Dynamic Engineering

**PMC Product Line**

Complete product data and manuals are available on our website. [http://www.dyneng.com/pmc.html](http://www.dyneng.com/pmc.html)

Dynamic Engineering enjoys a sterling reputation as a result of providing quality products and excellent service for over 20 years.

Dynamic Engineering is the Embedded Solution Center. We specialize in providing embedded solutions to integrators and designers. Dynamic Engineering is an expert with mezzanine modules (cPCI, custom, IndustryPack, PCI-104, PCIe, PCI, PMC, VME). System engineers can mix and match different functions under different system architectures.

System designers can port solutions between different architectures quickly and easily with mezzanine designs and modular software.

Solutions offered include Custom Design, Analog I/O, Digital I/O, Serial I/O, Control, Bus Interface, Robotics, Telephony, Networking and more.
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PMC Carrier Adapter Cards

**PCI2PMC**
1/2 Length PCI Adapter Mount PMC in PCIL Slot 32/64 Bit

http://www.dyneng.com/pci2pmc.html

PCI to PMC adapter / converter card provides the ability to install a PMC card into a standard or half length PCI slot.

The PCI2PMC has a PMC card slot mounted to a universal 1/2 length PCI card. Suitable for 32 bit or 64 bit data with 33 or 66 MHz bus operation. The PMC user IO connector Pn4 is brought out to two connectors for access (DIN IDC and SCSI II).

The PMC front panel connector is mounted through the PCI mounting bracket.

For superior performance the PCI2PMC has a cooling cutout for increased airflow to the PMC. A cut-out is preferred over a fan mounted to the PMC adapter for several reasons including: many components are not shielded against close proximity electro-magnetic fields and the reduction in MTBF that an additional mechanical device represents.

**PCIBPMC**
1/2 Length Bridge Based PCI Adapter Mount PMC in PCI Slot

http://www.dyneng.com/pciBpmc.html

PCI to PMC adapter/carrier card with optional Ethernet and/or Serial Ports and an optional Fan.

The PCIBPMC adapter card provides the ability to install a PMC card into a standard PCI slot, featuring independent signal levels on each side of the bridge, built in 3.3V supply 32/33 or 64/66 MHz PCI clocks. The bridge insures that multiple PCIBPMC cards can be installed onto the same PCI bus stub. For superior performance the PCIBPMC has a cooling cutout for increased airflow to the PMC.

**PCIBPMCET**
Industrial Temperature Range PMC Bridge for PCI Bus System

http://www.dyneng.com/pciBpmcet.html

PCIBPMCET is a universal voltage 1/2 length PCI card. This design is robust with extended temperature components, controlled impedance, PCI compliant routing, matched length differentially routed IO, zero bus stub options for high speed Ethernet and Serial ports, heavy power planes with decoupling for the PMC voltages, and more. For high power applications “zero slot fans™” are available. With the PCIBPMCET adapter converter card all you have to do is install your PMC onto the adapter, and plug into the PCI slot. PCIBPMCET is compatible with both 64 and 32 bit PCI slots. The PMC slot can be programmed to use 3.3 or 5V for VIO. The bridge provides plug and play operation.

**PCIBPMCx1**
1/2 Length Bridge Based PCI/PCI-X Adapter Install PMC in PCI Slot

http://www.dyneng.com/pciBpmcx1.html

The PCI / PCI-X Bridge PMC 1 slot adapter/carrier converter card provides the ability to install one PMC card into a standard PCI/PCI-X slot.

The PCIBPMCx1 PMC card slot can be programmed for 3.3 or 5V operation by the user, and the primary PCI bus implementation is universal voltage. Suitable for PCI or PCI-X operation with 32 bit or 64 bit data and 33, 66, 100 or 133 MHz. clock.

The PMC user IO connector Pn4 is available on a SCSI II connector. The Pn4 user IO is routed differentially with matched length and impedance control to the SCSI connector. The PCI bus is interconnected to the PMC via a 64 bit 133 MHz capable bridge.
**PMC Product Line**

**PCIeBPMCX1**

1/2 Length PCIeexpress Adapter Card with PMC Mounting Slot

http://www.dyneng.com/pciebpmcx1.html

Your one lane PCIe solution for new PC’s which have more PCIe Express connectors than PCI slots. The PCIeBPMCX1 (PCIe Bridge PMC 1 slot) adapter / carrier converter card provides the ability to install one PMC card into a standard PCIe (Express) 4 lane slot.

Suitable for PCI or PCI-X operation with the PMC; 32 bit or 64 bit data and PCI (25, 33, 50, 66) or PCI-X (50,66,100,133) MHz. clock. Auto selected or switch programmable speeds. The bridge can operate with 1, 2, 3, or 4 lanes active, and can be installed into slots with more than 4 lanes if desired. Front View shown with 2 installed fans model # PCIeBPMCX1-FAN12-OT.

