

JFLEX-Communication1

User's Guide

Document Revision 1.0

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1. USER INFORMATION

1.1 About This Manual

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- Intel is a registered trademark of Intel Corp.
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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 JFLEX-Communication1

The JFLEX-Communication1 increases I/O options on a 3.5" JRex SBC to a total of 3xLAN, 4xUSB, and FireWire. The add-on board enables the following: LAN communication, USB I/O extended, or FireWire multimedia applications. The JFLEX-Communication1 mounts on top of a JRex without using cables.

The JFLEX-Communication1 is part of a family of I/O extensions for Kontron's JRex family.

The JFLEX-Communication1 offers the following features:

- Two Davicom 9102A PCI single Ethernet chips
  - 10BASE-T/100BASE-T LAN
  - Fast Ethernet network interface (NIC) controller
- One VIA VT6306 FireWire (IEEE 1394A) OHCI host controller with integrated three-port 400 MBIT PHY
- Two additional USB ports (unavailable with the JRex-GX1)

2.2 JRex Concept

JRex is a 3.5" SBC family from Kontron Embedded Modules (formerly JUMPtec®). JRex interfaces for connectivity and expansion always are in the same position on the front side of a unit and include reset, ATX feature, 2xUSB, LAN, keyboard/mouse socket, Compact Flash™, VGA, and COM1.

JFLEX is an add-on I/O extension module that you can firmly place on top of every JRex without affecting the JRex 3.5" SBC footprint. Because they are mostly cable free, the JFLEX modules enable low-cost products while minimizing manual errors. The stackable JFLEX concept allows low cost, customizable I/O extensions.

3. SPECIFICATIONS

3.1 *Functional Specifications*

- **USB**
  - 2 x USB 1.1 ports (OHCI) (unavailable with the JRex-GX1)
- **Ethernet**
  - 2 x 10/100 Base-T twisted pair Davicom controller
- **FireWire**
  - VIA VT6306 controller (IEEE 1394)

3.2 *Mechanical Specifications*

- **82.55mm x 80.2mm (3.25" x 3.16")**

3.3 *Electrical Specifications*

3.3.1. Supply Voltage

- **5V DC +/- 5%**
- **3.3V DC =/- 5%**
- **12V DC +/- 5% (for nonpowered IEEE 1394 devices)**

3.3.2. Supply Voltage Ripple

- **100 mV peak to peak 0 - 20 MHz**

3.3.3. Supply Current

- **@5V (max. 50mA)**
- **@3.3V (max 350mA)**

3.4 *Environmental Specifications*

3.4.1. Temperature

- **Operating: 0 to +60 C (*) (with appropriate airflow)**
- **Non-operating: -10 to +85 °C (noncondensing)**

Note:
The maximum operating temperature is the maximum measurable temperature on any spot on the module's surface. You must maintain the temperature according to the above specification.

3.4.2. Humidity

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

4. ETHERNET INTERFACE

4.1 *Ethernet Controller*

The JFLEX-Communication1 Ethernet interface uses two Davicom DM9102A PCI Fast Ethernet controllers. The network controllers support a 10/100Base-T interface. The device auto-negotiates the use of a 10Mbit/sec or 100Mbit/sec connection.

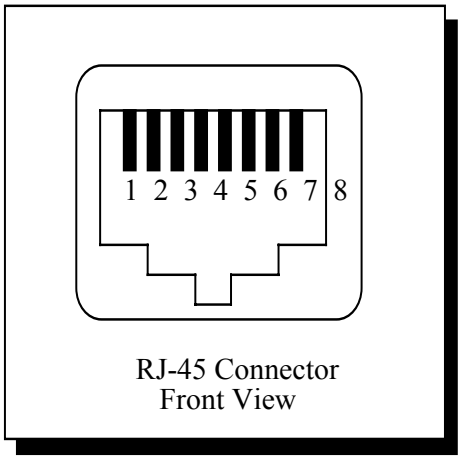
All major network-operating systems and several real-time and embedded operating systems support the interface.

The DM9102A provides:

- Integrated Fast Ethernet MAC, Physical Layer, and transceiver in one chip 74612 memory mapper
- Compliance with PCI Specification 2.2
- PCI bus master architecture
- EEPROM 93C46 interface supports node-ID and 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
- Loopback mode for easy system diagnostics

4.2 Connector

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



RJ-45 Connector
Front View

4.2.1. RJ45 Pinout

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

Notes:

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

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

4.3 *Ethernet Technical Support*

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

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

5. FIREWIRE INTERFACE

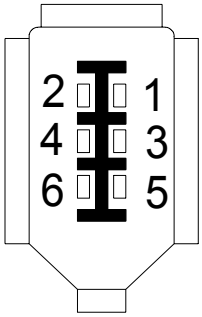
The JFLEX-Communication1 FireWire (IEEE 1394) interface uses a VIA VT6306 PCI Host controller. This is a 1394A OHCI host controller with an integrated, three-port, 400-megabit PHY.

