

# » User Guide «

**CP-RIO6-A**

**CP-RIO6-B**

**CP-RIO6-A216**

**CP-RIO6-B216**

**6U CompactPCI Rear Transition Modules**

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## Imprint

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## Table of Contents

<i>Revision History</i> .....	<i>ii</i>
<i>Imprint</i> .....	<i>ii</i>
<i>Disclaimer</i> .....	<i>ii</i>
<i>Table of Contents</i> .....	<i>iii</i>
<i>List of Tables</i> .....	<i>v</i>
<i>List of Figures</i> .....	<i>vii</i>
<i>Proprietary Note</i> .....	<i>ix</i>
<i>Trademarks</i> .....	<i>ix</i>
<i>Environmental Protection Statement</i> .....	<i>ix</i>
<i>Explanation of Symbols</i> .....	<i>x</i>
<i>For Your Safety</i> .....	<i>xi</i>
<i>High Voltage Safety Instructions</i> .....	<i>xi</i>
<i>Special Handling and Unpacking Instructions</i> .....	<i>xi</i>
<i>General Instructions on Usage</i> .....	<i>xii</i>
<i>Two Year Warranty</i> .....	<i>xiii</i>
<b>1. Introduction</b> .....	<b>1 - 3</b>
1.1 <i>Board Overview</i> .....	1 - 3
1.2 <i>CP-RIO6-Ax/Bx Feature Comparison</i> .....	1 - 3
1.3 <i>Board Diagrams</i> .....	1 - 4
1.3.1 <i>Functional Block Diagrams</i> .....	1 - 4
1.3.2 <i>Front Panels</i> .....	1 - 6
1.3.3 <i>Board Layout</i> .....	1 - 7
1.4 <i>Technical Specification</i> .....	1 - 11
1.5 <i>Standards</i> .....	1 - 13
1.6 <i>Related Publications</i> .....	1 - 14
<b>2. Functional Description</b> .....	<b>2 - 3</b>
2.1 <i>Board Interfaces</i> .....	2 - 3
2.1.1 <i>USB Interfaces</i> .....	2 - 3
2.1.1.1 <i>Front Panel USB 2.0 Interface</i> .....	2 - 3
2.1.1.2 <i>Onboard USB 2.0 NAND Flash Interface</i> .....	2 - 4
2.1.2 <i>COM Interfaces</i> .....	2 - 5



2.1.3	VGA Interface .....	2 - 7
2.1.4	DVI-D Interface .....	2 - 8
2.1.5	HDMI Interface .....	2 - 9
2.1.6	Gigabit Ethernet Interfaces .....	2 - 10
2.1.7	HD Audio Interfaces .....	2 - 11
2.1.7.1	HD Audio Specifications .....	2 - 11
2.1.7.2	Mic-In, Line-In and Line-Out Interfaces .....	2 - 13
2.1.7.3	S/P-DIF-Out Interface .....	2 - 13
2.1.7.4	CD-In Interface .....	2 - 13
2.1.7.5	Internal Line-Out Mono Interface .....	2 - 13
2.1.8	FAN Connectors .....	2 - 14
2.1.9	Serial ATA Interfaces .....	2 - 14
2.1.10	Rear I/O Interface on CompactPCI Connectors rJ3, rJ4 and rJ5 ..	2 - 15
2.1.10.1	States of ID Bits .....	2 - 17
<b>3.</b>	<b>Installation .....</b>	<b>3 - 3</b>
3.1	Safety Requirements .....	3 - 3
3.2	Initial Installation Procedures .....	3 - 4
3.3	Standard Removal Procedures .....	3 - 5
3.4	Installation of Peripheral Devices .....	3 - 5
3.4.1	USB Device Installation .....	3 - 5
3.4.2	USB 2.0 NAND Flash Module Installation .....	3 - 6
3.4.3	Installation of External Serial ATA Devices .....	3 - 6



## List of Tables

1-1	<i>CP-RIO6-Ax/Bx Feature Comparison</i> .....	1 - 3
1-2	<i>CP-RIO6-Ax/Bx Main Specifications</i> .....	1 - 11
1-3	<i>Standards for the CP-RIO6-Ax/Bx</i> .....	1 - 13
1-4	<i>Related Publications</i> .....	1 - 14
2-1	<i>USB Connectors J17 and J18 Pinout</i> .....	2 - 3
2-2	<i>USB NAND Flash Connectors J7 and J11 Pinout</i> .....	2 - 4
2-3	<i>Serial Port Connector J20 (COM1) Pinout (RS-232)</i> .....	2 - 5
2-4	<i>Serial Port Connector J6 (COM2) Pinout (RS-232/RS-422)</i> .....	2 - 6
2-5	<i>D-Sub VGA Connector J22 Pinout</i> .....	2 - 7
2-6	<i>DVI Connector J23 Pinout</i> .....	2 - 8
2-7	<i>HDMI Connector J21 Pinout</i> .....	2 - 9
2-8	<i>Pinout of GbE Connector J19A/B</i> .....	2 - 10
2-9	<i>HD Audio Specifications</i> .....	2 - 11
2-10	<i>CD-In Connector J14 Pinout</i> .....	2 - 13
2-11	<i>Internal Line-Out Mono Connector J10 Pinout</i> .....	2 - 13
2-12	<i>Fan Control Connectors J1 and J2 Pinout</i> .....	2 - 14
2-13	<i>SATA Connectors J8, J9, J12 and J13 Pinout</i> .....	2 - 14
2-14	<i>Rear I/O CompactPCI Rear I/O Connector rJ3 Pinout</i> .....	2 - 16
2-15	<i>Rear I/O CompactPCI Rear I/O Connector rJ3 Signals</i> .....	2 - 17
2-16	<i>Bit ID1 States</i> .....	2 - 17
2-17	<i>Bits ID4 and ID3 States</i> .....	2 - 17
2-18	<i>Rear I/O CompactPCI Rear I/O Connector rJ4 Pinout</i> .....	2 - 18
2-19	<i>Rear I/O CompactPCI Rear I/O Connector rJ5 Pinout</i> .....	2 - 19
2-20	<i>Rear I/O CompactPCI Rear I/O Connector rJ5 Signals</i> .....	2 - 20



