

RT4 PowerPact™ System



- Small form factor CompactPCI based rugged compute node
 - Width 124mm (4.88"), height 132mm (5.2"), length 255mm (10")
- 4 conduction-cooled 3U slots to VITA 30.1
 - System slot pre-loaded with IMP1A Single Board Computer (SBC), 3 spare slots for I/O and peripherals
- IMP1A provides PowerPC 755 or 7410 processor and VxWorks, LynxOS or Green Hills Software Inc INTEGRITY support
- High integrity bonded section chassis construction provides exceptional strength
- I/O connector panel and backplane formed as a single, removable, assembly for ease of maintenance
- All panels fitted with EMC and "hose down" gaskets
- Backed up by Radstone integration and through life support services



Product Overview

Setting new standards in COTS integration, Radstone's RT4 PowerPact™ computer system comes as an application ready platform equipped with, IMP1A processor, basic operational software and three 3U CompactPCI slots for additional functionality. In short, a low risk building block designed to deliver the genuine low cost of ownership that has become synonymous with Radstone equipment.

The system enclosure recognizes the fact that today, more than ever, time and budget constraints demand that core technologies can be utilized across and within programs. As a result, flexibility permeates the design. Outside mounting and cooling options enable the same board and Power Supply Unit (PSU) sub-system architecture to be repackaged and deployed throughout the full range of vetronic, naval and avionic applications. Inside, a pluggable power supply can be matched to differing input characteristics and internal loads. Even the I/O wiring is modular in order to allow speedy adaptation to individual requirements and cost effective field support.

At the board level, ease of use continues to be the key design parameter. Radstone's IMP1A Single Board Computer (SBC) provides PowerPC technology at 500 MHz and beyond and gives access to a range of proven software environments. In turn this de-risks the integration of other CompactPCI modules, PMCs mounted on IMPCC1 carrier boards and peripherals.

Like all Radstone products RT4 PowerPact computer system is supported by a full range of integration services. At the lowest level this equates to the provision of representative development environments. As the program develops Radstone can offer thermal modeling, mechanical adaptation, board level integration support and software engineering skills to complement in-house resource. Radstone's dedicated teams of engineers are able to provide ILS data, qualification, acceptance testing, obsolescence management and through life support. A "one stop shop" for an out of the box and ready to run solution.



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Why settle for less



Figure 1: System Components

The system is encased in a rigid box structure mounted by means of tapped holes into the “base” or “lid”. Additional holes provided in the “sides” for supplementary cooling fins may also be used for mounting. However, it should be noted that use of a “side” panel for mounting will compromise conduction cooling from the other CompactPCI card edge sidewall.

The internal structure comprises of two compartments, one for the CompactPCI boards and the other for I/O.

CompactPCI boards and the PSU are loaded from one end and slide into guides that are selectively plated to minimize long term abrasion. The PSU is mechanically keyed so that it can't be accidentally inserted into one of the CompactPCI slots where it might damage the backplane connector pins. A cable routing channel allows wires to be taken directly from the CompactPCI boards through the backplane “bulkhead” and on to I/O connectors. To complete the arrangement a gasketed panel seals the board compartment. Dished designs are available to enable front panel cable routing and specific peripheral mounting.

Standard I/O signals are routed between the 2mm hard metric backplane connectors and the I/O panel by means of flexi-circuits. Two designs are available. The first routes IMP1A signals together with signals from its on-board PCI Mezzanine Cards (PMC). The second supports signals from the IMPCC1 PMC carrier. Additional I/O wiring may be added by means of discrete wiring, or when volumes justify specific flexi-circuits.