The VT6306 provides:

- 32-bit CRC generator and checker to receive and transmit data
- On-chip isochronous receive and transmit FIFOs for packets
- Eight isochronous transmit / receive contexts
- Two-deep physical response queue
- Three-deep physical post-write queue
- Dual buffer mode enhancements
- Skip processing enhancements
- Block read request handling
- ACK tardy processing
- Complies with 1394 Open HCI Specifications v1.0 and v1.1
- Descriptor-based isochronous and asynchronous DMA channels for receive / transmit packets
- PCI specification v2.2 compliant
- Supports I2C EEPROM and 4-Wire Serial ROM with GUID PROM Shadow to EEPROM

5.1 Connector

The JFLEX-Communication1 uses a six-pin IEEE1394 female connector.



5.2 Pinout

Pin	Signal	Function	In/Out
1	Power	12V DC	Output
2	Ground	Ground return for power and inner cable shield	
3	TPB-	Twisted-pair B, differential signals	Differential Output
4	TPB+	Twisted-pair B, differential signals	Differential Output
5	TPA-	Twisted-pair A, differential signals	Differential Output
6	TPA+	Twisted-pair A, differential signals	Differential Output

5.3 Power

If the FireWire (IEEE 1394) device is not self-powered, Kontron recommends using a power connector for additional power. Incorrect power to the FireWire can damage the JFLEX-Communication1 module or the JRex board.

5.4 Connector

Pin	Function
1	+5V DC **(*)**
2	GND
3	GND
4	+12V DC **(*)**

Note: (*) 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.

5.5 FireWire Technical Support

For technical support, contact either Kontron or visit the VIA Web site.

6. USB INTERFACE

6.1 *USB*

The JFLEX-Communication1 comes with two USB ports, which you can expand by adding external hubs. You can connect up to 127 USB peripherals per port.

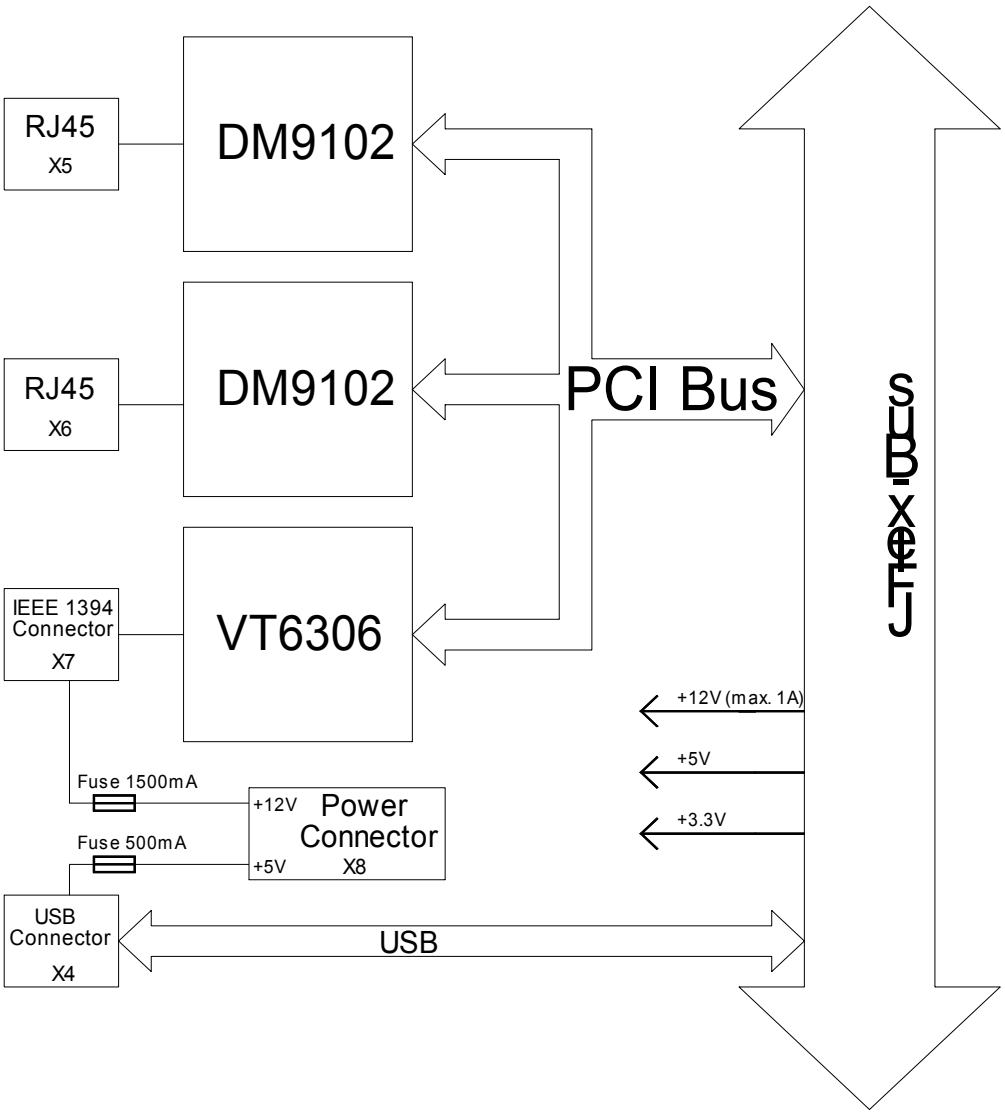
Note: This feature is not available on the JRex-GX1.

