

# JRex-GX1

## Product Manual

**Document Revision 1.2**

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# 1. USER INFORMATION

## 1.1 About This Manual

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For the circuits, descriptions and tables indicated, Kontron assumes no responsibility as far as patents or other rights of third parties are concerned.

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## 1.4 Standards

Kontron Embedded Modules is certified to ISO 9000 standards.

## 1.5 Warranty

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

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

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

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

## 1.6 Technical Support

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

Before contacting Kontron Embedded Modules technical support, please consult our Web site for the latest product documentation, utilities, and drivers. If the information does not help solve the problem, contact us by telephone.

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## 2. INTRODUCTION

### 2.1 JRex-GX1

JRex-GX1 is a member of the Kontron Embedded Modules' 3.5" board family. JRex modules feature the same pinout and interface for the following components and peripherals:

- Reset
- ATX
- 2xUSB
- FAST LAN
- Keyboard/mouse socket
- CompactFlash
- VGA
- COM1

These family features allow you to reuse chassis and maximize design re-use.

The JRex-GX1 hosts a fanless National Geode GX1 CPU that runs at 300MHz. A SDRAM-DIMM socket for up to 256MB allows you to use standard desktop memory. The compatible features allow easy upgrades within the JRex product family.

Display connections (18 bit TFT) are simplified by using the JUMPtec Intelligent LVDS Interface (JILI), which automatically recognizes the display that is connected and independently sets all video parameters. All JRexes are plug-and-work enabled.

## 3. SPECIFICATIONS

### 3.1 Functional Specifications

- National Semiconductor Geode GX1 Processor
- Bus
  - ◆ 200MHz (33Mhz bus clock)
  - ◆ 266MHz (33Mhz bus clock)
  - ◆ 300MHz (33Mhz bus clock)
- Geode I/O Companion Multifunction South Bridge (CS5530A) chipset
- Winbond W83977AF Super I/O
- 16KB-integrated cache
- Memory
  - ◆ One DIMM socket for 8/16/32/64/128/256MB DIMM SDRAM module
- Two serial ports
  - ◆ COM1: RS232 signals
  - ◆ COM2: Transistor to transistor logic (TTL) on the JFlex interface
- One parallel port
  - ◆ LPT1
  - ◆ Extended capabilities port (ECP) and enhanced parallel port (EPP) with bi-directional capability
- Floppy-drive interface
- One PCI bus master Integrated Drive Electronics (IDE) port support for up to two IDE devices
  - ◆ Ultra 33 direct memory access (DMA) mode
  - ◆ Programmable input/output (PIO) modes up to Mode 4 timing
  - ◆ Multiword DMA Mode 0, 1, 2 with independent timing

- Onboard CompactFlash socket
  - ◆ Type 1 only for commercial compact Flashes
  - ◆ Master on secondary IDE
- USB
  - ◆ Two USB-1.0 ports (OHCI)
  - ◆ USB legacy keyboard support
  - ◆ USB floppy-boot support
- Davicom 9102A PCI single Ethernet chips
  - ◆ 10BASE-T/100BASE-TX LAN
  - ◆ Fast Ethernet network interface card (NIC) controller
- Onboard VGA integrated in Geode I/O Companion Multifunction South Bridge (CS5530A) chipset
  - ◆ 2D-graphics accelerator and display controller
  - ◆ Cathode ray tube (CRT) and liquid crystal display (LCD) panel support: optional one LVDS 110MHz channel using the JUMPtac Intelligent LVDS Interface (JILI) or digital signals, using the JUMPtac Intelligent Digital Interface (JIDI)
  - ◆ Resolution up to 1280 x 1024 x 8 x 16bpp
  - ◆ Up to 4MB video RAM based on UMA
- Phoenix Flash BIOS
- NV-EEPROM for Complementary Metal Oxide Semiconductor (CMOS) setup
- Keyboard controller
- PS/2 mouse interface
- Watchdog timer (WDT)
- Real-time clock (battery onboard)

## 3.2 Mechanical Specifications

- Mechanical: 101.6mm x 147.3mm (4.0" x 5.8")

## 3.3 Electrical Specifications

### 3.3.1 Supply Voltage

- 5V DC +/- 5%
- 3,3V DC +/- 5%
- 5V DC Standby +/- 5%

### 3.3.2 Supply Voltage Ripple

- 100 mV peak to peak 0-20 MHz

### 3.3.3 Supply Current

- Typical (with 64MB SDRAM and 32MB CompactFlash):
  - ◆ 0.7A @ 5V
  - ◆ 0.5A @ 3.3V

### 3.3.4 RTC Battery

- Real-time clock (RTC) battery voltage: 1.8 - 4.0V (typ. 3.0V)
- RTC battery quiescent current: max. 3.5uA

---

**WARNING!**

An incorrectly placed battery can explode. Replace dead batteries with equivalent ones or with ones recommended by the manufacturer.

**WARNUNG !**

Es besteht Explosionsgefahr wenn die Batterie nicht korrekt ersetzt wird. Ersatz nur durch gleichen oder gleichwertigen vom Hersteller empfohlenen Typ. Entsorgung der Batterien muß entsprechend den Anweisungen des Herstellers erfolgen.

**ADVARSEL !**

Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leveradøren.

**ADVARSEL !**

Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

**VARNING !**

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

**VAROITUS !**

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laltevalmistajan suosittelmaan tyyppiin. Havita käytetty paristo valmistajan ohjeiden mukaisesti.

---

## 3.4 Environmental Specifications

### 3.4.1 Temperature

- Operating\*: 0 to + 60°C
- Nonoperating: -10 to + 85 °C

---

**Note:**

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

---

### 3.4.2 Humidity

- Operating: 10% to 90% (noncondensing)
- Nonoperating: 5% to 95% (noncondensing)

## 4. CPU, CHIPSET, AND SUPER I/O

### 4.1 CPU

National Semiconductor Geode GX1 Processor features include:

- Support for Intel's MultiMedia eXtensions (MMX) instruction set extension for acceleration of multimedia applications
- 16KB unified L1 cache
- Advanced Power Management (APM 1.2) for legacy power management
- PCI host controller
- 2D-graphics accelerator and display controller
- Synchronous dynamic random access memory (SDRAM) interface tightly coupled to CPU core and graphics subsystem for maximum efficiency

### 4.2 Chipset

Geode I/O Companion Multifunction South Bridge (CS5530A) features include:

- 3.3V or 5.0V PCI bus compatible
- 5.0V tolerant I/O interfaces
- PCI 2.1 compliant
- Support for PCI initiator to Industry Standard Architecture (ISA) and ISA master-to-PCI cycle translations
- PCI master for audio I/O and IDE controllers
- PCI-to-ISA interrupt mapper/translator distributed DMA supported
- Two 8259A-equivalent interrupt controllers
- 8254-equivalent timer
- Two 8237-equivalent DMA controllers

- Boot read only memory (ROM) and keyboard chip select
- Two controllers with support for up to three IDE devices
- Independent timing for master and slave devices for both channels
- PCI bus master burst reads and writes
- Ultra DMA/33 (ATA-4) support
- Independent USB interface
  - ◆ Open host controller interface (OpenHCI) specification compliant
  - ◆ Second-generation core design

### 4.3 Super I/O

The Winbond W83977AF Super I/O integrates the following:

- Disk-drive adapter
- Serial port (Universal Asynchronous Receiver/Transmitter [UART])
- Parallel port
- Configurable plug-and-play (PNP) registers for the whole chip

Other features include:

- PNP 1.0A compatible
- Support for 13 interrupt request (IRQ) lines, 4 DMA channels, and full 16-bit address decoding
- Capable of sharing ISA bus IRQs

## **5. SYSTEM MEMORY**

### **5.1 Connector (X6)**

The JRex-GX1 uses standard SDRAM memory modules. One socket is available for 3.3-volt (power level), unbuffered synchronous dynamic random access memory (SDRAM) of 8, 16, 32, 64, 128, or 256MB.

## 6. USB INTERFACE

The JRex-GX1 comes with two USB ports, which you can expand by adding external hubs. You can connect up to 127 USB peripherals to each hub.

### 6.1 Connector (X22)

Pin	Pin Function
1	USB1_+5V
2	USB1-
3	USB1+
4	USB1_GND
5	USB2_+5V
6	USB2-
7	USB2+
8	USB2_GND
9	-
10	Shielded Ground
11	Shielded Ground
12	Shielded Ground
13	Shielded Ground

---

**Note:** The current of the power lines is internally limited to 500mA.

---

## 7. SERIAL-COMMUNICATION INTERFACE

The JReX-GX1 has two 16550-compatible serial ports:

- COMA
- COMB (available only with additional hardware)

The line drivers conform to the IEEE RS232C standard.

### 7.1 Connector (X25)

COMA (X25) (RS232C)	
Pin	DSUB-9
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

### 7.2 Configuration

Refer to the I/O Device Configuration Submenu in the Appendix B: BIOS Operation chapter for information on configuration.

