



## Embedded I/O Products & Integrated Systems

THE SOURCE FOR ALL YOUR I/O NEEDS.

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**2009  
Product  
Catalog**

ACQUISITION CONTROL COMMUNICATION ENGINEERING/SYSTEMS

About ACCES I/O Products

Since its founding in 1987, San Diego, California-based ACCES I/O Products, Inc. has emerged as a true market leader in analog, digital, serial communication, and isolated I/O solutions. ACCES I/O also offers complete systems, integration services and enclosures. ACCES I/O's leadership in its target markets is the result of technical innovation, breadth of product line, and the indisputable price/performance value that ACCES I/O offers users in solving their real-world industrial/scientific/military data acquisition and control needs.

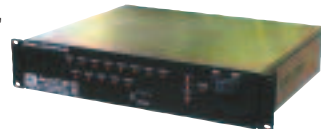
USB/104 where the PCB size and mounting holes match the PC/104 form factor. This allows our USB I/O products to serve both the mobile and embedded markets. ACCES became the first exclusive I/O manufacturer to offer ETX I/O baseboards using our large library of hardware designs and software drivers. This provides embedded OEM customers a semi-custom solution instead of what would formerly have been an expensive custom I/O solution. Our wireless I/O line provides the first rugged, practical solution for using wireless in remote and harsh locations.



Sorrento Valley, San Diego

Our Products

ACCES offers one of the industry's widest selection of data acquisition products, with hundreds of standard, off the shelf products to choose from. These products include signal conditioning, analog and digital I/O, RS-232/422/485 serial communications, isolated input / relay output, and watchdog timer cards, which feature specific, practical functionality. ACCES products are designed for use with PC/104, PCI, PCI-X, Low Profile PCI, EBX, ETX, EPIC, USB, Ethernet and ISA, as well as distributed and wireless I/O. All products ship with a complete software CD providing drivers, source code, setup programs, and samples.



New I/O Technology

ACCES has been a leader in the introduction of new technology such as Low Profile PCI, USB, ETX and Wireless for the I/O market. ACCES was the first I/O vendor with a Low Profile PCI analog input card. Our Low Profile PCI line now ranges from isolated relay digital cards to eight port RS-232/422/485 cards that can be used in 2U rack mount industrial servers. Our innovative USB I/O line recently introduced the OEM concept of

RoHS

ACCES I/O is committed to providing our customers quality products that comply with RoHS (2002/95/EC) and WEEE (2002/96/EC) to meet the lead-free European Union green initiatives. ACCES is dedicated to meeting the increasing demands for environmentally compatible products through this initiative, while meeting technical requirements and high quality standards. All new ACCES designs released since July 2006 have RoHS versions available.



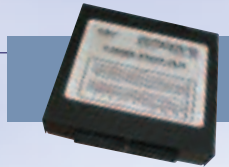
Our People

ACCES is staffed by experienced engineering and technical sales professionals whose decades of cumulative embedded I/O expertise have led to innovative and reliable products. Its loyal, forward thinking employees continuously anticipate, identify and meet the needs of internal and external customers. Engineers and buyers at ACCES work closely with a variety of component vendors to ensure long product life-cycle in all ACCES products. Design, prototype assembly, testing, software engineering, and new product support are all completed in-house. ACCES is extremely proud of its experienced Sales and Technical staff which makes sure to offer support before and after all sales. Customer support, service, and satisfaction is a priority for all ACCES employees.



USB & USB/104 I/O BOARDS & ACCESSORIES

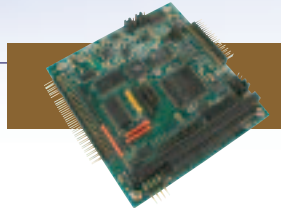
- Analog I/O & Multifunction - Up to 64 Channels, 100-500kHz, 12/16-Bit, ARB
- Digital I/O Boards-16 High Speed Input/Output with 16 additional I/O's, 32 Bits Parallel I/O
- Isolated Digital/Relay Output - 4/8/16 Isolated Inputs; 4/8/16 Relay Outputs with 2 RS-232/422/485 serial ports
- Counter/Timer Board - Fifteen independent 16-bit counter / timers (5 x 82C54-10)
- USB Adapters - Up to 4-Ports, USB to RS-232/-422/-485



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PC/104 I/O BOARDS & ACCESSORIES

