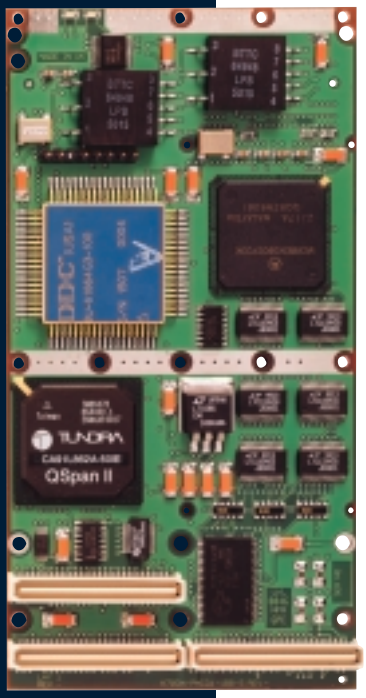
EmPower PMCQ1

RADSTONE MEZZANINE

High Speed Serial and MIL-STD-1553 Rugged PMC



- Available in 5 ruggedization levels
- QUICC (68360) based serial communications offering 4 high-speed sync / async channels
- Modular X.25 stack support
- Optional MIL-STD-1553 interface (Single channel, Dual redundant)
- Built-in test software support (BIT)
- Support for VxWorks and LynxOS
- 32bit / 33MHz PCI 2.1 compatible

Product Overview

Available in five ruggedization levels to meet the needs of the Industrial and Defense OEM marketplace, the PMCQ1 provides a means of adding high speed serial communication capabilities plus optional MIL-STD-1553 interface, to a main processing unit, to achieve cost effective system solutions.

Targeted at rugged communications orientated applications, the PMCQ1 is ideal for use with Radstone's market leading PowerPC based SBCs including the PPCx series and the EP1A-8240 from the ***EmPower*** product range. The PMCQ1 can also be used with Radstone's PMC Carrier Cards, up to 9 PMC cards being addressable using ***PPzero*** (PCI Extensions over P0).

The PMCQ1 features four high-speed serial channels, capable of R232, 422, 485 operation (software selectable), and configurable for synchronous or asynchronous operation. In addition, a single channel, dual redundant MIL-STD-1553 interface is also available as an additional communications option.

COTS software support includes provision for standard HDLC / LAPB / X.25 modules, and drivers for VxWorks/Tornado and LynxOS real-time operating systems.

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Why settle for less

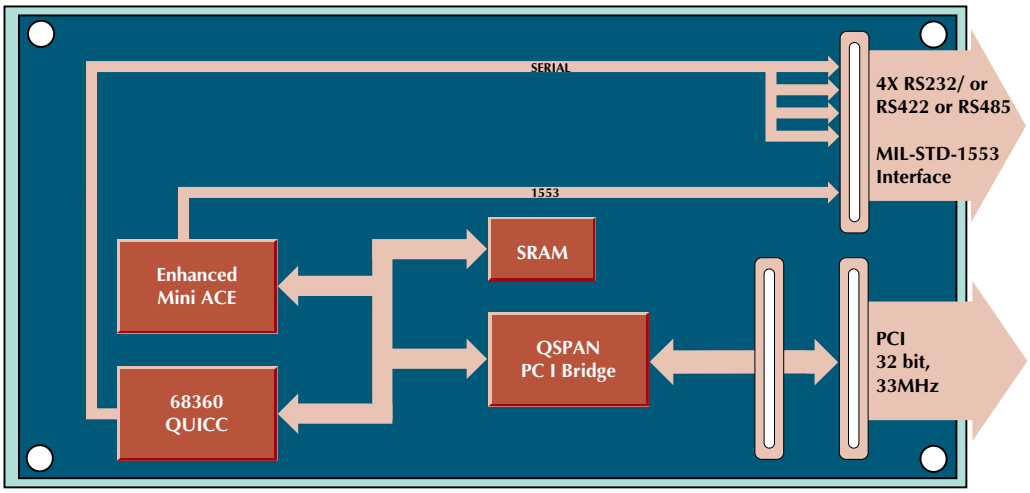

Figure 1: PMCQ1R Functional Block Diagram

68360 - QUICC

The MC68360 Quad Integrated Communication Controller is a versatile one-chip integrated microprocessor and peripheral combination family that can be used in a variety of controller applications, particularly excelling in communication activities. It has seven serial channel controllers including four SCC's (serial communication controllers), two serial management controllers (SMC's) and one serial peripheral interface (SPI).

The PMCQ1 utilizes four of the available SCC's to provided four fully featured high speed sync / async serial channels.

