

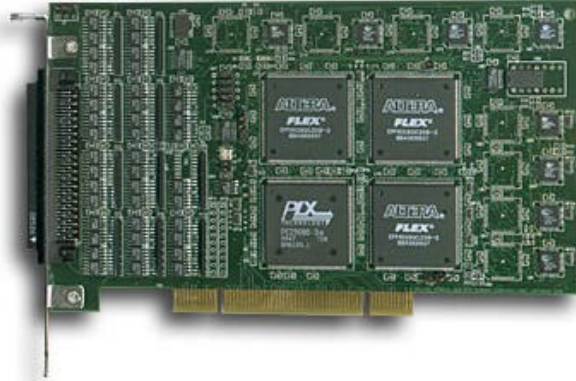
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High Performance Bus Interface Solutions

PCI-HPDI32A-COS

High-speed Parallel Digital I/O PCI Board

100 to 200 Mbytes/s Cable I/O with PCI-DMA engine



Features Include:

- 20 Mhz Sample rate.
- Software Selectable COS or Logic Analyzer Operation.
- Software Selectable Clock divider.
- Software Selectable COS or Logic Analyzer Mask.
- Software Selectable Logic Analyzer Trigger.
- Software Programmable Event Counter.
- Output data port that can be driven onto the cable on byte wide boundaries.

Applications Include:

- ✓ High speed data acquisition and control
- ✓ Point-to-Point PCI-to-PCI bus communication
- ✓ High-speed video data capture
- ✓ General Purpose Parallel DMA interface
- ✓ Development and research

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Functional Description:

The PCI-HPDI32A-COS Board includes a DMA Controller, 64/128/256/512 Kbytes of FIFO buffering, a cable Transmit controller, a cable Receive controller, and cable transceivers (RS-422/485 or differential pseudo ECL). The DMA on this board is intended for reading and writing the FIFOs. After the DMA is initialized and started, the host CPU will be free to proceed with other duties and need to respond only to interrupts. The DMA controller is capable of transferring data to host memory using D32 transfers; whereas the FIFO memory provides a means for continuous transmission of data without interrupting the DMA or requiring intervention from the host CPU. The board also provides for DMA chaining, interrupt generation for various states of the board, including End-Of-Transfer, TX FIFO Almost Empty, RX FIFO Almost Full, and more. The Transmitter and Receiver are in FPGAs that provide a configurable interface that is highly flexible in data width and transfer protocol.

Cable Interface:

The cable interface consists of 32 bi-directional Cable Data lines, and 2 control / Status output lines, Transmitter Driving the Cable and Receiver Running, which can employ either differential I/O RS485/422 compatibility or differential pseudo ECL. Refer to cable pin-out in Figure 4.3-1.

The Cable Command Lines are assigned as follows.

- Transmitter Driving Diphas Data Line - Connected to Cable Command 5.
- Receiver Running – Connected to Cable Command 6.
- 32 I/O Lines - Connected to Cable Data 0 thru Cable Data 31.

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SPECIFICATIONS

DMA Transfer Rates

- Transfer Rate over cable (RS-422/485 Transceivers):
100 Mbytes/sec at 25 MHz clock rate and 32-bit cable interface.
- Transfer Rate over cable (Differential Pseudo ECL Transceivers):
200 Mbytes/sec (max)
- PCI transfer rate from on-board FIFO to PCI:
132 Mbytes/sec max (100 Mbytes/sec typ)
- Data transfers over the cable do not interrupt data transfers over PCI since data is decoupled using FIFO buffering.

DMA Start Latency (when started by cable input or by CPU)

Initialization and DMA start: less than 1 microsecond typ.

FIFO Memory

The FIFOs on the PCI-HPDI32A-COS are used for buffering the transmit or receive data. There is a total of eight FIFOs on the board; 1 set of 4 for transmit, and 1 set of 4 for receive. Each set consists of 32 bits of data and 4 status flags. The receive FIFOs are loaded by the cable receive control logic and read by either the CPU or the DMA.

The transmit FIFOs are loaded by either the CPU or the DMA and read by the cable transmit control logic. The 4 status flags that accompany the FIFOs are all active low ('0' being TRUE) and are as follows: Empty, Almost Empty, Almost Full, Full. The Almost Empty and the Almost Full status flags can be programmed by the software to become true at most desired levels.

Cable Interface Transceivers

RS-422/485 levels (contact factory for availability of TTL levels)

RS-422/485 transceivers provide +- 7.5 Volts of noise immunity and can withstand +- 25 Volt transients without damage.

Optional on-board parallel termination. The parallel terminators provide the usual transmission line termination. In either case unused inputs can be left open; however, the logic level of unconnected inputs is indeterminate.

