IOs.

Floppy port

The GEMINI provides a slim type floppy port, supporting up to two floppy drives.

GPIO interface

The GEMINI includes a programmable 8-bit digital I/O interface. This provides general purpose I/O's to the user's application. The eight bidirectional lines are open collector and 5V compatible. GP0/1/6/7 have weak internal pull-ups.

Watchdog

The GEMINI supports a watchdog timer, integrated in the super IO chip with a software selectable timeout of 1ms to 255s. This can be used to generate a complete hardware system reset when an error causes a system lockup. By default, the watchdog timer is disabled and once enabled must be triggered within the timeout period programmed.

IrDA

An infrared port is available which supports the following infrared standards:

- Infrared Data Association (IrDA) V1.0 SIR with baud rates up to 115.2kbps.
- SHARP ASK-IR protocol with baud rates up to 57.6kbps.

Enabling the infrared port prevents operation of Serial Port COM2. The infrared port should be disconnected before using the COM2 port.

Parallel port

The GEMINI provides a parallel port that can be used to connect an external printer, tape drive, disk drive, scanner etc., or can provide additional digital I/O capability.

The port is both IBM XT/AT and IEEE1284 compatible. It supports Standard Parallel Port (SPP), Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP) modes.

Hardware monitor

The SIO has an integrated HW monitor that provides a combination of voltage and thermal monitoring. It also provides support for PWM fan speed control and monitoring. The HWM monitors the CPU core, VBAT, +3.3V, +5V, +5V standby and +12V supply rails. CPU and ambient temperature thermal diodes are also monitored.

Keyboard and mouse controller

The SIO contains a universal keyboard controller based on 8042 compatible instruction set. Four signals pins are provided which allow for the connection of two external PS/2 devices such as a keyboard and mouse.

System control interface

A system control interface connector, JFRNT, is provided to interface to standard input switches and status indicators for:

- *Power status.*
  A connection for a power on LED. This LED indicates the power state of the GEMINI.
- *System reset switch.*
  A connection for a momentary on reset switch. This provides standard PC reset functionality.
- *Power button (on/off switch).*
  A connection for a momentary on ACPI power button. This provides standard PC on/off functionality. The on/off switch ACPI functionality is configured in the BIOS power management setup screen.
- *PC speaker.*
  A connection to a standard 8Ω speaker to support PC speaker functionality. The GEMINI supports a mini buzzer onboard.
- *SATA/IDE activity.*
  A connection for a hard drive activity LED. This LED shows activity on both the SATA and IDE based devices.

Onboard audio interface

The GEMINI provides the onboard AC97 5.1-channel audio interface with Realtek ALC655.

USB 2.0 interface

Based on Intel ICH7-M, the GEMINI provides six USB2.0 ports. The USB2.0 interface supports transfer rates up to 480Mbps with an output Intensity of 500mA.

The USB2.0 protocol is only active when you connect a USB2.0 device. If you connect a USB1.1 device, the port automatically switches to the USB1.1 protocol. The maximum USB2.0 transfer rate of 480Mbps is dependent on device connected supporting this rate.

Power and fan connector

The GEMINI requires either an ATX power supply connected to the onboard ATX connector or a 8V to 24V DC input source connected to the onboard 4-pin CN_DCIN connector. See ATX: Power supply connector on page 26.

The maximum power consumption of the GEMINI mother board is about 60W with an Intel Core 2 Duo T2500 stressed to the absolute maximum power.

The GEMINI provides supports for one smart (4 wire) CPU fan allowing automatic thermal control of the board. This option is selectable in the BIOS and is disabled by default. The GEMINI also provides an onboard system FAN connector for 12V fan with tachometer input for speed feedback.