**PCIBPMCx2**

Full Length PCI Bridge Based Card with 2 PMC Slots

http://www.dyneng.com/pciBpmcx2.html

Embedded applications frequently require real time processing coupled with special purpose IO, as found with the PCIBPMCx2.

With two slots; a PrPMC can be matched with another PMC to make a high bandwidth processing node. The PrPMC can communicate with the host for set-up, and then use the local bus to control and transfer data with the special purpose IO card. For example the PMC-BiSerial-III-HW1 provides 32 channels of Manchester encoded IO, and when matched with a PrPMC can control or monitor a large system in real time.

Provides the ability to install two PMC cards into a standard PCI/PCI-X slot. The PCIBPMCx2 has two PMC card slots mounted to a universal voltage PCI card. Suitable for PCI or PCI-X operation with 32 bit or 64 bit data and 33, 66, 100 or 133 MHz. clock. The PCIBPMCx2 is a Non Transparent Bridge

**PMC2PCI**

Mount a PCI Card in a PMC Slot

http://www.dyneng.com/pmc2pci.html

Save development time by using a PCI card in a PMC slot.

The PMC2PCI (PMC to PCI) adapter / carrier converter card provides the ability to install a PCI card into a standard PMC slot. The PMC2PCI has two PCI card slots mounted to a PMC card. One slot can be used at a time with the choice of 3V or 5V IO and 32/33 or 64/66 MHz PCI clocks. Local 10A 3.3V power supply.

**cPCI2PMC**

cPCI Carrier with a PMC Slot

http://www.dyneng.com/cpci2pmc.html

With the cPCI2PMC directly connect to the PCI bus, optimizing the latency to the PMC. The cPCI2PMC has a PMC card slot mounted to a universal 3U 4HP cPCI card. Suitable for 32/33 or 64/ 66 MHz bus operation. The PMC user IO connector Pn4 is optionally connected to J2 for rear panel IO. The PMC bezel connector is mounted through the cPCI-mounting bracket. Individual pins on the JN4 (PN4) connector are accessible when the IO option is specified. cPCI J2 has two definitions - in a 64 bit PCI implementation J2 has the upper A/D & control signals & in a 32 bit PCI implementation J2 has the rear panel IO. With resistor jumpers the IO or the PCI signals can be connected to J2.

**cPCIBPMC**

Bridge Based cPCI Carrier with a PMC Slot

http://www.dyneng.com/cpcibpmc.html

Install a PMC card into a standard cPCI slot with the compact PCI to PMC adapter / carrier converter card. The cPCIBPMC has a PMC card slot mounted to a universal 3U 4HP cPCI card. Suitable for 32/64 with 33/ 66 MHz bus operation. The 3U card is wired for 64 bit PCI operation with pull-ups on the control lines to allow use in a 32 bit system. The PMC bezel connector is mounted though the cPCI mounting bracket.
Dynamic Engineering has developed an extended temperature version of our popular cPCIBPMC design, -40C to +85C standard. The design effort included switching to a new bridge to meet the temperature and timing requirements. The new bridge brings new features including the ability to operate the PMC side at a higher clock rate than the cPCI side. The new bridge also has built in features for local address spaces, using the PMC clock in monarch mode for the secondary side, and operating in transparent or non-transparent modes. The designs are ready for all of your PMC applications. Provides the ability to install a PMC card into a standard cPCI slot. The cPCIBPMC3U64ET has a PMC card slot mounted to a universal 3U 4HP cPCI card. Suitable for 32/64 with 33/66 MHz bus operation. The 3U card is wired for 64 bit PCI operation with pull-ups on the control lines to allow use in a 32 bit system. The PMC bezel connector is mounted though the cPCI mounting bracket. Conformal Coating is an option.

Dynamic Engineering has developed an extended temperature version of our popular cPCIBPMC design. The design effort included switching to a new bridge to meet the temperature and timing requirements. The new bridge brings new features including the ability to operate the PMC side at a higher clock rate than the cPCI side. The new bridge also has built in features for local address spaces, using the PMC clock in monarch mode for the secondary side, and operating in transparent or non-transparent modes. The designs are ready for all of your PMC applications. The 6U version has both PMC IO connectors routed with equal length traces to J3 and J5. A PIM Carrier is available for the 6U model to support rear panel IO.

The PCI-104 to PMC adapter/crrier converter card provides the ability to install a PMC card into a standard PCI-104 slot.

Mount a PMC Card in a PC104p Slot

Suitable for 32 bits with 33 or 66 MHz bus operation. The PMC front panel connector is mounted through the PCI mounting bracket. The PC104p2PMC design is passive with no added delays to access the PMC hardware. The traces are carefully routed with proper attention paid to the impedance and reference planes to maximize compatibility with your PCI system.

The PMC-MC-X2 adapter/crrier converter card provides the ability to install up to 2 PMC cards into a small enclosure.

