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Dynamic Engineering

PCI Express Product Line

Complete product data and manuals are available on our website.
http://www.dyneng.com/pciexpress.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, PCIexpress, 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.

Linux and Windows® driver(s) available for many Dynamic Engineering products

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Linux and Windows® driver(s) available for many Dynamic Engineering products

PCIe Carrier / Adapter Cards

PCIeBPMCX1

1/2 Length 4 lane PCI/PCI-X Card PMC Carrier

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

New PC´s have PCI Express connectors in larger quantities 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, Part Number: PCIeBPMCX1-FAN12-OT.

PCIeBPMC

1/2 Length 1 lane PCI/PCI-X Adapter Card with PMC Mounting Slot

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

Now you can use your PMC with a new PC as new PC´s have PCI Express connectors in larger quantities than PCI slots.

The PCIe Bridge PMC 1 slot adapter/carrier converter card provides the ability to install one PMC card into a standard PCIe (Express) **1** lane slot. Suitable for PCI 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.

PCIeBPMC is a copy of the PCIeBPMCX1 design and detuned to 1 lane operation to be compatible with PC machines with 1 lane slots. PCIeBPMC can be used in single lane as well as multi-lane slots. For use in higher lane count slots the PCIeBPMCX1 is recommended. All clock speeds and modes are available on the PMC side of the Bridge, however from a bandwidth point of view the single lane can only really support 32/33 operation for DMA. 64/66 can be used along with the other configurations if the overall performance does not exceed that of a single lane slot. PCIeBPMC [X1] shown.

PCIe General Purpose TTL, Open Collector, and Differential IO

PCIeBiSerialDb37
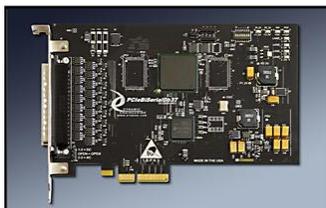
Spartan III FPGA based PCIe BiSerial with Db37, RS485/LVDS IO, Memory

http://www.dyneng.com/pciebiserialdb37.html

PCI Express compatible bi-directional serial data interface. Designed to be updated for client requirements. PCIeBiSerialDB37 is a PCI Express module with 1-4 lanes used. The DB37 connector is mounted to allow cabling directly to the IO port of the PC. DB37 connectors allow for a variety of wiring: twisted pair, twin-ax, ribbon etc.

PCIeBiSerialDb37 can be configured with RS-485/RS-422, LVDS or both types of IO. Each IO is individually programmable for direction and termination. PCIeBiSerialDb37 has 18 transceivers which can be used for any combination of input and output functions. All IO are matched length and impedance controlled from the FPGA to the connector cable mounting plane to allow for any client requirement: Full Duplex, Half-Duplex, Parallel, Serial, multi-channel etc. The hardware is optimized with "Channelized DMA"™ to allow for efficient data movement to and from the host memory. Additional hardware features include a 4 channel PLL, internal and external memory, local power supplies etc.

The first implementation included an ARC-210 interface and a GPIO port, providing bidirectional and fully independent Tx and Rx. Other BiSerial designs to date have used custom serial protocols, manchester encoding and decoding, and SDLC with custom options for parity, CRC and more.

Hardware Development Products

HDEterm68
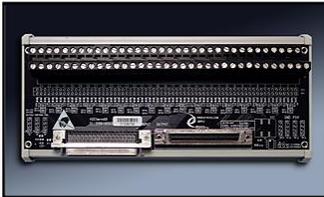
68 Position SCSI II/III Adapter to Terminal Strip Breakout

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.

Embedded Solutions featuring PMC Modules

Couple a Dynamic Engineering PCIe carrier with any of our PMC boards. Carriers available in 1 and 4 lane configurations.
See a full list of PMC solutions below.

PCIeBPMCX1 shown loaded with a PMC BiSerial III.
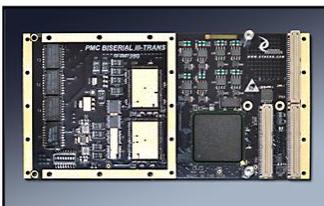
PCIe-BiSerial-III

Spartan III Based PMC BiSerial RS485 LVDS PLL + More

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

The PMC BiSerial III is recommended for new designs. More than 7 customerized versions and counting. The most recent version has 8 full or half duplex operation 10 MHz capable UART channels each with DMA support. New with the Spartan III are internal memories. With the Spartan III 1500 and larger devices 32 1Kx16 FIFOs can be configured making for multiple channels with internal memory support when the full size FIFOs are not required.

