

» User Guide «



CP-RAPID3

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Warranty

This Kontron product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period, Kontron 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.

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

1 Introduction

1.1 System Overview

The CP-RAPID3 is an integrated card cage, providing serial high speed interconnects for 6U Compact-PCI® boards. The serial capability, coupled with an appropriate slot routing, provides the CP-RAPID3 with the flexibility required for implementing high performance applications in a very compact unit.

Following the two basic definitions of PICMG®2.20 to provide fast serial backplane interconnects, the CP-RAPID3 is fitted with the high speed backplane connectors P4/P41 and related signal definition. Kontron uses the multivendor ZD plus connector for enhanced signal integrity which is compatible with PICMG®2.20, but which has a better shielding than the standard ZD connectors. The PICMG®2.20 signal definition at P4/P41 is used to enable 10 Gigabit Ethernet, PCI Express® and SATA via the backplane.

The system consists of:

- » a 19" wide rack mountable 3U high chassis with 6U wide front and rear sub racks
- » four horizontally oriented 6U 4HP slots (front and rear)
- » two horizontally oriented 3U 8HP front slots for power supplies
- » a CPCI four slot 6U front and rear IO backplane which supports PICMG® 2.0, 2.16 (with restrictions) and 2.20 like functionality

NOTE: Implementers must be aware that the implementation behind the P3/rP3 connectors for slots 1, 2 and 3 is not in accordance with the PICMG® specifications, as the Ethernet signals are routed as discrete channels between slots and not to a dedicated switch.

In addition, connector P4, as defined in PICMG® 2.0, has been replaced with special connectors P4 and P41, which are based on PICMG® 2.20. Also, connector rP4 is not populated.

Refer to the description of the backplane for further information.

- » a specially designed power distribution backplane with support for two power supplies including monitor and control interfacing
- » two 200 watt replaceable 3U 4HP AC power supplies
- » three fan assemblies for forced ambient air cooling with active temperature monitor and control capability
- » a rear main chassis AC input power interface (external three wire cold device connector (line, neutral and protective earth - PE), ON/OFF switch, fusing of both AC line and neutral wires).

1.2 System Features

Taking advantage of the expansion capabilities provided by the CPCI standards, the hybrid design of the CP-RAPID3 offers an extensive feature set including:

- » standard 64-bit CPCI interfacing for all slots (P1/2)

- » rear IO capability on the P3/rP3 connector for slots 1, 2 and 3 except for the pins which are dedicated to the Ethernet routing
- » full mesh 1GB Ethernet topology for slots 1, 2 and 3, with pin assignments of the P3 connector according to PICMG 2.16
- » reduced rear IO capability on the rP3 connector for slot 4
- » the P4 and P41 connectors provide serial mesh capability for 10-to-40GbE-KR, PCIe 3.0 and SATA 6GB/s
- » full rear IO capability on the rP5 connector for slots 1, 2, 3 and 4
- » redundant power supplies with monitor and control signals
- » fan monitor and control signals

1.3 CP-RAPID3 Mechanical and Functional Diagrams

The following figures illustrate mechanical and functional aspects of the CP-RAPID3.

Figure 1: CP-RAPID3 Chassis Views with Dimensions (Front and Rear)

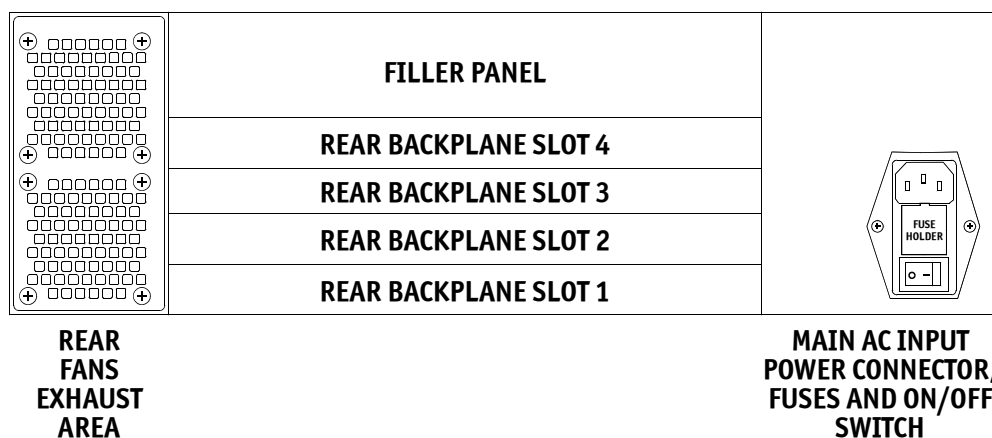
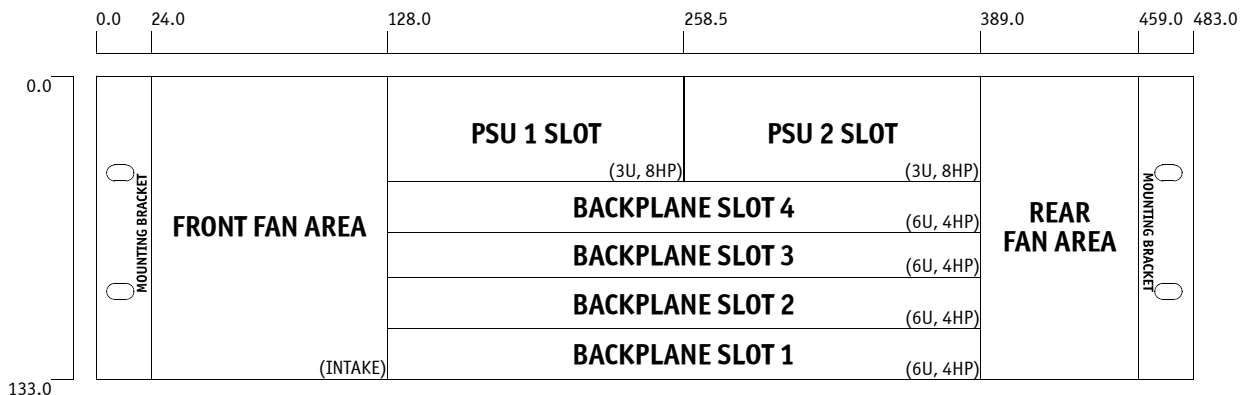


