RX3i Universal Backplane

GFK-2716B
April 2015

The PACSystems* RX3i 7-slot Universal Backplane is the smallest member of the RX3i Universal Backplane family. With its dual-purpose backplane, the RX3i Universal Backplane supports both PCI-based backplane (IC695) and serial backplane (IC693 and IC694) I/O and option modules. It also supports Series 90-30 I/O and option modules. The compact size of the 7-slot rack makes it ideal for applications where space is a significant constraint, or the number of I/O modules in a single location is small.

Slot 0, the slot furthest to the left (Figure 1), supports the IC695 power supply only. Slots 1–5 support both PCI-based and serial backplane modules. Slot 6 provides a PCI connector only and can therefore only accept IC695 single-width modules.

Features of the Universal Backplane include:

- Terminal Strip on the left end (Figure 1) for Isolated +24V input
- Backplane grounding point
- An integral grounding bar for connecting module/shield grounds
- Printed slot numbers that are mirrored in the Proficy Machine Edition (PME) hardware configuration.
- Support for all RX3i-compatible modules, except the IC695LRE001 Serial Bus Transmitter. Refer to the *PACSystems RX3i System Manual,* GFK-2314, for lists of supported modules.

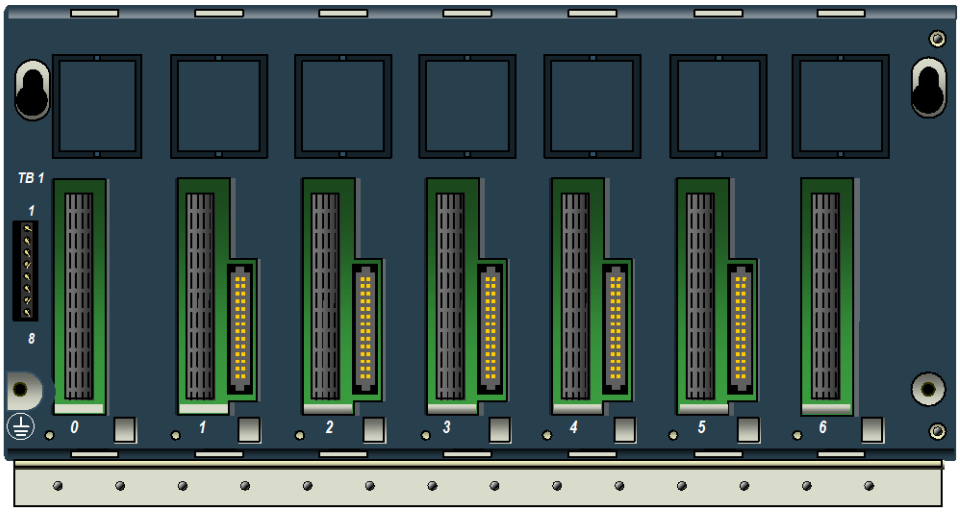

Figure 1: IC695CHS007 Universal Backplane showing slots 0 through 6

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Installation Location

This product is intended for use with the RX3i system. Its components are considered open equipment (having live electrical parts that may be accessible to users) and must be installed in an ultimate enclosure that is manufactured to provide safety. At a minimum, the enclosure shall provide a degree of protection against solid objects as small as 12mm (fingers, for example). This equates to a NEMA/UL Type 1 enclosure or an IEC60529 IP20 rating providing at least a pollution degree 2 environment. For details about installing RX3i rack systems, refer to *PACSystems RX3i System Manual*, GFK-2314.

Installation in Hazardous Areas

The following information is for products bearing the UL marking for Hazardous Areas or ATEX marking for explosive atmospheres:

CLASS 1 DIVISION 2 GROUPS ABCD

- This equipment is an open-type device and is meant to be installed in an enclosure suitable for the environment that is only accessible with the use of a tool.
- Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations, or nonhazardous locations only.

Warning – EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

Warning – WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES.

ATEX Zone 2

This module must be mounted in an enclosure certified in accordance with EN60079-15 for use in Zone 2, Group IIC and rated IP54. The enclosure shall only be able to be opened with the use of a tool.

RX3i Universal Backplane Installation

The enclosure into which the backplane is mounted must be able to adequately dissipate the heat generated by all of the components mounted inside so that no components overheat. As shown in Figure 3, a minimum space of at least 102mm (4 inches), is required on all sides of the RX3i backplane for cooling. Additional space may be required, depending on the amount of heat generated by the equipment during operation. Refer to the *PACSystems RX3i System Manual,* GFK-2314, for product standards, general operating specifications, and installation requirements.

