



USER MANUAL

FG104™ PC/104-PLUS FRAME GRABBER



2/11/2005

MNL-0506B-01

ABOUT THIS MANUAL

This manual is meant for engineers and programmers who wish to develop systems based on the Parvus FG104 PC/104-Plus Frame Grabber module. It contains the module's technical specifications, and deals with its connections and firmware/software. It also describes how to install, configure and troubleshoot the FG104 module.

NOTICE

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Conventions

The following table lists conventions that are used throughout this guide.

Icon	Notice Type	Description
	Information note	Important features or instructions
	Warning	Information to alert you to potential damage to a program, system or device or potential personal injury

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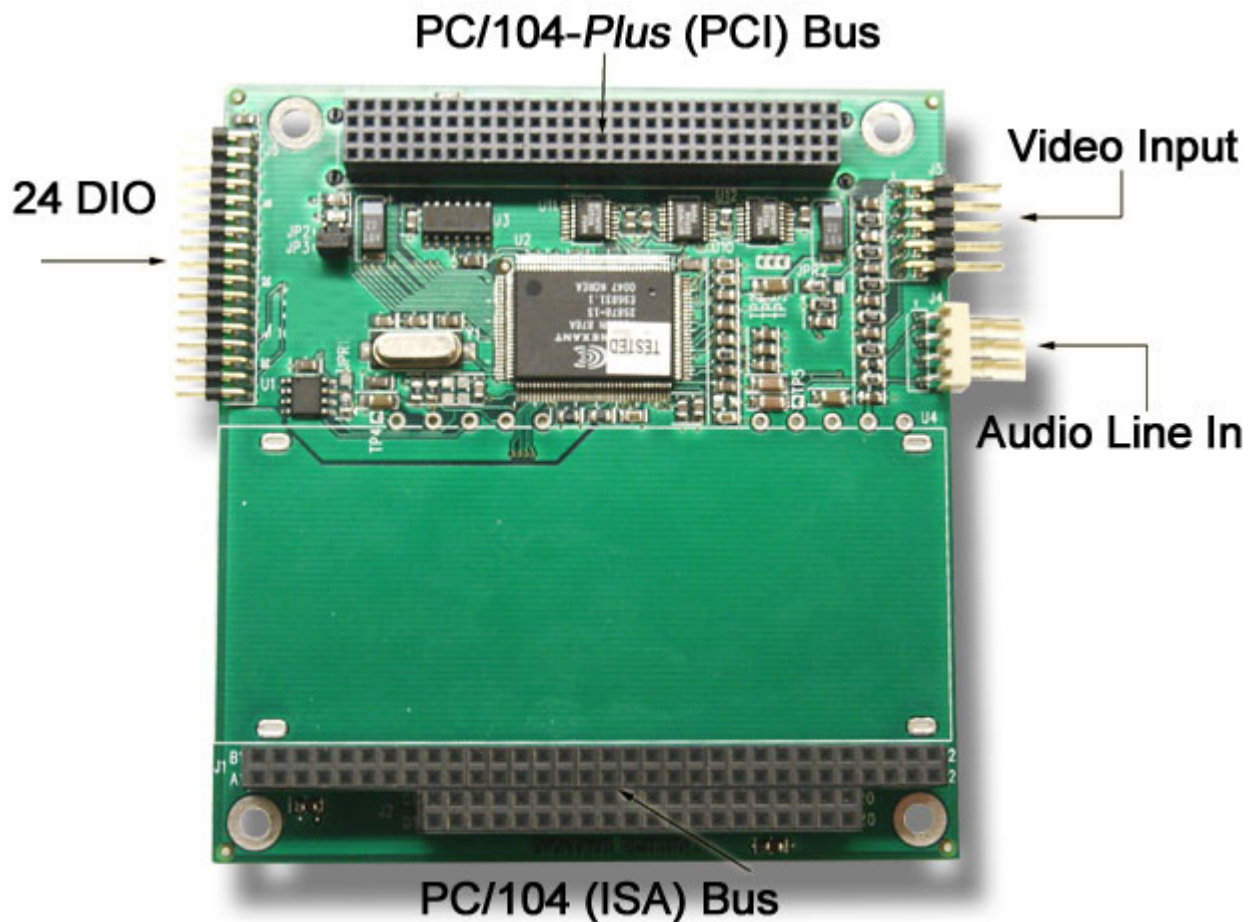
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Chapter 1 Product Overview

The FG104™ is a highly integrated PC/104-Plus Frame Grabber module, based on the Conexant Fusion™ 878A (Bt878A)