Figure 2: CP-RAPID3 Chassis View with Dimension (Top)

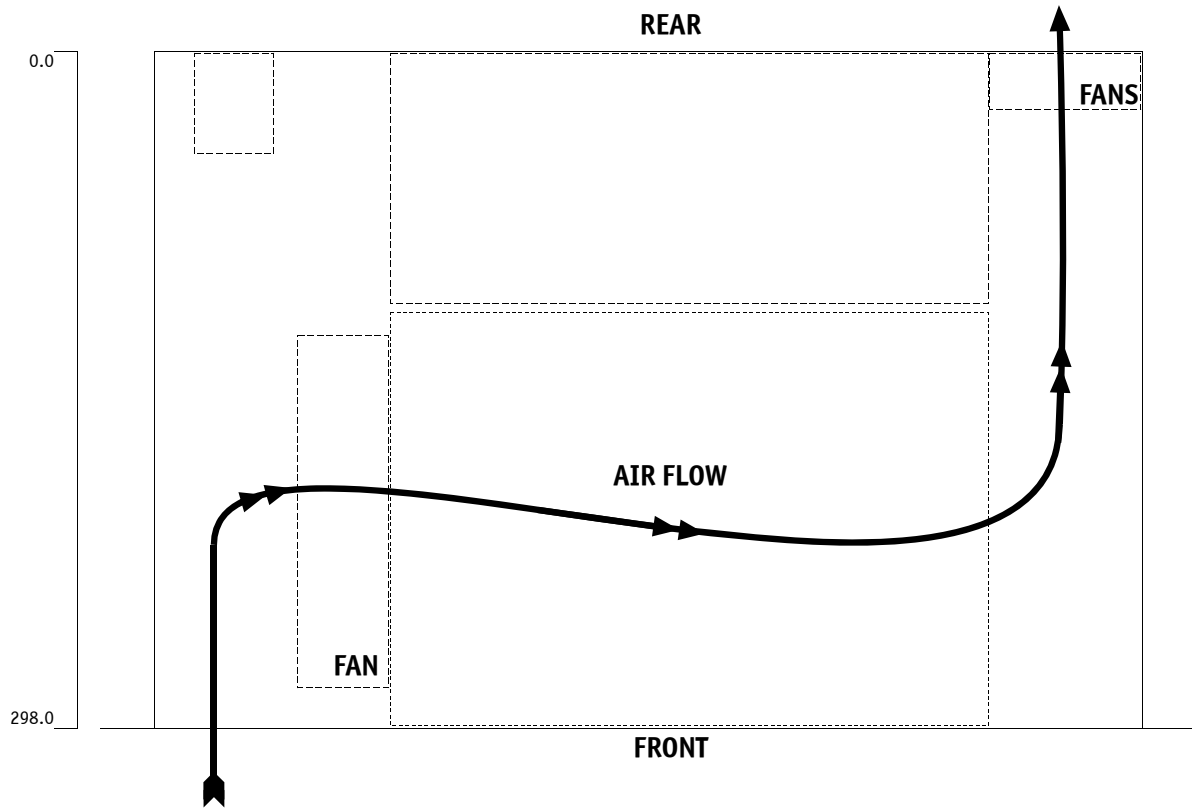


Figure 3: Assembly Drawing of the Backplane - Front and Rear Views

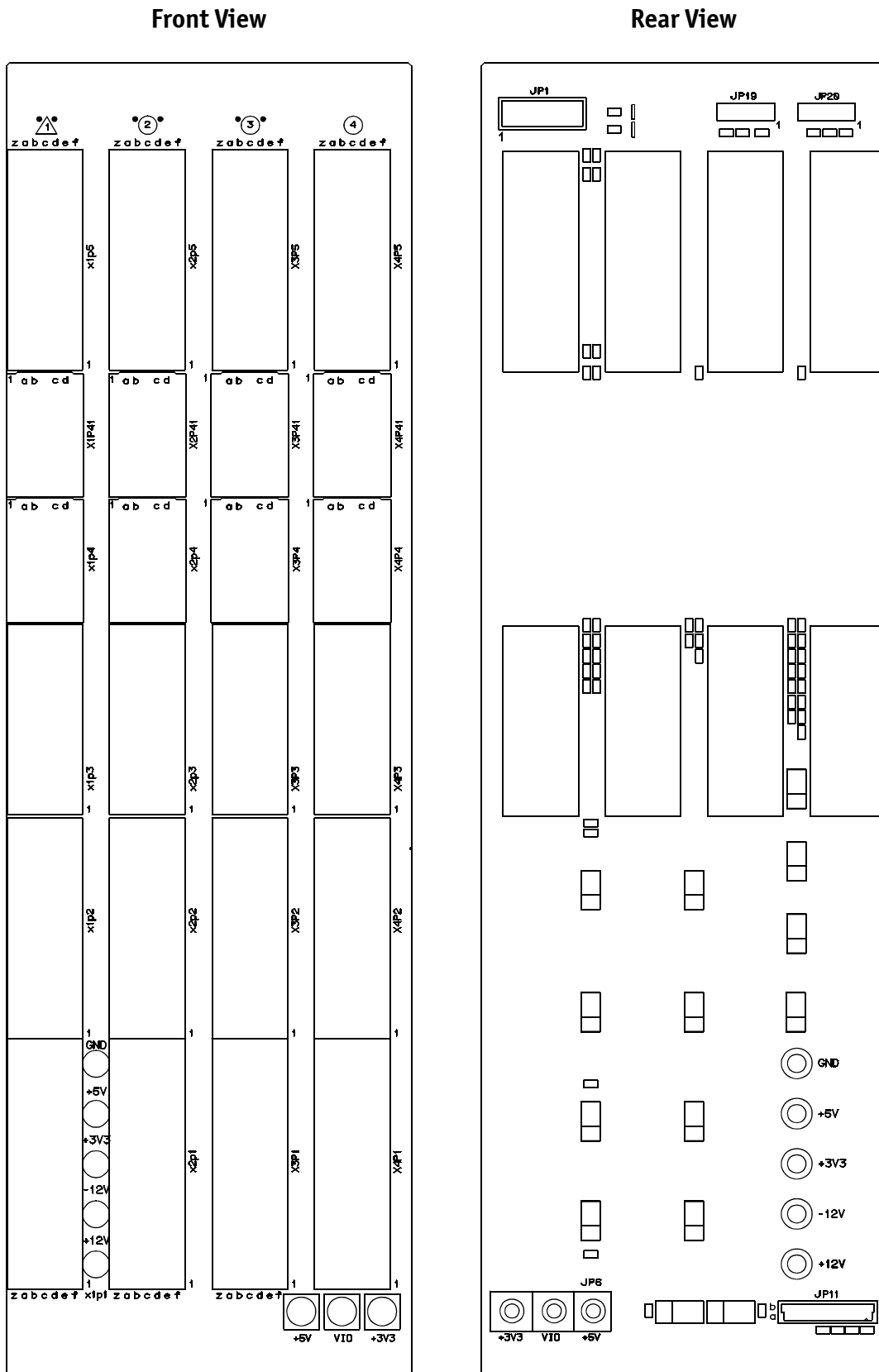
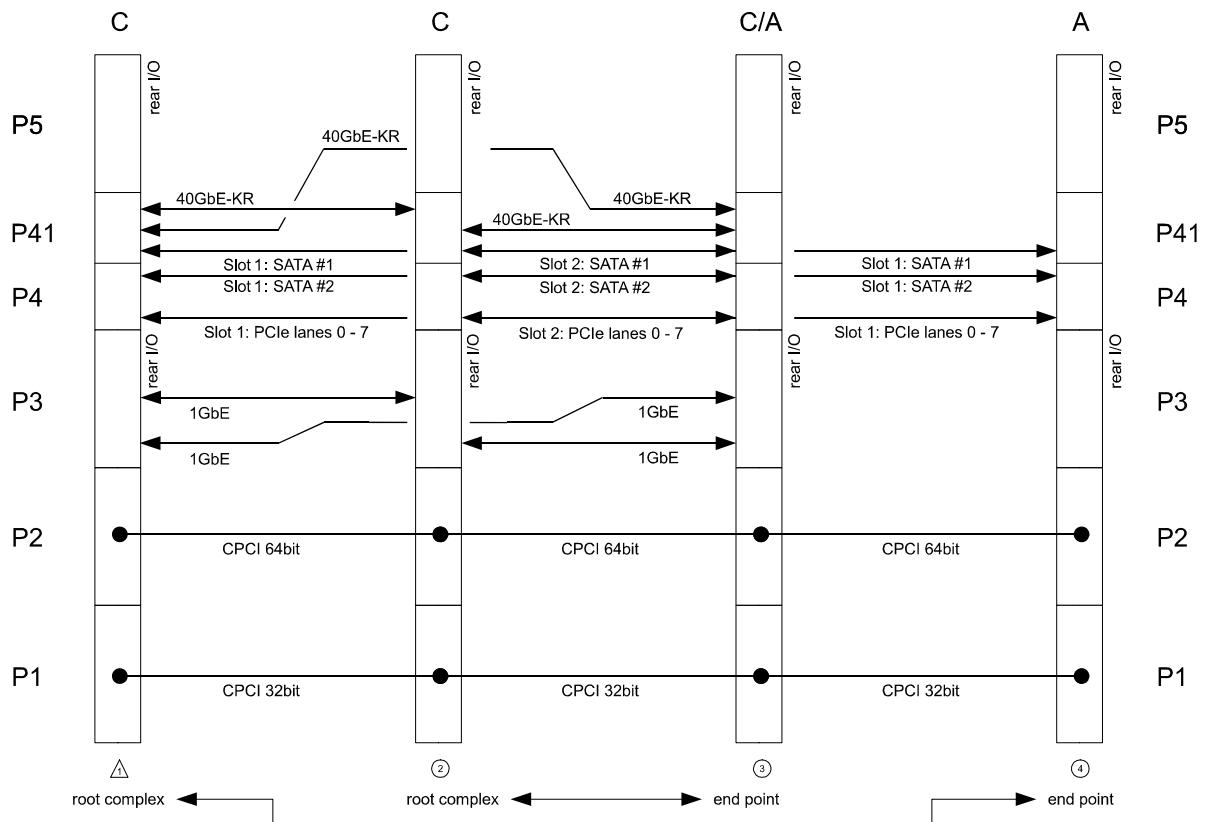


Figure 4: CP-RAPID3 Backplane Slot Interfacing



NOTE: The slots 1, 2 and 3 P3 connectors have rear I/O signal routing with the exception of the 1GbE signals which are routed in the backplane accordingly to provide interfacing between these slots.

The slot 4 P3 connector only provides rear I/O interfacing.

Slot 1 with slot 4 can be regarded as a CPU slot and auxiliary slot, linked via PCIe and SATA. This applies accordingly to slots 2 and 3 as well.

Slot 3 can alternatively be used as additional CPU slot.