Backplane Orientation

Backplanes must be mounted horizontally to meet product performance and reliability specifications by providing adequate airflow around the modules. Other mounting orientations may affect system performance and/or reliability and are therefore not recommended.

Figure 2: Vertical Mounting Not Recommended

Backplane Dimensions and Spacing

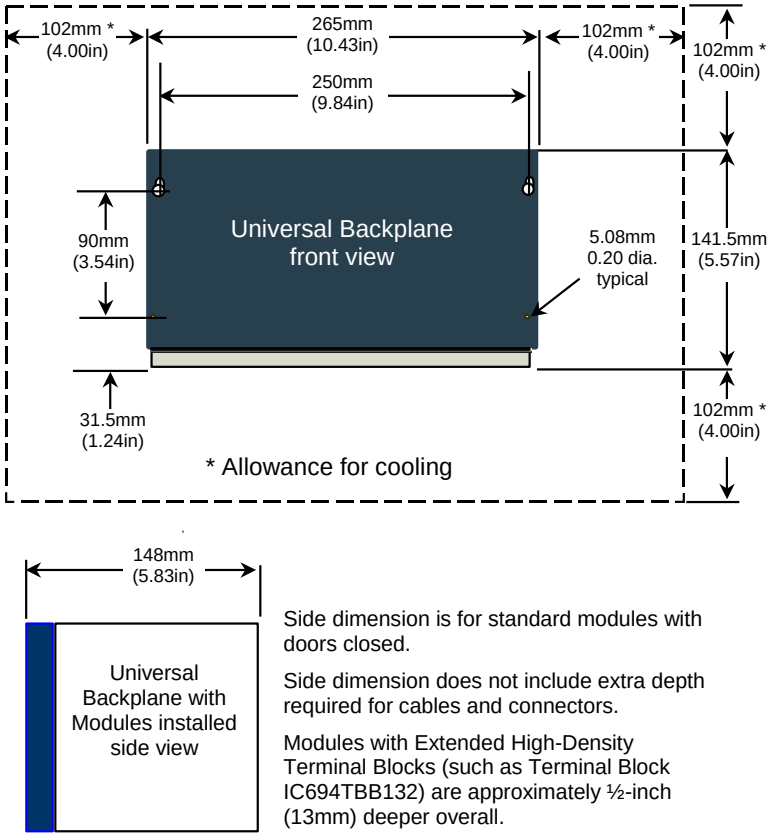


Figure 3: Mounting Arrangements

RX3i Universal Backplane Terminals and Connectors

TB1 Input Terminals

The RX3i IC695 Power Supplies do not provide Isolated +24V output power over the backplane. TB1 input terminals 7 and 8 can be used to connect an optional external source of Isolated +24VDC, which is required for some IC693 and IC694 modules. These terminals accept individual wires from 14 to 22 AWG.

TB1 terminals 1 through 6 are not used.

Slot 0

The leftmost slot in a Universal Backplane is slot 0. Only the backplane connector of IC695 Power Supplies can be installed in slot 0.

Note: IC695 Power Supplies can be installed in other slots. For details, see *Module Locations in a 7-Slot Universal Backplane*.

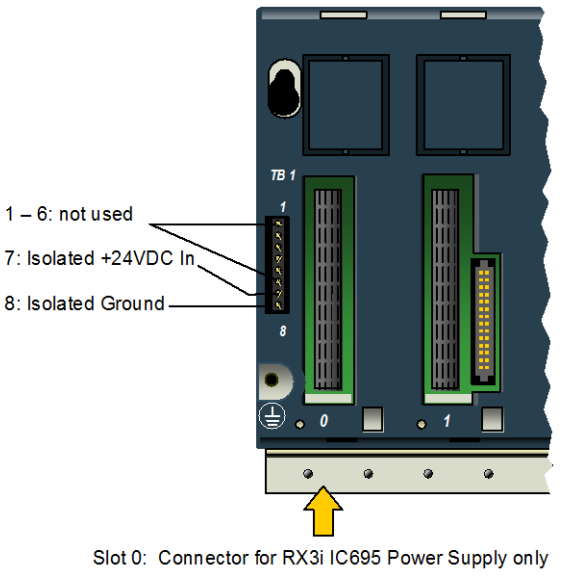


Figure 4: Left side Detail, Including Isolated Power

Two-slot-wide modules that have right-justified connectors, such as the CPE310, can be plugged into slot 1 and will therefore also cover slot 0. The CPU is referenced for configuration and application logic by the leftmost slot occupied by the entire module, not by the slot the physical connector is located in. For example, if the CPU has its physical connector inserted in slot 3, the CPU module occupies slots 2 and 3 and the CPU is therefore considered to be located in slot 2. The CPU may be located in slot 0 with its connector in slot 1.

