

» User Guide «

CP-RIO6-001
CP-RIO6-001-DD-216
CP-RIO6-001-HD
CP-RIO6-001-HD-216

6U CompactPCI Rear Transition Modules

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Kontron Europe GmbH may be contacted via the following:

MAILING ADDRESS

Kontron Europe GmbH
Sudetenstraße 7
D - 87600 Kaufbeuren Germany

TELEPHONE AND E-MAIL

+49 (0) 800-SALESKONTRON
sales@kontron.com

For further information about other Kontron products, please visit our Internet web site: www.kontron.com.

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Explanation of Symbols



Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.



Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.



Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



Note ...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.



For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions



Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.



Caution, Electric Shock!

Before installing a not hot-swappable Kontron product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks.

Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.

Special Handling and Unpacking Instructions



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.



General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.



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Kontron grants the original purchaser of Kontron's products a ***TWO YEAR LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

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Chapter

1

Introduction



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1. Introduction

1.1 Board Overview

The CP-RIO6-001, the CP-RIO6-001-DD-216, the CP-RIO6-001-HD, and the CP-RIO6-001-HD-216 are 6U CompactPCI rear transition modules designed for use with Kontron 6U CompactPCI CPU boards and provide comprehensive rear I/O functionality for peripherals. In order to use these modules, a special 6U CompactPCI backplane with rear I/O support as well as a compatible and correctly configured CPU board are required.

All four modules provide various data and communication interfaces as well as support for one optional USB 2.0 NAND Flash module and one external SATA device. In addition, the CP-RIO6-001-HD and the CP-RIO6-001-HD-216 provide support for one onboard 2.5" SATA HDD/SSD.

The CP-RIO6-001 comes with three USB 2.0 ports, two Gigabit Ethernet ports with LED signals, two digital video ports, one onboard SATA port, two onboard COM ports and two onboard fan connectors.

The CP-RIO6-001-DD-216 comes with three USB 2.0 ports, two digital video ports, one onboard SATA port, two onboard COM ports and two onboard fan connectors. On the front panel, the CP-RIO6-001-DD-216 is populated with a dual Ethernet connector. However, this connector has no functionality and has protective caps installed. The CP-RIO6-001-DD-216 is intended for use in a PICMG 2.16 backplane.

The CP-RIO6-001-HD comes with three USB 2.0 ports, two Gigabit Ethernet ports with LED signals, one digital video port, two onboard SATA ports, two onboard COM ports and two onboard fan connectors.

The CP-RIO6-001-HD-216 comes with three USB 2.0 ports, one digital video port, two onboard SATA ports, two onboard COM ports and two onboard fan connectors. On the front panel, the CP-RIO6-001-HD-216 is populated with a dual Ethernet connector. However, this connector has no functionality and has protective caps installed. The CP-RIO6-001-HD-216 is intended for use in a PICMG 2.16 backplane.

All modules provide three CompactPCI connectors for connection to the backplane.



1.2 CP-RIO6-001/-DD-216/-HD/-HD-216 Feature Comparison

The following table provides a feature comparison of the CP-RIO6-001/-DD-216/-HD/-HD-216 modules.

Table 1-1: CP-RIO6-001/-DD-216/-HD/-HD-216 Feature Comparison

PORT		CP-RIO6-001	CP-RIO6-001- DD-216	CP-RIO6-001- HD	CP-RIO6-001- HD-216
Front Panel Ports	Digital video port	2	2	1	1
	Gigabit Ethernet	2	-- *	2	-- *
	USB 2.0	2	2	2	2
Onboard Ports	COM	2	2	2	2
	USB 2.0 NAND Flash	1	1	1	1
	SATA port for an external SATA device	1	1	1	1
	SATA port for an onboard HDD/SSD	--	--	1	1
	FAN	2	2	2	2

* The CP-RIO6-001-DD-216 and CP-RIO6-001-HD-216 are populated with an Ethernet connector, J8A/B, but the Ethernet interface is isolated on the CompactPCI connector rJ3. Flat dummy plugs are fitted to these connectors as protective caps to prevent their unintentional use.

1.3 Board Diagrams

The following diagrams provide additional information concerning the boards' functionality and component layout.





1.3.1 Functional Block Diagrams

Figure 1-1: CP-RIO6-001/CP-RIO6-001-DD-216 Functional Block Diagram

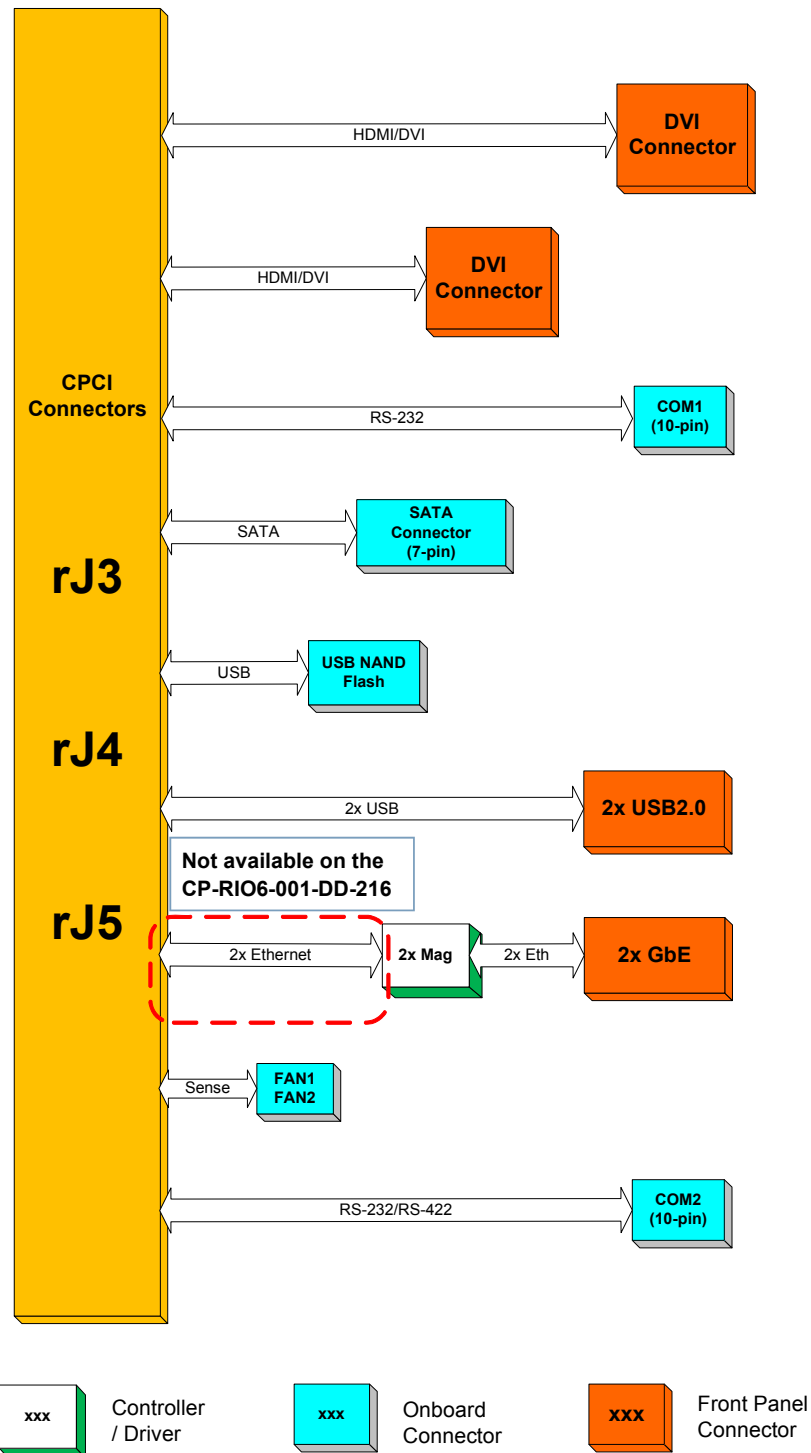
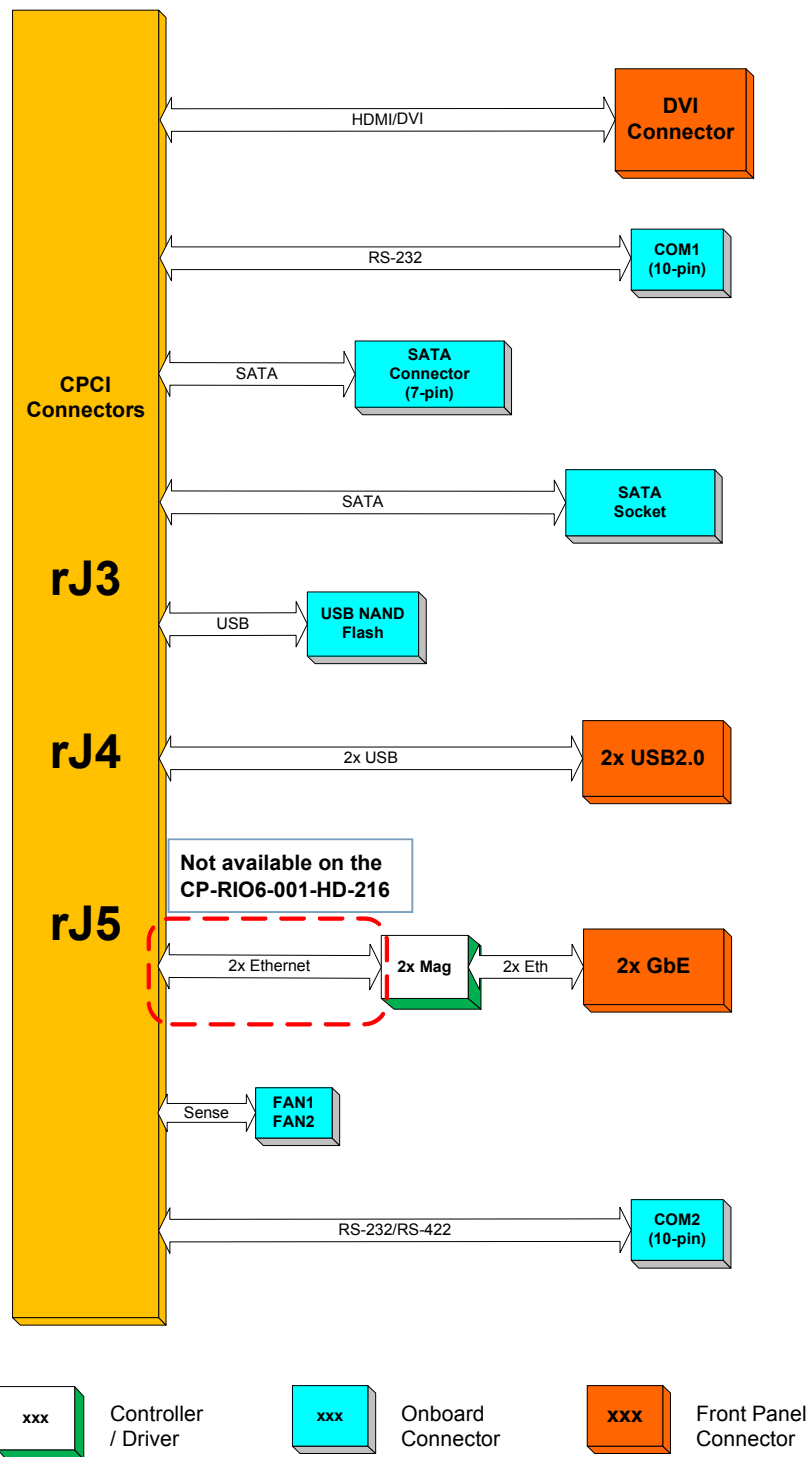