CPU slots 1,2 and 3 provide full mesh interfacing of 1GbE and 10/40 GbE and PCIe.

1.4 Technical Specification

Table 1: CP-RAPID3 Main Specifications

CP-RAPID3		SPECIFICATIONS
CHASSIS	CompactPCI	Horizontally oriented 19" wide 3U high chassis: <ul style="list-style-type: none"> » four 6U wide 4HP high CPCI slots, front and rear » slot 1 system slot (bottom) » slots 1 and 2 are for CPU boards » slot 3 for CPU or peripheral board » slot 4 for peripheral board only » two 3U 8HP horizontally oriented power supply slots » pluggable air intake fan on left front side of chassis » air exhaust fans (fixed) located at rear of chassis on the right side » main input power entry point at left rear of chassis
General	Power Supply	Two pluggable 200W AC redundant 3U 8HP power supplies (for more information refer to Chapter 1.6, Related Publications)
	Input Power	230 VAC three wire cold device connector (line, neutral and PE); the neutral and line wires both have fuses; one power ON/OFF switch
	Mounting	Standard 19" cabinet mounting brackets
	Cooling	Ambient air: 3 fans (1 push, 2 pull); active temperature monitor and control capability
	Temperature Range	Operational: 0°C to +50°C Standard (operational range of PSUs without derating) Storage: -40°C to +85°C Without application CPU or peripheral boards
	Acoustic	approx. 70 dB(A) maximum
	Dimensions	483 mm (with mounting brackets) x 133 mm x 298 mm
	Weight	approx. 8.4 kg (without application CPU or peripheral boards, but with two PSUs)

1.5 Standards

This product complies with the requirements of the following standards.

Table 2: Standards

TYPE	ASPECT	STANDARD
Environmental	Ingress Protection	IP20
	WEEE	Directive 2002/96/EC Waste electrical and electronic equipment
	RoHS 2	Directive 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment

Note: Customers desiring to perform environmental testing of the CP-RAPID3 must contact Kontron for assistance prior to performing any such testing.

Boards **without conformal coating** must not be exposed to a change of temperature which can lead to condensation. 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 this product.

Table 3: Related Publications

PRODUCT	PUBLICATION
CP-RAPID3	Kontron CP-RAPID3 Data Sheet
CP6004X-SA	Kontron CP6004X-SA User Guide; ID 1054-1227
CP6005X-SA	Kontron CP6005X-SA User Guide; ID 1055-2501
CP3-SVE-P200AC	Kontron CP3-SVE-P200AC Power Supply User Guide; ID 24139 PD05
CPCI	PICMG® 2.0 specification
CPCI	PICMG® 2.16 specification
CPCI	PICMG® 2.20 specification
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142

2 Functional Description

2.1 Chassis

The basic concept of this chassis is to provide as much capacity as practical in a compact design. This is achieved through the implementation of a horizontally oriented sub-rack design which allows the use of up to four 6U CompactPCI CPU boards making the most out of the space available in a 19" 3U cabinet.

In addition, the horizontally oriented sub-rack has a self-contained air-flow configuration from left front to right rear allowing the chassis to be installed in a standard 19" cabinet or customized operations console without depending on external forced air cooling.

2.2 Backplane

2.2.1 General

The CP-RAPID3 backplane is the key element of this system. It is designed for high performance and flexibility in terms of the CPU and peripheral boards that can be employed while maintaining for the most part CompactPCI compatibility. It takes advantage of various PICMG[®] CompactPCI specification features coupled with Kontron's CP6004X-SA/CP6005X-SA CPU boards to support a wide variety of possible applications.

The following features are standard with the CP-RAPID3 backplane:

1. Slots 1 to 4, connectors P1 and P2 - comply with the PICMG[®] 2.0 specification
2. Slots 1 to 4, connectors P3/rP3 provide rear IO support with exceptions as noted in 3 below
3. Slots 1, 2 and 3, connector P3 - provides three channels of PICMG[®] 2.16 like point-to-point 1GbE (slot 1 to 2; slot 1 to 3 and slot 2 to 3). There is no rear IO capability available on the pins used to support the 1GbE channels. Refer to the connector pinout table for further information.
4. Slots 1, 2, 3 and 4, connector P4 - the standard PICMG[®] 2.0 connector is not populated. Instead, the backplane provides two special high speed connectors - P4 and P41 - according to PICMG[®] 2.20, to enable point-to-point high speed serial interfacing, based on the PICMG[®] 2.20 signal definition, as indicated below:
 - » 10/40GbE-KR: slot 1 to 2, slot 1 to 3 and slot 2 to 3
 - » 6Gb/s SATA: slot 1 to 4, two channels; slot 2 to 3, two channels
 - » PCIe 3.0: slot 1 to 4, eight lanes; slot 2 to 3, eight lanes
5. Slots 1 to 4, connectors P5/rP5 provide rear IO support

While designed to fully support Kontron's CP6004X-SA/CP6005X-SA CPU boards, standard PICMG[®] 2.16 boards that can be appropriately configured (J4 not populated; J3/P3/backplane GbE signal routing in accordance with application requirements) may be used with this backplane. In addition, certain

Kontron rear IO modules can be supported. For further assistance, contact Kontron before committing to a specific implementation.

2.2.2 Backplane Connector Pinouts

2.2.2.1 Slots 1 to 4 - Connectors P1 and P2

These connectors comply with the PICMG[®] 2.0 specification for all slots.