## 8. PARALLEL-COMMUNICATION INTERFACE

The J Rex-GX1 supports one parallel port in either extended capabilities port (ECP) or enhanced parallel port (EPP) mode.

### 8.1 Connector (X24)

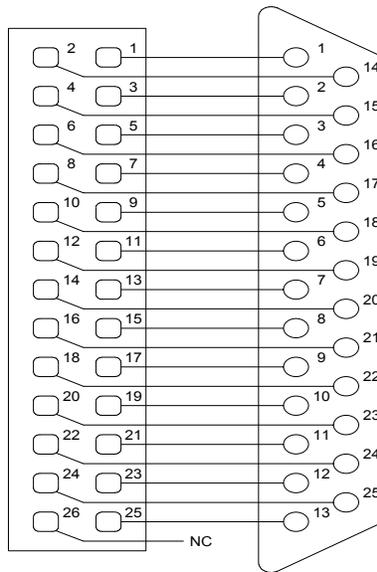
Parallel Port LPT 1 (X15)				
Pin	Signal Name	Function	In / Out	DSUB-25 (need adapter)
1	Strobe#		Out	1
3	Data 0		I/O	2
5	Data 1		I/O	3
7	Data 2		I/O	4
9	Data 3		I/O	5
11	Data 4		I/O	6
13	Data 5		I/O	7
15	Data 6		I/O	8
17	Data 7		I/O	9
19	ACK#		In	10
21	BUSY		In	11
23	PAPER out		In	12
25	SEL out		In	13
2	AUTOFD#		Out	14
4	ERROR#		In	15
6	INIT#		Out	16
8	SEL in		Out	17
26	VCC (*)	+ 5 V	--	NC
10,12	GND	Signal Ground	--	18 - 25
14,16	GND	Signal Ground	--	18 - 25
18,20	GND	Signal Ground	--	18 - 25
22,24	GND	Signal Ground	--	18 - 25

---

#### Notes:

- (\*) To protect external power lines of peripheral devices, make sure that
    - the wires have the right diameter to withstand maximum available current.
    - the enclosure of the peripheral device fulfils fire-protecting requirements of IEC/EN 60950.
-

You can use an adapter cable to change from the 26-pin header style of the JRex-GX1 to the more common 25-pin female D-sub.



26-pin Header to 25-pin D-Subconversion

## 8.2 Configuration

JRex-GX1 parallel ports are bi-directional. The bi-directional functions are compatible with those of a PS/2 style parallel port. The functionality is always available and does not conflict with normal printer use. Use the PhoenixBIOS Setup Utility to set the following:

- Parallel-port mode
- I/O addresses
- IRQs

Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

# 9. KEYBOARD AND PS/2 MOUSE INTERFACE

This interface consists of a keyboard and a PS/2 mouse.

To find the location of Connector X23 on the JRex-GX1 board, please see the **Appendix E: Connector Layout** chapter.

## 9.1 Connector (X23)

Pin	Signal Name	Function	
1	KBDAT	Keyboard Data	
2	MSDAT	Mouse Data	
3	GND	Ground	
4	VCC	+5V Vcc	
5	KBCLK	Keyboard Clock	
6	MSCLK	Mouse Clock	

For more information on the keyboard and front-panel interfaces, please see the **Appendix G: Literature and Standards** chapter.

## 9.2 Signals

### 9.2.1 KBDAT (Keyboard Data)

- Bi-directional I/O pin on CPU modules
- Keyboard data signal

### 9.2.2 KBCLK (Keyboard Clock)

- Bi-directional I/O pin on CPU modules
- Keyboard clock signal

### 9.2.3 MSDAT (Mouse Data)

- Bi-directional I/O pin on CPU modules
- Mouse data signal

### **9.2.4 MSCLK (Mouse Clock)**

- Bi-directional I/O pin on CPU modules
- Mouse clock signal

## **9.3 Configuration**

Refer to the **Keyboard Features Submenu** and to the **Advanced Menu (for PS/2 Mouse)** in the **Appendix B: BIOS Operation**.

## 10. FLOPPY-DRIVE INTERFACE

The floppy-drive interface can support a 3.5" drive, using the adapter cable ADA-Floppy 2, (Kontron Embedded Modules part number 96001-0000-00-0).

The board can support the following drive capacities:

- 720K
- 1.44M
- 2.88M

### 10.1 Connector (X19)

Signal	Function	Pin	Signal	Function
VCC (*)	+ 5V	2	IDX	Index
VCC (*)	+ 5V	4	DS0	Drive select 0
VCC (*)	+ 5V	6	DCHNG#	Disk change
NC	-	8	NC	-
NC	-	10	Mo0	Motor on
NC	-	12	DIR	Direction select
NC	-	14	STEP	Step
GND	Ground	16	WD	Write data
GND	Ground	18	WG	Write gate
GND	Ground	20	TR00	Track 00
GND	Ground	22	WP	Write protect
GND	Ground	24	RD	Read data
GND	Ground	26	SIDE	Side one select

---

#### Notes:

- (\*) To protect the external power lines of peripheral devices, make sure that:
- wires have the right diameter to withstand the maximum available current.
  - the enclosure of the peripheral device fulfils the fire protecting requirements of IEC/EN 60950.
-

## 10.2 Configuration

Specify the drive type using the PhoenixBIOS Setup Utility.

Choices for the 3.5" drive type include:

- 360KB
- 1.2MB
- 720Kb
- 1.44MB
- 2.88MB
- None

You can disable the floppy-disk interface from the PhoenixBIOS Setup Utility.

Refer to the **Advanced Menu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

# 11. IDE-CONTROLLER INTERFACE

PCI bus devices serve as primary and secondary IDE hosts on the JRex-GX1. BIOS automatically configures them, but you can disable them from the BIOS Setup Utility. Resources used by primary and secondary IDE host adapters are compatible with the PC/AT.

The IDE controller supports the following modes:

- Ultra 33 DMA mode
- PIO modes up to Mode-4 timing
- Multiword DMA Mode 0, 1, 2 with independent timing

Use a master/slave daisy chain when connecting two devices to a single adapter.

## 11.1 IDE Connector (X21)

The IDE connector is a 40-pin, dual in-line, 2.54mm-pitch, male header.

To find the location of Connector X5 on the JRex-GX1 board, please see the **Appendix E: Connector Layout** chapter.

You can connect one or two IDE drives to the header by using an appropriate flat-ribbon cable. Configure the first drive as master. Configure the second drive (at the end of the cable) as slave. Consult your disk-drive manual for instructions.

IDE Connector for 3.5" Hard Disk (X21)			
Pin	Signal	Pin	Signal
1	RESET#	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC
21	NC	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	RDY	28	NC
29	ACK	30	GND
31	IRQ14	32	NC
33	SA1	34	NC

IDE Connector for 3.5" Hard Disk (X21)			
Pin	Signal	Pin	Signal
35	SA 0	36	SA2
37	CS0#	38	CS1#
39	NC	40	GND

## 11.2 Configuration

You can connect one or two IDE drives to the header by using an appropriate flat-ribbon cable.

1. Configure the first drive as master.
2. Configure the second drive (at the end of the cable) as slave.
3. Consult your disk-drive manual for instructions.

Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

## 11.3 Signal Description

### 11.3.1 Reset#

Input low active

Reset signal from the host system that is active low during power up and inactive thereafter.

### 11.3.2 GND

Power ground.

### 11.3.3 D[0:15]

Input / output

16-bit bi-directional data bus between the host and the drive. The lower eight bits, D0:D7, are used for register and ECC access. All 16 bits are used for data transfers.

### 11.3.4 IOW#

Input low active

Write strobe, the rising edge of which clocks data from the host data bus, D0:D15, into a register of the *chip*DISK.

### 11.3.5 IOR#

Input low active

Read strobe, which when low enables data from a register of the *chip*DISK onto the host data bus, D0:D15.

### 11.3.6 IRQ

Output tri state

Interrupt to the host system.

The interrupt is enabled only when:

- Hard disk is selected
- Host activates the —IEN bit as active high
- Drive is not selected

This output is in a high impedance state regardless of the state of the IRQ bit. The interrupt is set when the IRQ bit is set by the harddisk. IRQ is reset to zero by a host read of the status register or a write to the command register.

### 11.3.7 IOCS16#

Output tri state

Indication to the host system that the 16 bit data register has been addressed and that the hard disk is prepared to send or receive a 16-bit data word.

### 11.3.8 PDIAG#

Input / output

Passed Diagnostic. Output by the hard disk if it is the slave drive. Input to the hard disk if it is the master drive. This low active signal indicates to a master that the slave has passed its internal diagnostic command. This signal is only high during the execution of the internal diagnostic command.

### 11.3.9 HA[0:2]

Input

Binary-coded address used to select the individual registers in the task file of the hard disk.