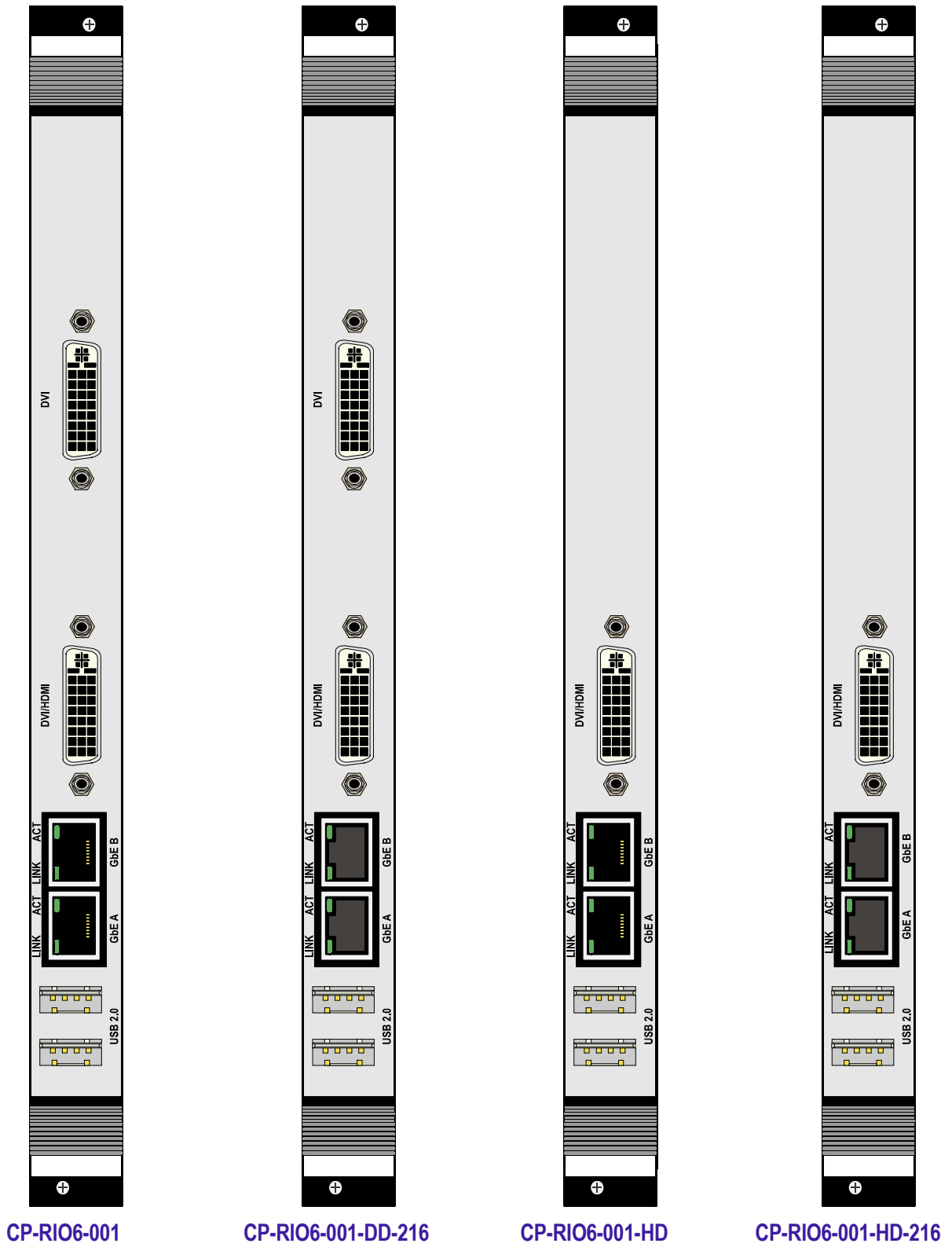


Figure 1-2: CP-RIO6-001-HD/CP-RIO6-001-HD-216 Functional Block Diagram



1.3.2 Front Panels

Figure 1-3: CP-RIO6-001/-DD-216/-HD/-HD-216 Front Panels