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## List of Figures

1-1	<i>CP-RIO6-A/CP-RIO6-A216 Functional Block Diagram</i> .....	1 - 4
1-2	<i>CP-RIO6-B/CP-RIO6-B216 Functional Block Diagram</i> .....	1 - 5
1-3	<i>CP-RIO6-Ax/Bx Front Panels</i> .....	1 - 6
1-4	<i>CP-RIO6-A Board Layout – Front View</i> .....	1 - 7
1-5	<i>CP-RIO6-A216 Board Layout – Front View</i> .....	1 - 8
1-6	<i>CP-RIO6-B Board Layout – Front View</i> .....	1 - 9
1-7	<i>CP-RIO6-B216 Board Layout – Front View</i> .....	1 - 10
2-1	<i>USB Connectors J17 and J18</i> .....	2 - 3
2-2	<i>USB NAND Flash Connectors J7 and J11</i> .....	2 - 4
2-3	<i>Serial Port Connector J20 (COM1)</i> .....	2 - 5
2-4	<i>Serial Port Connector J6 (COM2)</i> .....	2 - 6
2-5	<i>D-Sub VGA Connector J22</i> .....	2 - 7
2-6	<i>DVI Connector J23</i> .....	2 - 8
2-7	<i>HDMI Connector J21</i> .....	2 - 9
2-8	<i>Gigabit Ethernet Connectors J19A/B</i> .....	2 - 10
2-9	<i>Triple Audio Jack 16</i> .....	2 - 13
2-10	<i>S/P-DIF-Out Connector 15</i> .....	2 - 13
2-11	<i>CD-In Connector J14</i> .....	2 - 13
2-12	<i>Internal Line-Out Mono Connector J10</i> .....	2 - 13
2-13	<i>Fan Control Connectors J1 and J2</i> .....	2 - 14
2-14	<i>SATA Connectors J8, J9, J12 and J13</i> .....	2 - 14
2-15	<i>Rear I/O CompactPCI Connectors rJ3, rJ4 and rJ5</i> .....	2 - 15



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## Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.



## 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.



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## 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.



## Two Year Warranty

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.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long-term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

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.

Kontron will not accept liability for any further claims resulting directly or indirectly from any warranty claim, other than the above specified repair, replacement or refunding. In particular, all claims for damage to any system or process in which the product was employed, or any loss incurred as a result of the product not functioning at any given time, are excluded. The extent of Kontron liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron issues no warranty or representation, either explicit or implicit, with respect to its products' reliability, fitness, quality, marketability or ability to fulfil any particular application or purpose. As a result, the products are sold "as is," and the responsibility to ensure their suitability for any given task remains that of the purchaser. In no event will Kontron be liable for direct, indirect or consequential damages resulting from the use of our hardware or software products, or documentation, even if Kontron were advised of the possibility of such claims prior to the purchase of the product or during any period since the date of its purchase.

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*Chapter*

**1**

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# Introduction

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# 1. Introduction

## 1.1 Board Overview

The CP-RIO6-Ax/Bx 6U CompactPCI rear transition module has been designed for use with Kontron 6U CompactPCI CPU boards and provides comprehensive rear I/O functionality for peripherals. In order to use the CP-RIO6-Ax/Bx, a special 6U CompactPCI backplane with rear I/O support as well as a compatible and correctly configured CPU board are required.

There are four modules described in this user guide: CP-RIO6-A, CP-RIO6-A216, CP-RIO6-B, and CP-RIO6-B216. All four modules provide various data, communication and multimedia interfaces as well as support for two optional USB 2.0 NAND Flash modules and four external SATA devices. The CP-RIO6-Ax/Bx comes with four USB 2.0 ports, four onboard SATA ports, two COM ports, and an HD audio codec supporting five audio ports such as one onboard CD-In port, one Mic-In port, one Line-In port, one Line-Out port, and one S/P-DIF-Out port. Furthermore, the CP-RIO6-A and the CP-RIO6-A216 are equipped with one VGA (CRT) port on the front panel. The CP-RIO6-B and the CP-RIO6-B216 provide a DVI-D port and a HDMI port on the front panel. In addition, the CP-RIO6-A and the CP-RIO6-B are equipped with two Gigabit Ethernet ports on the front panel. The CP-RIO6-Ax/Bx has three CompactPCI connectors for connecting the CP-RIO6-Ax/Bx to the backplane.

## 1.2 CP-RIO6-Ax/Bx Feature Comparison

The following table provides a feature comparison of the CP-RIO6-Ax/Bx.