The PMC-MC-X2 has one PMC card slot mounted front and one mounted rear to create a compact arrangement with 2 PMC slots. Suitable for 32/64 with 33/66 MHz bus operation. The carrier provides power supplies for the +5, +3.3, +12, and minus 12 from a 12V wall mount transformer supply. Arbitration is accomplished with a CPLD mounted to the card. The CPLD also provides a selectable 66/33 MHz reference clock to be routed to each of the slots. Need more slots - please consider the X4 version with 4 PMC slots. Custom versions made to order!
PMC Product Line

PMC-MC-X4  
**PMC Mini Carrier with 4 PMC Positions**  
http://www.dyneng.com PMC_MC_x4.html  
The PMC-MC-X4 adapter / carrier converter card provides the ability to install up to 4 (four) PMC cards into a small enclosure.

The PMC-MC-X4 has two PMC card slots mounted front and rear to create a compact arrangement with 4 PMC slots. Suitable for 32/64 with 33/66 MHz bus operation. The carrier provides power supplies for the +5, +3.3, +12, and minus 12 from a 12V wall mount transformer supply. The X4 has an option for a 28V power supply input. 14-34V power can be used with the higher voltage option. Arbitration is accomplished with a CPLD mounted to the card. The CPLD also provides a selectable 66/33 MHz reference clock to rout to each of the slots.

PMC-MC-X2-Chassis  
**Compact, Cost Effective PMC Solution with 2 Slots**  
http://www.dyneng.com PMC_MC_x2x4_chassis.html  
Do you need a compact cost effective solution to your PMC mounting issues? All you need is a backplane and power supply for most embedded applications.

The PMC-MC-X2 was designed to create a compact configuration with built in power supply and slot 0 functions - bus arbitration, reset, clock, interrupt routing, terminations. To complete the package you can design your own chassis, use our off-the-shelf chassis or collaborate with us to make a custom chassis and motherboard for you.

PMC-MC-X4-Chassis  
**Compact, Cost Effective PMC Solution with 4 Slots**  
http://www.dyneng.com PMC_MC_x2x4_chassis.html  
Do you need a compact cost effective solution to your PMC mounting issues? All you need is a backplane and power supply for most embedded applications.

The PMC-MC-X4 was designed to create a compact configuration with built in power supply and slot 0 functions - bus arbitration, reset, clock, interrupt routing, terminations. To complete the package you can design your own chassis, use our off-the-shelf chassis or collaborate with us to make a custom chassis and motherboard for you.

PMC General Purpose – Install onto a PCI or cPCI Carrier to Accommodate your Platform

PMC-BiSerial-III  
**Spartan III Based PMC BiSerial RS485 LVDS PLL + More**  
http://www.dyneng.com PMC_BISERIAL_III.html  
The PMC BiSerial family has been updated to include a Spartan III [Xilinx] based card with expanded capabilities.

Building on the knowledge and experience gathered from multiple IP and PMC BiSerial implementations and adding in the latest technology has created the PMC-BiSerial-III. The BiSerial III features completely isolated FIFOs with 32 bit ports for increased adaptability and performance. The [34] RS-485 / LVDS buffers have programmable termination, and direction control. Half-Duplex, Full-Duplex and single ended systems can be configured with software and VHDL. The denser, faster FPGA will implement the most complex state-machines. If you need conduction cooling the PMC BiSerial III Trans is available. Fully independent and highly programmable RS-485 / RS-422 / LVDS IO channels are provided by the PMC-BiSerial III design. The channels are supported by two independent state-machines created within the Xilinx FPGA.
**PMC Product Line**

**ccPMC-BiSerial-III-TRANS**

Conduction Cooled Transformer Coupled Spartan III Based Design

[http://www.dyneng.com/pmc_biserial_iii_trans.html](http://www.dyneng.com/pmc_biserial_iii_trans.html)

ccPMC-BiSerial-III-TRANS has 8 channels, each fully programmable and capable of operating independently or in concert with the other IO. BiSerial III features completely isolated FIFO’s with 32 bit ports for increased adaptability and performance. Half-Duplex, Full-Duplex, serial and parallel systems can be configured with software and VHDL. The FPGA can implement the most complex state-machines and provides the PCI interface, “Channelized DMA”™ and local memory. The components are rated for the industrial temperature range. Transformers can be bypassed for applications not requiring the isolation. Designed to accommodate client requirements, the Xilinx FPGA can be updated for custom applications.

**PMC-BiSerial-IO**

PMC Compatible Bi-Directional Serial Data Interface


Please note that the PMC-BiSerial has been upgraded and the PMC-BiSerial-III is currently recommended for new designs.