1.3.3 Board Layout

Figure 1-4: CP-RIO6-001/CP-RIO6-001-DD-216 Board Layout – Front View

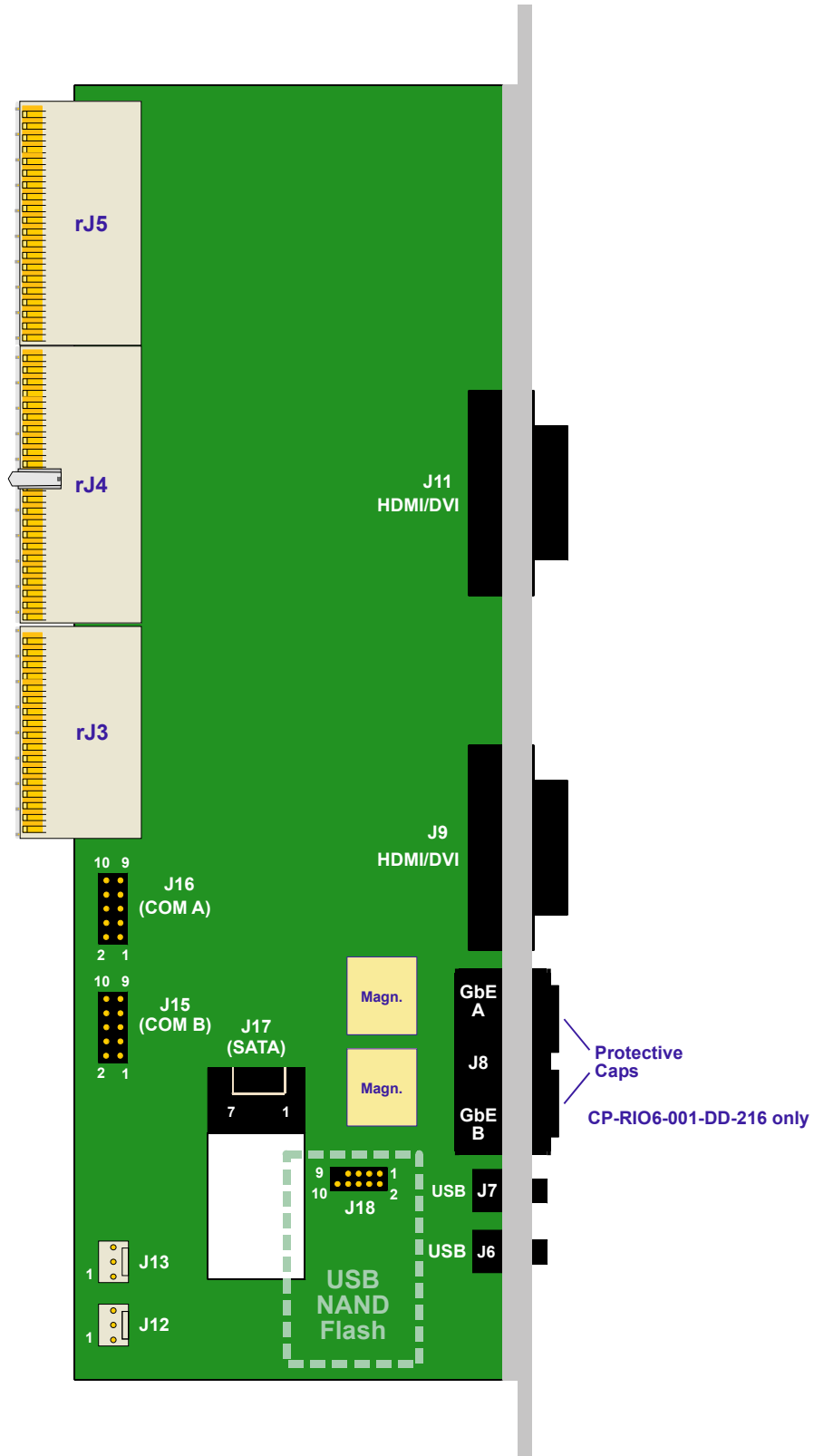
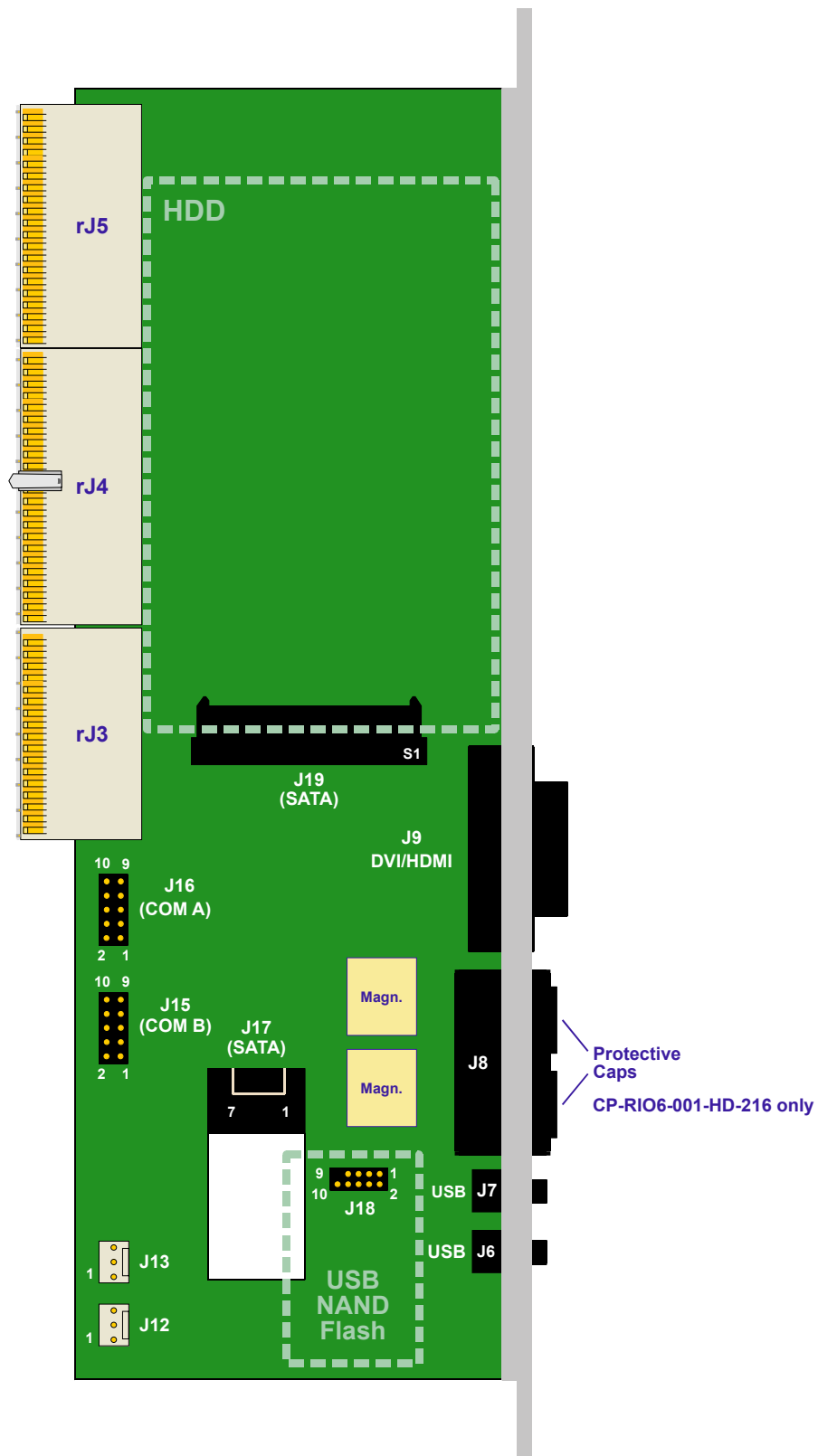