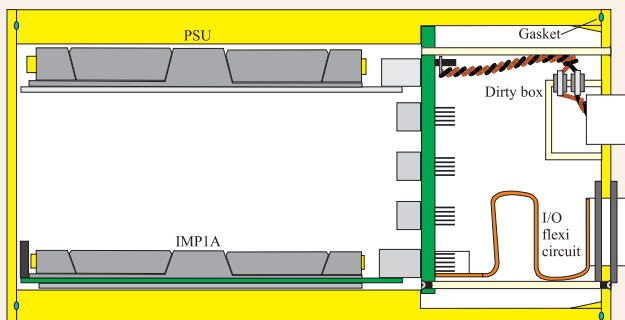


Figure 2: Internal Layout

Cooling Options

Primary cooling is by means of conduction to the system enclosure mounting plate. This supports a total power dissipation of up to 70 watts. Within this, allowance has to be made for the PSU (typically 75% efficient).

For applications where baseplate cooling isn't an option, it is possible to add cooling fins to the chassis free walls. Power dissipation is reduced and can be calculated according to ambient temperature and board level performance.



Figure 3: Convection-Cooling Fins

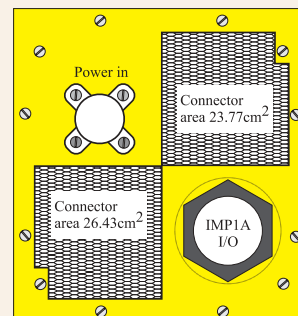


Figure 4: Front Panel Design

The front panel comes loaded with a power connector, IMP1A I/O connector and wiring. The two additional connector positions can be configured to requirements. Radstone can of course provide the cut outs and associated wiring as an additional service if required.

PSU Options

Primary power is routed through a “dirty box” filter arrangement and on to the 3U CompactPCI form factor MIL-STD-704E compliant PSU. MIL-STD-1275 and other “704” standards are available by special order.

Internally the PSU is modular meaning that the standard configuration (+5v@10A, +3.3v@10A) can be adapted to requirements. For example +5v@10A, +3.3v@6A, +12V@0.42A and -12V@0.42A can still be accommodated within the single slot, 0.8", card pitch.

Hold up and higher current levels may require the PSU to increase to two slots.

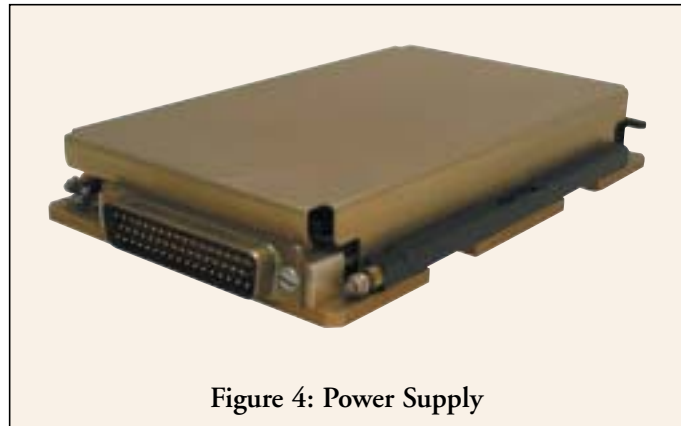


Figure 4: Power Supply

CompactPCI Backplane Detail

4 slots to PICMG 2.0 R3.0 standard:

- Left handed system controller giving system slot (IMP1A) adjacent to base
- 32 bit data width
- 33 MHz operation today, re-configurable to 66 MHz for a future upgrades
- V I/O = 3.3volt, with 5V as a configurable option.
- Rear I/O through J2
- CPCI slot keying utilizes the backplane connector code scheme
- Pluggable PSU slot through 50 way D-Type