2.2.2.2 Slots 1 to 3 - Connectors P3/rP3

The signal routing of these connectors is as follows:

Table 4: Slots 1 to 3 - Connectors P3/rP3 Pinout

PIN	Z	A	B	C	D	E	F
19	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
18	NC	P3_A	P3_A	GND	P3_A	P3_A	GND
17	NC	P3_A	P3_A	GND	P3_A	P3_A	GND
16	NC	P3_B	P3_B	GND	P3_B	P3_B	GND
15	NC	P3_B	P3_B	GND	P3_B	P3_B	GND
14	NC	Rear IO	Rear IO	Rear IO	Rear IO	FAN:SENSE2	GND
13	NC	Rear IO	Rear IO	Rear IO	Rear IO	FAN:SENSE1	GND
12	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
11	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
10	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
9	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
8	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
7	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
6	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
5	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
4	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
3	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
2	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
1	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND

Table 5: Slots 1 to 3 - Connectors P3/rP3 Routing Legend

SIGNAL	DESCRIPTION
Rear IO	Signal routing P3/rP3
P3_A P3_B	Signal routing P3/backplane/P3: » SLOT 1 P3_A / SLOT 2 P3_A » SLOT 1 P3_B / SLOT 3 P3_A » SLOT 2 P3_B / SLOT 3 P3_B
GND	Signal routing P3 to backplane
FAN:SENSE2 FAN:SENSE1	Signal routing backplane to P3 » only on slot 1 (inputs from fans) » otherwise, P3/rP3 and Rear IO

2.2.2.3 Slot 4 - Connectors P3/rP3

The signal routing of these connectors is as follows:

Table 6: Slot 4 Connectors P3/rP3 Pinout

PIN	Z	A	B	C	D	E	F
19	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
18	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
17	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
16	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
15	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
14	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
13	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
12	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
11	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
10	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
9	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
8	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
7	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
6	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
5	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
4	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
3	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
2	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
1	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND

Table 7: Slot 4 - Connectors P3/rP3 Routing Legend

SIGNAL	DESCRIPTION
Rear IO	Signal routing P3/rP3

2.2.2.4 Slots 1 to 4 - Connectors P4/P41

The signal routing of these connectors is as follows:

Table 8: Slots 1 to 4 - Connectors P4/P41 Pinout

CON	POS	A	B	C	D
P41	1	P41_A	P41_A	P41_A	P41_A
	2	P41_B	P41_B	P41_B	P41_B
	3	P41_B	P41_B	P41_B	P41_B
	4	P41_B	P41_B	P41_B	P41_B
	5	P41_B	P41_B	P41_B	P41_B
	6	P41_C	P41_C	P41_C	P41_C
	7	P41_C	P41_C	P41_C	P41_C
	8	P41_C	P41_C	P41_C	P41_C
	9	P41_C	P41_C	P41_C	P41_C
	10	P41_D	P41_D	P41_D	P41_D
P4	11	P4_E	P4_E	P4_E	P4_E
	12	P4_F	P4_F	P4_F	P4_F
	13	P4_F	P4_F	P4_F	P4_F
	14	P4_F	P4_F	P4_F	P4_F
	15	P4_F	P4_F	P4_F	P4_F
	16	P4_F	P4_F	P4_F	P4_F
	17	P4_F	P4_F	P4_F	P4_F
	18	P4_F	P4_F	P4_F	P4_F
	19	P4_F	P4_F	P4_F	P4_F
	20	P4_G	P4_G	NC	NC

Table 9: Slots 1 to 4 - Connectors P4/P41 Routing Legend

SIGNAL	DESCRIPTION
P41_A	Signal routing P41/backplane/P41 » SLOT 1 P41_A / SLOT 4 P41_A » SLOT 2 P41_A / SLOT 3 P41_A
P41_B P41_C	Signal routing P41/backplane/P41 » SLOT 1 P41_B / SLOT 2 P41_B » SLOT 1 P41_C / SLOT 3 P41_B » SLOT 2 P41_C / SLOT 3 P41_B (no connections to slot 4)
P41_D	Signal routing P41/backplane/P41 » SLOT 1 P41_D / SLOT 4 P41_D » SLOT 2 P41_D / SLOT 3 P41_D
P4_E	Signal routing P4/backplane/P4 » SLOT 1 P4_E / SLOT 4 P4_E » SLOT 2 P4_E / SLOT 3 P4_E
P4_F	Signal routing P4/backplane/P4 » SLOT 1 P4_F / SLOT 4 P4_F (slot 1 - root complex) » SLOT 2 P4_F / SLOT 3 P4_F (slot 2 - root complex)
P4_G	Signal routing P4/backplane/P4 » SLOT 1 P4_G / SLOT 4 P4_G » SLOT 2 P4_G / SLOT 3 P4_G

2.2.2.5 Slots 1 to 4 - Connectors P5/rP5

The signal routing of these connectors is as follows:

Table 10: Slots 1 to 4 Connectors P5/rP5 Pinout

PIN	Z	A	B	C	D	E	F
19	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
18	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
17	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
16	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
15	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
14	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
13	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
12	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
11	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
10	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
9	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
8	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
7	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
6	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
5	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
4	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
3	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
2	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND
1	NC	Rear IO	Rear IO	Rear IO	Rear IO	Rear IO	GND

Table 11: Slots 1 to 4 Connectors P5/rP5 Legend

SIGNAL	DESCRIPTION
Rear IO	Signal routing P5/rP5

2.3 Power Input and Distribution

Main input power interfacing is provided at the right rear of the CP-RAPID3 (as viewed from the rear of the chassis). The power connector is a three pole cold device connector with an ON/OFF switch and fuses for the line and neutral wires. The PE wire is connected to the CP-RAPID3 chassis internally.

Power distribution is achieved via a special power distribution backplane which accommodates up to two 3U 8HP P47 connector power supplies of type CP3-SVE-P200AC from Kontron. All power voltages plus various monitor and control signals are interfaced to the CP-RAPID3's main backplane.

2.4 Cooling

Cooling is provided by three fans: one large intake fan accessible from the front of the chassis and two smaller fixed exhaust fans located on the left side as viewed from the rear of the chassis.