Figure 1-5: CP-RIO6-001-HD/CP-RIO6-001-HD-216 Board Layout – Front View




1.4 Technical Specification

Table 1-2: CP-RIO6-001/-DD-216/-HD/-HD-216 Main Specifications

CP-RIO6-001/-DD-216/-HD/-HD-216		SPECIFICATIONS
Front Panel Interfaces	Digital Video	CP-RIO6-001, CP-RIO6-001-DD-216: <ul style="list-style-type: none"> Two digital video interfaces implemented as two 29-pin DVI-I connectors, J9 and J11, supporting HDMI and DVI signaling for digital monitors (no analog video signals on these connectors) CP-RIO6-001-HD, CP-RIO6-001-HD-216: <ul style="list-style-type: none"> One digital video interface implemented as a 29-pin DVI-I connector, J9, for connecting a monitor with a DVI/HDMI interface (no analog video signals on this connector)
	Ethernet	CP-RIO6-001, CP-RIO6-001-HD: <ul style="list-style-type: none"> Two Gigabit Ethernet interfaces implemented as a dual RJ-45 connector, J8A/B CP-RIO6-001-DD-216, CP-RIO6-001-HD-216: <ul style="list-style-type: none"> Ethernet not supported due to the fact that the Ethernet interface is isolated on the CompactPCI connector rJ3
	USB	Two USB 2.0 interfaces on type A connectors, J6 and J7
Onboard Interfaces	SATA	CP-RIO6-001, CP-RIO6-001-DD-216: <ul style="list-style-type: none"> One SATA interface implemented as one onboard connector, J17, for connecting a SATA device via a SATA cable CP-RIO6-001-HD, CP-RIO6-001-HD-216: <p>Two SATA interfaces implemented as two onboard connectors:</p> <ul style="list-style-type: none"> One SATA connector, J17, for connecting a SATA device via a SATA cable One SATA connector, J19, for installing a 2.5" SATA HDD/SSD (optional)
	USB	One onboard connector, J18, for connecting one USB 2.0 NAND Flash module
	COM	Two onboard COM ports implemented as two 10-pin, 2.54 mm onboard connectors, J15 and J16
	Fan	Two fan connectors, J12 and J13, with PWM control and sense inputs for monitoring the fan speed.
	CompactPCI	Three CompactPCI connectors, rJ3, rJ4 and rJ5, for connecting the module to the backplane



Table 1-2: CP-RIO6-001/-DD-216/-HD/-HD-216 Main Specifications (Continued)

CP-RIO6-001/-DD-216/-HD/-HD-216		SPECIFICATIONS
General	Temperature Range	Operational: 0°C to +60°C Standard -40°C to +85°C E2 (optional) Storage: -55°C to +85°C Without any additional components  <p>Note ... When additional components are installed, refer to their operational specifications as this will influence the modules' operational and storage temperature.</p>
	Mechanical	6U, 4HP, CompactPCI-compliant form factor
	Dimensions	233.35 mm x 80 mm
	Board Weight	CP-RIO6-001: 224 g (without USB NAND Flash module) CP-RIO6-001-DD-216: 224 g (without USB NAND Flash module) CP-RIO6-001-HD: 218 g (without USB NAND Flash module) CP-RIO6-001-HD-216: 218 g (without USB NAND Flash module)

1.5 Standards

The CP-RIO6-001/-DD-216/-HD/-HD-216 complies with the requirements of the following standards:

Table 1-3: Standards for the CP-RIO6-001/-DD-216/-HD/-HD-216

TYPE	ASPECT	STANDARD	REMARKS
CE	Emission	EN55022 EN61000-6-3	--
	Immission	EN55024 EN61000-6-2	--
	Electrical Safety	EN60950-1	--
Mechanical	Mechanical Dimensions	IEEE 1101.10	--
Environmental	Climatic Humidity	IEC60068-2-78	93% RH at 40°C, non-condensing
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS	Directive 2002/95/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment
	Vibration (Sinusoidal)	IEC61131-2 IEC60068-2-6	Test parameters (without protective caps): <ul style="list-style-type: none"> • 5-150 (Hz) frequency range • 1 (g) acceleration • 1 (oct/min) sweep rate • 10 cycles/axis • 3 axes
	Single Shock	IEC61131-2 IEC60068-2-27	Test parameters: <ul style="list-style-type: none"> • 15 (g) acceleration • 11 (ms) pulse duration • 3 shocks per direction • 6 directions • 5 (s) recovery time



Note ...

Kontron performs comprehensive environmental testing of its products in accordance with applicable standards.

Customers desiring to perform further environmental testing of Kontron products must contact Kontron for assistance prior to performing any such testing. This is necessary, as it is possible that environmental testing can be destructive when not performed in accordance with the applicable specifications.

In particular, for example, boards **without conformal coating** must not be exposed to a change of temperature exceeding 1K/minute, averaged over a period of not more than five minutes. Otherwise, condensation may cause irreversible damage, especially when the board is powered up again.

Kontron does not accept any responsibility for damage to products resulting from destructive environmental testing.



1.6 Related Publications

The following publications contain information relating to the CP-RIO6-001/-DD-216/-HD/-HD-216.

Table 1-4: Related Publications

PRODUCT	PUBLICATION
CompactPCI Systems and Boards	CompactPCI Specification 2.0, Rev. 3.0
	CompactPCI Packet Switching Backplane Specification PICMG 2.16 Rev. 1.0 (CP-RIO6-001-DD-216/CP-RIO6-001-HD-216)
	<i>Kontron</i> CompactPCI Backplane Manual, ID 24229
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142



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Chapter **2**

Functional Description



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2. Functional Description

2.1 Board Interfaces

2.1.1 USB Interfaces

The CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module supports three USB 2.0 ports, two on the front I/O and one onboard for the USB NAND Flash module. All ports are high-speed, full-speed, and low-speed capable. One USB peripheral may be connected to each port. For connecting more USB devices to the CP-RIO6-001/-DD-216/-HD/-HD-216 than there are available ports, an external USB hub is required.



Note ...

The USB host interfaces can be used with maximum 500 mA continuous load current as specified in the Universal Serial Bus Specification, Revision 2.0. Short-circuit protection is a function of the CPU board used with this rear I/O module. All the signal lines are EMI-filtered.



Note ...

The rear I/O interface supports the USB 1.1 and USB 2.0 standards. For USB 2.0 it is strongly recommended to use a cable length not exceeding 3 meters.

2.1.1.1 Front Panel USB Connectors J6 and J7

On the front panel of the CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module, there are two USB interfaces implemented on two 4-pin connectors with the following pinout:

Figure 2-1: USB Con. J6 and J7

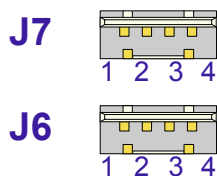


Table 2-1: USB Con. J6 and J7 Pinout

PIN	SIGNAL	FUNCTION	I/O
1	VCC	VCC	--
2	UV0-	Differential USB-	I/O
3	UV0+	Differential USB+	I/O
4	GND	GND	--



2.1.1.2 Onboard USB NAND Flash Connector J18

The CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module has one onboard USB interface implemented on a 9-pin connector, J18, with the following pinout.

Figure 2-2: USB NAND Flash Con. J18 Table 2-2: USB NAND Flash Con. J18 Pinout



PIN	SIGNAL	FUNCTION	I/O
1	VCC	VCC	--
3	UV0-	Differential USB-	I/O
5	UV0+	Differential USB+	I/O
7	GND	GND	--
9	Key		
2, 4, 6, 8	NC	Not connected	--
10	Res.	Reserved	--

The J18 connector is used to connect an optional USB 2.0 NAND Flash module qualified by Kontron. The USB 2.0 NAND Flash module is a USB 2.0-based NAND Flash drive with a built-in full hard-disk emulation and a high data transfer rate. It is optimized for embedded systems providing high performance, reliability and security.



Note ...

Only qualified USB 2.0 NAND Flash modules from Kontron are authorized for use with the CP-RIO6-001/-DD-216/-HD/-HD-216. Use of unqualified USB 2.0 NAND Flash modules or improper installation will void the warranty and may result in damage to the CP-RIO6-001/-DD-216/-HD/-HD-216 or the system.





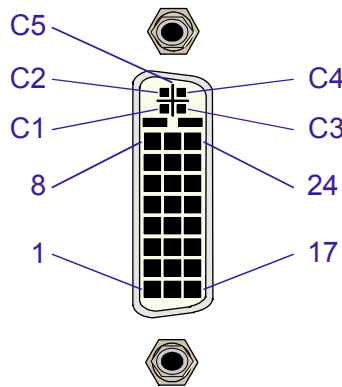
2.1.2 Digital Video Interfaces

The CP-RIO6-001/-DD-216/-HD/-HD-216 provides up to two digital video interfaces with support for HDMI and DVI signaling depending on the CPU board and the monitor capability.