Two fully independent and highly programmable RS-485 / RS-422 IO channels are provided by the PMC-BiSerial design. The channels are supported by two independent state-machines created within the Xilinx FPGA. The transmit and receive protocol can be the same or different. Manchester encoding and decoding, standard serial [UART], control, command, instrumentation, and custom protocols can be implemented. 16K FIFO per channel standard. Up to 128 K is available per RX and TX channel. External reference clock input standard. Multiple custom versions in addition to the standard design.

**PMC-BiSerial-II**

PMC Compatible Bi-Directional Serial Data Interface

[http://www.dyneng.com/pmc_biserial_ii.html](http://www.dyneng.com/pmc_biserial_ii.html)

The PMC-BiSerial-III is recommended for new designs.

The BiSerial II features completely isolated FIFOs with 32 bit ports for increased adaptability and performance. 32 - 40 MHz 485 buffers with programmable termination and direction can be configured to your systems requirements. An expanded faster FPGA will implement the most complex state-machines. The connector pinouts are the same for the first 20 channels to help with migration of older designs from the original BiSerial to the BiSerial II. Recommended for new designs. Optional Transformers available on 4 channels.

**PMC-BiSerial-II-NG1**

PMC Compatible Bi-Directional Serial Data Interface

[http://www.dyneng.com/pmcbs2_ng1.html](http://www.dyneng.com/pmcbs2_ng1.html)

Please note that the PMC-BiSerial-II has been upgraded and the PMC-BiSerial-III is currently recommended for new designs.

The PMC BiSerial-II NG1 is part of the PMC Module family of modular I/O components by Dynamic Engineering. The PMC BiSerial-II is capable of providing multiple serial protocols. The NG1 protocol implemented provides two full-duplex RS-422 UART interfaces with error detection, two half-duplex RS-485 custom “index” interfaces, external clock input, two clock outputs, and various discrete signal inputs and outputs, all using RS-485 transceivers. The transmit data rate is derived from the 31.25 MHz on-board oscillator or external reference clock. The 31.25 MHz clock is divided by 2, 3, 4, 5, 6, 7, or 8 to generate the external clock outputs as well as the Tx clock for the UART and index interfaces.

The receive side of these interfaces uses a doubled (62.5 MHz) clock to sample the input data stream. The receiver uses the clock divisor to determine how many clock periods constitute a received bit period.
PMC Product Line

PMC-BiSerial-II-NVY1  PMC Compatible 4 Channel Transmit Serial Data with Manchester Encoding

http://www.dyneng.com/pmcbs_nvy1.html

Please note that the PMC-BiSerial-II has been upgraded, and the PMC-BiSerial-III is currently recommended for new designs.

Uart function added and additional processing within the state-machine. Larger FIFOs [128K x 32]. Manchester encoded data inputs and outputs. Two output and 4 input channels with software selection of the active channels. Inputs are selectable two at a time. Data is captured and sync patterns tested for alignment as part of a redundant data path for system integrity.

PMC-BiSerial-BAE1  PMC Compatible Real Time Clock Interface

http://www.dyneng.com/pmcbs_bae1.html

Please note that the PMC-BiSerial-II has been upgraded, and the PMC-BiSerial-III is currently recommended for new designs.

The PMC-BiSerial-BAE1 is a customized version used to provide a master system clock or to provide a local RTC with an update from the master. When in target mode a local counter is used to track the time. When serial updates are received from the master unit the local timer is updated to match the master. Counters are 40 bits. Count rate is 2 MHz. Software selection of Master/Target mode.

PMC-BiSerial-BA1  PMC Compatible Bus Data Analyzer with 2 Protocols

http://www.dyneng.com/pmcbs_ba1.html

Please note that the PMC-BiSerial-II has been upgraded, and the PMC-BiSerial-III is currently recommended for new designs.

The PMC-BISERIAL-BA1 is designed to monitor traffic on two serial busses with different protocols. The PMC-BiSerial-BA1 is a customized version used to provide a bus snoop capability. The GSG/Seeker launcher/missile traffic. Two protocols are utilized – “UART” and 32 bit data. The received data is time stamped and stored. Auto block detection and programmable interrupts. Transmit capability provided for self-test.

PMC-BiSerial-PS1  PMC Compatible 4 Channel Transmit Serial Data Interface

http://www.dyneng.com/pmcbs_ps1.html

Customized version with four transmit and no receive channels. 5 MHz transmit rate. 16K FIFO channel 0, 4 x 32 FIFO channels 1-3. Reference clock out. Reference strobe on channel 0. LSB first. Fixed sync pattern on channels 1-3. FIFO based sync pattern on channel 0.
PMC-BiSerial-s311  
**PMC Compatible 4 Channel Transmit Serial Data Interface**

http://www.dyneng.com/pmcbis_s311.html

Please note that the PMC-BiSerial has been upgraded and the PMC-BiSerial-III is currently recommended for new designs.

