

PCI-7300A

80 MB/s High Speed 32-CH Digital I/O Card

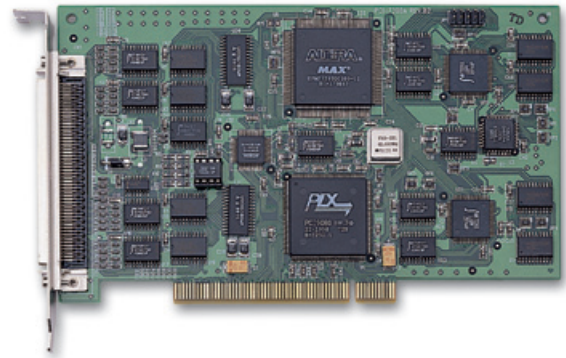
Features

- Supports a 32-bit 5V PCI bus
- 32-CH 5 V/TTL digital inputs/outputs
- 20 MHz (80 MB/s) maximum transfer rate
- 8, 16, or 32-bit transfers
- 4 auxiliary DI & 4 auxiliary DO
- On-board 64 kB FIFO
- On-board programmable timer pacer clock
- Timed digital input sampling controlled by Internal timer or external clock
- Independent trigger signals to start data acquisition and pattern generation
- Scatter-gather DMA
- Supports handshaking digital I/O transfer mode
- Repeated digital pattern generation from FIFO
- Active terminators for high speed and long distance data transfer
- Compact, half size PCB

- **Operating Systems**
 - Windows 98/NT/2000/XP/2003
 - Linux
 - DOS

- **Recommended Software**
 - VB/VC++/BCB/Delphi
 - DAQBench
 - DAQCreator

- **Driver Support**
 - DAQ-LVIEW PnP for LabVIEW
 - DAQ-MTLB for MATLAB
 - DAQBOY for Windows
 - PCIS-DASK for Windows
 - PCIS-DASK/X for Linux



Introduction

ADLINK PCI-7300A is an ultra-high speed digital I/O card. It consists of 32 digital input/output channel. High performance designs and state-of-the-art technology make this card ideal for a wide range of applications, such as high speed data transfer, digital pattern generation and digital pattern capture applications, and logic analyzer applications. Trigger signals are available to start the data acquisition of pattern generation.

Maximum Data Acquisition Rate

For sustained data transfer directly from or to host memory, could be 80 MB/s. The maximum data transfer rates between external device and on-board FIFO can be up to 80 MB/s for DO and 160 MB/s for DI. 80MB/s is achieved by 32-bit bus width multiplied by internal 20 MHz clock. 160 MB/s is achieved by 32-bit bus width with external 40 MHz clock for digital input channels only. The PCI-7300A can reach 160 MB/s throughput only when the acquired data length is less than FIFO size (16 k samples).

Bus Mastering DMA

The PCI-7300A performs high-speed data transfers between on-board FIFO and host memory using bus mastering DMA and scatter gather via a 32-bit PCI bus architecture. PCI bus greatly extends data throughput up to 132 MB/s (burst) and also has

provisions for processor-free DMA. When the PCI-7300A becomes the bus master, it takes control of the PCI bus, transfers data at burst speed, and then releases the bus. User can utilize the host memory as much as possible to store data when the data acquisition throughput is less than the sustained PCI bus bandwidth.

Scatter Gather Support

For bus master devices, the hardware has the special-design built-in support for transferring data to and from noncontiguous ranges of physical memory. The PCI-7300A contains multiple pairs of address and length registers, each one describing a single contiguous buffer segment. This allows PCI-7300A to perform I/O using buffers that are scattered throughout DMA address space. These multiple address and count registers are often referred to as a scatter/gather list, and you can also think of these bus masters as having their own built-in mapping registers. With scatter gather support, the data transfer size is no longer a limitation, and moreover, ring buffer is easily achieved with the link list of the scattered memory.