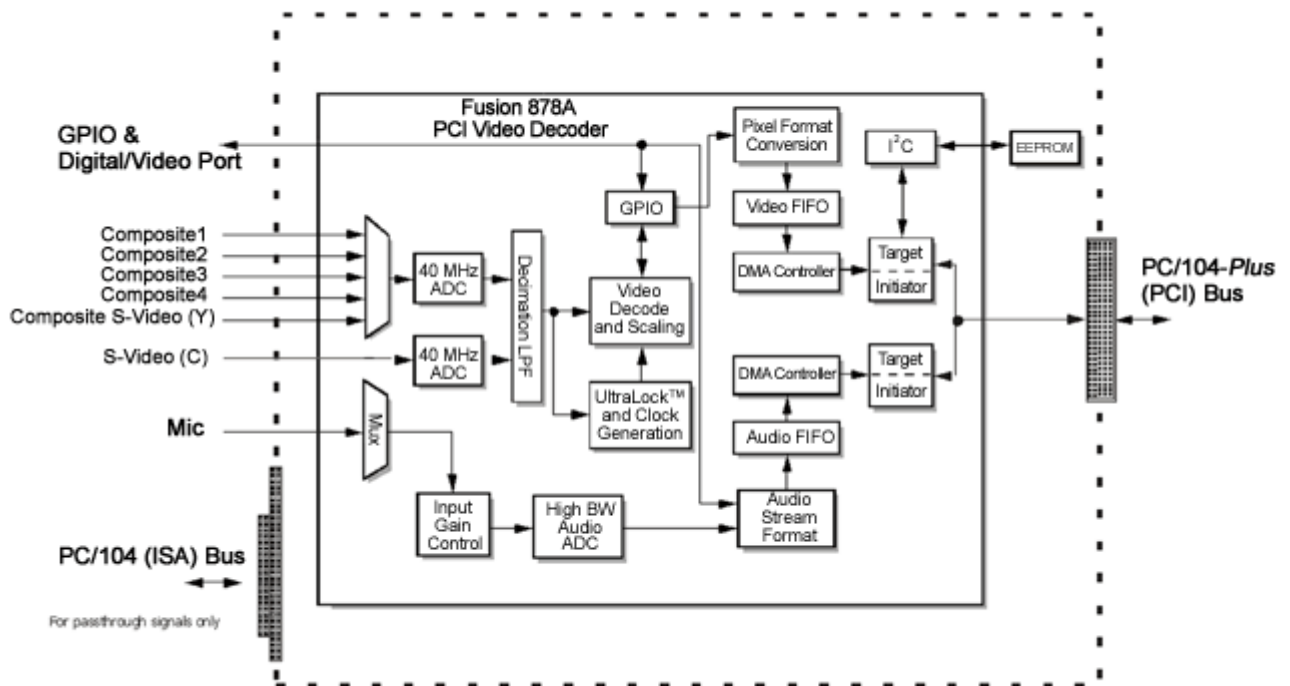
For a complete list of our products please go to our web site: www.parvus.com

In the following paragraphs you will find a brief description of the FG104™ characteristics.



FG104™ Functional Block Diagram

Figure 1. Functional blocks of the FG104™ module



Product Definition

FG104™ PC/104-Plus Module

General

- Frame Grabber module based on the Conexant Fusion 878A PCI video decoder chip.
- PC/104-Plus Form Factor: 3.550" x 3.775" (90 X 96 mm).
- PCI/ISA bus compliant with the PC/104-Plus standard.
- Low power consumption.
- High reliability.

Video

-
- Four (4) PAL/NTSC/SECAM composite video inputs OR Three (3) PAL/NTSC/SECAM composite video and One (1) S-Video video inputs.
 - Interfaces to a Digital TV data stream from a VSB or OFDM demodulator
 - Output Resolutions: 640 x 480, 320 x 240, 720 x 480 (NTSC); 768 x 576, 384 x 288 (PAL/SECAM)
 - Video Input Formats: NTSC-M, PAL-B, PAL-G, PAL-H, SECAM, etc.
 - FIFO Size: 630 bytes
 - Capture Rate: 30 fps (NTSC), 25 fps (PAL/SECAM)
 - Pixel Jitter: Less than 6 ns.
 - Horizontal & Vertical Scaling: Up to 16:1 in X and Y Direction
 - Advanced Chroma and Luma Comb Filters/Scalers (6-tap Luma/2-tap Chroma)
 - Adjustable Image Brightness, Contrast, Saturation and Hue

Audio

- Non-amplified microphone input
- Mono Audio input

GPIO-Digital Video

- Flexible 24-bit wide GPIO
- CCIR656 interface
- Interfaces to a Digital TV data stream from a VSB or OFDM demodulator

Software

- Drivers: Windows® 95/98/2000

Chapter 2 Jumper Description

This chapter shows the jumpers layout and explains how to setup the jumpers.