The PMC-BiSerial-S311 implements the Northrop Grumman S-311 interface protocol. This protocol uses a burst clock to shift 18 bits of data. The data changes on the rising edge of the clock and is valid on the falling edge. The first bit is the sync bit, which is always high and the next 8 bits are the upper byte of the data shifted out MSB first. The next bit is the mode bit, which is zero for a data word and one for a command word. The final 8 bits are the lower byte of data shifted out MSB first.

Two additional signals are used in this protocol, request and ready. The request signal is asserted high by the transmitter at least two clock periods before the first clock. The request signal also remains asserted at least two clock periods after the falling edge of the last clock. After request goes low, at least four clock periods must elapse before it is reasserted. The ready signal is asserted high by the receiver when it is ready to receive data i.e. it has been started and the Rx FIFO is not full. The ready signal can remain high between words as long as the receiver is able to receive data.

<table>
<thead>
<tr>
<th>REQUEST</th>
<th>READY</th>
<th>CLOCK</th>
<th>DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>[0 1 5 1 4 0 1 3 0 1 2 0 1 1 0 0 0 0 0 7 0 5 0 5 0 4 0 3 0 2 0 1 0 0]</td>
</tr>
</tbody>
</table>

PMC-BiFIFO  
**PMC Compatible BiDirectional Parallel Data Interface**

http://www.dyneng.com/pmcbififo.html

The parallel Input and Output channels are highly programmable and fully independent. The standard interface offers Data, Clock and Strobe. The 34 RS485 channels are programmable as input or output allowing for a variety of implementations. The programmable output rates and RS422/485 compatibility will interface to a multitude of systems. If your situation demands a custom application then we will update the Xilinx FPGA. Send us your timing and we will send you the interface.

PMC-Parallel-TTL  
**64 Independent Programmable Digital IO w/ FIFO’s & DMA**

http://www.dyneng.com/pmc_parallel_ttl.html

Does your system require single ended TTL or CMOS level signals? Dynamic Engineering can assist in your decision making regarding architecture and other trade-offs.

The PMC compatible PMC-Parallel-TTL has 64 independent digital IO. The high density makes efficient use of precious PMC slot resources. The IO is available for system connection both through the front panel and via the rear [Pn4] connector. A high density 68 pin SCSI III front panel connector provides the front panel IO. The rear panel IO has a PIM and PIM Carrier available for rear panel wiring options. The HDEterm68 can be used as a breakout for the front or rear panel IO. The HDEcabl68 provides a convenient connector cable. The pin definitions are consistent with the PMC Parallel IO card to enable users of the PMC Parallel IO to migrate to the PMC Parallel TTL quickly and easily.
**ccPMC-Parallel-TTL(ADC)**

- **Conduction Cooled w/ 64 Programmable Digital IO w/ Memory & DMA**
  
  ccPMC-Parallel-TTL has build options to have up to 64 independent digital IO and up to 8 ADC channels. The high density makes efficient use of precious PMC slot resources. The IO is available for system connection through the rear [Pn4] connector. The pin definitions are consistent with the PMC-Parallel-IO and PMC-Parallel-TTL designs to enable users to migrate to the ccPMC-Parallel-TTL quickly and easily when a conduction cooled solution is required.

ADC’s are available with sampling up to 10 MHz. The FPGA can be used for signal processing on the received data stream(s). The FPGA can support each channel with a separate “Channelized DMA”™ channel to allow for high speed sampling and data movement direct to system memory.

The rear panel IO has a PIM and PIM Carrier available for rear panel wiring options. HDEterm68 can be used as a breakout for the rear panel IO when the PMC carrier has a SCSI style connector for the rear IO. HDEcabl68 provides a convenient cable.

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**PMC-Parallel-IO**

- **64 Independent IO in One PMC Slot**
  
  Add 64 digital IO lines plus clock and clock enable to one PMC site.

High density 68 pin SCSI III front panel connector and back-plane IO provide system wiring options. Each channel is programmable to be an input or output on a channel-by-channel basis. Two IO channels can be used as interrupt generators. Interrupts are programmable to be based on level or edge and active high or low. An external clock and clock enable can be used or the internal clock selected for capturing the Input channels. The registers are mapped as 32 bit words and support byte, word and 32 bit access. All registers are read-writeable. Header for user re-programing of Altera FPGA. The upper 12 IO are routed through the FPGA for user applications.

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**PMC-Parallel-485**

- **32 Independent RS485 IO up to 34 Differential IO in 1 Card**
  
  A simple point and shoot interface makes it easy to add up to 34 differential IO to your system with the PMC Parallel 485.

Add 32 [RS-485 /RS-422] differential IO lines to one PMC site. Two additional differential pairs are available for a clock & clock enable. The signals can be used to capture data with an external reference or programmed to be references for the rest of the system. Each channel is programmable to be an input or an output. The lower four bits are independent. The rest are programmed on a nibble basis. Programmable termination. High density 68 pin SCSI III front panel connector and backplane IO provide system wiring options. The IO channels can be used as interrupt generators. Interrupts are programmable to be based on level or edge and active high or low. The registers are mapped as 32 bit words and support byte, word and 32 bit access. All registers are read-writeable.