PCIe-BiSerial-III-Trans

**Conduction Cooled Transformer Coupled Spartan III Based Design**

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

The PMC BiSerial family has been updated to include a conduction cooled version with transformer coupling. The PMC-BiSerial-III-TRANS has 8 channels, each fully programmable and capable of operating independently or in concert with the other IO. The BiSerial III features completely isolated FIFOs 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 denser, faster FPGA will implement the most complex state-machines. The components are rated for the industrial extended temperature range. Conformal coating is available.

PCIe-BiSerial-IO
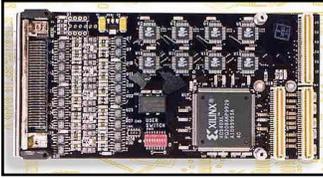
PMC Compatible Bi-Directional Serial Data Interface

http://www.dyneng.com/pmcbis.html
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 customerized versions in addition to the standard design.
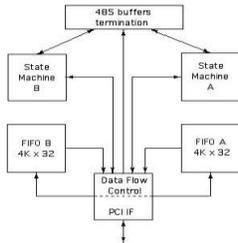
PCIe-BiSerial-II

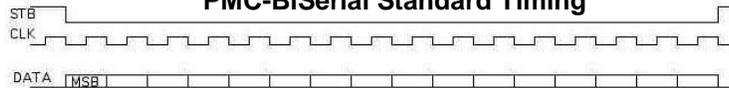**PMC Compatible Bi-Directional Serial Data Interface**

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 Standard Timing

PCIe-BiSerial-II-NG1

PMC Compatible Bi-Directional Serial Data Interface

http://www.dyneng.com/pmcbis2_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.

PCIe-BiSerial-II-NVY1

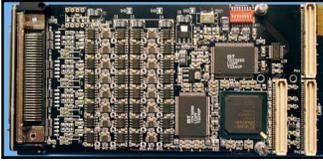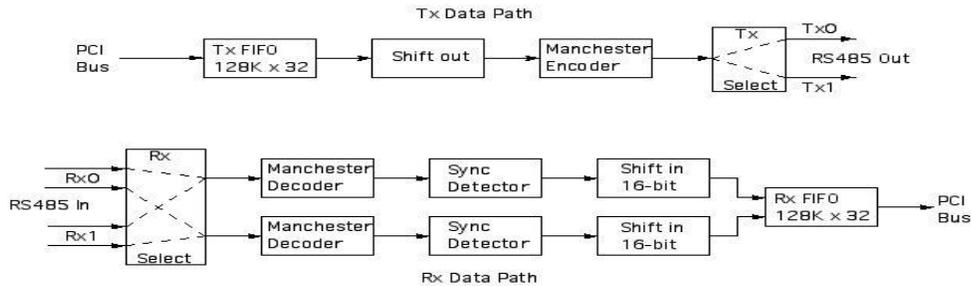### PMC Compatible 4 Channel Transmit Serial Data with Manchester Encoding

http://www.dyneng.com/pmcbis_nvy1.html

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

Uart funtion added and additional processing within the state-machine. Larger FIFOs [128K x32]. 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.

PCIe-BiSerial-BAE1
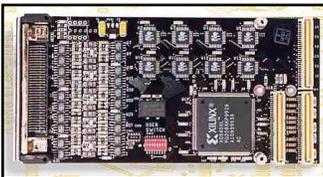
PMC Compatible Real Time Clock Interface

http://www.dyneng.com/pmcbis_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.

PCIe-BiSerial-BA1

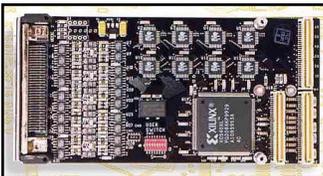### PMC Compatible Bus Data Analyzer with 2 Protocols

http://www.dyneng.com/pmcbis_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.

PCIe-BiSerial-PS1

PMC Compatible 4 Channel Transmit Serial Data Interface

http://www.dyneng.com/pmcbis_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.