Jumper Layout and Configuration

Figure below, shows the jumper layout of the FG104™ module.

In the figure below, the jumpers are indicated as **JP** followed by the jumper's number. The figure presents the jumpers' default configuration.

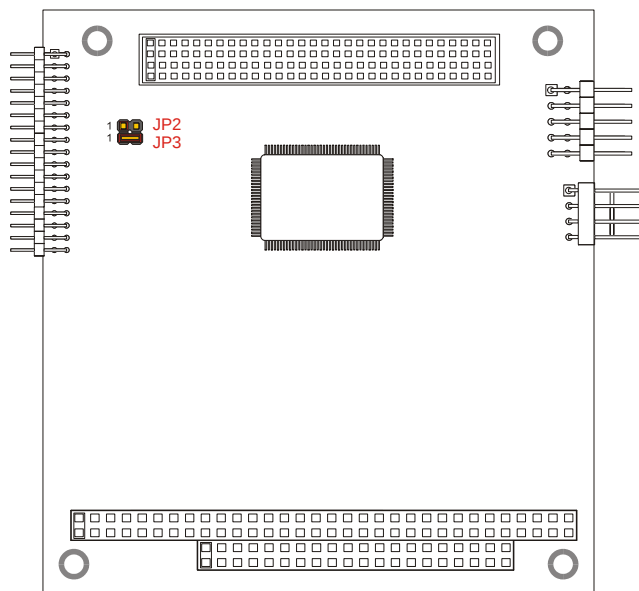


Figure 2. Jumpers located on the FG104™ module

Two 2-pin jumpers are located on the module, and can be set as follows:

- Pin 1 connected to pin 2 (which will be indicated as 'Closed')
- Pin 1 and pin 2 not connected (which will be indicated as 'Open')

The following table provides a quick cross-reference for them (default configuration is indicated by an asterisk: "*").

Table 1. Jumpers Configuration

Jumper	Type	Function			Default
JP2 JP3	2 pin Jumpers	JP3	JP2	PCI selection slot:	
		Closed	Closed	Slot 0	
		Open	Closed	Slot 1	
		Closed	Open	Slot 2	*
		Open	Open	Slot 3	

Chapter 3 Connectors Description

This chapter provides a brief description of the FG104™ module's connectors, with their positions and functions.

Connectors Layout

In the following figure are shown the connectors with their layout and function/s.