An 8 bit user switch is provided to allow custom configurations to be easily and automatically configured with a common software driver. For example; the switch can be read through the status port and used to determine what the RX/TX configuration should be and any special characteristics for that implementation. All of the data bits pass through the FPGA used to implement the PCI interface. Any or all bits can be used for custom state machine and IO functions. Custom termination options are also available.
PMC Product Line

**PMC-Parallel-485-NG1**

32 Independent RS485 IO in a Single PMC Slot

http://www.dyneng.com/pmc_parallel_485ng1.html

Customized version of PMC-Parallel-485. Design used for system timing synchronization. One card acts as a master and distributes the clock and counter synchronization pulses to the rest of the 485s in the system. Each card independently tracks the “time” and stays in sync with the master card. Master and slave cards are selected with software. Two timers with maskable interrupts per card. Interrupt on counter bits changing state for multiple system timers.

**PMC-Parallel-485-NRC1**

32 Independent RS485 IO in a Single PMC Slot

http://www.dyneng.com/pmc_parallel_485.html

Customized version of PMC-Parallel-485 with interrupt on change of state capability, upper bits muxed to allow input buffering or discrete outputs, and upper nibble predefined as output. Engineering kit available. Please download the manual for details.

**PMC Serial IO – UART / SCC Based**

**PMC-Serial**

Synch/Asynch Serial Protocols, UART and SCC

http://www.dyneng.com/pmc_serial.html

Replace several cards with one to save time, cards, slots and stay within budget.

The PMC-Serial features: Exar 854 quad UART and Zilog 85X30 Serial Communications Controller. The Xilinx FPGA provides a 33/32 PCI interface and control for the UART and SCC. The IO from the Quad UART and Serial Communications Controller are routed through the FPGA to provide multiple IO options. The PMC-Serial supports RS-232, RS-485, RS-423 and RS-188. The PMC-Serial has options for the UART and SCC reference frequencies, and the capability of adding a reference oscillator to the Xilinx for custom state machine requirements.

**PMC Bus Interface**

**PMC Spacewire**

PMC Compatible SpaceWire Interface ECSS-E-ST-50-12C Spec

http://www.dyneng.com/pmc_Spacewire.html

Utilize SpaceWire to communicate with the European Space Agency and NASA equipment utilizing the ECSS-E-ST-50-12C specification. SpaceWire is configured using routers to create a hierarchical point-to-point system with high speed parallel paths.

PMC SpaceWire implements SpaceWire in a convenient PMC format. With PMC you can install the adapter into PCI [PCI-BPMC], cPCI [cPCI2PMC], or processor board PMC slots. The SpaceWire specification calls for LVDS signaling and a specific 9 pin micro-D connector. You can connect the PMC-SpaceWire to other SpaceWire compliant devices without electrical interface issues.

Four fully independent and highly programmable LVDS IO channels are provided by the PMC-SpaceWire design. In the SpaceWire implementation the channels pass tokens between two independent state-machines to provide the proper protocol. The SpaceWire protocol is advanced with link testing, error handling, command and data protocols built in. The SpaceWire electrical interface is point-to-point. With the SpaceWire protocol it is easy to build a hierarchical architecture system with routers or a home-run wired system.
ccPMC-SpaceWire  Conduction Cooled PMC SpaceWire Interface ECSS-E-ST-50-12C Spec
http://www.dyneng.com/ccPmcSpaceWire.html
ccPMC-SpaceWire can be used in conduction cooled environments as well as standard PMC slots. Four fully independent and highly programmable SpaceWire channels provided. The SpaceWire channels pass tokens between two independent state-machines to provide flow control. The SpaceWire protocol is advanced with link testing, error handling, and command and data protocols built in. The SpaceWire electrical interface is point-to-point. With SpaceWire it is easy to build a hierarchical architecture system with routers or a “home-run” wired system. User programmable transmit frequency for each channel. Separate data and packet FIFO’s for each channel with optional 128k x 32 additional FIFO in the data path. “Channelized DMA™” included in the design for efficient data transfer with the host system.

The ccPMC version of the SpaceWire interface has the IO through the user IO connector Pn4. The IO are chosen to match the differential routing used on many carriers. Connect the ccPMC-SpaceWire to other SpaceWire compliant devices without electrical interface issues. Time Code support provides a complete solution. Option for RAD HARD FLASH available for the ccPMC-SpaceWire. Shown with Radiation Hardened Rad Hard FLASH option [RHF].

PMC Wizard  Ultra High Speed Bidirectional P2P Transmission System
http://www.dyneng.com/pmc_wizard.html
The PMC-Wizard is intended for use in ultra high-speed bidirectional point-to-point data transmission systems. The primary application is to provide very high-speed I/O data channels for point-to-point baseband data transmission over controlled impedance media of approximately 50 Ω.