The CP-RIO6-001 and CP-RIO6-001-DD-216 rear I/O modules provide two digital video interfaces implemented as two 29-pin DVI connectors, J9 and J11, which allow for simultaneous connection of two digital monitors. This feature is referred to as dual head support.

The CP-RIO6-001-HD and CP-RIO6-001-HD-216 provide one digital video interface implemented as one 29-pin DVI connector, J9, for connecting a digital monitor.

Figure 2-3: DVI Connectors J9/J11



The following table indicates the pinout of the DVI Connectors J9/J11.

Table 2-3: DVI Connectors J9/J11 Pinouts

PIN	SIGNAL	DESCRIPTION	I/O	PIN	SIGNAL	DESCRIPTION	I/O
1	TMDS Data 2-	TMDS* Link -	O	2	TMDS Data 2+	TMDS* Link +	O
3	GND	Ground	--	4	NC	Not connected	--
5	NC	Not connected	--	6	DDC Clock	I ² C™ Clock	O
7	DDC Data	I ² C™ Data	I/O	8	NC	Not connected	--
9	TMDS Data 1-	TMDS Link -	O	10	TMDS Data 1+	TMDS Link +	O
11	GND	Ground	--	12	NC	Not connected	--
13	NC	Not connected	--	14	VCC	Power +5 V, 0.5A fused	--
15	GND	Ground	--	16	HPDETECT	Hot Plug Detect	I
17	TMDS Data 0-	TMDS Link -	O	18	TMDS Data 0+	TMDS Link +	O
19	GND	Ground	--	20	NC	Not connected	--
21	NC	Not connected	--	22	GND	Ground	--
23	TMDS Clock +	TMDS Link +	O	24	TMDS Clock -	TMDS Link -	O
C1	NC	Not connected	--	C2	NC	Not connected	--
C3	NC	Not connected	--	C4	NC	Not connected	--
C5	GND	Ground	--				



2.1.3 Gigabit Ethernet Interfaces

The CP-RIO6-001 and the CP-RIO6-001-HD provide a Gigabit Ethernet interface implemented as one dual, RJ-45 Ethernet connector J8A/B.

The CP-RIO6-001-DD-216 and CP-RIO6-001-HD-216 are populated with an Ethernet connector, J8A/B, but the Ethernet interface is isolated on the CompactPCI connector rJ3. Flat dummy plugs are fitted to these connectors as protective caps to prevent their unintentional use.

Figure 2-4: Dual Gigabit Ethernet Con. J8A/B

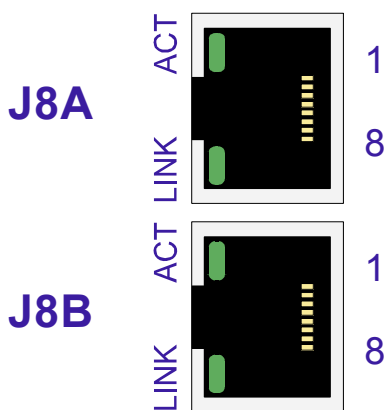


Table 2-4: Pinout of Dual GbE Connector J8A/B

PIN	MDI / STANDARD ETHERNET CABLE					
	10BASE-T		100BASE-TX		1000BASE-T	
	I/O	SIGNAL	I/O	SIGNAL	I/O	SIGNAL
1	0	TX+	0	TX+	I/O	BI_DA+
2	0	TX-	0	TX-	I/O	BI_DA-
3	1	RX+	1	RX+	I/O	BI_DB+
4	-	-	-	-	I/O	BI_DC+
5	-	-	-	-	I/O	BI_DC-
6	1	RX-	1	RX-	I/O	BI_DB-
7	-	-	-	-	I/O	BI_DD+
8	-	-	-	-	I/O	BI_DD-



Note ...

The Ethernet transmission can operate effectively with structured cable that meets CAT5 cable or higher specifications.

Ethernet LED Status

ACT (green): This LED monitors network connection and activity. When this LED is lit, it means that a link has been established. The LED blinks when network packets are sent or received through the RJ-45 port. When this LED is not lit, there is no link established.

LINK (green): This LED lights up to indicate a successful 100Base-TX connection. When not lit and the ACT-LED is active, the connection is operating at 1000Base-T or 10Base-T.





2.1.4 Serial ATA Interfaces

The CP-RIO6-001 and CP-RIO6-001-DD-216 provide one Serial ATA (SATA) interface for connecting a SATA device to the module via a SATA cable. The CP-RIO6-001-HD and the CP-RIO6-001-HD-216 provide two SATA interfaces, one for connecting a standard 2.5" SATA HDD/SSD and one for connecting a SATA device via a SATA cable.

The SATA interfaces are capable of supporting SATA 1.5Gb/s and SATA 3Gb/s signaling.

2.1.4.1 SATA Connector J17

The CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module is equipped with a SATA connector, J17, used to connect a standard SATA device to the rear I/O module via a SATA cable. The rear I/O module will not exceed the thickness of 4HP when a Serial ATA cable is used.

The following figure and table provide pinout information for the SATA connector J17.

Figure 2-5: SATA Con. J17



Table 2-5: SATA Connector J17 Pinout

PIN	SIGNAL	DESCRIPTION	I/O
1	GND	Ground signal	--
2	SATA_TX+	Differential Transmit +	O
3	SATA_TX-	Differential Transmit -	O
4	GND	Ground signal	--
5	SATA_RX-	Differential Receive -	I
6	SATA_RX+	Differential Receive +	I
7	GND	Ground signal	--



Note ...

To ensure secure connectivity, the SATA connector supports the use of SATA 3Gb/s cables (SATA cables with locking latch).



2.1.4.2 SATA Connector J19 (optional)

The CP-RIO6-001-HD and the CP-RIO6-001-HD-216 rear I/O modules are equipped with the SATA connector J19 used to connect a 2.5" SATA HDD/SSD to the rear I/O module. The connector is divided into two segments, a signal segment and a power segment.

Figure 2-6: SATA Connector J19

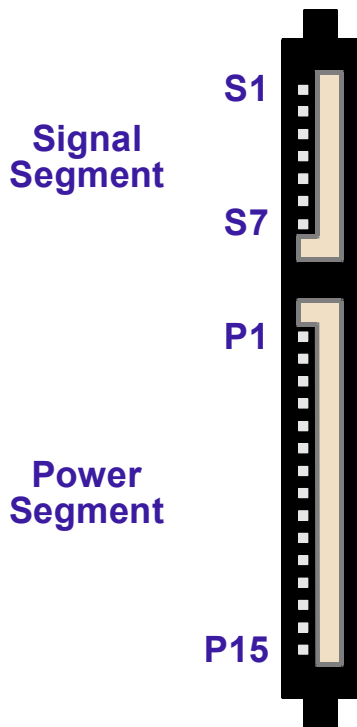


Table 2-6: SATA Connector J19 Pinout

PIN	SIGNAL	FUNCTION	I/O
Signal Segment Key			
S1	GND	Ground signal	--
S2	SATA_TX+	Differential Transmit+	I
S3	SATA_TX-	Differential Transmit-	I
S4	GND	Ground signal	--
S5	SATA_RX-	Differential Receive-	O
S6	SATA_RX+	Differential Receive+	O
S7	GND	Ground signal	--
Signal Segment "L"			
Central Connector Polarizer			
Power Segment "L"			
P1	3.3V	3.3V power	--
P2	3.3V	3.3V power	--
P3	3.3V	3.3V power	--
P4	GND	Ground signal	--
P5	GND	Ground signal	--
P6	GND	Ground signal	--
P7	5V	5V power	--
P8	5V	5V power	--
P9	5V	5V power	--
P10	GND	Ground signal	--
P11	RES	Reserved	--
P12	GND	Ground signal	--
P13	12V	12 V power	--
P14	12V	12 V power	--
P15	12V	12 V power	--
Power Segment Key			





2.1.5 COM Interfaces

The CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module provides two COM ports for connecting RS-232 (COMA) and RS-232/RS-422 (COMB) devices, depending on the CPU board. The following figures and tables provide pinout information for the onboard COM connectors J15 (COM B) and J16 (COM A).