Appendix A – Product specification

General specification

Form factor	5¼" miniboard
CPU	Intel® Core 2 Duo / Core Duo / Core Solo / Celeron M 4xx processor Package type: Micro- FCPGA478 Front side bus: 533/667MHz
Memory	2 x 240-pin DDR2 533/667MHz SDRAM up to 3GB Up to 10.67GB/s of bandwidth with dual-channel interleaved mode Dual-Channel technology supported Unbuffered, none-ECC memory supported only
Chipset	Intel® 945GME and ICH7-M
BIOS	Phoenix-Award v6.00PG 4Mb PnP flash BIOS
Green function	Power saving mode includes hibernation, standby and suspend modes. ACPI version 1.0 and APM version 1.2 compliant
Watchdog timer	System reset programmable watchdog timer with 1 ~ 255 sec/min. of timeout value
Real Time Clock	Intel® ICH7-M built-in RTC with lithium battery
Enhanced IDE	UltraDMA33 IDE interface supports up to 2 ATAPI devices One 44-pin IDE port onboard One CompactFlash Type II socket on solder side
Serial ATA	Intel® ICH7-M integrates 2 Serial ATA interfaces (No RAID Function) Up to 150MB/s of transfer rate

Multi-I/O port

Chipset	Intel® ICH7-M with Winbond® W83627THG controller
Serial port	Three RS-232 and one RS-232/422/485 serial ports
USB port	Six Hi-Speed USB 2.0 ports with 480Mbps of transfer rate
Parallel port	One 26-pin internal parallel port
Floppy port	One slim type Floppy port
Infrared port	Support IrDA version 1.0 SIR and SHARP ASK-IR protocols
Keyboard and mouse	PS/2 keyboard and mouse ports
GPIO	One 12-pin Digital I/O connector with 8-bit programmable GPIO's
Smart fan	One CPU fan connector for smart fan speed control

VGA display interface

Chipset	Intel® 945GME GMCH (Graphic Memory Controller Hub)
Frame buffer	Up to 224MB shared with system memory
Display type	CRT, LCD monitor with analogue display
Connector	External DB15 female connector on rear I/O panel Onboard 40-Pin LVDS connector Onboard 26-Pin DVI-I connector Onboard 10-Pin TV-out connector

Ethernet interface

Controller	Four Intel 82573L Gigabit Ethernet controller
Type	Triple speed 10/100/1000Base-T auto-switching Fast Ethernet Full duplex, IEEE802.3U compliant
Connector	Four external RJ45 connectors with LEDs on rear I/O panel

Audio interface

Chipset	REALTEK ALC655
Interface	5.1 channel surround audio with Line-in, Line-out and MIC-in
Connector	Onboard audio connector with pin header Onboard CD-IN connector