The maximum rate and distance of data transfer is dependent upon the attenuation characteristics of the media, and the noise coupling to the environment. PMC-Wizard can also be used to replace parallel data transmission architectures by providing a reduction in the number of traces, connector terminals, and transmit / receive terminals. Designed with a high speed, high density FPGA, plus Wizard transceiver devices.

ccPMC-HOTLINK  Conduction Cooled PMC Card with HOTLink RX/TX and Differential IO
http://www.dyneng.com/ccPmcHOTLink.html
HOTLink is used in applications demanding high speed and high reliability including: sonar, radar, other scanning applications, seismic, oil exploration, etc. Alternate purposes include high speed buses between equipment or within equipment for command and control, data transfer etc. ccPMC-HOTLink is a conduction cooled PMC card with 6 HOTLink receiver/transmitter pairs plus 12 differential IO. Each of the HOTLink channels is supported with a separate “Channelized DMA™” transfer engine plus local memory. Standard with industrial temperature operation. Pictured built with Transformer option.

MDM Spacewire Cable  MDM9 SpaceWire Cable
http://www.dyneng.com/pmc_Spacewire.html
MDM Spacewire Cable: Lab Environment Spacewire Cable
Conduction Cooled Designs

ccPMC-HOTLINK
Conduction Cooled PMC Card with HOTLink RX/TX and Differential IO
http://www.dyneng.com/ccPmcHOTLink.html
Click here for board description.

ccPMC-Spacewire
Conduction Cooled PMC SpaceWire Interface ECSS-E-ST-50-12C Spec
http://www.dyneng.com/ccPmcSpaceWire.html
Click here for board description.

ccPMC-Parallel-TTL
Conduction Cooled w/ 64 Programmable Digital IO w/ FIFO’s & DMA
http://www.dyneng.com/ccpmc_parallel_ttl.html
Click here for board description.

ccPMC-BiSerial-III-TRANS
Conduction Cooled Transformer Coupled Spartan II Based Design
http://www.dyneng.com/pmc_biserial_III_trans.html
Click here for board description.

PMC User Design

PMC-XM
User Programmable PMC with Two FPGA Devices and Transition Module
http://www.dyneng.com/pmc_xm.html
The PMC-XM is intended for use in situations where the user wants to control the design.

PMC-XM has two FPGA devices built in. The first device takes care of the PCI interface, DMA etc. The second device [Virtex XC4VSX35-10] is for the user application. The Transition Module [XM] is attached to the Virtex device. The Virtex is further supported by a 1M x 36 QDR SRAM, PLL, Digital Temperature Sensor, and connections to the PMC Pn4 connector. Four LEDs are supplied to the Virtex to provide design status, debugging support and other user purposes.
PMC Product Line

PMC-XM-DIFF

Reprogrammable Logic with LVDS and/or RS485 differential IO ‘DIFF’

http://www.dyneng.com/ PmcXmDiff.html

PMC optimized for IO interfacing requirements featuring universal voltage 32/33 PCI interface with DMA support, user programmable PLL, optional 1M x 36 RAM, 34 LVDS and/or RS-485 IO types. User FPGA supported with software reload and FLASH. FIFO memories and programmable interrupts off-load the CPU from most of the management. CPU overhead is further reduced by rapid data transfer created by FIFO access for the PCI bus, as well as independent “Channelized DMA”™ when multiple streams are in use. For user applications a temperature sensor and 4 Virtex controlled LED’s are provided.

On the IO side, PMC-XM-DIFF has options for Bezel IO and/or Rear IO with independent and interconnected channel functions. LVDS provides 200+ MHz IO and RS-485 provides up to 40 MHz IO. When mixed, the 3.3V RS-485 devices have a lower IO rate.

Hardware Development Products

DESWCB

Custom Cable to SpaceWire Adapter

http://www.dyneng.com/deswcb.html

Dynamic Engineering SpaceWire Connector Board.

SpaceWire is becoming a common interface, and is finding its way into embedded and distributed systems. With rack mounted systems rear IO is frequently utilized. In some situations custom cabling is required. The Dynamic Engineering SpaceWire Connector board helps with the transition from custom cabling to SpaceWire standard cabling.

HDEterm68

68 Position SCSI II/III Adapter to Terminal Strip Breakout w/ DinRail Option

http://www.dyneng.com/HDEterm68.html

Two SCSI II compatible connectors interconnected with a 68 position terminal block. The SCSI connectors are connected to the screw terminals and to each other 1:1. The “in” SCSI connector is connected to the screw terminals and then to the “out” connector. Test point positions and land patterns are provided to support loop-back testing and special termination requirements.