6.2 *Connector*

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

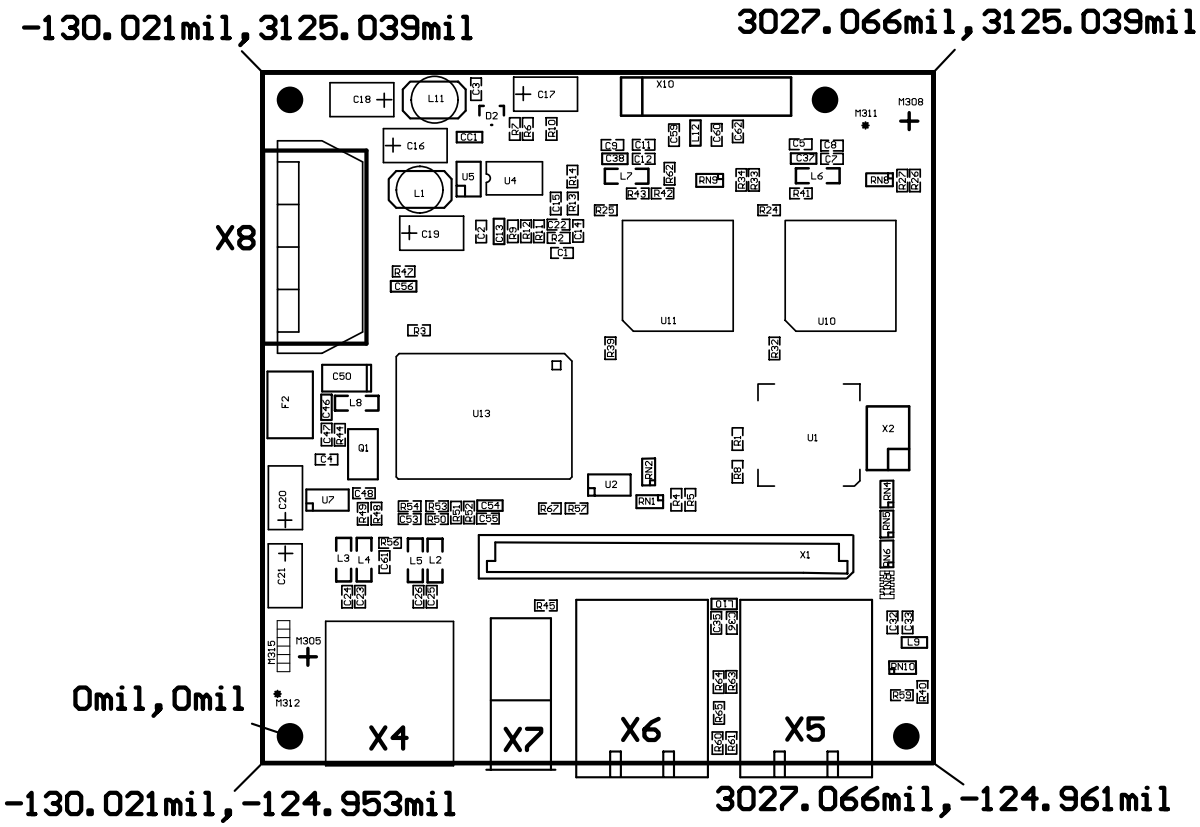
Note: The current of the power line is internally limited to 500mA.

7. APPENDIX A: BLOCK DIAGRAM



8. APPENDIX B: MECHANICAL DIMENSIONS

The following illustration shows the mechanical dimensions and layout of the connectors for the JFLEX Communication1 module.



9. APPENDIX C: PC ARCHITECTURE INFORMATION

9.1 *Buses and USB Information*

9.1.1. PCI

- **PCI SIG**
  The PCI-SIG provides a forum for 900 companies that develop PCI products based on specifications 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.

9.1.2. USB

USB Specification
USB Implementers Forum, Inc. is a non-profit corporation founded by companies that developed the Universal Serial Bus (USB) specification. The USB-IF provides a support organization and forum to advance and adopt USB technology.

10. APPENDIX D: DOCUMENT REVISION HISTORY

Version	Date	Edited by	Changes
JFX1M010.DOC	16.07.03	KFR and JL	Created