I/O Port Configurations

The PCI-7300A is initially configured as two ports, PORTA and PORTB. Each port controls 16 digital

I/O lines. The I/O ports can be configured as either input or output. According to outside device environment, users can configure PCI-7300A to meet all high-speed digital I/O data transferring. PCI-7300A can support many different digital I/O operation modes:

Internal clock

The digital input and output operations are handled by internal clock and data is transferred by bus mastering DMA.

External clock

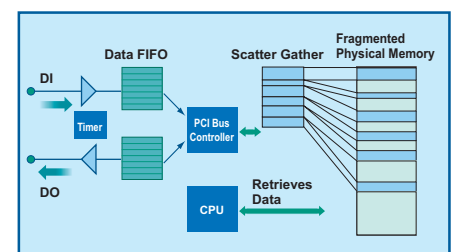
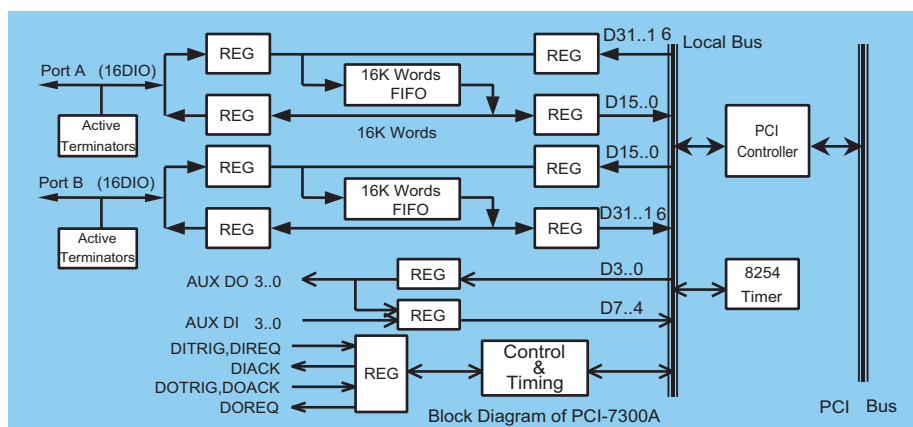
The digital input and output operations are handled by external In/Out strobe signals (DI_REQ or DO_ACK) and data is transferred by bus mastering DMA.

Handshaking

Through REQ and ACK signals, the digital I/O data can have simple handshaking data transfer to guarantee no data loss.

Pattern generation

The PCI-7300A reads or writes digital data at a predetermined rate. Users can control the rate internally by on-board counters with 50ns timing resolution.



Specifications

Digital I/O

- Numbers of channel (Software configurable)
 - 16 DI & 16 DO
 - 32 DI
 - 32 DO
- Compatibility: 5 V/TTL
- Digital logic levels
 - Input high voltage: 2-5.25 V
 - Input low voltage: 0-0.8 V
 - Output high voltage: 2.7 V minimum
 - Output low voltage: 0.5 V maximum
- Input load
 - Terminator OFF
 - Input high current: 1 mA
 - Input low current: 20 mA
 - Terminator ON
 - Termination resistor: 111 Ω
 - Termination voltage: 2.9 V
 - Input high current: 1 mA
 - Input low current: 22.4 mA
- Output driving capacity
 - Source current: 8 mA
 - Sink current: 48 mA

Transfer characteristics

- Data transfers:
 - Bus Mastering DMA with Scatter/Gather
- Data width: 32/16/8 bits (programmable)

Data transfer count

- 2 M double words (8 M bytes) for non-chaining mode DMA
- No limitation for chaining mode (scatter/gather) DMA

Max transfer rate

- DO: 80 MBytes/s, 32-bit output @ 20 MHz
- DI: 80 MBytes/s, 32-bit input @ 20 MHz

Trigger

- DI_TRG for digital inputs, DO_TRG for digital outputs
- Compatibility: 5 V/TTL
- Trigger types: rising or falling edges
- Minimum pulse width: 32 ns

Clocking mode

- Internal clock
 - Internal clock sources: 20 MHz, 10 MHz, Timer #0 output (digital input pacer) and Timer #1 output (digital output pacer)
- External clock up to 40 MHz
- Handshaking
- Burst handshaking