### 11.3.10 IDECS0

Input

Chip-select input from the host system. Used to select some of the host-accessible registers.

### 11.3.11 IDECS1

Input

Chip-select input from the host system. Used to select three of the registers in the task file.

### 11.3.12 SLVI/ACT

Output

Signal from the hard disk to:

- Drive an LED whenever the *chipDISK* is accessed
- Indicates a second drive present

This signal is active low when the hard disk is busy.

## 11.4 CompactFlash Connector (X20)

A CompactFlash socket for commercial CompactFlashes (only Type I) is integrated on the bottom side of the JReX-GX1 board.

### 11.4.1 Configuration

You can use the CompactFlash card as a master device on the secondary IDE port.

Refer to the **I/O Device Configuration Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuraton.

## 12. ETHERNET-CONTROLLER INTERFACE

The JRex-GX1 Ethernet interface uses a Davicom DM9102A PCI Fast Ethernet Controller. The network controller supports a 10/100Base-TX interface. The device auto-negotiates the use of a 10Mbps or 100Mbps connection.

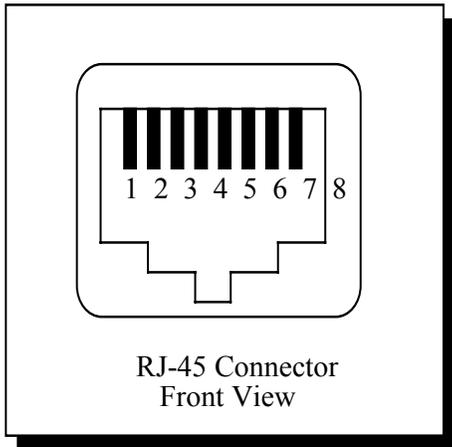
All major network-operating systems and several real-time and embedded operating systems support the interface.

The DM9102A provides:

- Integrated Fast Ethernet MAC, Physical Layer, and transceiver in one chip
- Compliance with PCI specification 2.2
- PCI bus-master architecture
- EEPROM 93C46 interface supports node-ID, access-configuration information
- Compliance with IEEE 802.3u 100Base-TX and 802.3 10Base-T
- Compliance with IEEE 802.3u auto-negotiation protocol for automatic link-type selection
- Full-duplex/half-duplex capability
- Supports IEEE 802.3x full duplex flow control
- Digital-clock recovery circuit using advanced digital algorithm to reduce jitter
- High-performance 100Mbps-clock generator and data-recovery circuit
- Provides loopback mode for easy system diagnostics

## 12.1 Connector (X27)

The 10/100Base-T connector is a standard 8-pin RJ45 jack.



### 12.1.1 RJ45 Pinout

Pin#	Signal Name	Function	In/Out
1	TXD+ <sup>1</sup>	100/10BASE-T Transmit	Differential Output
2	TXD- <sup>1</sup>	100/10BASE-T Transmit	Differential Output
3	RXD+ <sup>2</sup>	100/10BASE-T Receive	Differential Input
4	NC	Unused Pin	
5	NC	Unused Pin	
6	RXD- <sup>2</sup>	100/10BASE-T Receive	Differential Input
7	NC	Unused Pin	
8	NC	Unused Pin	

**Notes:**

<sup>1</sup>TXD+, TXD- Differential output pair drives 10 and 100Mb/s Manchester-encoded data to the 100/10BASE-T transmit lines.

<sup>2</sup>RXD+, RXD- Differential input pair receives 10 and 100Mb/s Manchester-encoded data from the 100/10BASE-T receive lines.

## **12.2 Configuration**

You can configure the on-board PCI Ethernet interface via the PhoenixBIOS Setup Utility. You can assign it to an available I/O and IRQ location.

## **12.3 Ethernet Technical Support**

You can solve some Ethernet problems by using the latest drivers for the DAVICOM DM9102A controller. Kontron Embedded Modules provides you with the latest tested drivers, which can differ from newer ones.

For further technical support, contact either Kontron Embedded Modules or get support information and download software updates from DAVICOM.

## 13. GRAPHICS-CONTROLLER INTERFACE

The Geode I/O Companion Multifunction South Bridge (CS5530A) chipset incorporates extensions to the GX1 processor's display subsystem. These include:

- Video Accelerator
  - ◆ Buffers and formats input luminance-bandwidth-chrominance (YUV) video data from processor
  - ◆ 8-bit interface to the GX1 processor
  - ◆ X & Y scaler with bilinear filter
  - ◆ Color space converter (YUV to RGB)
- Video Overlay Logic
  - ◆ Color key
  - ◆ Data switch for graphics and video data
  - ◆ Gamma RAM
  - ◆ Brightness and contrast control
- Display Interface
  - ◆ Integrated RGB Video digital-to-analog converters (DACs)
  - ◆ VESA DDC2B/DPMS support
  - ◆ Flat-panel interface (simultaneous operation of CRT and LCD)
- Supported Resolutions (CRT and LCD)
  - ◆ The display controller on the JReX-GX1 supports resolutions for CRT and LCD panels (only JILI) up to 1280x1024x8 bpp and 1024x768x16 bpp.
  - ◆ On the flat panel digital interface (JIDI), displays up to 640x480x18 bpp can be used.

### 13.1 Flat Panel LVDS (JILI) Connector (X26)

The user interface for flat panels is the JILI. The implementation of this subsystem complies with the JILI specification.

To find the location of Connector X26 on the JReX-GX1 board, please see the **Appendix E: Connector Layout** chapter.

## 13.2 Configuration

For information on configuring JILI, call Kontron Embedded Modules Technical Support for documentation and information.

## 13.3 VGA Connector (J2)

DSUB15 (J2)	Signal Name	Function
1	RED	Analog Video Red
2	GREEN	Analog Video Green
3	BLUE	Analog Video Blue
5	GND	Signal Ground
6	GND	Signal Ground
7	GND	Signal Ground
8	GND	Signal Ground
10	GND	Signal Ground
13	HSYNC	Horizontal Sync
14	VSNC	Vertical Sync

## 13.4 Configuration

Refer to the **Advanced Chipset Control Submenu** in the **Appendix B: BIOS Operation** chapter for information on configuration.

## **14. OPERATING SYSTEMS**

The JRex-GX1 is compatible with the following operating systems (OS):

- DOS
- Linux
- Most PC-compatible RTOS
- Windows CE, Window 9x, and Windows NT

# 15. POWER

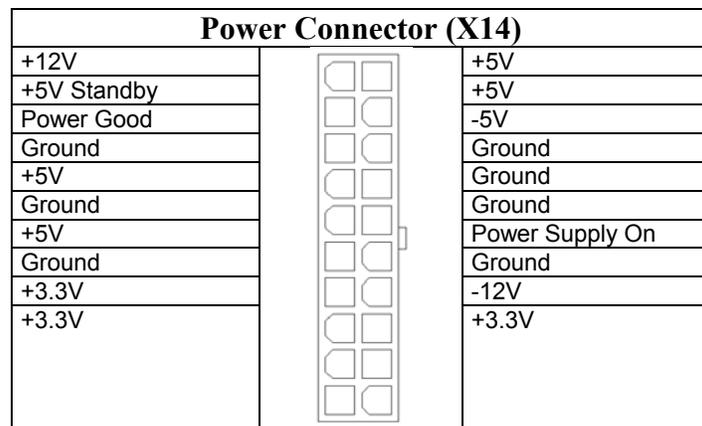
The JRex-GX1 uses +5V and +3.3V power supplies. It also uses +5V standby power and a power-good signal. For some panels or some JFLEX modules, +12V are required. Please make sure that all voltages will connect to the board at the same time.

---

**Note:** Kontron Embedded Modules recommends using a standard ATX power supply.

---

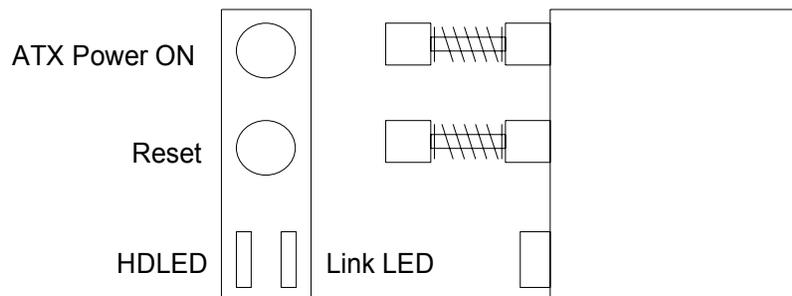
## 15.1 Connector (X14)



## 15.2 Power Button

On the front of the board, there are buttons to switch the ATX power supply on or off and to reset the board.

There also are LEDs to indicate hard-disk activity (HDLED) and to display a link to a network (Link LED).