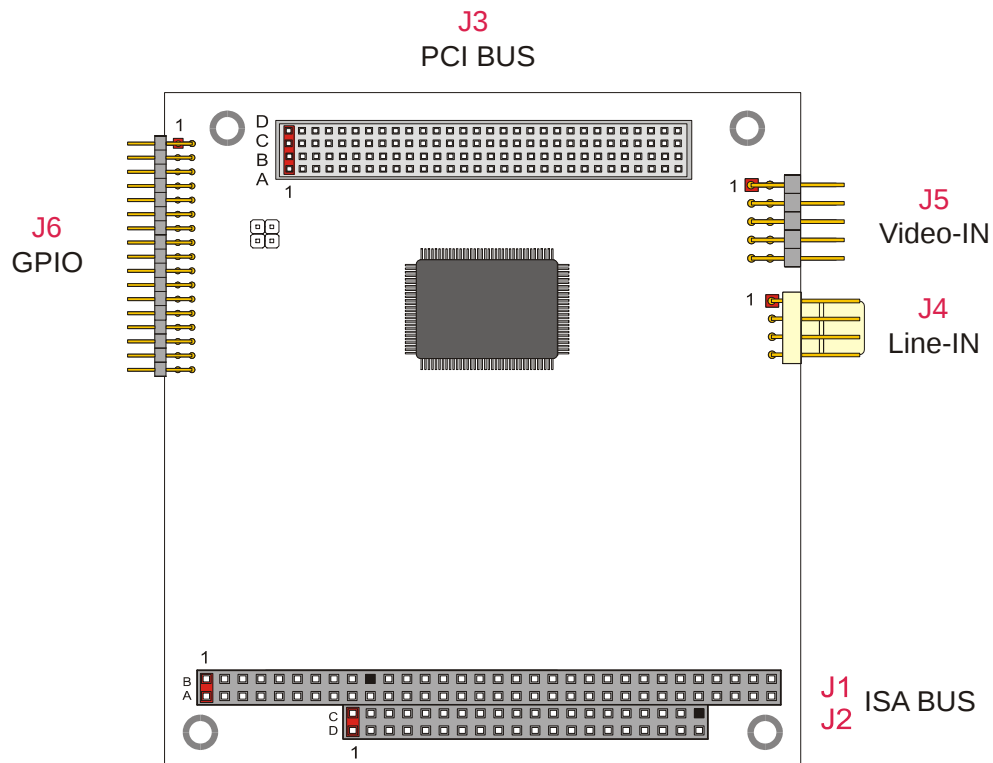


Figure 3. Connectors layout



Note: in the previous figure, a red square pad indicates pin 1 of each connector.

Table below lists the name of the connectors with their function and the reference page.

Table 2. Connector Functions

Connector	Function	Page
J1-J2	ISA BUS	15
J3	PCI BUS	15
J4	Line-IN	17
J5	Video-IN	17
J6	GPIO	18

J1, J2 for the ISA Bus and J3 for the PCI Bus

The ISA BUS

Connectors J1 and J2 carry the signals for the ISA Bus.
Below is shown a picture of the ISA BUS

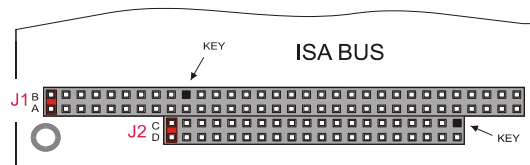


Figure 4. ISA BUS layout

According to PC/104 specifications, KEY are filled holes in the upper side and missing pins in the lower side of the bus. This is made to avoid the wrong insertion in/of another module.

The PCI BUS

Connector J3 carries signals of the PCI Bus. The PCI Bus mechanical interface is a stackable 30x4 header. This interface carries all of the required PCI signals per *PCI Local Bus Specification Version. 2.1*.

Below is shown a picture of the PCI BUS

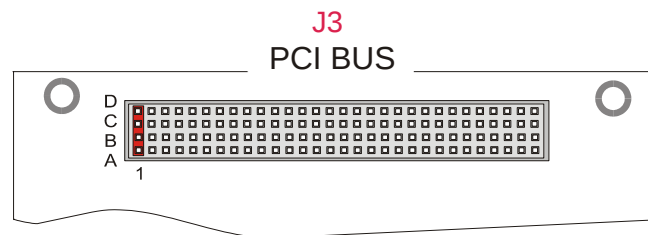


Figure 5. PCI BUS layout



For further info about ISA bus and PCI bus please refer to PC/104 Consortium Website (www.pc104.org).

How to connect the module to other PC/104 & PC/104-Plus devices: the stack assembly

The ISA Bus connectors of the module are designed to allow the connection onto a stack of other PC/104 and/or PC/104-Plus devices. We recommend you to follow the procedure below ensuring that stacking of the modules does not damage connectors or electronics parts.

1. Turn off power to the PC/104-Plus system or stack.
2. Select and install standoffs to properly position the module on the PC/104-Plus stack.
3. Touch a grounded metal part of the rack to discharge any build-up of static electricity.
4. Remove the module from its anti-static bag.
5. Check that keying pins in the bus connector are properly positioned.
6. Check the stacking order; make sure an XT bus card will not be placed between two AT bus cards or it will interrupt the bus's signals.
7. Hold the module by its edges and orient it so that the bus connector pins line up with the matching connector on the stack.
8. Press evenly the module onto the PC/104-Plus stack.

The picture below shows a typical module stack with 2 PC/104-Plus modules, 1 PC/104 16-BIT module, and 1 PC/104 8-BIT module.

The maximum configuration for the PCI bus of PC/104-Plus modules is 4 plus the Host Board. If standard PC/104 modules are used in the stack, they must be the top module(s) because they will normally not include the PCI bus.