**Table 1-1: CP-RIO6-Ax/Bx Feature Comparison**

PORT		CP-RIO6-A	CP-RIO6-A216	CP-RIO6-B	CP-RIO6-B216
Front Panel Ports	VGA	x	x	--	--
	DVI-D	--	--	x	x
	HDMI	--	--	x	x
	2x GbE	x	--	x	--
	COM1	x	x	x	x
	2x USB 2.0	x	x	x	x
	Mic-In	x	x	x	x
	Line-In	x	x	x	x
	Line-Out	x	x	x	x
	S/P-DIF-Out	x	x	x	x
Onboard Ports	COM2	x	x	x	x
	2x USB 2.0 NAND Flash	x	x	x	x
	4x SATA	x	x	x	x
	CD-In	x	x	x	x
	Internal Line-Out Mono	x	x	x	x
	2x FAN	x	x	x	x



### 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-A/CP-RIO6-A216 Functional Block Diagram

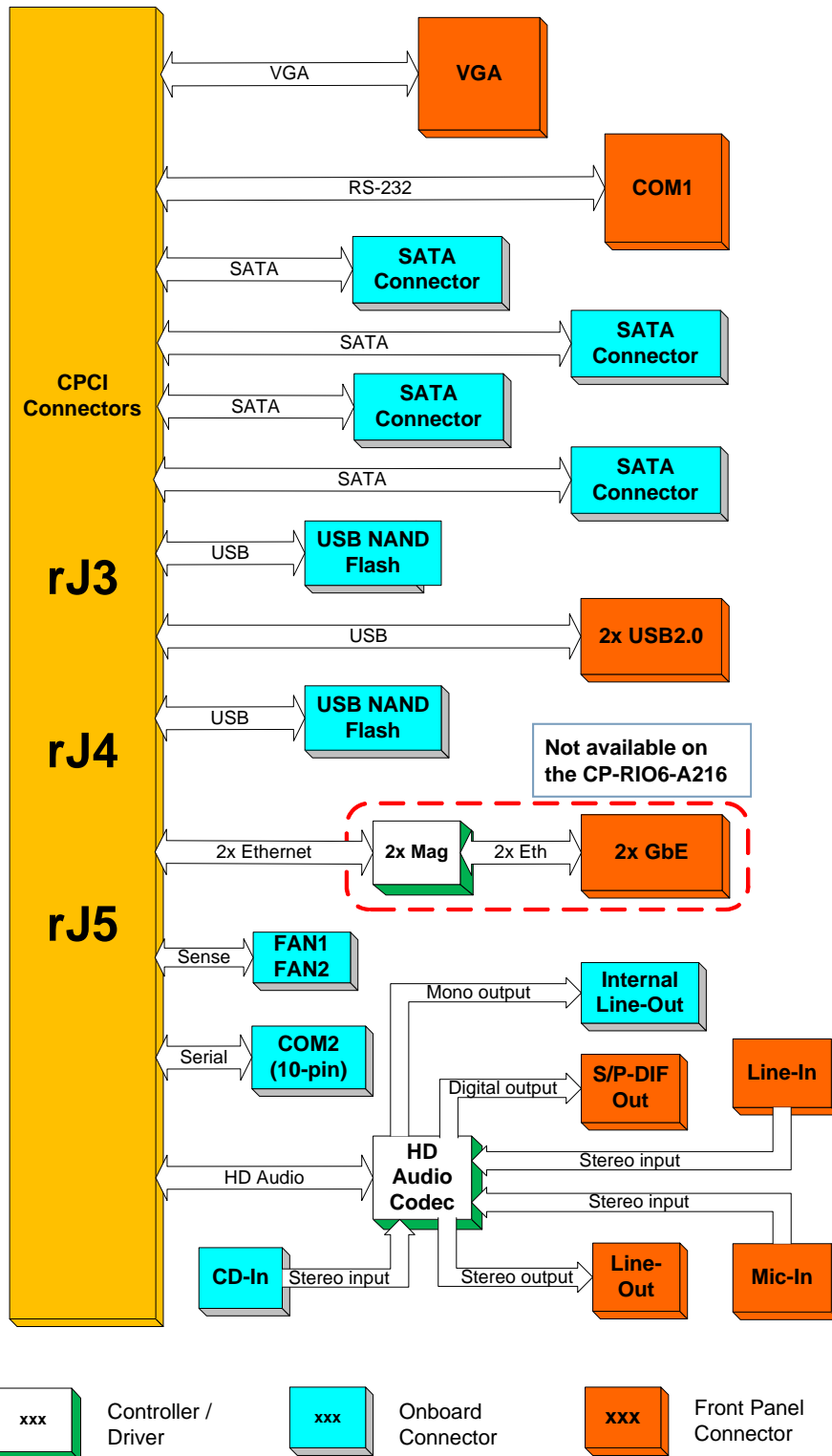
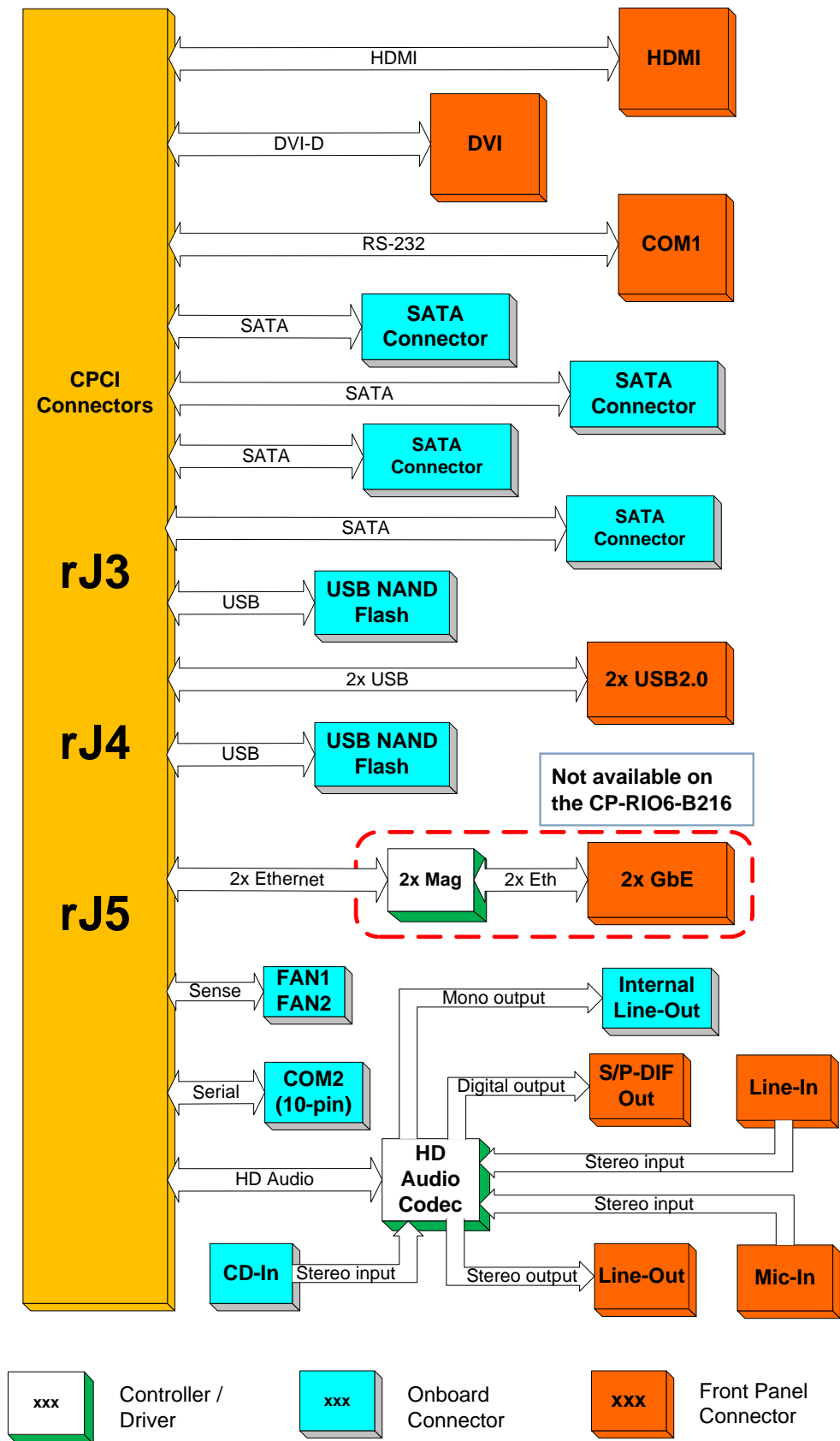