## **16. WATCHDOG TIMER**

The watchdog-timer (WDT) feature is implemented in the Winbond W83977A super I/O device. You can configure the WDT from the BIOS setup utility to start after a set amount of time after power-on boot. The application software will strobe the WDT to prevent its timeout. Upon timeout, the WDT resets and restarts the system. This provides a way to recover from program crashes or lockups.

You can program the timeout period for the WDT in ranges from 15 seconds to 30 hours and 15 minutes.

Contact Kontron Embedded Modules Technical Support for information on programming and operating the WDT.

## 17. APPENDIX A: SYSTEM-RESOURCE ALLOCATIONS

### 17.1 I/O Port Assignments

Devices on the JReX-GX1 use I/O addresses common to the PC/AT.

### 17.2 Interrupt Request Lines

The following table describes the allocation of the 16 hardware-interrupt lines for the JReX-GX1.

IRQ #	Primary Use	Available	Comment
0	Timer0	No	
1	Keyboard	No	
2	Cascade	No	
3	COM2	No	Note (1)
4	COM1	No	Note (1)
5	Free	Yes	
6	FDC	No	Note (1)
7	LPT1	No	Note (1)
8	RTC	No	
9	Free	Yes	
10	Free	No	
11	Free	No	
12	PS/2 Mouse	No	Note (1)
13	FPU	No	
14	IDE0	No	Note (1)
15	IDE1	No	Note (1)

---

**Note:** <sup>1</sup> If the "Used For" device is disabled in setup, the corresponding interrupt is available for other devices.

---

### 17.3 Direct Memory Access (DMA) Channels

DMA #	Used For	Available
0		Yes
1		Yes
2	FDC	No
3	LPT	No
4	Cascade	No
5		Yes
6		Yes
7		Yes

---

**Note:** If the “Used For” device is disabled in setup, the corresponding interrupt is available for other devices.

---

### 17.4 Upper Memory Area Map

Upper Memory	Use	Available
C0000h – CBFFFh	VGA BIOS	No
CC000h – DFFFFh		Yes
E0000h – E5FFFh*	Free	Yes
E6000h – F0000h	System BIOS	No

---

**Note:** \*The availability of Upper Memory depends upon the BIOS revision. You can check the actual UMA ceiling from the Summary Screen. To do this, enable the Summary Screen from the BIOS setup.

---

### 17.5 PCI Devices

PCI Device #	IDSEL #	Usage	Device/Vendor ID
South Bridge	REQ0 / GNT0	-	Required for CS5530A
Ethernet	REQ1 / GNT1	INTD	REQ1/GNT1 available if a CPU board without Ethernet is used
USB Controller	-	INTA	Integrated in CS5530A

## 18. APPENDIX B: BIOS OPERATION

The JRex-GX1 comes equipped with Phoenix BIOS 4.0, Release 6.1, which is located in an onboard Flash. The device has an 8-bit access. The shadow RAM feature offers faster access (16 bit). You can update the BIOS using a Flash utility. For complete Phoenix BIOS 4.0 information, visit the Phoenix Technologies Web site.

### 18.1 BIOS Version

The BIOS version displays onscreen during the POST at boot.

### 18.2 Setup Guide

The PhoenixBIOS setup utility allows you to change system behavior by modifying the BIOS configuration. Setup-utility menus allow you to make changes and turn features on or off.

BIOS setup menus represent those found in most models of the JRex-GX1. The BIOS setup utility for specific models can differ slightly.

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

#### 18.2.1 Start Phoenix BIOS Setup Utility

To determine the PhoenixBIOS version, immediately press the **Pause** key on your keyboard as soon as you see the following text display in the upper left corner of your screen:

```
PhoenixBIOS 4.0 Release 6.0. .05
Copyright 1985-2001 Phoenix Technology Ltd.
JUMPttec ® BIOS Version <MOD7R105>
© Copyright 2002 JUMPttec ® Industrielle Computertechnik AG
```

The Main Menu then appears.

Several sections comprise the **Setup Screen**.

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

*Menu Bar*

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

*Legend Bar*

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

Key	Function
<F1> or <Alt-H>	General Help window
<Esc>	Exit menu
← or → Arrow key	Select a menu
↑ or ↓ Arrow key	Select fields in current menu
<Tab> or <Shift-Tab>	Cycle cursor up and down
<Home> or <End>	Move cursor to top or bottom of current window
<PgUp> or <PgDn>	Move cursor to next or previous page
<F5> or <->	Select previous value for the current field
<F6> or <+> or <Space>	Select next value for the current field
<F9>	Load the default configuration values for this menu
<F10>	Save and exit
<Enter>	Execute command or select submenu
<Alt-R>	Refresh screen

*Selecting an Item*

Use the ↑ or ↓ key to move the cursor to the field you want. Then use the + and - keys to select a value for that field. The **Save Value** commands in the **Exit** menu save the values displayed in all the menus.

*Displaying Submenus*

Use the ← or → key to move the cursor to the submenu you want. Then press <Enter>. A pointer ( ▶ ) indicates submenus.

*Item Specific Help Window*

The Help window on the right side of each menu displays the Help text for the selected item. It updates as you move the cursor to each field.

*General Help Window*

Pressing <F1> or <ALT-F1> on a menu brings up the General Help window that describes legend keys and alternates. Press <Esc> to exit the General Help window.

### 18.3 Main Menu

Feature	Option	Description
System Time	HH:MM:SS	Sets system time. Use <Enter> to move to MM or SS.
System Date	MM/DD/YYYY	Sets system date. Use <Enter> to move to DD or YYYY.
Legacy Diskette A	360 kB, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 kB, 3 ½ “ <b>1.44/1.25 MB, 3 ½ “</b> 2.88 MB, 3 ½ “ Disabled	Select type of floppy disk drive.
Legacy Diskette B	360 kB, 5 ¼ “ 1.2 MB, 5 ¼ “ 720 kB, 3 ½ “ 1.44/1.25 MB, 3 ½ “ 2.88 MB, 3 ½ “ <b>Disabled</b>	Select the type of floppy disk drive.
▸ Primary Master	Autodetected drive	Displays result of PM autotyping.
▸ Primary Slave	Autodetected drive	Displays result of PS autotyping.
▸ Compact Flash	Autodetected drive	Displays result of SM autotyping.
System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory	N/A	Displays amount of extended memory detected during bootup.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.1 Primary Master, Primary Slave, and CompactFlash Submenus

Feature	Option	Description
Type	None User <b>Auto</b> CD-ROM ATAPI Removable Other ATAPI	None = Autotyping is unable to supply the drive type or end user has selected None, disabling any drive that may be installed. User = End user supplies hdd information. Auto = Autotyping, drive supplies information.
Cylinders	1 to 65,536	Number of cylinders.
Heads	1 to 256	Number of read/write heads.
Sectors	1 to 63	Number of sectors per track.
Maximum Capacity	N/A	Displays calculated size of the drive in CHS
Total Sectors	N/A	Displays total number of sectors in LBA
Maximum Capacity	N/A	Displays calculated size of drive in LBA
Multisector Transfer	Disabled Standard 2 sectors 4 sectors 8 sectors <b>16 sectors</b>	Any selection except Disabled determines the number of sectors transferred per block.  Standard is one sector per block.
LBA Mode Control	Disabled <b>Enabled</b>	Enabling Logical Block Addressing (LBA) allows the use of LBA instead of CHS.
32-Bit I/O	<b>Disabled</b> Enabled	Enables 32-bit communication between CPU and IDE card. Requires PCI or Local Bus.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 <b>Fast PIO 4</b> FPIO3 / DMA1 FPIO4 / DMA2	Selects method for transferring data between the hard disk and system memory. Autotype the drive to select the optimum transfer mode.
SMART Device Monitoring	<b>Disabled</b> Enabled	Enables SMART warnings of imminent failure of drive.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

18.3.2 Advanced Menu

Feature	Option	Description
▸ Advanced Chipset Control	Submenu	Opens Advanced Chipset Control submenu.
Plug & Play (PNP) OS	Yes <b>No</b>	If your system has a plug and play (PNP) OS, such as Win9X, select Yes to let OS configure PNP devices not required for boot. No makes BIOS configure them.
Secured Setup Configuration	<b>Yes</b> No	Yes prevents a PNP OS from changing system settings.
Reset Configuration Data	<b>No</b> Yes	Yes erases all configuration data in ESCD, which stores the configuration settings for plug-in devices. Select Yes when required to restore the manufacturer's defaults.
▸ PCI Configuration	Submenu	Opens PCI Configuration submenu.
PS/2 Mouse	<b>Enabled</b> Autodetect Disabled	Selecting Disabled prevents installed PS/2 mouse from functioning but frees up IRQ12. Selecting Autodetect frees IRQ12 if no mouse detected.
▸ Keyboard Features	Submenu	Opens keyboard features submenu.
▸ I/O Device Configuration	Submenu	Opens I/O Device Configuration submenu.
▸ Audio Option Menu	Submenu	Opens the Audio Configuration submenu.
▸ Ethernet Configuration Menu	Submenu	Opens the Ethernet Configuration submenu.
Large Disk Access Mode	<b>DOS</b> Other	Select DOS if you have DOS. Select Other if you have another OS, such as UNIX. A large disk has more than 1024 cylinders, more than 16 heads, or more than 63 sectors per track.
Halt On Errors	No <b>Yes</b>	Determines if post errors cause the system to halt.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.3 Advanced Chipset Control Submenu

Feature	Option	Description
Multiple Monitor Support	Motherboard Disable Motherboard Primary <b>Adapter Primary</b>	Motherboard Primary enables motherboard graphics for VGA; Adapter Primary enables an external adapter or VGA; Motherboard Disable does not allocate graphics resources.
Video Resolution	Low Medium High <b>Super</b>	Determines the UMA memory size for VGA. Higher resolution means more VGA memory and less system memory. Super = 4MB, High = 2.125 MB, Medium = 1.5 MB, Low = 1.25 MB
Display Mode	CRT only LCD only <b>Simultan</b>	Determines display mode.