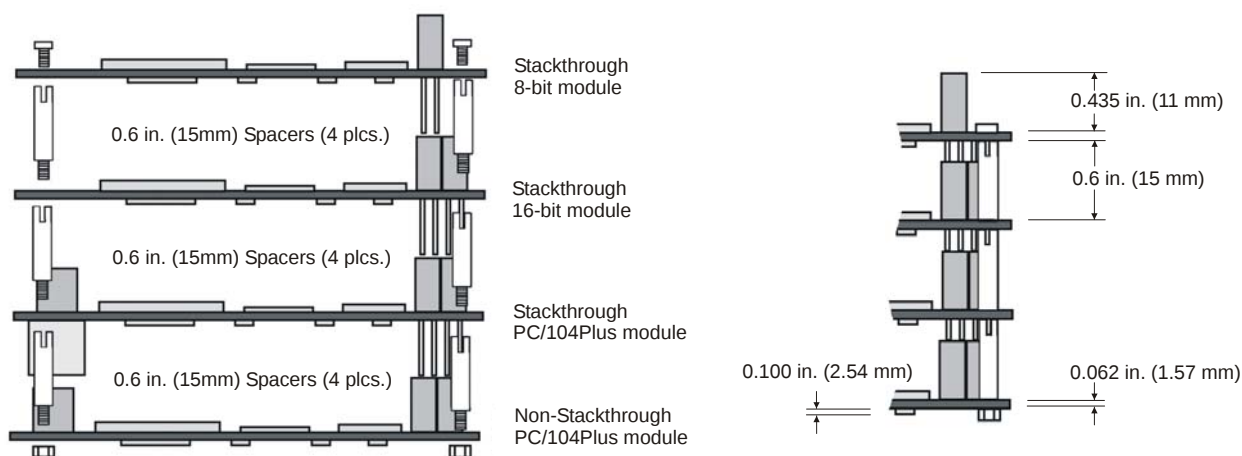


Figure 6. The Module Stack



Do not force the module onto the stack! Wiggling the module or applying too much pressure may damage it. If the module does not readily press into place, remove it, check for bent pins or out-of-place keying pins, and try again.

J4 Connector Line-IN

J4 is a 4 pin with 1.25-mm step connector, and implements the Line IN function

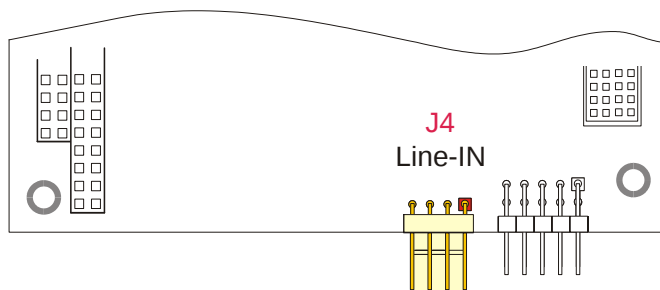


Figure 7. J4 Connector Layout

The table below shows the J4 connector pin out.

Table 3. J4 Connector pin out

PIN	Function
1,4	Audio IN (Mono)
2,3	GND

J5 Connector for Video IN

J5 is a double row 5 x 2 pin with 2.54-mm step connector that implements the Video-IN function:

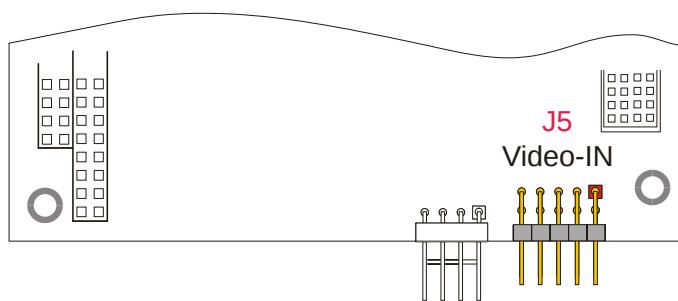


Figure 8. J5 Connector Layout

Below is shown the connector pin out.

Table 4. J5 Connector pin out

PIN	Function
1	Chrominance
3	Composite signal Input CH0
5	Composite signal Input CH1
7	Composite signal Input CH2
9	Composite signal Input CH3
2,4,6,8,10	GND

J6 Connector for General Purpose I/O

J6 is a double row 2x17 pin with 2-mm step connector, and implements the following functions:

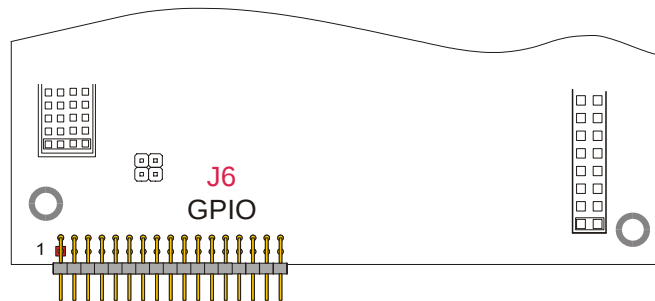


Figure 9. J6 Connector layout

PIN	Function	PIN	Function
1	GPIO0	2	VDD
3	GPIO1	4	GPCLK
5	GPIO2	6	GND
7	GPIO3	8	GPIO17
9	GPIO4	10	GND
11	GPIO5	12	GPIO18
13	GPIO6	14	GND
15	GPIO7	16	GPIO19
17	GPIO8	18	GND
19	GPIO9	20	GPIO20
21	GPIO10	22	GND
23	GPIO11	24	GPIO21
25	GPIO12	26	GND
27	GPIO13	28	GPIO22
29	GPIO14	30	GND
31	GPIO15	32	GPIO23
33	GPIO16	34	GND