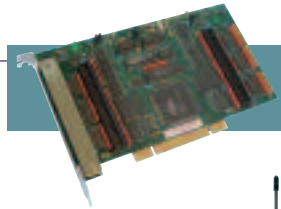
- Analog I/O & Multifunction - Up to 16 Channels, 100-500kHz, Arbitrary Waveform Generator
- Analog Multiplexers - 32 Channels of Current Loop, T/C, RTD, Other Transducer Inputs
- Digital I/O - 24/48/96 Lines with Change of State (COS) Detection
- Isolated Digital/Relay Output - 8/16/32/48 Channels; 4/8/16 Relay Outputs, COS
- Serial Communications - 2/4/8 Ports; Isolated & Non-Isolated
- DC/DC Power Modules - 12/24/48V; Single/Multiple Outputs
- Accessories - Screw Terminal Boards, Ribbon Cables, Snaptrack, and more



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PCI BUS I/O CARDS

- Analog/Digital - Up to 16-Channels, 100-500kHz, 12/16-Bit A/D Converters, Selection of Digital I/O
- Digital/Analog - 2/4/6/8/16 Double-Buffered 12-Bit D/A Converters, 16/24 Digital I/O
- Digital I/O - 8/16/24/48/72/96/120-Channel Parallel; COS Detection, Isolation, Relay and Solid-State Outputs
- Serial Communications Cards - Multi-Protocol, Multi-Port RS-232/-422/-485, Low-Profile Universal PCI; 1/2/4/8 Ports
- Watchdog Utility Cards - Timer, Computer Power & Temperature Monitors, Fan Speed Control, and other options



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REMOTE ACCES™ DISTRIBUTED & WIRELESS I/O

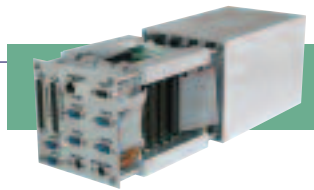
- Digital I/O Pods - 24-Bit Parallel Digital I/O, 54 Digital Inputs Allowing up to 50V Signal Levels, Several Enclosure Options
- Analog Input Pods - Wide Variety of Multiplexed Transducer Inputs, Up to 16-Channels, 12-Bit A/D with Differential or Single-Ended Inputs
- Analog Output Pods - 8 D/A Converters, 7 Digital I/O Ports; Low & High Power Output Models
- Connection Options - Wireless Transceivers, Ethernet, USB-to-Serial Converters, Cabling, Power Supplies



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INTEGRATED PC/104 EMBEDDED DATA ACQUISITION SYSTEMS

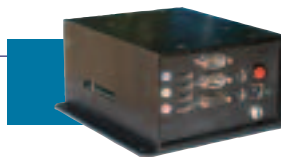
- IE-DAS - Intelligent Embedded Data Acquisition System - EBX, EPIC, PC/104 CPU Compatibility; 20GB Hard Drive, 4 Expansion Slots, Scalable & Flexible I/O Interfacing, Convection-Cooled Steel Enclosure, 115VAC Power Supply Included
- E4-DAS - Rugged, Easy to Use, Ethernet Enabled, Environmentally Adaptable Data Acquisition System; Conduction Cooled, PC/104 & PC/104-Plus CPUs up to 1GHz; Up to 6 PC/104 or PC/104-Plus Expansion Slots



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ETX SYSTEM & I/O SOLUTIONS

- Semi-Custom ETX Baseboard Development
- Embedded Motherboard/Baseboard Products Using Your Choice of COTS ETX CPUs, PC/104, & USB I/O Modules
- ETX Development Baseboards. Just Add ETX CPU & I/O Boards Needed for Your Application
- ETX Systems, Small, Fanless Intel® Core™ Duo Embedded Systems With Industrial PC/104-Plus I/O Expansion



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ACCES I/O FOR EVERY APPLICATION

Serving Virtually Every Type of Application



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CUSTOM DESIGN CAPABILITIES

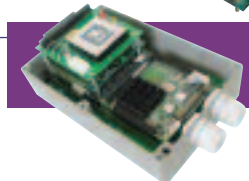
Full range of custom design and integration services from prototype through production. Development, documentation, sourcing and procurement, assembly, software, and thorough testing provide a high-quality solution you can count on.