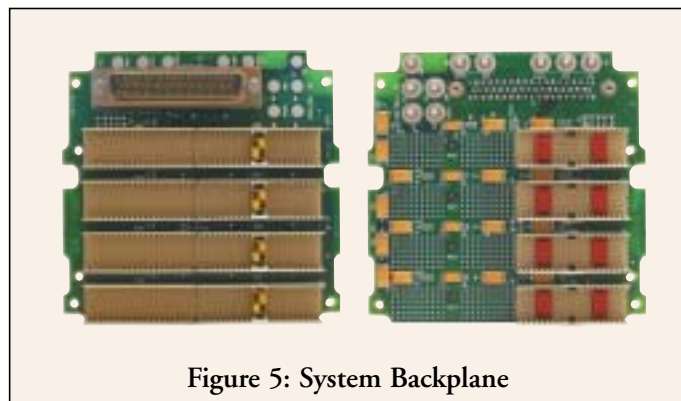


Figure 5: System Backplane

IMP1A Single Board Computer

High performance conduction-cooled 3U CompactPCI SBC with 500 MHz PowerPC 755 or 7410, up to 128 Megabytes (MB) SDRAM, 2 MB L2 Cache, 64 FLASH, two 10/100 Base-T Ethernet ports, two fast Sync/Async serial ports, 12 bits GPIO and on-board PMC site.

Software options include:

- Built-In-Test (BIT) and Background Condition Screening (BCS) diagnostic support
- VxWorks Board Support Package (BSP) and additional Enhanced Support Package (ESP)
- LynxOS BSP and additional ESP
- Green Hills Software Inc INTEGRITY RTOS support

The on-board PMC site provides access to Radstone's range of PMCs and associated software drivers. For additional functionality one or more IMPCCI PMC carrier cards, or standard conduction-cooled CompactPCI cards can be loaded into unused slots.

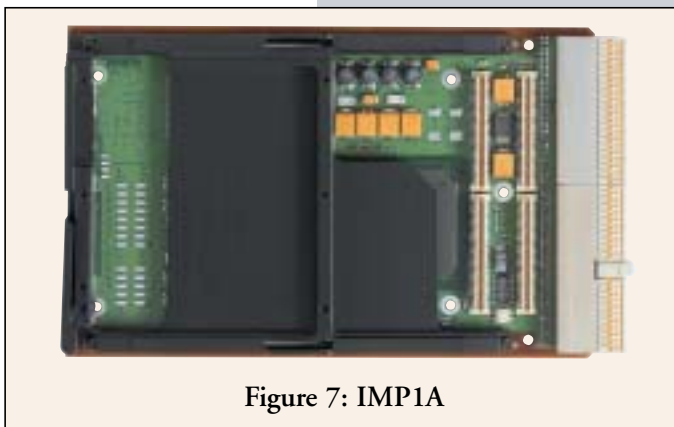


Figure 7: IMP1A

Development Support

Radstone RDS chassis provide a complete RT4 PowerPact software development environment including the provision of an extra card slot to hold a bus analyzer or other developmental item. In terms of the actual target system, RT4 mechanical outline drawings, front panel drawings and sample wiring schedules can be supplied in a range of formats in order to fast-track programs.