Figure 2-7: Serial Port Connector J15/J16

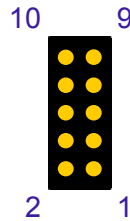


Table 2-6: Serial Port Connector J15 (RS-232/RS-422) Pinout

RS-232 SIGNALING			PIN	RS-422 SIGNALING		
I/O	DESCRIPTION	SIGNAL		SIGNAL	DESCRIPTION	I/O
I	Data carrier detect	DCD	1	RX+	Receive data +	I
I	Data send request	DSR	2	RX-	Receive data -	I
I	Receive data	RXD	3	NC	Not connected	--
O	Request to send	RTS	4	NC	Not connected	--
O	Transmit data	TXD	5	TX+	Transmit data +	O
I	Clear to send	CTS	6	TX-	Transmit data -	O
O	Data terminal ready	DTR	7	NC	Not connected	--
I	Ring indicator	RI	8	NC	Not connected	--
--	Signal ground	GND	9	NC	Not connected	--
--	Not connected	NC	10	NC	Not connected	--

Table 2-7: Serial Port Connector J16 (RS-232) Pinout

PIN	SIGNAL	DESCRIPTION	I/O
1	DCD	Data carrier detect	I
2	DSR	Data send request	I
3	RXD	Receive data	I
4	RTS	Request to send	O
5	TXD	Transmit data	O
6	CTS	Clear to send	I
7	DTR	Data terminal ready	O
8	RI	Ring indicator	I
9	GND	Signal ground	--
10	NC	Not connected	--



2.1.6 FAN Connectors

The CP-RIO6-001/-DD-216/-HD/-HD-216 module has two 3-pin, onboard fan connectors, J12 and J13, for connecting two external cooling fans.

Figure 2-8: Fan Control Con. J12 and J13

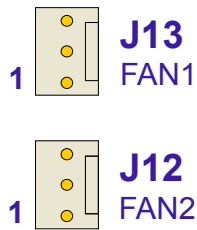


Table 2-8: Fan Control Con. J12 and J13 Pinout

PIN	SIGNAL	DESCRIPTION	I/O
1	GND	Signal ground	--
2	PWM	Fan Supply Voltage (12V)	O
3	SENSE	Fan Sense	I



Note ...

The maximum allowable continuous load current on each fan interface is 300 mA.





2.1.7 Rear I/O interface on Compact PCI Connectors rJ3, rJ4 and rJ5

The CP-RIO6-001/-DD-216/-HD/-HD-216 rear I/O module is equipped with three CompactPCI rear I/O connectors, rJ3, rJ4 and rJ5.



Note ...

To support the rear I/O feature, a 6U CompactPCI backplane with rear I/O support as well as a compatible and correctly configured CPU board are required. Do not plug the CP-RIO6-001/-DD-216/-HD/-HD-216 into a backplane without rear I/O support. Failure to comply with the above will result in damage to the CP-RIO6-001/-DD-216/-HD/-HD-216.

Figure 2-9: Rear I/O CompactPCI Connectors rJ3, rJ4 and rJ5

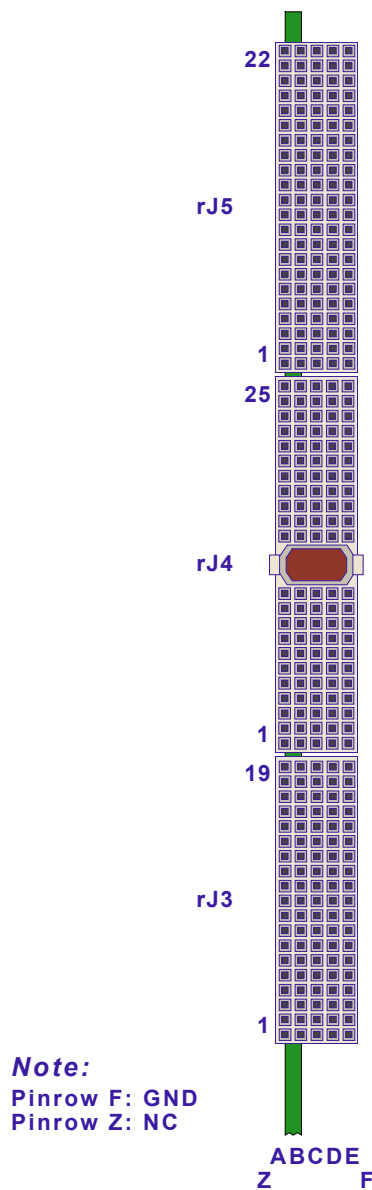




Table 2-9: CP-RIO6-001/-HD Rear I/O CompactPCI Connector rJ3 Pinout

PIN	Z	A	B	C	D	E	F
19	NC	RIO_VCC	RIO_VCC	RIO_3.3V	RIO_+12V	RIO_-12V	GND
18	NC	LPa_DA+	LPa_DA-	GND	LPa_DC+	LPa_DC-	GND
17	NC	LPa_DB+	LPa_DB-	GND	LPa_DD+	LPa_DD-	GND
16	NC	LPb_DA+	LPb_DA-	GND	LPb_DC+	LPb_DC-	GND
15	NC	LPb_DB+	LPb_DB-	GND	LPb_DD+	LPb_DD-	GND
14	NC	LPa:LINK	LPb:LINK	LPab:CT1	LPc:LINK	FAN:SENSE2	GND
13	NC	LPa:ACT	LPb:ACT	NC	NC	FAN:SENSE1	GND
12	NC	NC	NC	GND	NC	NC	GND
11	NC	NC	NC	GND	NC	NC	GND
10	NC	USB1:VCC	USB0:VCC	GND	RSV	USB2:VCC	GND
9	NC	USB1:D-	USB1:D+	GND	RSV	RSV	GND
8	NC	USB0:D-	USB0:D+	GND	USB2:D-	USB2:D+	GND
7	NC	RIO_3.3V	NC	ID3	ID4	SPEAKER	GND
6	NC	RSV	RSV	RSV	RSV	RSV	GND
5	NC	RSV	RSV	RSV	RSV	RSV	GND
4	NC	SP1:RI SP1:NC	SP1:DTR SP1:NC	SP1:CTS SP1:TX-	SP1:TX SP1:TX+	RSV	GND
3	NC	SP1:RTS SP1:NC	SP1:RX SP1:NC	SP1:DSR SP1:RX-	SP1:DCD SP1:RX+	RSV	GND
2	NC	SP0:RI	SP0:DTR	SP0:CTS	SP0:TX	RSV	GND
1	NC	SP0:RTS	SP0:RX	SP0:DSR	SP0:DCD	ID1	GND



Warning!

The RIO_XXX signals are power supply **INPUTS** to supply the rear I/O module with power from the CPU board. These pins **MUST NOT** be connected to any other power source, either within the backplane itself or within a rear I/O module.

Failure to comply with the above will result in damage to your board.

The following table describes the signals of the rJ3 connector used on the CP-RIO6-001/-HD.

Table 2-10: CP-RIO6-001/-HD Rear I/O CompactPCI Connector rJ3 Signals

SIGNAL	DESCRIPTION
SP0	COMA Signaling RS-232
SP1	COMB Signaling RS-232/RS-422
USB0 to USB2	USB Port Signaling
SPEAKER	Standard PC Speaker
FAN	Fan Sensoring
LPa	Rear I/O LAN Port B
LPb	Rear I/O LAN Port A



Table 2-11: CP-RIO6-001- /DD-216/HD-216 Rear I/O CompactPCI Connector rJ3 Pinout

PIN	Z	A	B	C	D	E	F
19	NC	RIO_VCC	RIO_VCC	RIO_3.3V	RIO_+12V	RIO_-12V	GND
18	NC	NC	NC	NC	NC	NC	GND
17	NC	NC	NC	NC	NC	NC	GND
16	NC	NC	NC	NC	NC	NC	GND
15	NC	NC	NC	NC	NC	NC	GND
14	NC	LPa:LINK	LPb:LINK	LPab:CT1	LPc:LINK	FAN:SENSE2	GND
13	NC	LPa:ACT	LPb:ACT	NC	NC	FAN:SENSE1	GND
12	NC	NC	NC	GND	NC	NC	GND
11	NC	NC	NC	GND	NC	NC	GND
10	NC	USB1:VCC	USB0:VCC	GND	RSV	USB2:VCC	GND
9	NC	USB1:D-	USB1:D+	GND	RSV	RSV	GND
8	NC	USB0:D-	USB0:D+	GND	USB2:D-	USB2:D+	GND
7	NC	RIO_3.3V	NC	ID3	ID4	SPEAKER	GND
6	NC	RSV	RSV	RSV	RSV	RSV	GND
5	NC	RSV	RSV	RSV	RSV	RSV	GND
4	NC	SP1:RI SP1:NC	SP1:DTR SP1:NC	SP1:CTS SP1:TX-	SP1:TX SP1:TX+	RSV	GND
3	NC	SP1:RTS SP1:NC	SP1:RX SP1:NC	SP1:DSR SP1:RX-	SP1:DCD SP1:RX+	RSV	GND
2	NC	SP0:RI	SP0:DTR	SP0:CTS	SP0:TX	RSV	GND
1	NC	SP0:RTS	SP0:RX	SP0:DSR	SP0:DCD	ID1	GND



Warning!