Slot 1 to Slot 6

Slots 1 through 5 have two connectors: a connector for the RX3i PCI-based bus and a connector for the RX3i serial bus. Each of these slots can accept any type of compatible module: IC695 Power Supply, IC695 CPU, or IC695, IC694 and IC693 I/O or option modules. See the *PACSystems RX3i System Manual*, GFK-2314, for lists of supported modules.

Slot 6 has one RX3i PCI connector and can accept only IC695 single-width I/O or option modules.

Provided the Hot Installation procedure described in the *PACSystems RX3i System Manual,* GFK2314, is carefully followed, I/O and option modules in a Universal Backplane may be removed and replaced without powering-down.

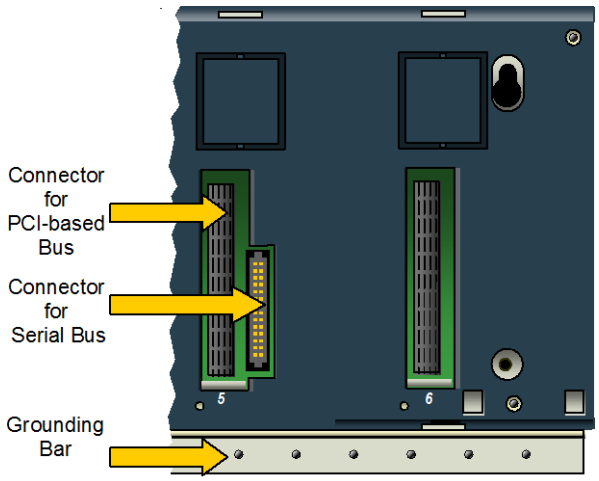


Figure 5: PCI and Serial Bus Connectors & Grounding Bar

Grounding Bar

Module shield grounds can be connected to the Grounding Bar (Figure 5) at the bottom of a Universal Backplane using size M3 screws. The recommended torque is 4 in/lb (0.45 Nm) maximum.

Module Locations in a 7-Slot Universal Backplane

- DC Power Supplies IC695PSDx40 occupy one slot and may be installed in any slot. AC Power Supplies IC695PSAx40 occupy two slots and cannot be installed in slot 6. *IC694 and IC693 Power Supplies cannot be installed in Universal Backplanes.*
- Any I/O or option module can be installed in slots 1 through 5. These slots have two connectors and can accommodate either an RX3i PCI-based module or a serial module. Slot 6 can accommodate only RX3i PCI-based single-wide modules. I/O and option modules cannot be installed in slot 0, which can only accept IC695 Power Supplies.
- An RX3i CPU can be installed anywhere in the backplane except slot 6. Most CPU modules occupy two slots. If a double-wide CPU is installed in slot 1, only a single-wide power supply may be used in slot 0. If the application must maintain a slot 1 CPU and use an AC power supply, the AC power supply must be located in the slot to the right of the installed CPU.
- Before deciding to place the CPU in a slot other than slot 1, it is important to consider the following:
  - The configured slot location of the CPU must match the CPU's true location (or leftmost occupied slot if double-wide).
  - For Service Request #15 (*Read Last-Logged Fault Table Entry*) and Service Request #20 (*Read Fault Tables*), the location of CPU faults will reflect the slot at which the CPU is located. Logic that decodes fault table entries retrieved by these service requests may need updating. Refer to *PACSystems RX7i & RX3i CPU Programmer's Reference Manual*, GFK-2950.
  - COMMREQs directed to the CPU itself must reference the backplane slot where the CPU is considered to be located, as discussed above.
  - External devices should be checked for compatibility with CPU slot locations other than slot 1.
  - Remote Series 90 PLCs that use SRTP Channels COMMREQs expect the CPU to be in slot 1 or slot 2.