Expansive interface

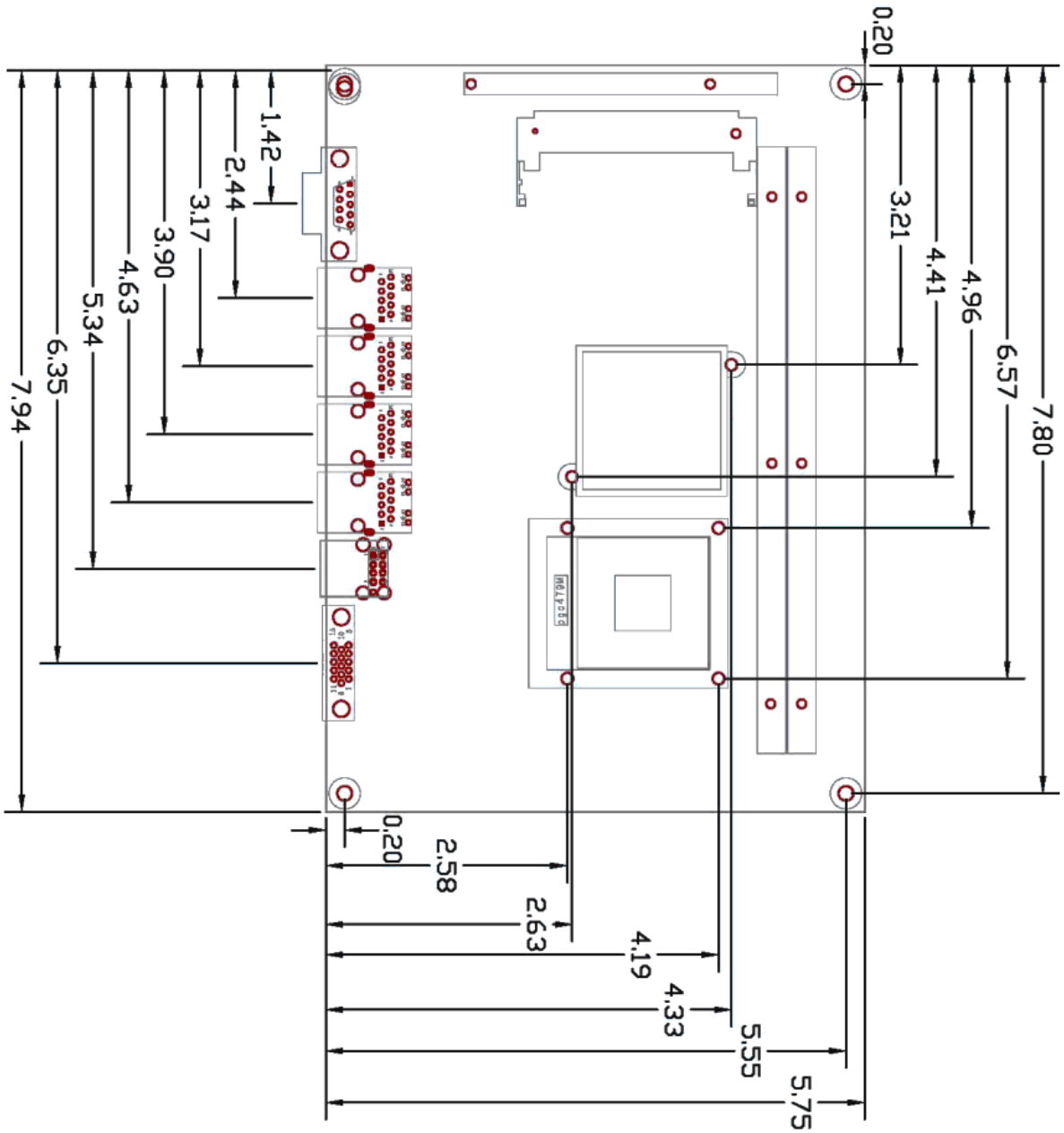
PCI	One PCI slot supports up to two PCI devices through riser card
Mini PCI	One Mini PCI socket
Memory card	One CompactFlash socket

Power and environment

Power requirement	Standard 24-pin ATX power supply (20-pin compatible) 8~24VDC input with onboard 4-pin connector.
Dimension	146 (L) x 203 (H) mm
Temperature	Operating within 0 ~ 60°C (32 ~ 140°F) Storage within -20 ~ 85°C (-4 ~ 185°F)

For further product information please contact the Eurotech sales team (see page 55).

Appendix B – Mechanical drawing



Appendix C – System resources

I/O port address map

[00000000 - 0000000F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000061 - 00000061] System speaker
[00000062 - 00000063] Motherboard resources
[00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000065 - 0000006F] Motherboard resources
[00000070 - 00000073] System CMOS/real time clock
[00000074 - 0000007F] Motherboard resources
[00000080 - 00000090] Direct memory access controller
[00000091 - 00000093] Motherboard resources
[00000094 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000FF] Numeric data processer
[00000170 - 00000177] Secondary IDE Channel
[000001F0 - 000001F7] Primary IDE Channel
[00000200 - 00000200] Standard Game Port
[00000201 - 00000207] Standard Game Port
[00000274 - 00000277] ISAPNP Read Data Port
[00000279 - 00000279] ISAPNP Read Data Port
[000002E8 - 000002EF] Communications Port (COM4)
[000002F8 - 000002FF] Communications Port (COM2)
[00000376 - 00000376] Secondary IDE Channel
[00000378 - 0000037F] Printer Port (LPT1)
[000003B0 - 000003BB] Mobile Intel(R) 945GM Express Chipset Family
[000003C0 - 000003DF] Mobile Intel(R) 945GM Express Chipset Family
[000003E8 - 000003EF] Communications Port (COM3)
[000003F0 - 000003F5] Standard Floppy disk controller
[000003F6 - 000003F6] Primary IDE Channel
[000003F7 - 000003F7] Standard Floppy disk controller
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 000004BF] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[00000500 - 0000051F] Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
[00000778 – 0000077B] Printer Port (LPT1)