Please refer to the Conexant Fusion 878A datasheet at <http://www.conexant.com/products/entry.jsp?id=272> if you intend to use the General Purpose I/O and need further info.

Chapter 4 Troubleshooting

Many problems that you may encounter with your FG104™ module are due to common errors like bad (cable) connections or wrong settings in the Setup Program. Please also refer to the Fusion 878A chip datasheet at <http://www.conexant.com/products/entry.jsp?id=272> for further technical and specification information.

Common Problems and Solutions

The following table lists some of the common problems that you may encounter using your FG104™ module, and suggests possible solutions. If you have problems with your FG104™ module, please review this table *before* contacting technical support.

Table 5. Common problems and solutions

FG104™ Module doesn't work	
No power or wrong polarity	Check for correct power on PC/104-Plus bus connectors
Defective or misconnected device on bus	Check for misaligned bus connectors, remove other cards from stack
Cable connected backwards	Verify all cables are connected properly

Troubleshooting a PC/104-Plus System

If you have reviewed the preceding table and still cannot isolate the problem with your FG104™ module, please try the following troubleshooting steps. Even if the resulting information does not help you find the problem, it will be very helpful if you contact technical support.

- **Simplify the system.** Remove items one at a time and see if one particular item seems to cause the problem.
- **Swap components.** Try replacing items in the system one-at-a-time with similar items.

Technical/Sales Assistance

If you have a technical question, please contact Parvus Technical Support:

- Email: tsupport@parvus.com

-
- Phone: 801-483-1533
 - Fax: 801-483-1523

Additional information is available at the Parvus website, located at:

www.parvus.com

Returning For Service

Before returning any of Parvus' products, you must call Parvus at 801-483-1533 to obtain a Returned Material Authorization (**RMA**) number. The Module will be returned to you with the RMA number for enclosure with the returned products.



Note. You must have the RMA number in order to return any product for any reason!

The following information is needed to expedite the shipment of a replacement to you:

- Your company name and address for invoice
- Shipping address and phone number
- Product I.D. number
- The name of a technically qualified individual at your company familiar with the mode of failure on the board
- A detailed description of the problem and of the current configuration including OS and software loaded.

If the unit is out of warranty, service is available at a pre-designated service charge. Contact Parvus for pricing and please supply a purchase order number for invoicing the repair. Pack the board in an anti-static material and ship it in a sturdy cardboard box with enough packing material to adequately cushion it.



Warning! Any product returned to Parvus improperly packed will immediately void the warranty for that particular product!

Appendix

A.1 Electrical and Environmental Specifications

The following section provides tables and illustrations showing the electrical, mechanical and environmental specifications for the FG104™ module.

In the following tables you will find:

- Operating Characteristics
 - Electrical operating characteristics
 - Operating temperature Range
- Absolute maximum ratings
- MTBF

Operating Characteristics

Electrical Operating Characteristics

Table 6. DC Operating Characteristics

Name	Description	Minimum	Typical	Maximum	Unit
Vdd	Board Voltage	4.75	5.00	5.25	V
Idd	Board Current	-	250	350	mA

Operating Temperature Range

For proper operation of the module, the ambient air temperature must remain inside this range: 0°C to +60°C (+32°F to +140°F).



Note. This module is not warranted against damage caused by overheating due to improper or insufficient cooling or airflow.

Absolute Maximum Ratings

Table 7. Absolute Maximum Ratings

Supply Voltage:	V _{CC} : 0.00 to 7.00V
Storage Temperature Range:	-40°C to +85°C (-40°F to +185°F)
Non-Condensing Relative Humidity:	<95% at 40°C (+104°F)
Operating Temperature Range:	0°C to +60°C (+32°F to +140°F)

The FG104™ module with extended Operating Temperature Range, -40°C to +80°C (-40°F to 176°F), version is also available.



Warning! Stressing the device beyond the “Absolute Maximum Ratings” may cause permanent damage. These are stress ratings only. Operation beyond the “Operating Conditions” is not recommended. Extended exposure beyond the “Operating Conditions” may affect device reliability.