The RIO_XXX signals are power supply **INPUTS** to supply the rear I/O module with power from the CPU board. These pins **MUST NOT** be connected to any other power source, either within the backplane itself or within a rear I/O module.

Failure to comply with the above will result in damage to your board.

The following table describes the signals of the rJ3 connector used on the CP-RIO6-001- /DD-216/HD-216:

Table 2-12: CP-RIO6-001- /DD-216/HD-216 Rear I/O CompactPCI Connector rJ3 Signals

SIGNAL	DESCRIPTION
SP0	COMA Signaling RS-232
SP1	COMB Signaling RS-232/RS-422
USB0 to USB2	USB Port Signaling
SPEAKER	Standard PC Speaker
FAN	Fan Sensoring
LPa	Rear I/O LAN Port B status information for Ethernet LEDs
LPb	Rear I/O LAN Port A status information for Ethernet LEDs



Table 2-13: Rear I/O CompactPCI Connector rJ4 Pinout

PIN	Z	A	B	C	D	E	F
25	NC	RSV	RSV	GND	RSV	RSV	GND
24	NC	RSV	RSV	GND	RSV	RSV	GND
23	NC	NC	RIO_VCC	GND	NC	RIO_3.3V	GND
22	NC	RSV	RSV	GND	RSV	RSV	GND
21	NC	RSV	RSV	GND	RSV	RSV	GND
20	NC	GND	GND	GND	GND	GND	GND
19	NC	RSV	RSV	GND	RSV	RSV	GND
18	NC	RSV	RSV	GND	RSV	RSV	GND
17	NC	GND	GND	GND	GND	GND	GND
16	NC	RSV	RSV	GND	RSV	RSV	GND
15	NC	RSV	RSV	GND	RSV	RSV	GND
12-14	Key Area						
11	NC	RSV	RSV	GND	RSV	RSV	GND
10	NC	RSV	RSV	GND	RSV	RSV	GND
9	NC	GND	GND	GND	GND	GND	GND
8	NC	RSV	RSV	GND	RSV	RSV	GND
7	NC	RSV	RSV	GND	RSV	RSV	GND
6	NC	GND	GND	GND	GND	GND	GND
5	NC	RSV	RSV	GND	RSV	RSV	GND
4	NC	RSV	RSV	GND	RSV	RSV	GND
3	NC	GND	GND	GND	GND	GND	GND
2	NC	RSV	RSV	GND	RSV	RSV	GND
1	NC	RSV	RSV	GND	RSV	RSV	GND



Warning!

The RIO_XXX signals are power supply **INPUTS** to supply the rear I/O module with power from the CPU board. These pins **MUST NOT** be connected to any other power source, either within the backplane itself or within a rear I/O module.

Failure to comply with the above will result in damage to your board.





Table 2-14: Rear I/O CompactPCI Connector rJ5 Pinout

PIN	Z	A	B	C	D	E	F
22	NC	RSV	PWM1:OUT	GND	PWM2:OUT	RSV	GND
21	NC	RSV	RSV	GND	RSV	RSV	GND
20	NC	RSV	RSV	GND	RSV	RSV	GND
19	NC	GND	GND	GND	RSV	RSV	GND
18	NC	DVI2:D0+	DVI2:D0-	GND	GND	GND	GND
17	NC	DVI2:D2+	DVI2:D2-	GND	DVI2:D1+	DVI2:D1-	GND
16	NC	RSV	DVI2:HPDET	GND	RSV	RSV	GND
15	NC	DVI2:CLK+	DVI2:CLK-	GND	DVI2:SDA	DVI2:SDC	GND
14	NC	GND	GND	GND	GND	GND	GND
13	NC	DVI1:D0+	DVI1:D0-	GND	DVI1:D1+	DVI1:D1-	GND
12	NC	DVI1:D2+	DVI1:D2-	GND	RSV	RSV	GND
11	NC	RSV	DVI1:HPDET	GND	DVI1:SDA	DVI1:SDC	GND
10	NC	DVI1:CLK+	DVI1:CLK-	GND	RSV	RSV	GND
9	NC	GND	GND	GND	GND	GND	GND
8	NC	HT3:TX+	HT3:TX-	GND	HT3:RX+	HT3:RX-	GND
7	NC	GND	GND	GND	GND	GND	GND
6	NC	RSV	RSV	GND	RSV	RSV	GND
5	NC	GND	GND	GND	GND	GND	GND
4	NC	HT1:TX+	HT1:TX-	GND	HT1:RX+	HT1:RX-	GND
3	NC	GND	GND	GND	GND	GND	GND
2	NC	RSV	RSV	GND	RSV	RSV	GND
1	NC	GND	GND	GND	GND	GND	GND

The following table describes the signals of the rJ5 connector.

Table 2-15: Rear I/O CompactPCI Rear I/O Connector rJ5 Signals

SIGNAL	DESCRIPTION
HT1 and HT3	SATA Port 1 and Port 3 Signaling
DVI1	HDMI/DVI signaling
DVI2	HDMI/DVI signaling
PWM	Pulse width modulation output for fan



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Chapter **3**

Installation



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3. Installation

The CP-RIO6-001/-DD-216/-HD/-HD-216 has been designed for easy installation. However, the following standard precautions, installation procedures, and general information must be observed to ensure proper installation and to preclude damage to the CP-RIO6-001/-DD-216/-HD/-HD-216, other system components, or injury to personnel.

3.1 Safety Requirements

The following safety precautions must be observed when installing or operating the CP-RIO6-001/-DD-216/-HD/-HD-216. Kontron assumes no responsibility for any damage resulting from failure to comply with these requirements.



Caution!

Ensure that the system main power is removed prior to installing or removing the CP-RIO6-001/-DD-216/-HD/-HD-216. Ensure that there are no other external voltages or signals being applied to the CP-RIO6-001/-DD-216/-HD/-HD-216 or other boards within the system. Failure to do so could endanger your life or health and may damage the CP-RIO6-001/-DD-216/-HD/-HD-216 or other system components including process-side signal conditioning equipment.



ESD Equipment!

The CP-RIO6-001/-DD-216/-HD/-HD-216 contains electrostatically sensitive devices. Please observe the necessary precautions to avoid damage to the CP-RIO6-001/-DD-216/-HD/-HD-216:

- Discharge your clothing before touching the assembly. Tools must be discharged before use.
- Do not touch components, connector-pins or traces.
- If working at an anti-static workbench with professional discharging equipment, please do not omit to use it.



3.2 Rear I/O Module Installation Procedures

To perform an installation of the rear I/O module in a system, proceed as follows:

1. Ensure that the safety requirements indicated Chapter 3.1 are observed.



Warning!

Failure to comply with the instruction below may cause damage to the rear I/O module or result in improper system operation.

2. Ensure that the rear I/O module is compatible with the CPU board and the backplane prior to installation.



Note ...

Ensure that the system components are properly configured for use with the rear I/O module.

3. If appropriate, ensure that the onboard peripheral devices are properly installed prior to installation.
4. Ensure that no power is applied to the system before proceeding.



Warning!