The front fan is a removable L-form assembly on which the fan and an air filter are mounted. The filter can be replaced. If the fan is defective, the whole assembly must be replaced.

When the system is operating, ambient air is pulled in from the front of the chassis, pushed through the sub-rack and exhausted at the rear of the chassis.

The CP-RAPID3 performs its own temperature monitoring and control. If required, the application can be configured to perform monitor and control. In this case, please contact Kontron for further assistance.

2.5 Power Supply

Kontron's CP3-SVE-P200AC power supplies are designated for use with the CP-RAPID3. To support maximum loading, two power supplies must be installed. For this reason, in this system the power supplies are not hot-swappable.

For further information concerning the power supplies, refer to Kontron's on-line documentation at www.kontron.com.

2.6 Application Devices

Documentation for application devices (CPU boards and peripheral boards including the power supplies) is not within the scope of this document. Refer to the Kontron web-site (www.kontron.com) for documentation concerning application devices provided by Kontron. For third party devices, refer to the supplier's documentation.

3 Installation

Integration of a CP-RAPID3 system in an application is an involved process which requires a comprehensive and in-depth design concept as well as a thorough understanding of the functionality provided by the CP-RAPID3 system.

The previous chapters in this guide have dealt primarily with hardware aspects of the CP-RAPID3 providing details of the interfacing available to an application. This chapter is intended to aid the integration process by providing information which must be considered prior to, during and after the integration of the CP-RAPID3 in an application.

Towards this goal the following subjects are addressed in this chapter:

- » safety
- » personnel requirements
- » thermal considerations
- » mounting pre-requisites
- » initial installation of a unit
- » removal of a unit
- » (re-) installation of a unit
- » system operation
- » maintenance
- » optional component replacement
- » unit disposal at end of life
- » software
- » system label

3.1 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 the product's 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 component versions, which must not be exceeded. If batteries, SSD/HDDs or other add-in devices are present, their temperature restrictions must be taken into account.

3.2 Safety

To ensure personnel safety and correct operation of this product, the following safety precautions must be observed:

- » All operations involving the CP-RAPID3 require that personnel be familiar with system equipment, safety requirements and the CP-RAPID3.
- » This product contains electrostatically sensitive components which can be seriously damaged by electrical static discharge (ESD). Therefore, proper handling must be ensured at all times.
- » 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 the system housing.
- » Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.
- » Do not touch components, connector pins or traces.
- » This system is designed for operation using AC voltage in the range from 85 to 264 VAC. Therefore when connected to the mains power source hazardous AC voltage is present. Disconnect the mains power from the system before performing any operation such as maintenance, configuration changes, inspection, etc.

Kontron assumes no liability for any damage resulting from failure to comply with these requirements.

3.3 Personnel Requirements

Personnel involved in the handling and operation of the CP-RAPID3 need to be aware of the requirements placed on them depending on the particular environment in which they are working. This user guide defines the following CP-RAPID3 environments:

- » development environment
- » implementation environment
- » application environment
- » maintenance environment

3.3.1 Development Environment

The development environment pertains to those activities related to application design and proof of design testing. These activities include but are not limited to application software development, interface functionality verification, and proof of application suitability.

It is assumed that all personnel involved in these activities are trained and experienced as well as being cognizant of all safety requirements for the environment in which they work.

In this environment, personnel have access to all externally available interfaces.

WARNING! Ensure that power is only applied when it is safe to do so.

3.3.2 Implementation Environment

The implementation environment pertains to those activities dealing with the initial installation of the CP-RAPID3 at its final operational location within an application. These activities include but are not limited to the initial mounting of the unit, application software installation, application interface functionality verification, and user operational acceptance of the unit.

It is assumed that all personnel involved in these activities are trained and experienced as well as being cognizant of all safety requirements for the environment in which they work.

In this environment, personnel have access to all externally available interfaces until the unit is installed. Once installed in the application, only the front panel interfaces are normally accessible.

WARNING! Ensure that power is only applied when it is safe to do so.

3.3.3 Application Environment

The application environment pertains to those activities dealing with the operation of the CP-RAPID3 in the application for which it is intended. These activities include but are not limited to the operation of the unit as called for by the application, assessment of the operational status of the unit, application of work-around procedures for failed unit functionality, and initiation of failure resolution actions.

It is assumed that all personnel involved in these activities are trained and experienced as well as being cognizant of all safety requirements for the environment in which they work.

In this environment, personnel normally only have access to the front panel interfaces.

WARNING! When power is applied to the CP-RAPID3 in a “cold” state, the CP-RAPID3 begins to operate (prerequisite: ON/OFF switch set to on and main power cable connected to operating power source). Ensure that power is only applied when it is safe to do so.

3.3.4 Maintenance Environment

The maintenance environment pertains to those activities dealing with the resolution of unacceptable performance of the unit during operation. These activities include but are not limited to determination of the operational status of the unit, localization of the possible failure source, determination of action(s) to be taken to resolve the situation, and the resolution of the failure.

It is assumed that all personnel involved in these activities are trained and experienced as well as being cognizant of all safety requirements for the environment in which they work.

In the event the CP-RAPID3 is physically installed at the point of application use, care must be exercised when handling or operating the unit for maintenance purposes so as not to damage other application elements external to the CP-RAPID3.

In this environment, personnel have access to all externally available interfaces.

WARNING! Ensure that power is only applied when it is safe to do so.

3.4 Thermal Considerations

The CP-RAPID3 is designed for ambient air convection cooling within the specified ambient air temperature ranges. Therefore it is imperative that air flow to and from the unit is guaranteed. In addition, implementers must empirically verify the cooling concept for the CP-RAPID3 including optionally installed devices prior to implementing the unit in the intended application.

WARNING! Do not operate the CP-RAPID3 if it is not properly cooled!