Sample Configurations

Allowed

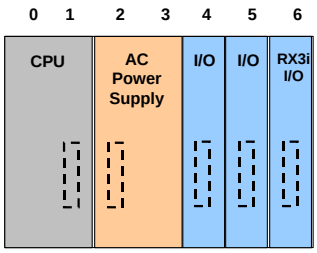


Figure 6: Configured as CPU in slot 0, Power Supply in slot 2

Not Allowed

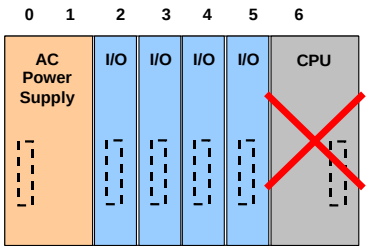


Figure 7: CPU cannot be configured in slot 6

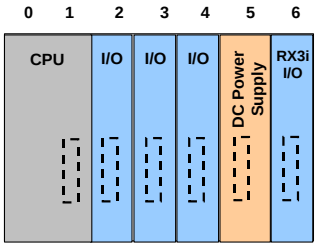


Figure 8: Configured as CPU in slot 0, Power Supply in slot 5

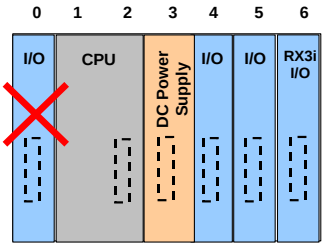


Figure 9: I/O or Option Module cannot be installed in slot 0

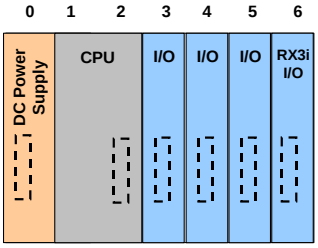


Figure 10: Configured as Power Supply in slot 0, CPU in slot 1

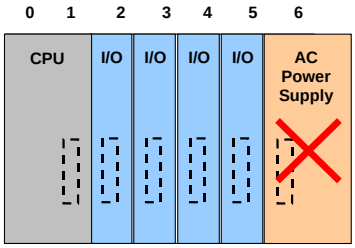


Figure 11: AC Power Supply cannot be configured in slot 6

Important Product Information

Current Release

Part Number	Date	Comments
IC695CHS007-CA	April 2015	The catalog number is being bumped for manufacturing reasons. There is no other change in the delivered product.

Release History

Catalog Number	Date	Description
IC695CHS007-BA	March 2012	Mechanical enhancements for improved module-to-connector engagement with the backplane PCI connector, as described below.
IC695CHS007-AA	March 2011	Initial release.

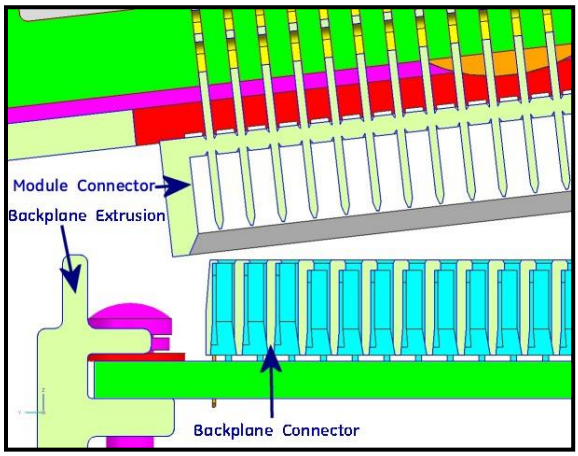
Operating Notes

Effective with IC695CHS007-BA, IC695CHS012-DA and IC695CHS016-DA, the product was enhanced with the following mechanical design changes:

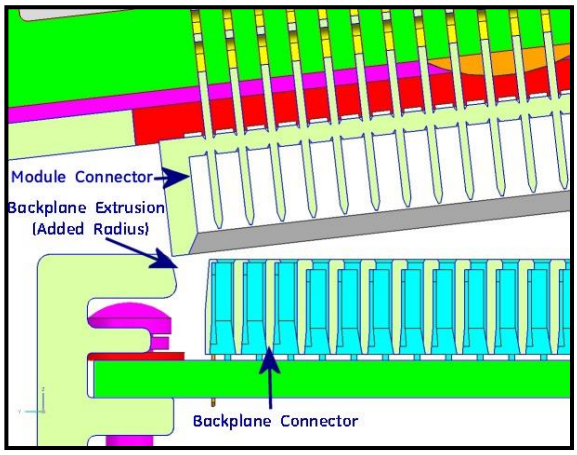
1) Added an upper ledge with a radius to the backplane extrusion. For PCI-based (IC695) RX3i modules, this upper ledge helps align the module vertically as it is being inserted into the backplane. This reduces the likelihood of experiencing bent or recessed module backplane connector pins when inserting PCI-based modules into the backplane.

   Note that the ledge with the enhanced radius reduces, but does not eliminate, the likelihood of experiencing bent or recessed mating pins on PCI-based modules. To avoid damaging mating module pins, continue to exercise proper care and follow the installation instructions in the *PACSystems RX3i System Manual,* GFK-2314, when inserting modules into an RX3i universal backplane.

Prior Design



Enhanced Design



2) Backplane PWA and backplane connectors were moved 0.015 inch (3.81mm) closer to the front of the backplane. This increases the mechanical module-to-backplane engagement, providing for better connectivity.