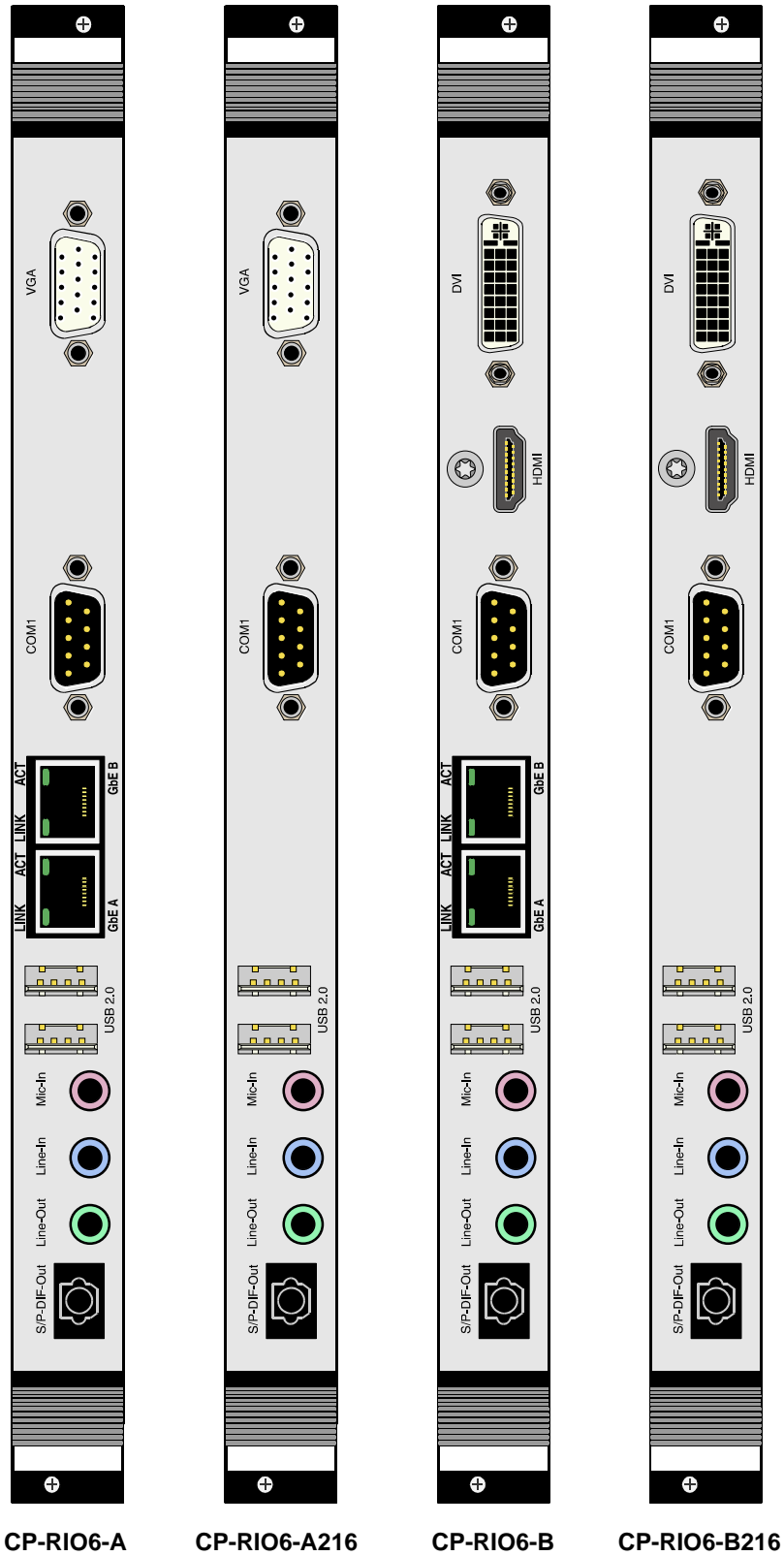
Figure 1-2: CP-RIO6-B/CP-RIO6-B216 Functional Block Diagram