Kontron rejects all liability for any and all damages resulting from operation of the CP-RAPID3 at ambient temperatures outside the specified operating range.

NOTE: To help ensure proper cooling of the CP-RAPID3, all unused slots including the rear IO slots must have blind front panels installed. In addition, all unused front slots must have air guides installed to ensure air flow over the installed devices.

3.5 Mounting Pre-requisites

The unit mounting concept is an integral element of CP-RAPID3 applications. Not only the basic positioning of the unit itself must be considered, it is necessary to fulfill various other requirements in order to achieve a successful implementation of the CP-RAPID3 in the intended application.

The following issues must be considered prior to physically attempting to integrate the CP-RAPID3:

- » physical orientation
- » physical mounting
- » cabling
- » air flow

3.5.1 Physical Orientation

The unit must be so positioned as to facilitate good ambient air circulation. To a certain degree this may be limited by the possibilities presented by the installation point surroundings. In any event a satisfactory positioning must be achieved which takes into consideration the application cabling requirements.

3.5.2 Physical Mounting

The CP-RAPID3 is designed for mounting inside a 19" control cabinet as well as in an operator's console using the front panel mounting brackets. Refer to chapter 1 for the physical dimensions of the unit.

3.5.3 Cabling

All cables must be clearly marked to ensure that they are connected to the correct connectors on the unit. In addition, the cables must be long enough to facilitate installation and have some form of support so as to minimize the strain on the unit's connectors.

If the CP-RAPID3 requires rear IO cabling, there must be adequate room behind the chassis to accommodate the cables without incurring excessive bending of the cables.

The mains AC input power cable must also have an indication as to the power source nominal voltage: 115 - 230 VAC.

3.5.4 Air Flow

The CP-RAPID3 is designed for front to rear air flow. For this reason it must be ensured that neither the front air intake nor the rear air exhaust areas are obstructed. Adequate air flow is essential for the operation of the CP-RAPID3.

3.6 Installation and Removal in an Application Environment

The following chapters provide basic instructions and information necessary to:

- » initially install a CP-RAPID3 in an application environment
- » remove a previously installed unit
- » (re-)install a unit

3.6.1 Initial Installation of a CP-RAPID3

The initial installation of a CP-RAPID3 assumes that all required preparatory work has been accomplished, that the unit to be installed has been configured for application operation and accepted as operable, that proper mounting bolts/screws and appropriate washers are available, and that the available mains AC input voltage is the same as that required by the unit.

Personnel who perform this procedure must have read and familiarized themselves with the procedure prior to executing it.

All discrepancies encountered during the execution of this procedure must be resolved before proceeding with the next step indicated. If necessary, begin again with step 1 of the procedure. Do not leave out any steps.

To initially install a CP-RAPID3 perform the following procedure:

1. Ensure that at all times during the execution of this procedure that all safety requirements are fulfilled.

Refer to chapter 3.2 for safety information.
2. Ensure that the available mains AC input power is the same as required for the unit to be installed.

There is a label on the CP-RAPID3 which indicates the input voltage required by the unit. Compare this with the source voltage indicated on the input power cable. If they are not the same, do not install this unit.
3. Except for the power cable, connect and secure all rear IO interfacing cables.
4. Configure the ON/OFF switch to ON.
5. Verify that it is safe to connect the power cable.

The reason for this being is that depending on the application and configuration of the mains AC input power, the system may start to operate as soon as the power cable is connected. Ensure that the system will not start to operate when the power cable is connected.

Refer to the application documentation for further assistance regarding this issue.

6. Connect and secure the main input power cable.

There must not be power on the power cable at this time.

7. Mount the CP-RAPID3 using four M5 bolts/screws with washers. Tighten the bolts/screws so that the CP-RAPID3 will be secure during operation.

8. Connect and secure all front IO interfacing cables. The system is now ready for operation.

Initial physical installation of the CP-RAPID3 is now completed.

Verification or operation of the application functionality is not within the scope of this user guide.

3.6.2 Removal of a CP-RAPID3

The following procedure assumes that the CP-RAPID3 has been shutdown and that all required tools are available.

Personnel who perform this procedure must have read and familiarized themselves with the procedure prior to executing it.

All discrepancies encountered during the execution of this procedure must be resolved before proceeding with the next step indicated. If necessary, begin again with step 1 of the procedure. Do not leave out any steps.

To remove the CP-RAPID3 perform the following procedure:

1. Ensure that at all times during the execution of this procedure that all safety requirements are fulfilled.

Refer to chapter 3.2 for safety information.

2. Ensure that the system is safe for removal.

Verify that all application functions have been properly terminated and the system is safe for removal of mains input power.

3. Ensure that the mains input power has been removed from the system.

Verify that it is safe to disconnect the power cable.

4. Disconnect and secure all front IO interfacing cables.

5. Remove the unit's mounting bolts/screws. Retain them for further use.

Depending on the mounting situation, it may be necessary to provide support of the unit to prevent it from falling.

6. Pull the CP-RAPID3 system far enough out of the mounting site so as to gain access to the rear IO cabling.

7. Set the ON/OFF switch to the OFF position.

8. Disconnect and secure the power cable.
9. Disconnect and secure all of the remaining rear IO interfacing cables.

Physical removal of the CP-RAPID3 is now completed.

10. Dispose of the unit as required.

3.6.3 (Re-)installation of a CP-RAPID3

The (re-)installation of a CP-RAPID3 assumes that an initial installation of the CP-RAPID3 has been performed. If not then refer to chapter 3.6.1. Personnel who perform this procedure must have read and familiarized themselves with the procedure prior to executing it.

All discrepancies encountered during the execution of this procedure must be resolved before proceeding with the next step indicated. If necessary, begin again with step 1 of the procedure. Do not leave out any steps.