[00000800 - 0000087F] Motherboard resources
[00000880 - 0000088F] Motherboard resources
[00000A79 - 00000A79] ISAPNP Read Data Port
[00000D00 - 0000FFFF] PCI bus
[00009000 - 00009FFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[00009F00 - 00009F1F] Intel(R) PRO)/1000 PL Network Connection #4
[0000B000 - 0000BFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D6
[0000BF00 - 0000BF1F] Intel(R) PRO)/1000 PL Network Connection #2
[0000C000 - 0000CFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
[0000CF00 - 0000CF1F] Intel(R) PRO)/1000 PL Network Connection
[0000D000 - 0000DFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
[0000DF00 - 0000DF1F] Intel(R) PRO)/1000 PL Network Connection #3
[0000F000 - 0000F0FF] Realtek AC'97 Audio
[0000F800 - 0000F80F] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000FA00 - 0000FA3F] Realtek AC'97 Audio
[0000FB00 - 0000FB1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
[0000FC00 - 0000FC1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
[0000FD00 - 0000FD1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
[0000FE00 - 0000FE1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
[0000FF00 - 0000FF07] Mobile Intel(R) 945GM Express Chipset Family

Memory address map

[00000000 - 0009FFFF] System board
[000A0000 - 000BFFFF] Mobile Intel(R) 945GM Express Chipset Family
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[000E0000 - 000EFFFF] System board
[000F0000 - 000F3FFF] System board
[000F4000 - 000F7FFF] System board
[000F8000 - 000FBFFF] System board
[000FC000 - 000FFFFF] System board
[00100000 - 3F6DFFFF] System board
[3F6E0000 - 3F6FFFFF] System board
[3F700000 - FEBFFFFF] PCI bus
[D0000000 - DFFFFFFF] Mobile Intel(R) 945GM Express Chipset Family
[E0000000 - EFFFFFFF] Motherboard resources
[FD400000 - FD4FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
[FD500000 - FD5FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
[FD5E0000 - FD5FFFFF] Intel(R) PRO)/1000 PL Network Connection #3
[FD600000 - FD6FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[FD900000 - FD9FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[FD9E0000 - FD9FFFFF] Intel(R) PRO)/1000 PL Network Connection #4
[FDA00000 - FDAFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D6
[FDB00000 - FDBFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D6
[FDBE0000 - FDBFFFFF] Intel(R) PRO)/1000 PL Network Connection #2
[FDC00000 - FDCFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4

[FDD00000 - FDDFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
[FDDE0000 - FDDFFFFF] Intel(R) PRO)/1000 PL Network Connection
[FDE80000 - FDEFFFFF] Mobile Intel(R) 945GM Express Chipset Family
[FDF00000 - FDF7FFFF] Mobile Intel(R) 945GM Express Chipset Family
[FDF80000 - FDFBFFFF] Mobile Intel(R) 945GM Express Chipset Family
[FDFFD000 - FDFFD0FF] Realtek AC'97 Audio
[FDFFE000 - FDFFE1FF] Realtek AC'97 Audio
[FDFFF000 - FDFFF3FF] Intel(R) 82801G (ICH7 Family) US82 Enhanced Host Controller - 27CC
[FEC00000 - FEC00FFF] System board
[FED13000 - FED1DFFF] System board
[FED20000 - FED8FFFF] System board
[FEE00000 - FEE00FFF] System board
[FFB00000 - FFB7FFFF] System board
[FFB80000 - FFBFFFFF] Intel(R) 82802 Firmware Hub Device
[FFF00000 - FFFFFFFF] System board

System IRQ resources

(ISA) 0 System timer
(ISA) 1 Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA) 3 Communications Port (C0M2)
(ISA) 4 Communications Port (COM1)
(ISA) 5 Communications Port (COM4)
(ISA) 6 Standard Floppy disk controller
(ISA) 7 Communications Port (COM3)
(ISA) 8 System CMOS/real time clock
(ISA) 9 Microsoft ACPI-Compliant System
(ISA) 12 PS/2 Compatible Mouse
(ISA) 13 Numeric data processor
(ISA) 14 Primary IDE Channel
(ISA) 15 Secondary IDE Channel
(PCI) 11 Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
(PCI) 16 Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
(PCI) 16 Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
(PCI) 16 Intel(R) PRO)/1000 PL Network Connection #4
(PCI) 16 Mobile Intel(R) 945GM Express Chipset Family
(PCI) 17 Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
(PCI) 17 Intel(R) PRO)/1000 PL Network Connection #3
(PCI) 17 Realtek AC'97 Audio
(PCI) 18 Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
(PCI) 18 Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
(PCI) 18 Intel(R) PRO)/1000 PL Network Connection
(PCI) 19 Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D6
(PCI) 19 Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
(PCI) 19 Intel(R) PRO)/1000 PL Network Connection #2
(PCI) 23 Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
(PCI) 23 Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC

Appendix D – RoHS-6 Compliance - Materials Declaration Form

EUROTECH

Confirmation of Environmental Compatibility for Supplied Products

Substance	Maximum concentration
Lead	0.1% by weight in homogeneous materials
Mercury	0.1% by weight in homogeneous materials
Hexavalent chromium	0.1% by weight in homogeneous materials
Polybrominated biphenyls (PBBs)	0.1% by weight in homogeneous materials
Polybrominated diphenyl ethers (PBDEs)	0.1% by weight in homogeneous materials
Cadmium	0.01% by weight in homogeneous materials

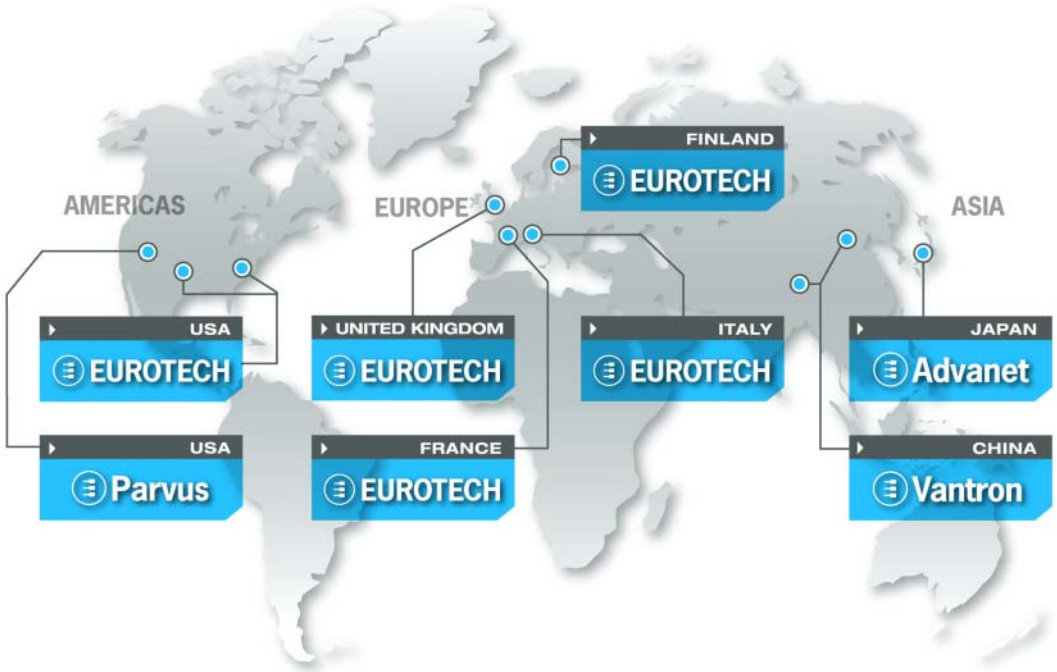
The products covered by this certificate include:

Product Name	Eurotech Part Number
GEMINI	6580-00773-001-001

Eurotech has based its material content knowledge on a combination of information provided by third parties and auditing our suppliers and sub-contractor's operational activities and arrangements. This information is archived within the associated Technical Construction File. Eurotech has taken reasonable steps to provide representative and accurate information, though may not have conducted destructive testing or chemical analysis on incoming components and materials.

Additionally, packaging used by Eurotech for its products complies with the EU Directive 2004/12/EC in that the total concentration of the heavy metals cadmium, hexavalent chromium, lead and mercury do not exceed 100 ppm

Eurotech Group Worldwide Presence



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