The 68k processing core is not used on the PMCQ1, the 68360 being used in Slave mode only.

BU-61688 – DDC Enhanced Mini-ACE

The PMCQ1 offers an optional MIL-STD-1553 interface using the BU-61688 – DDC Mini-ACE. The Mini-ACE comprises a complete integrated interface to MIL-STD1553A /B

- transceiver
- protocol
- memory management
- processor interface logic

The PMCQ1 provides BC, RT and MT modes of operation. BC mode includes advanced features, such as automatic re-tries, programmable gap times and frame auto repeat. RT mode has buffering for 3 messages and programmable system test features. MT mode allows word monitoring, selective message monitoring or simultaneous RT and MT modes, as may be required for backup BC operation.

I/O Connections

The PMCQ1R provides full Rear I/O through its P14 user defined connector, and the PMCQ1F provides full Front I/O through a 68 way Honda SCSI 2 connector.

Table 1: I/O Connections

	PMCQ1R Ruggedization Levels 1-5	PMCQ1F Ruggedization Levels 1-3
4 serial communication channels	Rear	Front
MIL-STD-1553	Rear	Front

Environmental Ruggedization Levels

The PMCQ1x is available in air and conduction cooled formats across all 5 of Radstone's clearly defined environmental ruggedization levels – see the Radstone ruggedization data sheet for full details of temperature range, shock, vibration, humidity etc.

Table 2: Ruggedization Levels

Level	Cooling	Temp Range	Ruggedization Level
1	Air	0 to +55°C	Standard
2	Air	-20 to +65°C	As 1 but conformal coated
3	Air	-40 to +75°C	Rugged, Coated
4	Conduction	-40 to +75°C	Rugged, Coated
5	Conduction	-40 to +85°C	Rugged, Coated

Table 3: Hardware I/O Specifications

Function	Device	Hardware Features	I/O Location
4 x SCC	MPC68360	Synchronous / Asynchronous 4Mbaud RS232 / RS422 / RS485 (Software Selectable)	Front I/O on PMCQ1F Rear I/O on PMCQ1R
1 X MIL-STD-1553	BU-61688	Single Channel Dual Redundant BC, RT, MT	Front I/O on PMCQ1F Rear I/O on PMCQ1R

Note: Performance Considerations. The above table specifies maximum hardware baud rates for an individual channel. Practical rates tend to depend upon the software overhead, the software configuration and the number of channels running concurrently.

COTS Serial Communications Software

Standard communication protocols are available for the PMCQ1 in the form of a modular X.25 stack, offering straightforward configuration for adaptation to different application situations. The modules forming this stack originate from the highly respected Trillium Digital Systems Inc, a leading provider of communication software solutions and Radstone's technology partner. Further communication software modules originated at Radstone provide fast asynchronous support and 1553 support.

The communication software modules sit above a COTS Operating System (VxWorks or LynxOS) on the Host processor, taking their system services from here. Not all modules need to be present, but for those which are part of the X.25 stack, the higher level modules need to be supported by all lower level modules. (i.e. options are HDLC only, or HDLC + LAPB, or HDLC + LAPB + X.25). Connections to the X.25, LAPB, or low level HDLC may be formed simultaneously for mixed line type operation. Synchronous and asynchronous operation may also be mixed.

1553 Software Support

Radstone provides a 1553 software library for VxWorks and LynxOS that simplifies host system integration by offering functional level commands. Other operating systems are also supported by the C source code package that provides: detailed error reporting, improved interrupt handling that minimizes the processing overhead, supports re-entrancy from multiple tasks and RT broadcast sub-addresses.

The communication modules are identical to those used to support similar hardware functionality on other ***EmPower*** products including :-

EP1A – A 6U VME SBC featuring an MPC8240 integrated PowerPC processor chip with optional serial and MIL-STD-1553 functions onboard.

EPMCQ2 – A PMC featuring an MPC8260 integrated PowerPC processor chip with serial and ethernet functions.