Programmable counter

- Base clock: 10 MHz
- Timer #0 as digital input pacer
- Timer #1 as digital output pacer
- Timer #2: as interrupt source

Auxiliary digital I/O

- Number of channels
 - 4-CH digital inputs
 - 4-CH digital outputs
- Compatibility: 5 V/TTL
- Data transfers: programmed I/O

General Specifications

- I/O connector: 100-pin SCSI-II female
- Operating temperature: 0 to 60°C
- Storage temperature: -20 to 80°C
- Relative humidity: 5 to 95%, noncondensing
- Power requirements

| Power | on-board terminator off | on-board terminator on |
|-------|-------------------------|------------------------|
| +5 V | 830 mA max. | 1.0 A max. |

- Dimensions (not including connectors)
179 mm x 106 mm

Termination Boards

- **DIN-100S**
Termination Board with a 100-pin SCSI-II Connector and DIN-Rail Mounting (Including One 1-meter ACL-102100 Cable)
- **DIN-502S**
Two Pieces of DIN-50S Termination Board (Including One 1-meter ACL-10252 Cable)

Pin Assignment

| | | | |
|-----|----|-----|---------|
| GND | 1 | 51 | PB15 |
| GND | 2 | 52 | PB14 |
| GND | 3 | 53 | PB13 |
| GND | 4 | 54 | PB12 |
| GND | 5 | 55 | PB11 |
| GND | 6 | 56 | PB10 |
| GND | 7 | 57 | PB9 |
| GND | 8 | 58 | PB8 |
| GND | 9 | 59 | PB7 |
| GND | 10 | 60 | PB6 |
| GND | 11 | 61 | PB5 |
| GND | 12 | 62 | PB4 |
| GND | 13 | 63 | PB3 |
| GND | 14 | 64 | PB2 |
| GND | 15 | 65 | PB1 |
| GND | 16 | 66 | PB0 |
| GND | 17 | 67 | DO_ACK |
| GND | 18 | 68 | DO_REQ |
| GND | 19 | 69 | DO_TRG |
| GND | 20 | 70 | AUXO3 |
| GND | 21 | 71 | AUXO2 |
| GND | 22 | 72 | AUXO1 |
| GND | 23 | 73 | AUXO0 |
| GND | 24 | 74 | TERMPWR |
| GND | 25 | 75 | TERMPWR |
| GND | 26 | 76 | TERMPWR |
| GND | 27 | 77 | TERMPWR |
| GND | 28 | 78 | AUXI3 |
| GND | 29 | 79 | AUXI2 |
| GND | 30 | 80 | AUXI1 |
| GND | 31 | 81 | AUXI0 |
| GND | 32 | 82 | DI_ACK |
| GND | 33 | 83 | DI_REQ |
| GND | 34 | 84 | DI_TRG |
| GND | 35 | 85 | PA15 |
| GND | 36 | 86 | PA14 |
| GND | 37 | 87 | PA13 |
| GND | 38 | 88 | PA12 |
| GND | 39 | 89 | PA11 |
| GND | 40 | 90 | PA10 |
| GND | 41 | 91 | PA9 |
| GND | 42 | 92 | PA8 |
| GND | 43 | 93 | PA7 |
| GND | 44 | 94 | PA6 |
| GND | 45 | 95 | PA5 |
| GND | 46 | 96 | PA4 |
| GND | 47 | 97 | PA3 |
| GND | 48 | 98 | PA2 |
| GND | 49 | 99 | PA1 |
| GND | 50 | 100 | PA0 |

Ordering Information

- **PCI-7300A**
80MB/S High Speed 32-CH Digital I/O Card

- 1 Software Solutions
- 2 PXI/CompactPCI Platforms
- 3 PXI-Based Instruments
- 4 PXI/CompactPCI Modules
- 5 PCI DAQ Cards
- 6 PCI DIO Cards
- 7 PC/104-Plus Products
- 8 ISA DAS/DIO Cards
- 9 Wiring Termination Boards
- 10 Motion Vision & COM
- 11 Remote I/O Modules
- 12 Industrial Computers