To (re-)install a CP-RAPID3 perform the following procedure:

1. Ensure that at all times during the execution of this procedure that all safety requirements are fulfilled.

Refer to chapter 3.2 for safety information.

2. Ensure that the available mains AC input power is the same as required for the unit to be installed.

There is a label on the CP-RAPID3 which indicates the input voltage required by the unit. Compare this with the source voltage indicated on the input power cable. If they are not the same, do not install this unit.

3. Except for the power cable, connect and secure all rear IO interfacing cables.
 4. Configure the ON/OFF switch to ON.
 5. Verify that it is safe to connect the power cable.
-
6. Connect and secure the main input power cable.
 7. Mount the CP-RAPID3 using four M5 bolts/screws with washers. Tighten the bolts/screws so that the CP-RAPID3 will be secure during operation.
 8. Connect and secure all front IO interfacing cables. The system is now ready for operation.

Physical installation of the CP-RAPID3 is now completed.

3.7 System Operation

As system operation is a function of the operating systems involved and the application, it is not within the scope of this user guide.

Implementers, however, must still be aware that they are responsible for ensuring that for a given application all necessary functions are available to ensure proper operation of the system including the safety of the system as well as personnel (e.g. operators, installers, maintainers).

For this reason, some required application functions may or must be external to the CP-RAPID3.

3.8 Maintenance

In the strictest sense, the CP-RAPID3 itself consists of the chassis, the backplanes, the fans and the power supplies. As such it is a sub-system and not a system and cannot be operated alone. In order to function as an application it requires additional components - CPU boards and other peripheral devices plus software.

Prior to installation of application components, the CP-RAPID3 should not require any form of maintenance except for resolution of obvious physical damage or malfunctioning of the fans or power supplies. The front fan assembly and the power supplies are field replaceable. If their replacement does not resolve the discrepancy, then the CP-RAPID3 must be returned to Kontron for repair.

Determination of the operational status of application components of the CP-RAPID3 and actions to be performed to resolve unacceptable performance issues is not within the scope of this user guide. Application developers and implementers are responsible for providing guidance and assistance to operations and maintenance personnel for accomplishing these functions.

In any event, before replacing any system components it must be ensured that it is safe to do so. If an application component is to be replaced, refer to the component's documentation for guidance before initiating replacement actions.

If a CP-RAPID3 is to be returned to Kontron and the original packaging is not available for returning the unit, the packaging used must comply with the IEC standard 1131-2.

3.9 Application Component Replacement

In the event an application component requires replacement, refer to the documentation provided with the application component for information and instructions as to how this is to be accomplished.

Depending on the application configuration, it may be possible to "hot-swap" certain components. As this is a function of the application, refer to the application documentation for further assistance.

As a component replacement is in any case a maintenance action, it must be ensured that all safety requirements are followed to prevent system damage or personnel injury.

All discrepancies encountered during the replacement activities must be resolved before putting the system into operation.

Operation of the CP-RAPID3 in an application environment with a removed module is normally not a defined operational mode. Therefore do not operate units which normally must have a module installed in an application environment.

Dispose of a removed or replaced module as required. If the CP-RAPID3 was removed from its application site, refer to chapter 3.6.3 for installation procedures of the unit.

3.10 CP-RAPID3 Component Replacement

In the event an application component requires replacement, refer to the documentation provided with the application component for information and instructions as to how this is to be accomplished.

3.11 System Disposal

The CP-RAPID3 system may be disposed of as electronic waste. The chassis itself is made up of steel and aluminum. The metal parts can be disposed of as scrap metal provided the electronic components are removed prior to disposal.

3.12 Software

The CP-RAPID3 power supply backplane has its own firmware for control and monitor functions (temperature, fans, power etc.).

For software provided by Kontron with the CP-RAPID3 application devices (CPU boards and other devices) refer to the online documentation provided with the software packages for installation and usage.

Application software including any diagnostic software must be provided by the user.

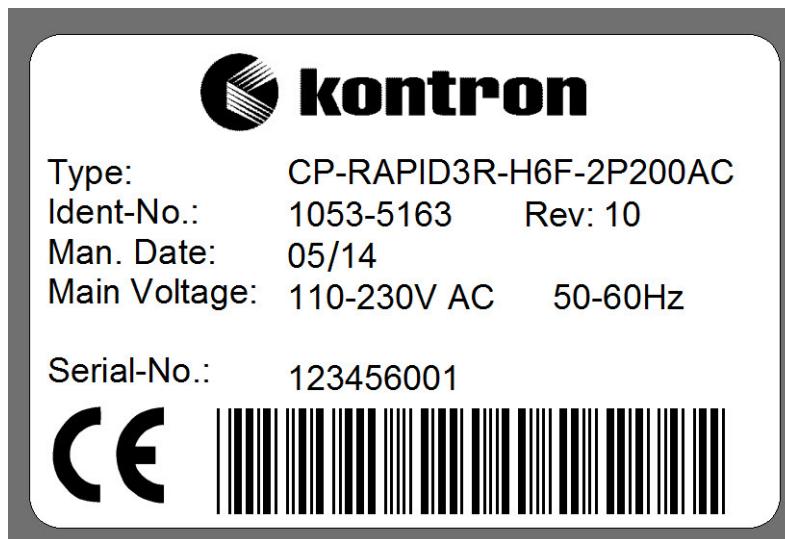
3.13 System Label

Each system is supplied with an identification label attached to the system chassis on the left side looking from the front. This system label contains the following information:

- » Type indicates the system type and product configuration
- » Ident-No. indicates the Kontron identification number of the system
- » Rev: indicates the product revision
- » Man. Date indicates the month and year that the system was manufactured
- » Main Voltage indicates the required nominal input voltage for this system
- » Serial Number indicates the Kontron serial number of the system
- » Barcode indicates the serial number of the system in barcode format

The following figure provides an example of a system label.

Figure 5: Sample System Label



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