Table 4: Summary of Communication Software Modules for PMCQ1

Modules	Description
EPHDLC	Low level fast synchronous support
EPLAPB	Communication protocol support
EPX25	Full X.25 communication protocol support
EPASYN	Low level fast asynchronous support
EP1553	Full 1553 protocol library support

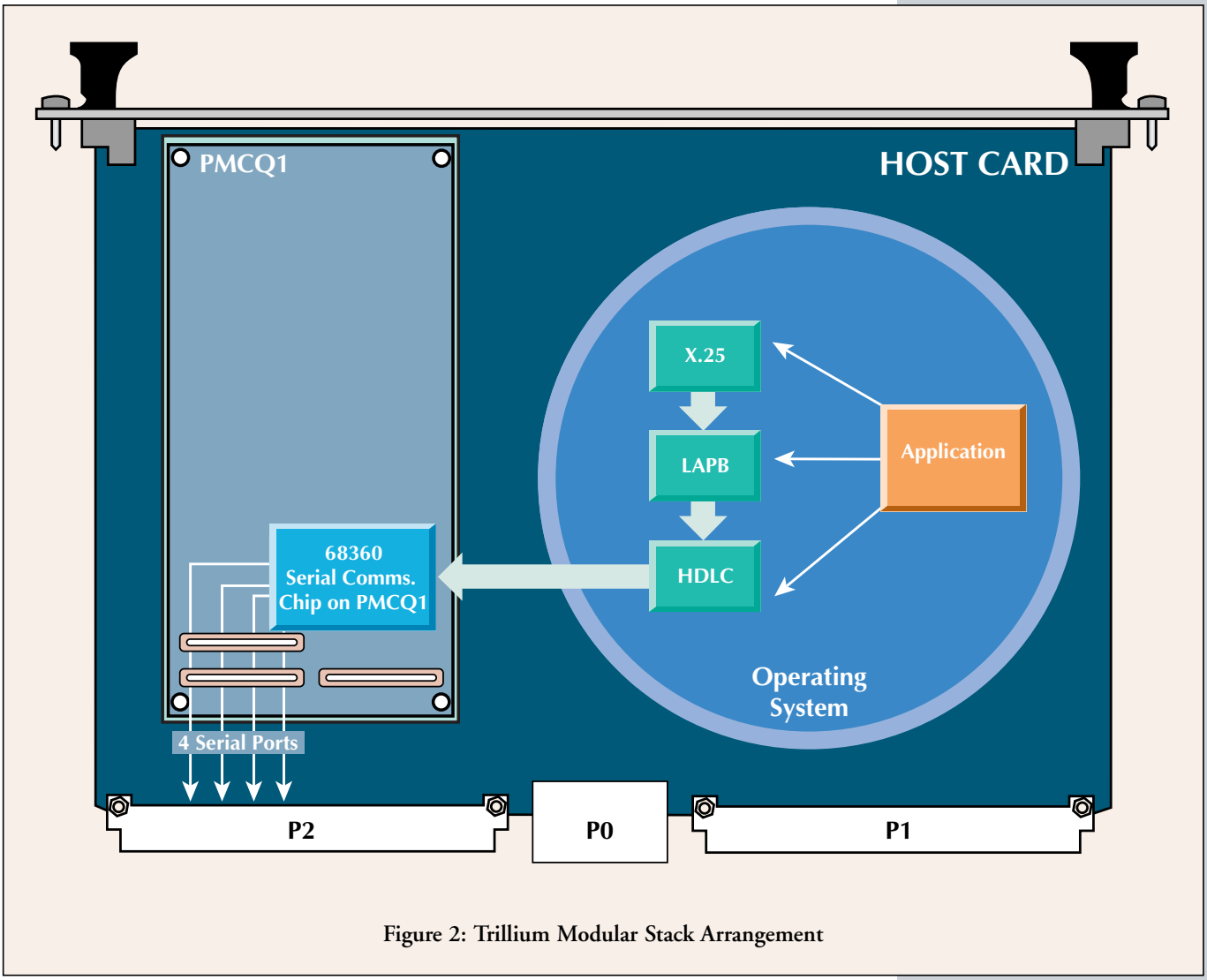

Figure 2: Trillium Modular Stack Arrangement

Table 5: Ordering Information

Sales Code	Product
PMCQ1R-100	PMCQ1R Ruggedization Level 1 (Rear I/O)
PMCQ1R-200	PMCQ1R Ruggedization Level 2 (Rear I/O)
PMCQ1R-300	PMCQ1R Ruggedization Level 3 (Rear I/O)
PMCQ1R-400	PMCQ1R Ruggedization Level 4 (Rear I/O)
PMCQ1R-500	PMCQ1R Ruggedization Level 5 (Rear I/O)
PMCQ1R-x01	PMCQ1R Ruggedization Level x with MIL-STD1553 Option (Rear I/O)
PMCQ1F-x00	PMCQ1F Ruggedization Level x (Front I/O)
PMCQ1F-x01	PMCQ1F Ruggedization Level x with MIL-STD1553 Option (Front I/O)

NOTE: PMCQ1F is on long lead time, please consult your nearest sales office for availablility.

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