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ACCESSORIES

- Wireless Communications Interfaces - Variety of Wireless Modem Transceivers for Remote ACCES Pods, including 900MHz, 2.4GHz, Dipole Antenna, RS-232/-422/-485
- Utility Boards to Pair to Digital I/O Boards
- Adapters, Connectors & Cabling - Screw Terminals, Variety of Pin Count Connectors, Ribbon, SCSI, Snaptrack, and more



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# USB I/O BOARDS



**ANALOG**  
16-Bit Multifunction Analog I/O

### USB-AI16-16A USB-AI16-16E

- Up to 500kHz sampling rate
- All functions fully software configurable
- 16-bit with 16 single-ended or 8 differential inputs
- Autocalibration and real-time hardware calibration and oversampling for accurate data
- 16 high-current digital I/O lines
- Eight input ranges, unipolar or bipolar
- Small, (4" x 4" x 1.25") rugged industrial enclosure
- USB-AI16-16E reaches speeds of 250kHz
- Factory options include external power for high current capabilities, extended temperature and DIN rail mounting provisions, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, 4-20mA or 10-50mA inputs



**ANALOG**  
12-Bit Multifunction Analog I/O

### USB-AI12-16A USB-AI12-16E USB-AI12-16E

- Up to 500kHz sampling rate
- All functions fully software configurable
- 12-bit with 16 single-ended or 8 differential inputs
- Autocalibration and real-time hardware calibration and oversampling for accurate data
- 16 high-current digital I/O lines
- Eight input ranges, unipolar or bipolar
- Small, (4" x 4" x 1.25") rugged industrial enclosure
- Model USB-AI12-16 reaches speeds of 250kHz, USB-AI12-16E is at 100kHz
- Factory options include external power for high current capabilities, extended temperature and DIN rail mounting provisions, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, 4-20mA or 10-50mA inputs



**ANALOG**  
16-Bit, 64-Channel Analog I/O

### USB-AI16-64A USB-AI16-64E

- Up to 500kHz sampling rate
- All functions fully software configurable
- 16-bit with 64 single-ended or 32 differential inputs
- Autocalibration and real-time hardware calibration and oversampling for accurate data
- 12 high-current digital I/O lines
- Eight input ranges, unipolar or bipolar
- Small, rugged industrial enclosure
- USB-AI16-64E reaches speeds of 250kHz
- Factory options include external power for high current capabilities, extended temperature and DIN rail mounting provisions, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications



**ANALOG**  
12-Bit, 64-Channel Analog I/O

### USB-AI12-64A USB-AI12-64E

- Up to 500kHz sampling rate
- All functions fully software configurable
- 16-bit with 64 single-ended or 32 differential inputs
- Autocalibration and real-time hardware calibration and oversampling for accurate data
- 12 high-current digital I/O lines
- Eight input ranges, unipolar or bipolar
- Small, rugged industrial enclosure
- Model USB-AI12-64 reaches speeds of 250kHz, USB-AI12-64E is at 100kHz
- Factory options include external power for high current capabilities, extended temperature and DIN rail mounting provisions, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications



**DIGITAL**  
High-Speed USB Digital Input/Output

### USB-DIO-16H

- High-speed USB 2.0 digital waveform (pattern) generator
- 16 fast digital I/O lines feature continuous, sustained throughput up to 16 MB/s
- Capable of 80 MB/s bursts with flexible synchronous clock and handshaking capabilities
- Continuous streaming over USB with no maximum waveform length
- On-board embedded 128 kByte FIFO memory
- 18 additional digital I/O lines arranged in 4 programmable groups
- All outputs buffered with 24 mA sink/source capabilities
- Factory options include LVTTTL for 3.3V applications, OEM version (board only) features PC/104 module size and mounting compatibility, external power for high current capabilities, extended temperature and DIN rail mounting provisions



**DIGITAL**  
High-Speed USB Digital I/O  
USB-DIO-16A  
USB-DI16A  
USB-DO16A

- High-speed USB 2.0 digital waveform (pattern) generator
- 16 fast digital I/O lines feature continuous, sustained throughput up to 16 MB/s
- Capable of 80 MB/s bursts with flexible synchronous clock and handshaking capabilities
- Continuous streaming over USB with no maximum waveform length
- On-board embedded 8 kByte FIFO memory
- 18 additional digital I/O lines arranged in 4 programmable groups
- All outputs buffered with 24 mA sink/source capabilities
- Factory options include LVTTTL for 3.3V applications, input only (USB-DI16A), output only (USB-DO16A), and input/output (USB-DIO-16A) versions, OEM version (board only) features PC/104 module size and mounting compatibility, external power for high current capabilities, extended temperature and DIN rail mounting provisions