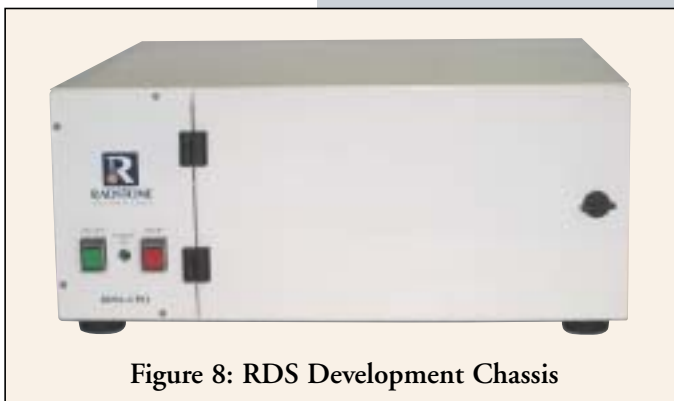


Figure 8: RDS Development Chassis

Specification

Dimensions	Height 132mm (5.2 inch), width 124mm (4.88 i), Length 255mm (10 inch)	
Weight	3.6 Kg (7.92 lbs)	PSU 610g, IMP1A 240g
Surface Finish	Alochrome in accordance with MIL-C-5541, Class 1A, GOLDEN IRIDESCENT	
Connectors	Power DC D38999/20FB05PN (mating half D38999/26FB05SN) Shell size 11, 5 contacts AC D38999/20FB05PA (mating half D38999/26FB05SA) Shell size 11, 5 contacts IMP1A I/O D38999/24FG35SN (mating half D38999/26FG35PN) Shell size 21, 79 contacts User defined (2) up to shell size 21 (e.g. 79 size 22D contacts or other configurations)	
Operating temperature	-40°C to 63 °C (level 4 boards), 70 Watts internal power, conduction-cooling -40°C to 73 °C (level 5 boards), 70 Watts internal power, conduction-cooling OR as determined by thermal analysis of the full configuration	
Storage temperature	-50°C to +100 °C (level 4 or 5 boards)	
Vibration	Category 5 equipment of MIL-STD-810E vibration spectrum fig 514.4-8 15 to 2000 Hz at 0.1g ² /Hz (RMS 12g approximately)	
Shock	Terminal peak saw tooth test pulse of fig 516.4-4 of MIL-STD-810E at the level of 40g for 11ms. Bench handling in accordance with procedure VI of method 516.4 of MIL-STD-810E.	
EMC to MIL-STD-461C MIL-C-38999 connectors fitted	Conducted emissions	CE01, CE03 and CE07
	Conducted susceptibility	CS01, CS02 and CS06
	Radiated emissions	RE01 and RE02
	Radiated susceptibility	RS01, RS02 and RS03

Ordering Information

RT4-S-001-400x	Conduction-cooled chassis. Three spare 3U CPCI slots to Vita 30.1. Alochrome surface finish. 28VDC primary power. Internal +5V@10A, +3.3V@10A Level 4 IMP1A-500 MHz PowerPC 7410, 64 MB SDRAM, 2 MB L2 Cache, 64 MB FLASH, 2 x 10/100 Base-T, 1 x RS232, 1 x RS232/422/485 async port, 12 bits GPIO, 1PMC slot
RT4-S-003-400x	Conduction-cooled chassis. Three spare 3U CPCI slots to Vita 30.1. Alochrome surface finish. 115VAC, 400 Hz 1 phase primary power. Internal +5V@10A, +3.3V@10A Level 4 IMP1A - 500 MHz PowerPC 7410, 64 MB SDRAM, 2 MB L2 Cache, 64 MB FLASH, 2 x 10/100 Base-T, 1 x RS232, 1 x RS232/422/485 async port, 12 bits GPIO, 1 PMC slot
FINS	Optional free convection cooling fins mounted on any RT4 chassis

x denotes IMP1A firmware 1=PPCBoot, 3=VxWorks bootrom, 4= BIT and VxWorks bootrom

Services

ESS	Environmental Stress Screening. The system will be exercised using Built-In-Test while it is subjected to thermal cycling and vibration testing. Specification available on demand. A per system charge
ATP	Functional testing of a configured system according to an agreed Acceptance Test Program. A per system charge
SYSCONFIG	System configuration, the installation of I/O wiring, connectors and peripherals as required. A per system charge
THERMAL ANALYSIS	Fluent Icepak modeling software will be used to predict system level temperature gradients
SYSTEM-MTBF	System level MTBF calculation using COTS board level and peripheral data
SYSTEM-DOC	Additional system level documentation to support contractual requirements

UK

Radstone Technology
Water Lane
Towcester
Northants NN12 6JN
Telephone: +44 (0) 1327 359444
Facsimile: +44 (0) 1327 359662
E-mail: sales@radstone.co.uk
Videoconferencing: +44 (0) 1327 359495
(by arrangement)

USA

Radstone Technology Corporation
50 Tice Boulevard
Woodcliff Lake, NJ 07677-7645
Telephone: +1 800 368-2738
Facsimile: +1 (201) 391-2899
E-mail: sales@radstone.com

Eastern Area: +1 (201) 391-2700
Mid-Atlantic Region: +1 (201) 391-2700
Southeast Region: +1 (321) 308-0240
Western Region: +1 (909) 974-1141
Central Region: +1 (480) 964 5407

Helpdesk: +44 (0) 1327 359804
E-mail: support@radstone.co.uk



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