**Notes:**

In the **Option** column, **bold** shows default settings.

If you enable **Motherboard Disable** but later want to allocate graphics resources, you will need to load the BIOS setup defaults. Press <F2> during boot up until you hear a beep, and then press <F9><Enter> and <F10> <Enter>.

### 18.3.4 PCI Configuration Submenu

Feature	Option	Description
PCI IRQ line 1	Disabled <b>Auto</b> IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PIC interrupt INTA. Select Auto to let BIOS assign IRQ.
PCI IRQ line 2	Disabled <b>Auto</b> IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PIC interrupt INTB. Select Auto to let BIOS assign IRQ.
PCI IRQ line 3	Disabled <b>Auto</b> IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PIC interrupt INTC. Select Auto to let BIOS assign IRQ.
PCI IRQ line 4	Disabled <b>Auto</b> IRQ3, 4, 5, 7, 9, 10, 11, 12, 14,15	Select IRQ for PIC interrupt INTD. Select Auto to let BIOS assign IRQ.
► PCI/PNP ISA UMB Region Exclusion	Submenu	Opens UMB Region Exclusion submenu.
► PCI/PNP ISA IRQ Resource Exclusion	Submenu	Opens IRQ Exclusion submenu.
► PCI/PNP ISA DMA Resource Exclusion	Submenu	Opens DMA Exclusion submenu.
ISA graphics device installed	<b>No</b> Yes	PCI devices may need to know if an ISA graphics device is installed in the system to enable card to function correctly.

**Notes:** In the **Option** column, **bold** indicates the default setting.

### 18.3.5 PCI/PNP ISA UMB Region Exclusion Submenu

Feature	Option	Description
C800 - CBFF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices.
CC00 - CFFF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices.
D000 – D3FF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices.
D400 – D7FF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices.
D800 - DBFF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices.
DC00 - DFFF	<b>Available</b> Reserved	Reserves specified block of upper memory for legacy ISA devices. (Reserved if legacy USB enabled.)

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.6 PCI/PNP ISA IRQ Exclusion Submenu

Feature	Option	Description
IRQ3	<b>Available</b> Reserved	Reserves the specified IRQ for use by legacy ISA devices.
IRQ4	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ5	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ7	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ9	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ10	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ11	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ12	See above.	Reserves the specified IRQ for use by legacy ISA devices.
IRQ14	See above.	Reserves the specified IRQ for use by legacy ISA devices. (Visible if primary IDE disabled).
IRQ15	See above.	Reserves the specified IRQ for use by legacy ISA devices. (Visible if secondary IDE disabled).

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.7 PCI/PNP ISA DMA Exclusion Submenu

Feature	Option	Description
DMA 0	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 1	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 2	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 3	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 5	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 6	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.
DMA 7	<b>Available</b> Reserved	Reserves specified DMA for legacy ISA devices.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.8 Keyboard Features Submenu

Feature	Option	Description
Numlock	<b>Auto</b> On Off	Turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric keypad.
Key Click	<b>Disabled</b> Enabled	Turns audible key click on.
Keyboard auto-repeat rate	<b>30/sec</b> , 26.7/sec, 21.8/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Sets number of times to repeat a keystroke per second when you hold key down.
Keyboard auto-repeat delay	¼ sec, ½ <b>sec</b> , ¾ sec, 1 sec	Sets delay time after the key is held down before it begins to repeat the keystroke.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.9 Audio Options Submenu

Feature	Option	Description
Sound	<b>Disabled</b> Enabled Auto	Configures sound device. Auto lets BIOS or OS configure the device.
Base I/O address	<b>220 – 22F</b> 240 – 24F 260 – 26F 280 – 28F	Sets base I/O address for sound device.
MPU I/O address	300 – 301 <b>330 – 331</b>	Sets base I/O address for MPU device.
8-bit DMA channel	DMA0, <b>DMA1</b> , DMA3	Sets the 8bit DMA channel for sound device.
16-bit DMA channel	<b>DMA5</b> , DMA6, DMA7	Sets the 16bit DMA channel for sound device.
Joystick	<b>Disabled</b> Enabled	Enable/disable the joystick.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.3.10 Ethernet Configuration Submenu

Feature	Option	Description
Onboard Ethernet 1	<b>Enabled</b> Disabled	Enable/Disable onboard Ethernet Controller 1.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

## 18.3.11 I/O Device Configuration Submenu

Feature	Option	Description
Local Bus IDE adapter	Disabled Primary Compact Flash <b>Both</b>	Enables onboard PCI IDE device.
Onboard FDC	Disabled <b>Enabled</b> Auto	Enables onboard FDC controller.
Base I/O address	<b>Primary</b> Secondary	Selects base address of FDC controller. (Primary = 3F0h, Secondary = 370)
Floppy Drive Swap	<b>Disabled</b> Enabled	Determines whether to swap Floppy A & B drives.
Serial Port A Serial Port B	Disabled Enabled <b>Auto</b>	Disabled turns off port. Enabled requires end user to enter base I/O address and IRQ. Auto makes BIOS or OS configure the port, depending on PNP OS setting.
Base I/O address	3F8h, 2F8h, 3E8h, 2E8h	Select I/O base of port.
IRQ (port A and B)	IRQ 3, IRQ 4	Select IRQ of Port A and B.
Onboard LPT	Disabled Enabled <b>Auto</b>	Disabled turns off port. Enabled requires end user to enter base I/O address and IRQ. Auto makes BIOS or OS configure port, depending on PNP OS setting.
Mode	Output only Bi-directional <b>ECP</b> EPP	Set the mode for the parallel port.
Base I/O address	378h, 278h, 3BCh	Select I/O base of port.
IRQ	IRQ 5, <b>IRQ 7</b>	Select IRQ of parallel port.
DMA	DMA1, <b>DMA3</b>	Select DMA channel of port if in ECP mode.
USB Host Controller	<b>Disabled</b> Enabled	Enable or disable onboard USB controller.
USB BIOS Legacy Support	<b>Disabled</b> Enabled	Enable or disable support for USB keyboard and mice. Enable for use with non-USB aware OSes such as UNIX and DOS.
OHCI Registers at	<b>E0000h</b> , D0000h	Select address of the OHCI register
► Watchdog Settings	Submenu	Opens WDT Settings submenu.

**Notes:**

The options noted in bold are default settings.

If legacy USB is enable, IRQ1 and IRQ2 do not wake the system from standby or suspend state; the UMB region DC000h-E3FFFh is reserved.

### 18.3.12 Watchdog Settings Submenu

Feature	Option	Description
Mode	<b>Disabled</b> Reset	Select watchdog operation mode.
Timeout	15s, 45s, <b>1:15m</b> , 2:15m, 5:15m, 10:15m, 30:15m	Max. trigger period.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

## 18.4 Security Menu

Feature	Option	Description
Set Supervisor Password	Up to seven alphanumeric characters	Pressing <Enter> displays dialog box for entering the user password. In related systems, this password gives full access to setup.
Set User Password	Up to seven alphanumeric characters	Pressing <Enter> displays dialog box for entering user password. In related systems, this password gives restricted access to setup.
Diskette access	User Supervisor	Enabled requires supervisor password to access floppy disk.
Fixed disk boot sector	<b>Normal</b> Write protected	Write-protect the boot sector on the hard disk for virus protection. Requires a password to format or Fdisk the hard disk.
Virus check reminder	<b>Disabled</b> Daily Weekly Monthly	Displays a message during boot-up asking (Y/N) if you backed up the system or scanned for viruses. Message returns on each boot until you respond with Y. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and monthly on the first boot of the month.
System backup reminder	<b>Disabled</b> Daily Weekly Monthly	Displays a message during boot-up asking (Y/N) if you backed up the system or scanned for viruses. Message returns on each boot until you respond with Y. Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and monthly on the first boot of the month.
Password on boot	<b>Disabled</b> Enabled	Enabled requires a password on boot. Requires prior setting of the supervisor password. If supervisor password is set and this option is disabled, BIOS assumes user is booting.