HDEcabl68

68 pin SCSI II/III Cable

http://www.dyneng.com/HDEcabl68.html

SCSI compliant cable with either latch block or screw terminal retention. Cables are stocked in the 3 and 6-foot lengths. Custom lengths and connectors available.

DINterm64

64 position ribbon cable to terminal block breakout

http://www.dyneng.com/DINterm64.html

Ribbon cable headers are commonly used with VME compatible hardware. Ribbon cable is difficult to connect to other hardware, especially if multiple destinations are involved. The DINterm64 converts from 64 pin ribbon cable to a 64 pin terminal strip. Discrete wires are easily connected with the screw locks on the terminal strip.

The DINterm64 provides a space efficient, low cost method of interconnecting the control electronics to the rest of the sensors, IO, machinery etc.
**DINribn64**

64 position ribbon cable with strain relief

http://www.dyneng.com/DINribn64.html

The DINribn64 cable set is designed to interconnect devices using 64 connection DIN connectors. Rows A and C are utilized. Many Dynamic Engineering products have this connector system as well as products from third parties for VME systems. Utilize the DINribn64 cable to connect the DINterm64 to the PCIBPMC, PCIBPMCX2, PCI2PMC etc. A snap together breakout system with DIN rail capability is created with these components. You can also use the DINribn64 to interconnect your rear IO VME hardware to the DINterm64 or other breakout device.

**PMC Test**

**DESWBO**

SpaceWire Breakout Design with Power Adapter

http://www.dyneng.com/deswbo.html

DESWBO- Dynamic Engineering SpaceWire Break-Out - will help you to solve SpaceWire link issues.

With DESWBO - Dynamic Engineering SpaceWire BreakOut - Spacewire can be interconnected and monitored. DESWBO has two 9-pin MDM connectors to facilitate in-line monitoring of both sides of a SpaceWire link. DESWBO is designed to detect and decode bit sequences. Signals are issued indicating what types of characters are passing between nodes as well as the contents of data and timecode characters. A running count of flow control credits for each node is calculated by the DESWBO by monitoring FCTs and N-character occurrences. LED and testpoint based user interface. Stand-alone operation. Power Supply included. Cables available.

**PMC-Extendio**

Mount the PMC remote from the Carrier to Access Component Side

http://www.dyneng.com/pmcextendio.html

A two card set with flex cable interconnection. The PMC is available for test or debugging with the component side up. The Flex cables allow for the PMC to be moved. 64 bit PCI bus interconnection. Rated at 33 MHz. With 12” cables. 66 MHz cable length will depend on your system.

**PMC cPCI Rear IO Support – PIMs, PIM Carriers, IO Options**

**PIM-Carrier-Dual**

PIM Carrier Board

http://www.dyneng.com/pim_carrier.shtml

The PIM Carrier facilitates rear panel IO in cPCI systems using PMC’s. The PIM-Carrier has 2 PIM sites. PIMs provide PMC front panel IO at the rear panel. Signals routed from P14 through J3 to PIM and P24 through J5 to PIM.
PIM-Parallel-IO  **PIM-PMC Interface Module**
The PIM-Parallel-IO facilitates rear panel IO in cPCI based systems using PMC’s. It provides the PIM-Parallel-IO front panel IO where rear panel IO is desired. The PIM-Parallel-IO can be used with other PMCs as well. A PIM Carrier is mounted to the underside of the backplane. The Pn4 [PMC] IO is passed through the backplane connectors to the PIM Carrier and to the installed PIM devices. Most PIM Carriers have two PIM sites which correspond to the two PMC’s mounted to the host card. The PIM (PMC Interface Module) carrier supports the flexible PIM scheme for PMC rear I/O.

PIM-Universal-IO  **PIM – Interface Module for cPCI**
The PIM-Universal-IO facilitates rear panel IO in cPCI based systems using PMC’s. The PIM-Universal-IO provides the PMC front panel IO where rear panel IO is desired. The PIM-Universal-IO can be used with any PMC implementing Pn4 IO. When installed, the PIM-Universal-IO will re-create the PMC’s Pn4 IO in the rear compartment of the chassis [under the backplane]. All of the 64 IO connections are routed to the 68 pin SCSI II connector. The signals are routed through 0 ohm resistors. Alternate resistor values can be used to provide signal damping.

cPCI-J2-SCSI  **SCSI Connector Board**
http://www.dyneng.com/cpci-j2-scsi.html
Dynamic Engineering’s cPCI-J2-SCSI is a connector board [CompactPCI]. Ribbon cable is used between the rear IO and SCSI connector. The lengths are reasonably well matched. The cable is short. The design is intended for lower speed IO - 10 MHz and below. Cable interface includes 68 pin SCSI 1:1 with PMC Pn4 connector using standard VITA defined J2 rear IO for PMC. See manual for pin table. The cPCI-J2-SCSI is a somewhat specialized design. If your requirements are somewhat different please contact us to make a version for you.