1.3.2 Front Panels

Figure 1-3: CP-RIO6-Ax/Bx Front Panels





1.3.3 Board Layout

Figure 1-4: CP-RIO6-A Board Layout – Front View

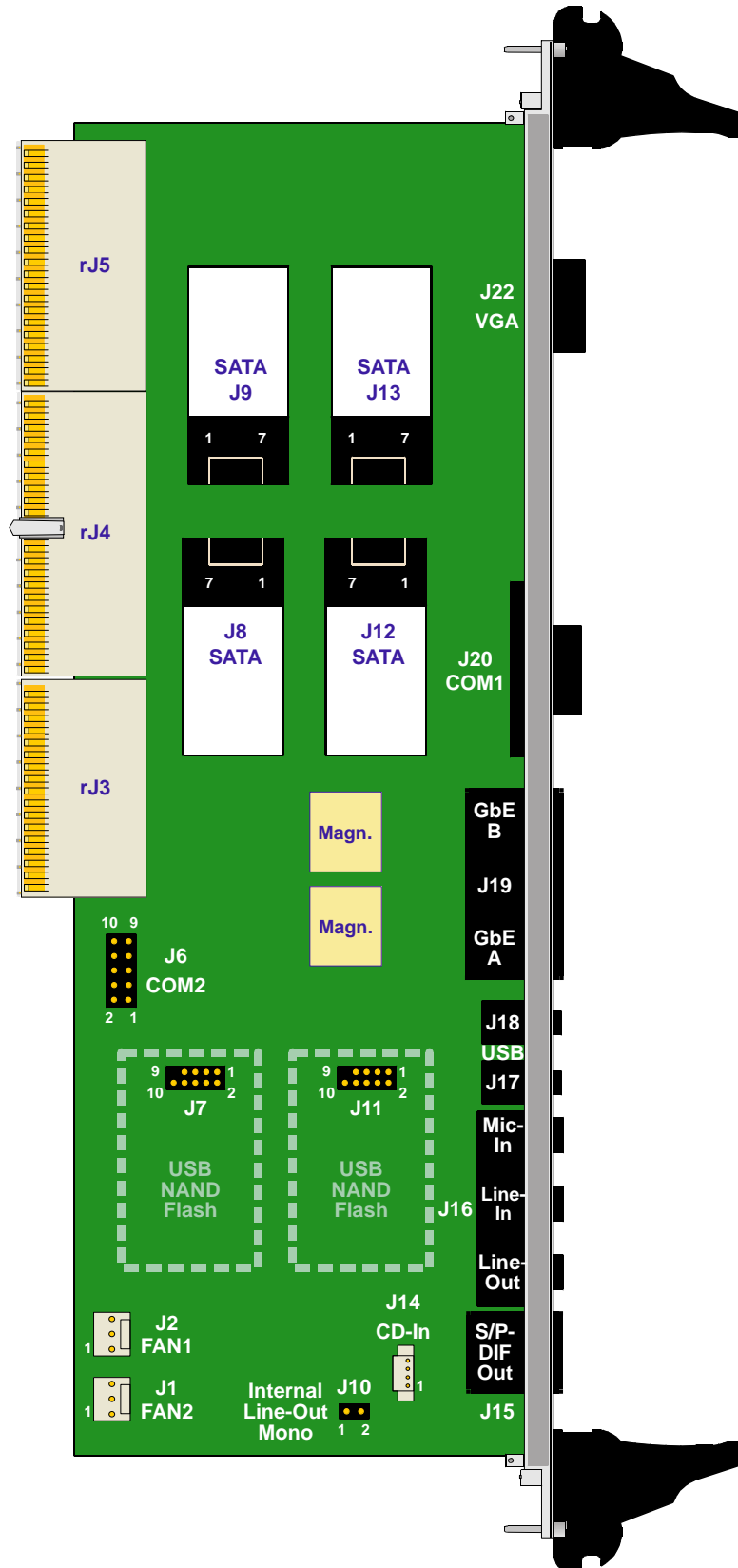




Figure 1-5: CP-RIO6-A216 Board Layout – Front View

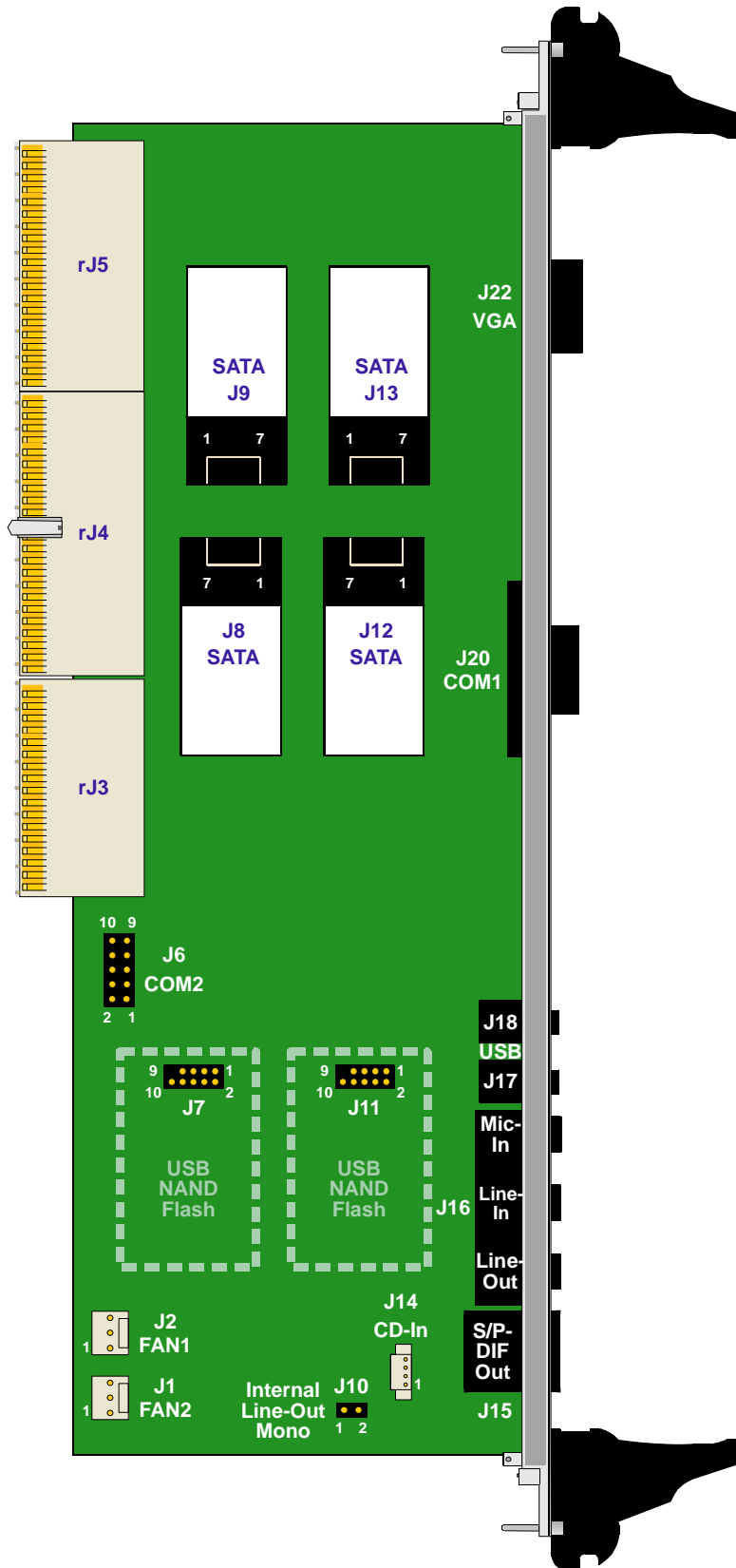