---

**Notes:**

- In the **Option** column, **bold** shows default settings.
  - Enabling Supervisor Password requires a password for entering Setup.
  - Passwords are not case sensitive.
  - User and Supervisor passwords are related.
  - You can only create a User password if a Supervisor password is first created.
-

## 18.5 Power Menu

A power management system reduces energy after specified periods of inactivity. The setup menu supports:

- Full On state
- Standby state with partial power reduction
- Suspend state with full power reduction

Feature	Option	Description
Power Savings	<b>Disabled</b> Enabled	Disabled turns off all power management.
Standby Timeout	Off, 1min, 2min, <b>4min</b> , 5min, 10min, 20min, 30min, 1hour	Inactivity period required to put system in Standby mode (partial power shutdown).
Auto Suspend Timeout	Off, 1min, 2min, <b>4min</b> , 5min, 10min, 20min, 30min, 1hour	Inactivity period required after Standby to Suspend mode (maximum power shutdown).
Hard Disk Timeout	<b>Off</b> , 1min, 2min, 4min, 5min, 10min, 20min, 30min, 1hour	Inactivity period of hard disk required before standby (motor off).
► Activity Event	Submenu	Opens advanced options submenu.

---

**Note:** In the **Option** column, **bold** shows default settings.

---

### 18.5.1 Activity Event Submenu

Feature	Option	Description
IRQ1	<b>Yes</b> No	Wakes up system on IRQ1 (Keyboard).
IRQ12	<b>Yes</b> No	Wakes up system on IRQ1 (PS/2 Mouse).
IRQ3, 4, 5, 7, 9, 10,. 11	Yes <b>No</b>	Wakes up system on IRQ.

---

**Note:** If legacy USB is enabled, IRQ1 and IRQ12 do not wake system from standby or suspend state.

---

## 18.6 Boot Menu

### 18.6.1 QuietBoot

Upon turn on or reset, QuietBoot displays a black screen as the default or a graphical logo instead of a text-based POST screen, which displays diagnostic messages.

The graphical logo is visible until just before the OS load unless:

- <Esc> is pressed to display the POST screen
- <F2> is pressed to enter Setup
- POST issues an error message
- BIOS or option ROM requests keyboard input

### 18.6.2 MultiBoot

Multiboot allows you to select the following boot device:

- Hard disk
- Floppy disk
- CD-ROM
- Network card

You can make the selections from the BIOS utility setup, or by selecting the boot device in the **BootFirst Menu**.

MultiBoot consists of the following menus:

- Setup Boot
- Boot Device Priority
- Removable Devices
- Hard Drive
- Network Boot Priority
- Boot First

## 18.7 Setup Boot Menu

Feature	Option	Description
Floppy Check	<b>Disabled</b> Enabled	Enabled verifies floppy type on boot; disabled speeds boot.
Summary Screen	<b>Disabled</b> Enabled	If enabled, a summary screen is displayed just before booting the OS to let the end user see the system configuration.
QuickBoot Mode	Disabled <b>Enabled</b>	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Dark Boot	<b>Disabled</b> Enabled	If enabled, system comes up with a blank screen instead of the diagnostic screen during bootup.
▸ Boot Device Priority	Submenu	Opens boot device priority submenu
Onboard LAN RPL ROM	<b>Disabled</b> Enabled	Enables the remote boot BIOS extension for the onboard LAN controller. See either Intel's Web site for Wired for Management (WfM) or Boot Agent for more information.

---

### Notes:

In the Option column, bold represents the default settings.

If the onboard LAN RPL ROM is enabled, the LANBOOT ROM asks during bootup which LANBOOT option to use.

---

### 18.7.1 Boot Device Priority Submenu

This menu allows you to select the order of the devices from which the BIOS attempts to boot the OS. During POST, if BIOS is unsuccessful at booting from one device, it will try the next one on the list.

The items on this menu each may represent the first of a class of items. For example, if you have more than one hard disk drive, Hard Drive represents the first of such drives as specified in the Hard Drive menu described below.

To change the order select the device you want to change and press <-> to decrease or <+> to increase priority.

Feature	Option	Description
▸ Hard Drive	Boot priority & submenu	Sets boot priority of Hard Disks as described in the respective submenu.
▸ Removable Devices	Boot priority & submenu	Sets boot priority of Removable Devices as described in the respective submenu.
ATAPI CD-ROM Drive	Boot priority	Sets boot priority of ATAPI CD:ROM Drives.
▸ Network Boot	Boot priority & submenu	Sets boot priority of Network adapters as described in respective submenu.

### 18.7.2 Hard Drive Priority Menu

If there is more than one bootable hard drive, select **Hard Drive** and press <Enter> to display Fixed Disk Menu and choose a boot priority.

### 18.7.3 Removable Devices Menu

If there is more than one Removable Media drive, select **Removable Devices** and press <Enter> to display the Removable Media menu and choose which drive is represented in the boot-order menu.

---

**Note:** The standard 1.44MB floppy drive is referenced as Legacy Floppy Drives.

---

### 18.7.4 Network Boot Priority Menu

If there is more than one bootable network adapter in the system, select **Network Boot** and press <Enter> to display available network adapters and choose the boot priority.

### 18.7.5 Boot First Menu

Display the **Boot First Menu** by pressing <Esc> during POST. In response, the BIOS displays the message `Entering Boot Menu` and then displays the Boot Menu at the end of POST.

Use the menu to select a following option:

- Override the existing boot sequence (for this boot only) by selecting another boot device. If the specified device does not load the OS, the BIOS reverts to previous boot sequence.
- Enter Setup.
- Press <Esc> to continue with the existing boot sequence.

## 18.8 Exit Menu

The following sections describe the five options in **Exit Menu**. Pressing <Esc> does not exit this menu. You must select an item from the menu to exit.

Feature	Option	Description
Exit Saving Changes	Saves selections and exits setup. The next time the system boots, the BIOS configures the system according to the Setup selection stored in CMOS.	Exit Saving Changes
Exit Discarding Changes	Exits Setup without storing in CMOS selections you made. Existing selections remain in effect.	Exit Discarding Changes
Load Setup Defaults	Displays default values for all the Setup menus.	Load Setup Defaults
Discard Changes	If, during a Setup session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you saved to CMOS.	Discard Changes
Save Changes	Saves all the selection without exiting Setup. You can return to the other menus to review and change your selection.	Save Changes

## 18.9 Updating BIOS with Phoenix Phlash

Phoenix Phlash allows you to update BIOS using a floppy disk without installing a new ROM chip. Phoenix Phlash is a utility for flashing a BIOS to the Flash ROM installed on the JRex-GX1.

Use Phoenix Phlash to:

- Update the current BIOS with a newer version
- Restore a corrupt BIOS (see below)

To update a BIOS by using a floppy disk, do the following:

- 1) Download Phoenix Phlash as a compressed file, CRISBQG1.ZIP, from the Kontron Embedded Modules Web site. It contains the following files:

File	Purpose
MAKEBOOT.EXE	Creates the custom boot sector on the Crisis Recovery Diskette.
CRISBOOT.BIN	Serves as the Crisis Recovery boot sector code.
MINIDOS.SYS	Allows the system to boot in Crisis Recovery Mode.
PHLASH.EXE	Programs the Flash ROM.
WINCRISIS.EXE	Creates the Crisis Recovery Diskette from Windows.
WINCRISIS.HLP	Serves as the help file of WINCRISIS.EXE.
PLATFORM.BIN	Performs platform-dependent functions.
BIOS.ROM	Serves as BIOS image that is programmed into Flash ROM.

- 2) To install Phoenix Phlash on a hard disk, unzip the content of CRISBQG1.ZIP into a local directory such as C:\PHLASH.
- 3) Create a crisis recovery diskette by inserting a blank diskette into Drive A: or B: and execute WINCRISIS.EXE. This copies four files onto the Crisis Recovery Diskette.

File	Purpose
MINIDOS.SYS	Allows the system to boot in Crisis Recovery Mode.
PHLASH.EXE	Programs the Flash ROM.
PLATFORM.BIN	Performs platform-dependent functions.
BIOS.ROM	Serves as BIOS image that is programmed into Flash ROM.