**DIGITAL**  
Up to 16 Isolated Inputs and 16 Solid State Relay Outputs  
USB-IDIO-16 Series

- High-speed USB 2.0 device, USB 1.1 compatible
- 16 individually optically isolated inputs (channel to channel and channel to ground)
- Polarity insensitive AC/DC inputs accept up to 31 VDC or AC RMS
- Jumper selectable filtering per input channel for AC or voltage transients
- 16 optically isolated fully protected high-side FETs capable of switching up to 2A
- Internal removable screw terminal board for easy wiring
- All power drawn from USB port, no external power adapter required
- Small, (4" x 4" x 1.4") rugged industrial enclosure
- Factory options include input only and solid state output only versions, eight input/output version, external power for high current capabilities, extended temperature and DIN rail mounting provisions, OEM version (board only) features PC/104 module size and mounting compatibility



**DIGITAL**  
Up to 16 Isolated Inputs and 16 Relay Outputs  
USB-IIRO-16 Series

- High-speed USB 2.0 device, USB 1.1 compatible
- 16 optically isolated inputs
- 16 Form C electromechanical 1A relays
- Internal, removable screw terminal board for easy wiring
- Small (4" x 4" x 1.4") rugged industrial enclosure
- High-speed API (no HID!)
- Factory options include eight or four input/output versions, input only and relay only versions, external power from AC/DC adapter for high current capabilities, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, DIN rail mounting provision



**ANALOG**  
8-Channel Arbitrary Waveform Generator

### USB-DA 12-8A OEM USB-DA 12-8E OEM

- 8 Independent 12-bit DACs
- USB 2.0 bulk buffered or streaming waveform output

- Point-list based update configuration allows varying output speed per channel
- Point-list features include loop, flags, and terminate control
- 128K sample buffer output at 1 Million DACs / second
- DAC slew 14% of FSV per usec
- USB Streaming at 320K
- Six per-channel ranges

- Status and control TTL signals
- Small (3.5 by 3.775") portable module (PC/104 size and mounting compatibility)
- Options include non-ARB version (E), differential outputs, ILDA compatibility, and numerous power connectivity options



**DIGITAL**  
32-Channel USB Digital Input/Output Module

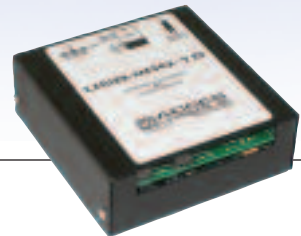
### USB-DIO-32 OEM

- High-speed USB 2.0 device, USB 1.1 compatible
- 32-channel USB digital I/O module

- Four 8-bit ports independently selectable for inputs or outputs
- All 32 I/O lines buffered with Sink 64mA / Source 32mA current capabilities
- OEM version (board only) features PC/104 module size and mounting compatibility
- High speed API (no HID!)
- Removable screw terminal adapter for easy wiring

- Standard 50-pin IDC connector with key
- Factory options include up to three 82C54 counter/timers, a rugged, industrial enclosure, external power for high current capabilities, DIN rail mounting provision

# USB I/O BOARDS



**DIGITAL**

16 Isolated Inputs or 16 Relay Outputs

**USB-II-16  
USB-RO-16**

- High-speed USB 2.0 device, USB 1.1 compatible
- 16 optically isolated inputs (USB-II-16)
- 16 Form C electromechanical 1A relays (USB-RO-16)
- Internal, removable screw terminal board for easy wiring
- Small (4" x 4" x 1.4") rugged industrial enclosure
- High-speed API (no HID!)
- Factory options include external power from AC/DC adapter for high current capabilities, OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, extended temperature, and DIN rail mounting provisions

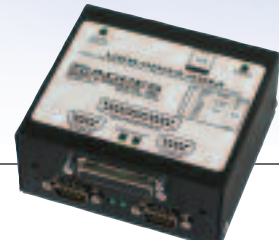


**DIGITAL**

4 Isolated Inputs and 4 Relay Outputs

**USB-IIRO4-DB**

- High-speed USB 2.0 device, USB 1.1 compatible
- Four optically isolated digital inputs
- Four Form C electromechanical 1A relays
- Small (4"x4"x1.8") rugged industrial enclosure
- All required power drawn from USB port, no external power adapter required
- Relay contacts and isolated inputs accessed via a mounted DB25 connector
- Expansion USB hub port connector
- Factory options include OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, extended temperature, and DIN rail mounting for industrial environments