Figure 1-6: CP-RIO6-B Board Layout – Front View

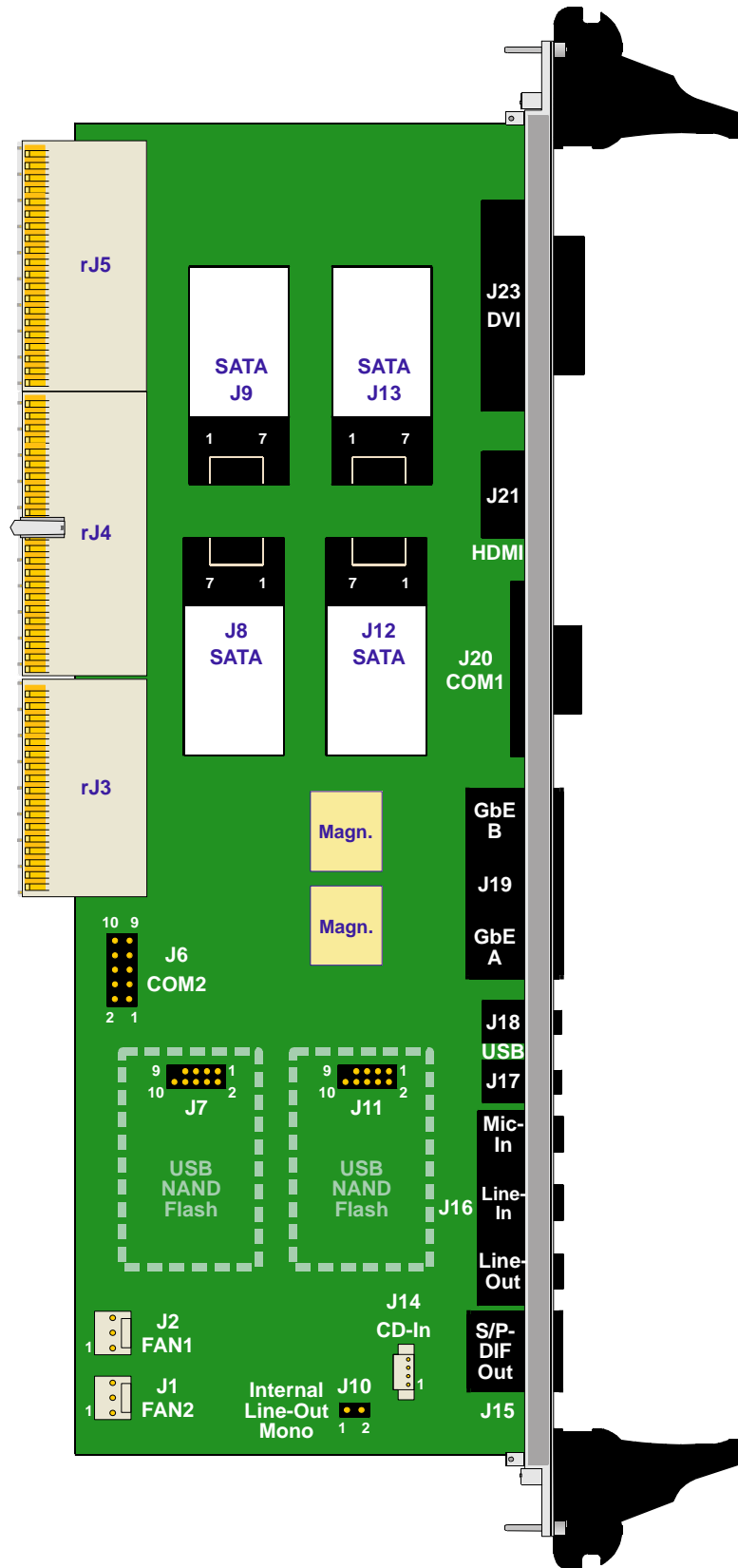
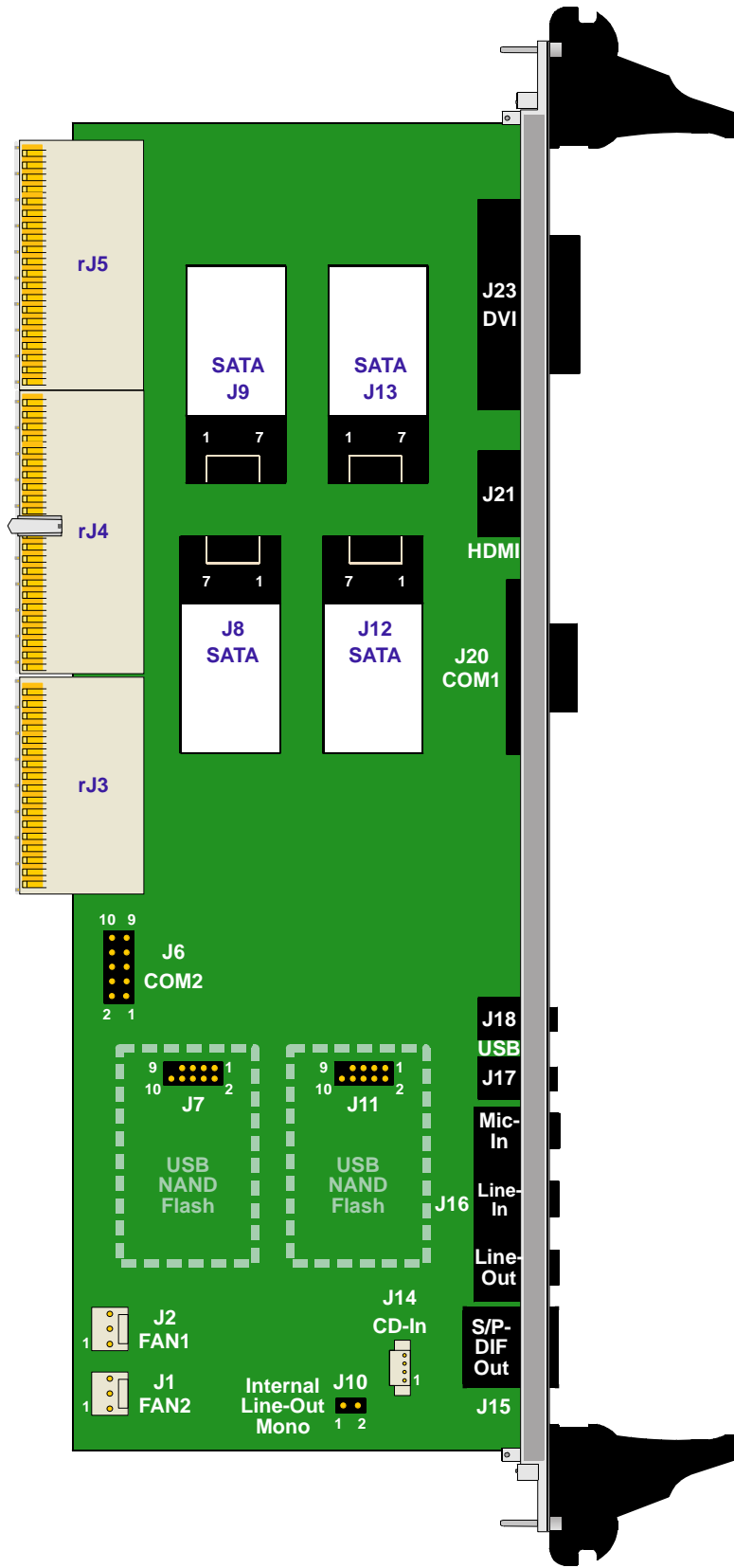