- 4) If the BIOS image (BIOS.ROM) changes because of an update or bug fix, copy the new BIOS.ROM image onto the diskette. Phoenix Phlash runs in one of two modes:
  - Command Line Mode
  - Crisis Recovery Mode

- 5) Use the Command Line mode to update or replace a BIOS. To execute Phlash in this mode, move to the Crisis Recovery Disk and type:

```
PHLASH BQG1R110.ROM
```

- 6) Phoenix Phlash will update the BIOS. Phlash can fail if the system uses memory managers. If this occurs, the utility displays the following message:

```
Cannot flash when memory manager are present.
```

- 7) Update the BIOS image by typing:

```
PHLASH /X BQG1R110.ROM
```

## 18.10 Preventing Potential Problems Updating BIOS

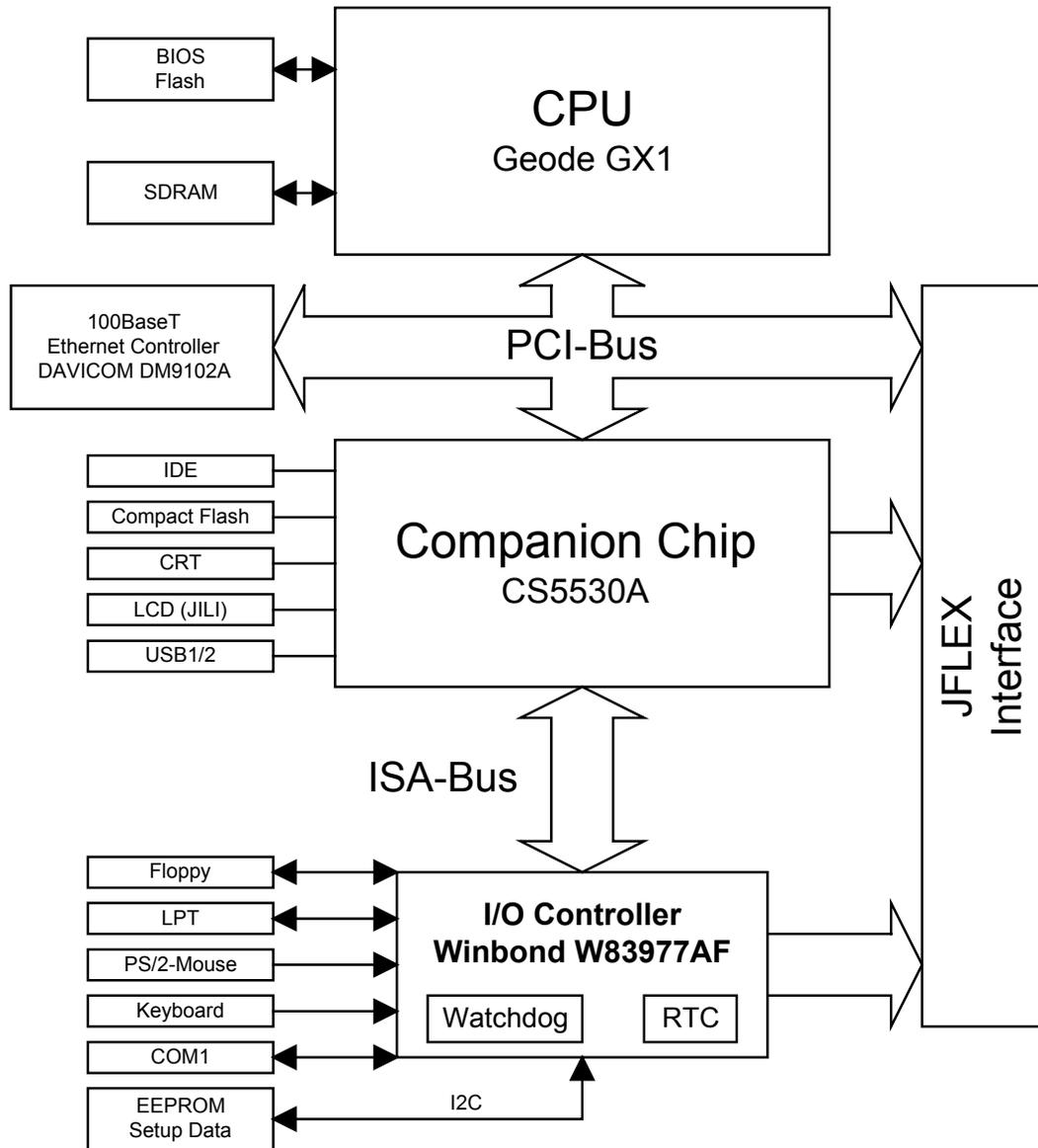
Updating the BIOS represents a potential hazard. Power failures or fluctuations that occur when you update the Flash ROM can damage the BIOS code, making the system unbootable.

To prevent this hazard, many systems come with a boot-block Flash ROM. The boot-block region contains a fail-safe recovery routine. If the boot-block code finds a corrupted BIOS (checksum fails), it boots into the crisis recovery mode and loads a BIOS image from a crisis diskette (see above).

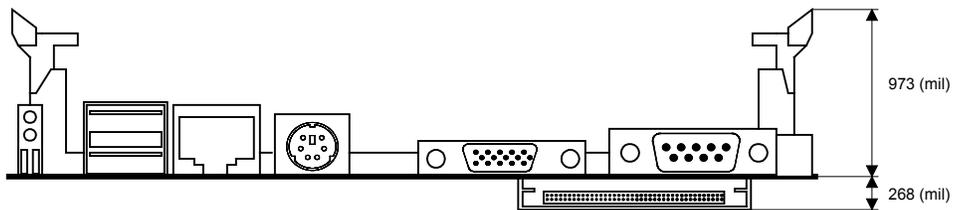
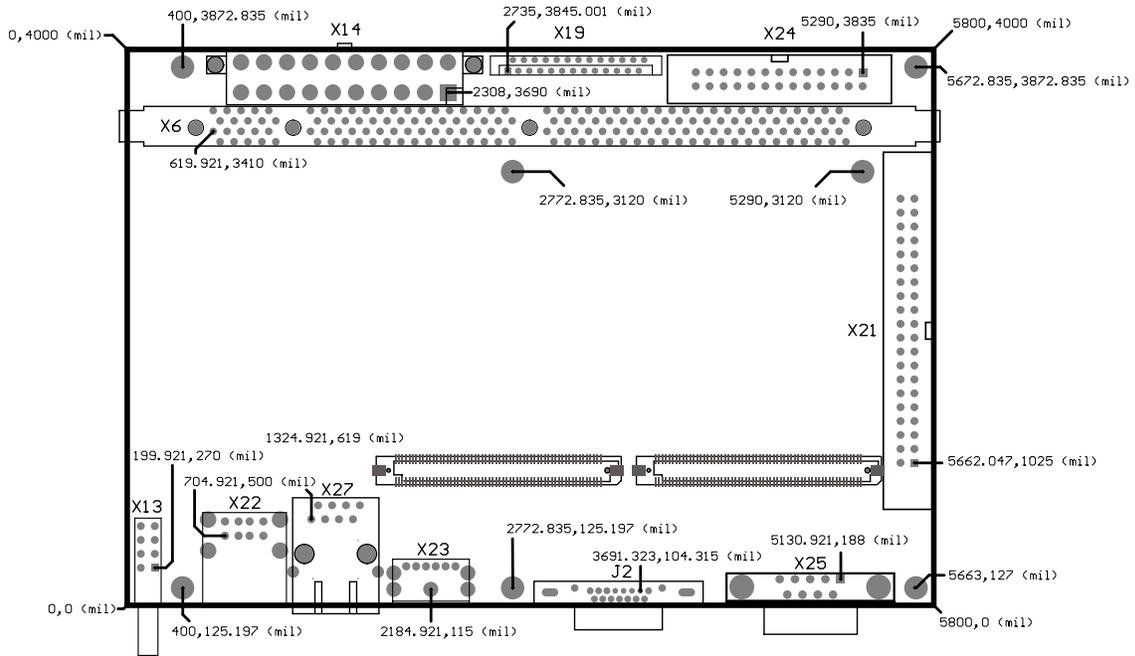
Additionally, the end user can insert an update key into the serial port (COM1 only) to force initiating the boot block recovery routine.

For further information on the update key and the crisis diskette, see the JAP0034 application note, which is available on the Kontron Embedded Modules' Web site.