MTBF

Hours: 728,964

Standard: MIL-STD-217 Ground Benign

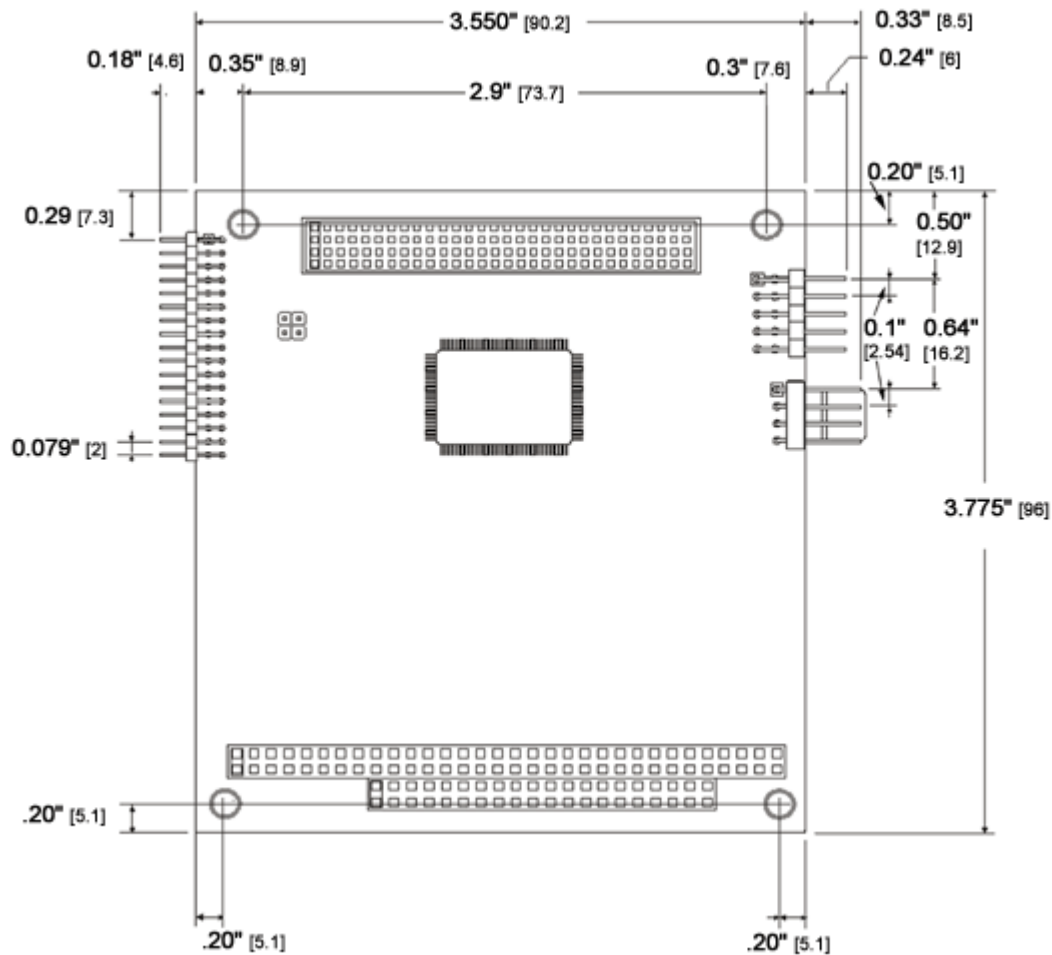
Temperature: 25.0 °C

A.2 Mechanical Dimensions

Module Dimensions

The FG104™ module's mechanical dimensions are shown in the following picture:

- Dimensions: 3.550" x 3.775" (90 X 96 mm)



Dimensions are in inches and [millimeters]

Figure 10. FG104™ Board dimensions



Note: For further information about the mechanical dimensions of ISA and PCI buses please refer to the pc104 consortium site (www.pc104.org)

A.3 Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Parvus assumes no liability for the customer's failure to comply with these requirements. The safety precautions listed below represent warnings of certain dangers of which Parvus is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. The equipment is supplied with a three-conductor ac power cable; the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electro technical Commission QEC) safety standards.

Do Not Operate in an Explosive Atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Keep Away From Live Circuits

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

Do Not Substitute Parts or Modify Equipment

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the equipment. Contact Parvus technical staff or your local representative for service and repair to ensure that safety features are maintained.

Observe Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions, which you deem necessary for the operation of the equipment in your operating environment.

Flammability

All Parvus PCBs (printed circuit boards) are manufactured by UL-recognized manufacturers, with a flammability rating of UL-V0.