Figure 1-7: CP-RIO6-B216 Board Layout – Front View






## 1.4 Technical Specification

**Table 1-2: CP-RIO6-Ax/Bx Main Specifications**

CP-RIO6-Ax/Bx		SPECIFICATIONS
Front Panel Interfaces	VGA (CP-RIO6-A, CP-RIO6-A216)	One VGA interface on a 15-pin, D-Sub connector, J22, for connecting a standard analog monitor
	DVI-D (CP-RIO6-B, CP-RIO6-B216)	One DVI-D interface (digital only) on a 29-pin DVI connector, J23, for connecting a monitor with a DVI-D interface
	HDMI (CP-RIO6-B, CP-RIO6-B216)	One HDMI interface on a 19-pin HDMI connector, J21, for connecting a monitor with a HDMI interface
	Ethernet (CP-RIO6-A, CP-RIO6-B)	Two Gigabit Ethernet interfaces implemented as a dual RJ-45 connector, J19A/B
	COM1	One serial RS-232 port on a 9-pin, D-Sub connector, J20
	USB	Two USB 2.0 interfaces on type A connectors, J17 and J18
	HD Audio	AD1884A HD audio codec supporting the following ports: <ul style="list-style-type: none"> <li>• Mic-In stereo port on a 3.5 mm stereo jack (pink), J16</li> <li>• Line-In stereo port on a 3.5 mm stereo jack (blue), J16</li> <li>• Line-Out stereo port on a 3.5 mm stereo jack (green), J16</li> <li>• S/P-DIF-Out digital port on an optical fiber connector (Toslink), J15</li> </ul> The CP-RIO6-Ax/Bx provides no audio jack detection support.
Onboard Interfaces	SATA	Four SATA I interfaces implemented as onboard connectors, J8, J9, J12 and J13, for connecting external SATA devices via a SATA cable
	USB	Two onboard connectors, J7 and J11, for connecting two USB 2.0 NAND Flash modules
	COM2	One onboard serial port implemented as a 10-pin, 2.54 mm connector, J6
	HD Audio	AD1884A HD audio codec supporting the following ports: <ul style="list-style-type: none"> <li>• CD-In stereo port on a 4-pin onboard connector, J14</li> <li>• Internal line-out mono port on a 2-pin onboard connector, J10</li> </ul>
	Fan	Two fan connectors, J1 and J2, with PWM control and sense inputs for monitoring the fan speed.
	CompactPCI	Three CompactPCI connectors, rJ3, rJ4 and rJ5, for connecting the CP-RIO6-Ax/Bx to the backplane

Table 1-2: CP-RIO6-Ax/Bx Main Specifications (Continued)

CP-RIO6-Ax/Bx		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><b>Note ...</b> When additional components are installed, refer to their operational specifications as this will influence the modules' operational and storage temperature.</p>
	MTBF	750253 h (MIL-HDBK-217 FN2, Ground Benign 30°) 1262748 h (Bellcore Issue 6, Ground Benign 30°)
	Mechanical	6U, 4HP, CompactPCI-compliant form factor
	Dimensions	233.35 mm x 80 mm
	Board Weight	CP-RIO6-A: 227 g (without USB NAND Flash module) CP-RIO6-A216: 223 g (without USB NAND Flash module) CP-RIO6-B: 231 g (without USB NAND Flash module) CP-RIO6-B216: 227 g (without USB NAND Flash module)

## 1.5 Standards

The CP-RIO6-Ax/Bx complies with the requirements of the following standards:

**Table 1-3: Standards for the CP-RIO6-Ax/Bx**

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: <ul style="list-style-type: none"> <li>• 5-150 (Hz) frequency range</li> <li>• 1 (g) acceleration</li> <li>• 1 (oct/min) sweep rate</li> <li>• 10 cycles/axis</li> <li>• 3 axes</li> </ul>
	Single Shock	IEC61131-2 IEC60068-2-27	Test parameters: <ul style="list-style-type: none"> <li>• 15 (g) acceleration</li> <li>• 11 (ms) pulse duration</li> <li>• 3 shocks per direction</li> <li>• 6 directions</li> <li>• 5 (s) recovery time</li> </ul>



### 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-Ax/Bx.

**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-A216, CP-RIO6-B216)
	<i>Kontron</i> CompactPCI Backplane Manual, ID 24229
HD Audio	Intel's High Definition Audio Specification, Rev. 1.0, April 15, 2004
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142