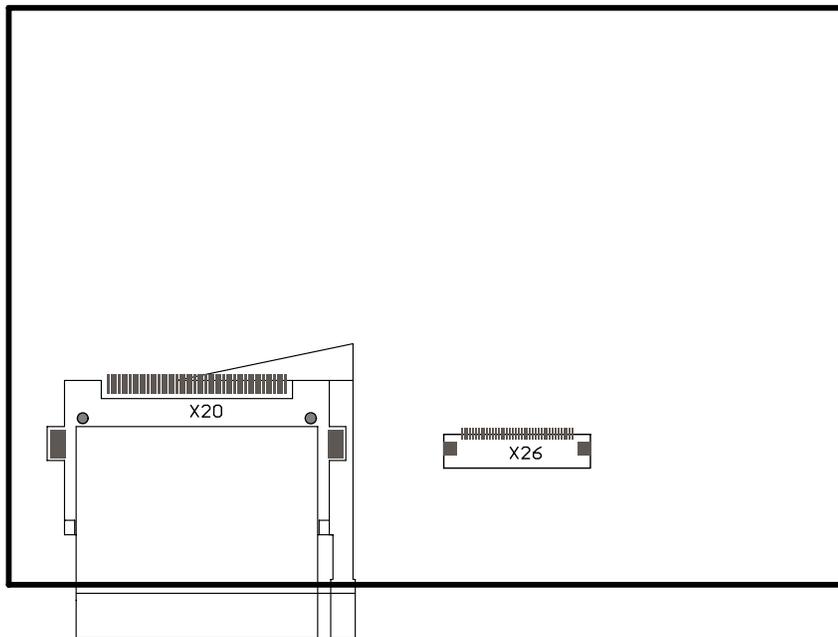
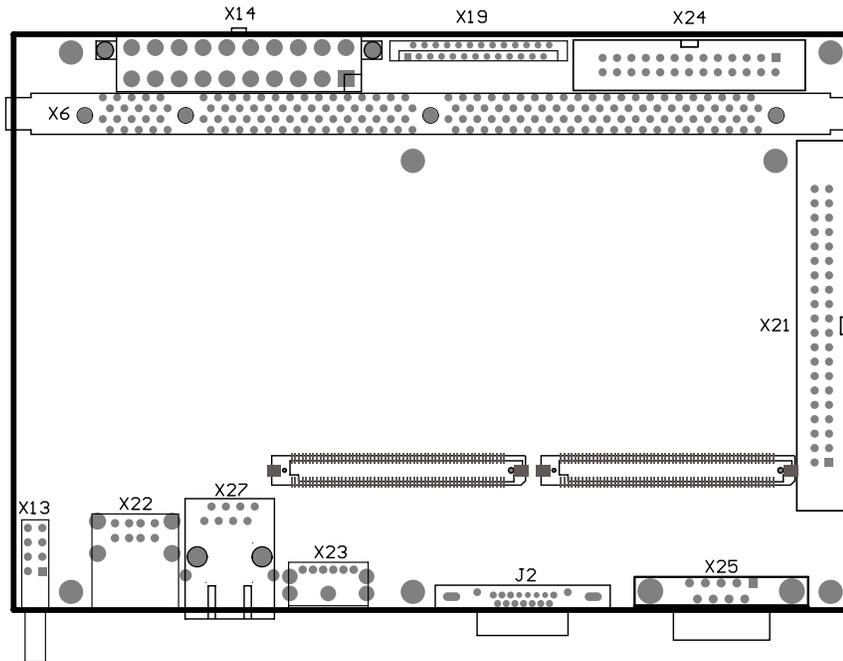
**19. APPENDIX C: BLOCK DIAGRAM**



**20. APPENDIX D: MECHANICAL DIMENSIONS**



# 21. APPENDIX E: CONNECTOR LAYOUT



## 22. APPENDIX F: JIDA STANDARD

Every board with an on-board BIOS extension supports the following function calls, which supply information about the board. JIDA functions are called via Interrupt 15h. Functions include:

- AH=EAh
- AL=function number
- DX=4648h (security word)
- CL=board number (starting with 1)

The interrupt returns a CL≠0 if a board with the number specified in CL does not exist. CL will equal 0 if the board number exists. In this case, the content of DX determines if the operation was successful. DX=6B6Fh indicates success; other values indicate an error.

### 22.1 Obtaining Information about Boards that Use the JIDA Standard

To obtain information about the installed boards that follow the JIDA standard, use the following procedure.

- 1) Call Get BIOS ID with CL=1. The name of the first device installed will be returned. If you see the result Board exists (CL=0), increment CL, and call Get BIOS ID again.
- 2) Repeat until you see Board not present (CL≠0). You now know the names of all boards within your system that follow the JIDA standard.
- 3) You can find out more information about a specific board by calling the appropriate inquiry function with the board's number in CL.

---

**Note:** Association between board and board number may change because of configuration changes. Do not rely on any association between board and board number. Always use the procedure described above to determine the association between board and board number.

---

Refer to the JIDA manual in the jidai110.zip folder for further information on implementing and using JIDA calls with C sample code.

## 23. APPENDIX G: PC ARCHITECTURE INFORMATION

Below is a list of information sources to help you to further understand PC architecture.

### 23.1 Buses

#### 23.1.1 ISA, Standard PS/2 - Connectors

- *AT Bus Design: Eight and Sixteen-Bit ISA, E-ISA and EISA Design*, Edward Solari, Annabooks, 1990, ISBN 0-929392-08-6
- *AT IBM Technical Reference Vol 1&2*, 1985
- *ISA & EISA Theory and Operation*, Edward Solari, Annabooks, 1992, ISBN 0929392159
- *ISA Bus Specifications and Application Notes*, Jan. 30, 1990, Intel
- *ISA System Architecture, Third Edition*, Tom Shanley and Don Anderson, Addison-Wesley Publishing Company, 1995, ISBN 0-201-40996-8
- *Personal Computer Bus Standard P996*, Draft D2.00, Jan. 18, 1990, IEEE Inc
- *Technical Reference Guide, Extended Industry Standard Architecture Expansion Bus*, Compaq 1989

#### 23.1.2 PCI

- PCI SIG  
The PCI-SIG provides a forum for its ~900 member companies, who develop PCI products based on the specifications that are created by the PCI-SIG.
- *PCI & PCI-X Hardware and Software Architecture & Design*, Fifth Edition, Edward Solari and George Willse, Annabooks, 2001, ISBN 0-929392-63-9.
- *PCI System Architecture*, Tom Shanley and Don Anderson, Addison-Wesley, 2000, ISBN 0-201-30974-2.

## 23.2 General PC Architecture

- *Embedded PCs*, Markt&Technik GmbH, ISBN 3-8272-5314-4 (German)
- ePanorama PC Hardware  
ePanorama.net is dedicated to offer information on electronics found on the Web.
- *Hardware Bible*, Winn L. Rosch, SAMS, 1997, 0-672-30954-8
- *Interfacing to the IBM Personal Computer*, Second Edition, Lewis C. Eggebrecht, SAMS, 1990, ISBN 0-672-22722-3
- *The Indispensable PC Hardware Book*, Hans-Peter Messmer, Addison-Wesley, 1994, ISBN 0-201-62424-9
- *The PC Handbook: For Engineers, Programmers, and Other Serious PC Users, Sixth Edition*, John P. Choisser and John O. Foster, Annabooks, 1997, ISBN 0-929392-36-1

## 23.3 Ports

### 23.3.1 RS-232 Serial

- EIA-232-E Interface  
The EIA-232-E standard specifies the interface between (for example) a modem and a computer so that they can exchange data. The computer can then send data to the modem, which then sends the data over a telephone line. The data that the modem receives from the telephone line can then be sent to the computer.
- *RS-232 Made Easy: Connecting Computers, Printers, Terminals, and Modems*, Martin D. Seyer, Prentice Hall, 1991, ISBN 0-13-749854-3
- National Semiconductor  
Interface Data Book includes application notes. Type “232” as a search criteria to obtain a list of application notes.

### 23.3.2 Serial ATA

Serial AT Attachment (ATA) Working Group

This X3T10 standard defines an integrated bus interface between disk drives and host processors. It provides a common point of attachment for systems manufacturers and the system.

We recommend you also search for information on “4.2 I/O cable” if you use hard disks in a DMA3 or PIO4 mode.

### 23.3.3 USB

USB Specification

USB Implementers Forum, Inc. is a non-profit corporation founded by the group of companies that developed the Universal Serial Bus specification. The USB-IF was formed to provide a support organization and forum for the advancement and adoption of Universal Serial Bus technology.

## 23.4 Programming

- *C Programmer's Guide to Serial Communications*, Second Edition, Joe Campbell, SAMS, 1987, ISBN 0-672-22584-0
- *Programmer's Guide to the EGA, VGA, and Super VGA Cards*, Third Edition, Richard Ferraro, Addison-Wesley, 1990, ISBN 0-201-57025-4
- *The Programmer's PC Sourcebook*, Second Edition, Thom Hogan, Microsoft Press, 1991, ISBN 1-55615-321-X
- *Undocumented PC, A Programmer's Guide to I/O, CPUs, and Fixed Memory Areas*, Frank van Gilluwe, Second Edition, Addison-Wesley, 1997, ISBN 0-201-47950-8

**24. APPENDIX H: DOCUMENT-REVISION HISTORY**

<b>Version</b>	<b>Date</b>	<b>Edited by</b>	<b>Changes</b>
1.2	07.01.03	FK	Updates USB information.
1.1	21.11.02	FK	Adds information on operating temperature.
1.0	23.07.02	FK and JL	Initial release.
0.2	15.07.02	JL	Edited and reformatted.
0.1	26.06.02	FK	Created preliminary manual.