Pseudo ECL levels (option) is realized using Lucent BTK1A16NB differential pseudo ECL to/from TTL transceivers. The transceiver has a high output driver for up to 50 ohm loads. The driver outputs are terminated internally at 220 ohms and the inputs are terminated at 110 ohms eliminating the need for external resistors. For more information refer to www.lucent.com and search on the above part number.

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PCI INTERFACE

- Compatibility:** Conforms to PCI Specification 2.1, with D32 read/write transactions.
Supports "plug-n-play" initialization.
Single multifunction interrupt.
Supports DMA transfers as bus master.

MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS

- Power Requirements**
 - +5.0 VDC \pm 0.20 VDC at 4.5 Amps, maximum
- Physical Dimensions (Excluding panel bracket)**
 - Height: 98 mm
 - Length: 175 mm
 - Width: 6.1 mm
- Environmental Specifications**
 - Ambient Temperature Range: Operating: 0 to +55 degrees Celsius
Storage: -40 to +85 degrees Celsius
 - Relative Humidity: Operating: 0 to 80%, non-condensing
Storage: 0 to 95%, non-condensing
 - Altitude: Operation to 10,000 ft.
- Cooling Requirements**
 - 200 LFPM minimum air flow across component side of board;

ORDERING INFORMATION

PCI-HPDI32A-COS with 8K x 32-bit FIFOs on each channel (both Tx & Rx, 64K byte total);

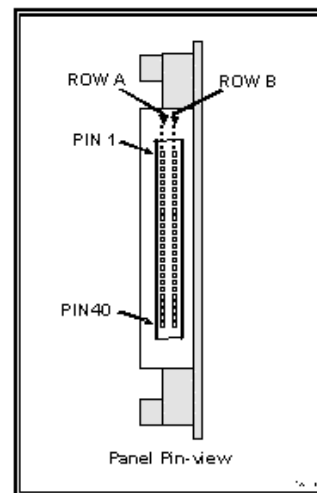
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SYSTEM I/O CONNECTIONS

System Connector Pin Functions

Pin No.	Cable Signal Name	Pin No.	Cable Signal Name
1	CABLE CLK +	41	CABLE D12 +
2	CABLE CLK -	42	CABLE D12 -
3	CABLE COMMAND D0 +	43	CABLE D13 +
4	CABLE COMMAND D0 -	44	CABLE D13 -
5	CABLE COMMAND D1 +	45	CABLE D14 +
6	CABLE COMMAND D1 -	46	CABLE D14 -
7	CABLE COMMAND D2 +	47	CABLE D15 +
8	CABLE COMMAND D2 -	48	CABLE D15 -
9	CABLE COMMAND D3 +	49	CABLE D16 +
10	CABLE COMMAND D3 -	50	CABLE D16 -
11	CABLE COMMAND D4 +	51	CABLE D17 +
12	CABLE COMMAND D4 -	52	CABLE D17 -
13	CABLE COMMAND D5 +	53	CABLE D18 +
14	CABLE COMMAND D5 -	54	CABLE D18 -
15	CABLE COMMAND D6 +	55	CABLE D19 +
16	CABLE COMMAND D6 -	56	CABLE D19 -
17	CABLE D0 +	57	CABLE D20 +
18	CABLE D0 -	58	CABLE D20 -
19	CABLE D1 +	59	CABLE D21 +
20	CABLE D1 -	60	CABLE D21 -
21	CABLE D2 +	61	CABLE D22 +
22	CABLE D2 -	62	CABLE D22 -
23	CABLE D3 +	63	CABLE D23+
24	CABLE D3 -	64	CABLE D23 -
25	CABLE D4 +	65	CABLE D24 +
26	CABLE D4 -	66	CABLE D24 -
27	CABLE D5 +	67	CABLE D25 +
28	CABLE D5 -	68	CABLE D25 -
29	CABLE D6 +	69	CABLE D26 +
30	CABLE D6 -	70	CABLE D26 -
31	CABLE D7 +	71	CABLE D27 +
32	CABLE D7 -	72	CABLE D27 -
33	CABLE D8 +	73	CABLE D28 +
34	CABLE D8 -	74	CABLE D28 -
35	CABLE D9 +	75	CABLE D29 +
36	CABLE D9 -	76	CABLE D29 -
37	CABLE D10 +	77	CABLE D30 +
38	CABLE D10 -	78	CABLE D30 -
39	CABLE D11 +	79	CABLE D31 +
40	CABLE D11 -	80	CABLE D32 -



System Mating Connector:
Robinson Nugent # P50E-080-S-TG

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