PCIe-BiSerial-s311

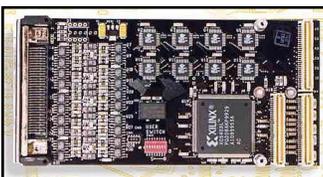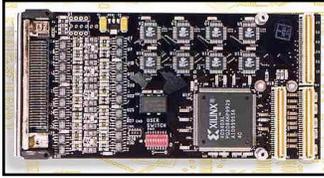**PMC Compatible 4 Channel Transmit Serial Data Interface**

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.
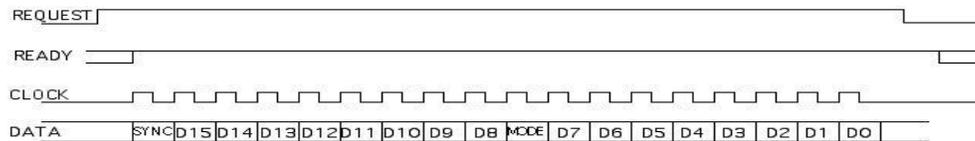
PCIe-BiFIFO

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.

PCIe-Parallel-TTL
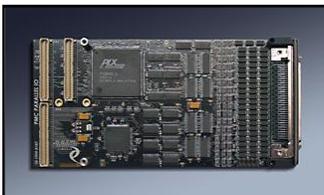
64 Independently Programmable Digital IO w/ FIFO's & DMA

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

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 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.

PCIe-Parallel-IO

64 Independent IO in one PMC Slot

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

The PMC compatible PMC-Parallel-IO 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 cable.
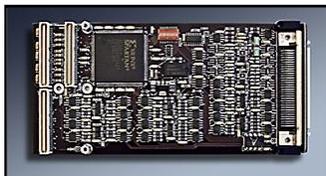
PCIe-Parallel-485
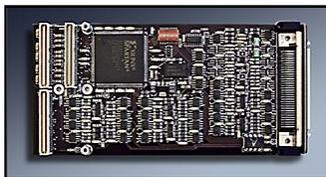
32 Independent RS485 IO up to 34 Differential IO in 1 Card

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

A simple point and shoot interface makes it easy to add up to 34 differential IO to your system with the PMC Parallel 485. The PMC compatible PMC-Parallel-485 design adds 32 [RS-485 /RS-422/LVDS] differential IO lines to one slot of your carrier board. 2 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. Many standard features and ease of VHDL updating make PMC Parallel 485 a versatile design.

PCIe-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.

PCIe-Parallel-485-NRC1

32 Independent RS485 IO in a Single PMC Slot
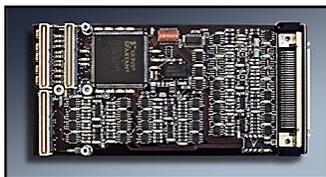
http://www.dyneng.com/pmc_parallel_485.html

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.

PCIe-Serial
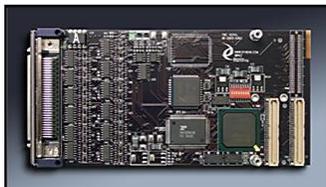
Sync/ Async Serial Protocols, UART and SCC

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

The PMC-Serial is capable of providing multiple serial protocols, both synchronous and asynchronous with a wide range of baud rates. The PMC-Serial has up to 8 UART channels, and two SCC channels. The protocol processors are complemented with a variety of IO which can be selected as a build option. RS-232, RS-485, RS-422, and RS-423 are supported. Two enhanced hysteresis MIL STD 188-114A receivers, and two open drain active low output drivers are also provided. The PMC-Serial also has a wide range of IO drivers and receivers to interface with. The SCC and UART IO are tied to the Xilinx and then back to the IO to allow for programmable options and ease of customerization.

PCIe-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 heirarchical 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 [PCIBPMC], 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

PCIe-Wizard
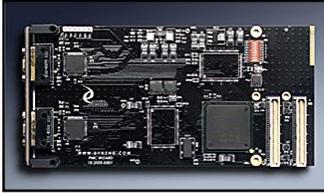
Ultra High Speed Bidirectional P2P Transmission System

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.

PCIe-XM

User Programmable PMC w/ Virtex FPGA & Transition Module Position

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.