Even though power may be removed from the system, the rear I/O module's front panel cables may have power applied which comes from an external source.

In addition, these cables may be connected to devices that can be damaged by electrostatic discharging or short-circuiting of pins.

It is the responsibility of the system designer or integrator to ensure that appropriate measures are taken to preclude damage to the system or injury to personnel which may arise from the handling of these cables (connecting or disconnecting).

Kontron disclaims all liability for damages or injuries resulting from failure to comply with the above.



Warning!

When performing the next step, **DO NOT** push the rear I/O module into the backplane connectors. Use the ejector handles to seat the rear I/O module into the backplane connectors.

5. Carefully insert the rear I/O module into the slot designated by the application requirements for the rear I/O module until it makes contact with the backplane connectors.
6. Using both ejector handles, engage the rear I/O module with the backplane. When the ejector handles are locked, the rear I/O module is engaged.
7. Fasten the two front panel retaining screws.
8. Connect all external interfacing cables to the rear I/O module as required.
9. Ensure that the rear I/O module and all required interfacing cables are properly secured.

The rear I/O module is now ready for operation.



3.3 Rear I/O Module Removal Procedures

To remove the rear I/O module proceed as follows:

1. Ensure that the safety requirements indicated in Chapter 3.1 are observed.



Warning!

Care must be taken when applying the procedures below to ensure that neither the rear I/O module nor system boards are physically damaged by the application of these procedures.

2. Ensure that no power is applied to the system before proceeding.



Warning!

Even though power may be removed from the system, the rear I/O module's front panel cables may have power applied which comes from an external source.

In addition, these cables may be connected to devices that can be damaged by electrostatic discharging or short-circuiting of pins.

It is the responsibility of the system designer or integrator to ensure that appropriate measures are taken to preclude damage to the system or injury to personnel which may arise from the handling of these cables (connecting or disconnecting).

Kontron disclaims all liability for damages or injuries resulting from failure to comply with the above.

3. Disconnect and secure any interfacing cables that may be connected to the rear I/O module.
4. Unscrew the two front panel retaining screws.
5. Disengage the rear I/O module from the backplane by first unlocking the ejection handles and then by pressing the handles as required until the rear I/O module is disengaged.
6. After disengaging the rear I/O module from the backplane, pull it out of the slot.
7. Dispose of the rear I/O module as required.

3.4 Installation of Peripheral Devices

The CP-RIO6-001/-DD-216/-HD/-HD-216 is designed to accommodate a variety of peripheral devices whose installation varies considerably. The following chapters provide information regarding installation aspects and not detailed procedures.

3.4.1 USB Device Installation

The CP-RIO6-001/-DD-216/-HD/-HD-216 supports all USB Plug and Play computer peripherals (e.g. keyboard, mouse, printer, etc.).



Note ...

All USB devices may be connected or removed while the host or other peripherals are powered up.



3.4.2 USB 2.0 NAND Flash Module Installation

One USB 2.0 NAND Flash module may be connected to the CP-RIO6-001/-DD-216/-HD/-HD-216 via the onboard USB 2.0 NAND Flash connector, J18.

The USB 2.0 NAND Flash module must be physically installed on the CP-RIO6-001/-DD-216/-HD/-HD-216 prior to installation of the rear I/O module in a system.

During installation it is necessary to ensure that the USB 2.0 NAND Flash module is properly seated in the onboard USB 2.0 NAND Flash connector, i.e. the pins are correctly aligned and not bent.



Note ...

Only qualified USB 2.0 NAND Flash modules from Kontron are authorized for use with the CP-RIO6-001/-DD-216/-HD/-HD-216. Use of unqualified USB 2.0 NAND Flash modules or improper installation will void the warranty and may result in damage to the CP-RIO6-001/-DD-216/-HD/-HD-216 or the system.

If this module is ordered separately, it is delivered with two screws and a standoff to assemble the module to the CP-RIO6-001/-DD-216/-HD/-HD-216. To do this, first install the standoff, then mount the module itself and fixate it with the second screw.

Refer to Figure 3-1 for placement of the USB 2.0 NAND Flash module.

3.4.3 Installation of an External Serial ATA Device

One external SATA device may be connected to the CP-RIO6-001/-DD-216/-HD/-HD-216 via the onboard SATA connector J17 as well as the appropriate SATA cable.

Some symptoms of incorrectly installed SATA devices are:

- Device on a SATA channel does not spin up: check power cables and cabling. May also result from a bad power supply or SATA device.

The SATA connector on the CP-RIO6-001/-DD-216/-HD/-HD-216 provides only a data connection. The power for this device must be supplied by a separate connector. For further information, refer to the respective documentation of the device.

- SATA device fail message at boot-up: may be a bad cable or lack of power going to the drive.



Warning!

The incorrect connection of power or data cables may damage the SATA device and/or the CP-RIO6-001/-DD-216/-HD/-HD-216.

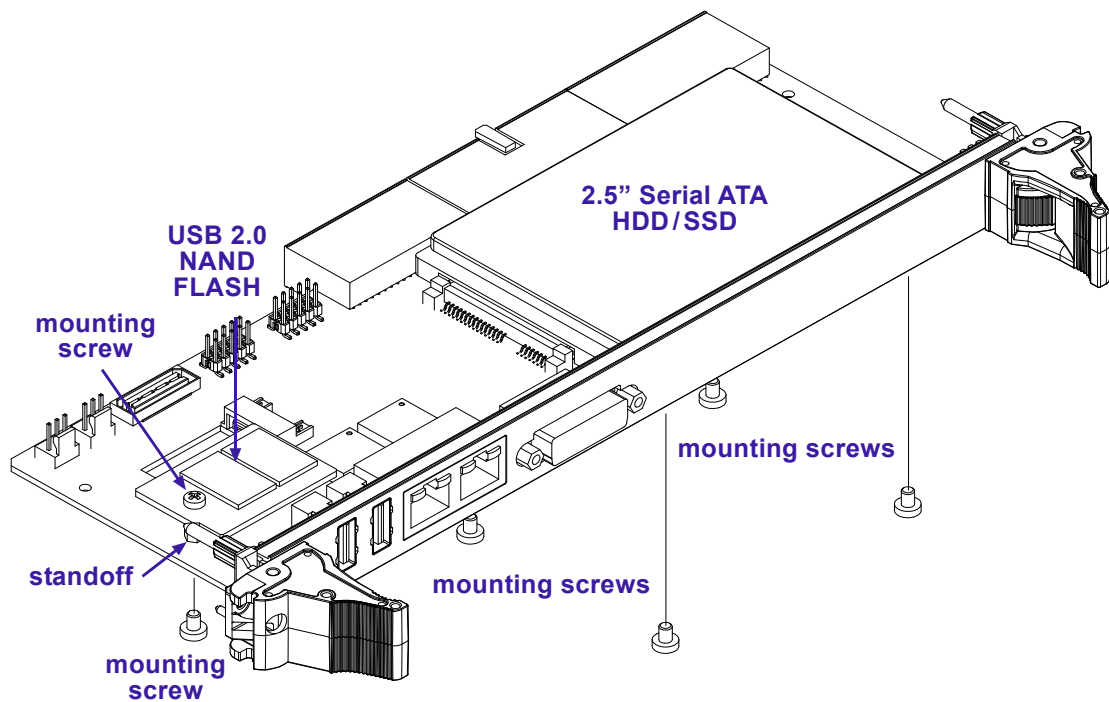


3.4.4 Installation of a 2.5" SATA HDD/SSD Device

One 2.5" SATA HDD/SSD may be installed on the CP-RIO6-001-/HD/HD-216 via the onboard SATA connector J19. During installation it is necessary to ensure that the SATA device is correctly seated in the onboard SATA connector and properly secured via the four mounting screws.

The following figure shows the placement of the 2.5" SATA HDD/SSD on the CP-RIO6-001-/HD/HD-216.

Figure 3-1: Placement of the 2.5" SATA HDD/SSD on the CP-RIO6-001- /HD/HD-216



Note ...

The CP-RIO6-001-/HD/HD-216 supports SATA devices with a maximum start-up current of 1.1 A (5.5 W) and a maximum operating current of 0.7 A (3.5 W) on the 5 V voltage supply.



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