EMI Caution

This equipment generates, uses and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used in a cabinet with adequate EMI protection.

Disclaimer of Warranty

THIS MANUAL IS PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The laws of some states and countries do not allow the disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you. As such, the above warranty disclaimer shall only apply to the extent permitted by law.

Notice

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Reliability

Parvus has taken extra care of product design in order to ensure reliability. The two major ways in which reliability is achieved are:

- The product is designed in top-down fashion, utilizing the latest in hardware and software techniques, so unwanted side effects and unclear interactions between parts of the system are eliminated.
- Parvus tests each board by exercising its functions, burns it in under power, and retests it to ensure that the infant mortality phase is passed before the product is shipped.

Life Support Policy

Parvus products are not authorized for use as critical components in life support devices or systems without the express written approval of the president of Parvus.

Acronyms and Abbreviations

APM	Advanced Power Management	MB	Megabyte
ATA	AT Attachment	Mbps	Megabits per second
ATAPI	ATA Packet Interface	MHZ	Megahertz
BIOS	Basic I/O System	NIDS	Network Driver Interface Specification
DMA	Direct Memory Access	NTSC	National Television System Committee
ECC	Error Correction Code	OEM	Original Equipment Manufacturer
ECP	Enhanced Capabilities Port	PAL	Phase Alternation Line
FDC	Floppy Disk Drive Controller	PCI	Peripheral Component Interconnect
FDD	Floppy Disk Drive	PCMCIA	Personal Computer Memory Card International Association
HDC	Hard Disk Drive controller	PIC	Programmable Interrupt Controller
HDD	Hard Disk Drive	PIO	Programmed I/O
IDE	Integrated Device Electronics	POST	Power-On Self Test
IEEE	Institute for Electrical and Electronics Engineers, Inc.	RAM	Random Access Memory
I/O	Input/Output	RAMDAC	RAM digital-to-analog converter
IP	Internet Protocol	SCSI	Small Computer System Interface
IRQ	Interrupt Request	SMBus	System Management Bus
ISA	Industry Standard Architecture	TCP/IP	Transmission Control Protocol/Internet Protocol
KB	Kilobyte	USB	Universal Serial Bus
Kbps	Kilobits per Second	V	Volts
KHz	Kilohertz	WAN	Wide Area Network
LAN	Local Area Network		
LBA	Logical Block Addressing		
LCD	Liquid Crystal Display		
LPT	Line Printer		
LVD	Low Voltage Differential		

For more information about this or other products in the Parvus line of embedded systems development tools and control systems call (801) 483-1533 from 8:00AM to 5:00PM Mountain Time, E-mail us at parvus@parvus.com or visit our web-site at: <http://www.parvus.com>

LIMITED WARRANTY

Parvus Corporation warrants this product to be free of defects in materials and workmanship, and that the product meets or exceeds the current specifications published by Parvus. This Warranty is valid for a period of one (1) year from the date of purchase. Parvus reserves the right to repair or replace any Warranted products at its sole discretion. Any product returned to Parvus for repair or replacement under the provisions of this warranty must be accompanied by a valid Return Material Authorization (RMA) number issued by the Parvus Customer Service Department.

Parvus Corporation makes no warranty not expressly set forth in this document. Parvus disclaims and excludes all implied warranties of merchantability and fitness for a particular purpose. The aggregate liability of Parvus arising from or relating to (regardless of the form of action or claim) is limited to the total of all payments made to purchase the product. Parvus shall not in any case be liable for any special, incidental, consequential, indirect or punitive damages, even if Parvus has been advised of the possibility of such damages. Parvus is not responsible for lost profits or revenue, loss of the use of software, loss of data, costs of recreating lost data, or the cost of any substitute equipment or program.

This Warranty shall be governed by the laws of the United States of America and the State of Utah, and any claim brought under this Warranty may only be brought in state or federal court located in Salt Lake County, State of Utah, and purchaser hereby consents to personal jurisdiction in such courts.

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

Warning: The equipment described herein has been designed to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (computer input/output devices, terminals, printers, etc.) designed to comply with the Class B limits may be attached to this computer.

INSTRUCTIONS TO USER: This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the operating instructions, reference manuals, and the service manual, may cause interference to radio or TV reception. It has been designed to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

For further information contact:

Parvus® Corporation
3222 S. Washington St.
Salt Lake City, Utah, USA 84115
(801) 483-1533, FAX (801) 483-1523
Web-site: <http://www.parvus.com>
Email: parvus@parvus.com