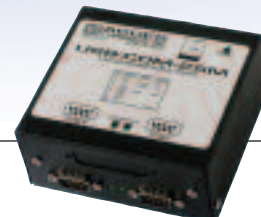


**DIGITAL / SERIAL**

Isolated I/O and Serial Communications

**USB-IIRO4-2SM**

- High-speed USB 2.0 device, USB 1.1 compatible
- Four optically isolated digital inputs
- Four Form C electromechanical 1A relays
- Two serial ports, field selectable RS-232/422/485
- Small (4"x4"x1.8") rugged industrial enclosure
- Custom high-speed function driver
- All required power drawn from USB port, no external power adapter required
- Expansion USB hub port connector
- Factory options include a four digital input/output version (USB-IIRO-4DB), two serial ports only (USB-COM-2SM), OEM (board only) version features PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, extended temperature, and DIN rail mounting for industrial environments



**SERIAL**

USB to Serial RS-232/422/485 Adapters  
**USB-COM-4SM  
USB-COM232-4  
USB-COM-4S  
USB-COM-2SM**

- Four and two-port USB to serial RS-232/422/485 adapters
- For use with USB 1.1 and 2.0 port hosts
- User selectable RS-232, RS-422, or RS-485, per port
- Small, (4" x 4" x 1.8") rugged industrial enclosure
- Speeds up to 921.6K
- Power and individual port activity LEDs
- All required power drawn from USB port, no external power adapter required
- Extra downstream USB expansion port
- Factory options include RS-232 only (USB-COM232-4) and RS-422/485 only (USB-COM-4S) versions, OEM (board only) version features PC/104 mounting holes and PCB footprint for added flexibility in embedded applications, extended temperature, and DIN rail mounting provision for industrial environments



**SERIAL**

Single Port USB Serial Adapters

**USB-232  
USB-422  
USB-485**

- Add a RS-232, RS-422 or RS-485 serial port to any USB equipped computer
- Data transfer rates up to 921.6K baud
- Built in six foot cable
- Plug-n-Play allowing quick connect/disconnect whenever you need an additional serial port
- Ideal for use with portables and laptops
- No available board slots needed
- LED Indicates serial port activity
- No external power needed



**DIGITAL**

Counter/Timer Module  
**USB-CTR-15 OEM**

- High-speed USB 2.0 device, USB 1.1 compatible
- Fifteen independent 16-bit counter/timers (5 x 82C54-10)
- Clock, gate and out signals from all 15 channels buffered and accessed via 1 connector

- PC/104 module size (3.550" by 3.775") and mounting compatibility
- Standard configuration adaptor pre-configured for event counting, frequency measurement, pulse width measurement, or frequency generation
- Removable screw-terminal board for easy wiring

- User wiring adaptor card provided for flexible yet easy counter concatenation/configuration
- Factory options include external power and AC/DC adaptor, a rugged, industrial enclosure, extended temperature, and DIN rail mounting provision

Products	ANALOG INPUTS								ANALOG OUTPUTS				MISC		
	# Inputs	Res	Res Ranges	4-20mA	Gain	Speed	Autocal	FIFO	#Outputs	Res	BIP RG	UNI RG	4-20mA	#Dig I/O	XT
USB-AI16-16A	16 SE, 8 DIF	16	8	Factory	Program	500KHz	Yes	Yes						16 I/O	Yes
USB-AI16-16E	16 SE, 8 DIF	16	8	Factory	Program	250KHz	No	Yes						16 I/O	Yes
USB-AI12-16A	16 SE, 8 DIF	12	8	Factory	Program	500KHz	Yes	Yes						16 I/O	Yes
USB-AI12-16E	16 SE, 8 DIF	12	8	Factory	Program	250KHz	No	Yes						16 I/O	Yes
USB-AI12-16E	16 SE, 8 DIF	12	8	Factory	Program	100KHz	No	Yes						16 I/O	Yes
USB-AI16-64A	64 SE, 32 DIF	16	8	No	Program	500KHz	Yes	Yes							
USB-AI16-64E	64 SE, 32 DIF	16	8	No	Program	250KHz	No	Yes							
USB-AI12-64A	64 SE, 32 DIF	12	8	No	Program	500KHz	Yes	Yes							
USB-AI12-64E	64 SE, 32 DIF	12	8	No	Program	250KHz	No	Yes							
USB-AI12-64E	64 SE, 32 DIF	12	8	No	Program	100KHz	No	Yes							
U-RA1216	16 SE, 8 DIF	12	8 + Offset	Factory**	Program	baud	No	Yes	3	12		2	Yes	7 I/O	Yes
U-RAD128	8 SE	12	4	No	Program	baud	No	Yes						8 I/O	Yes
U-RIDACS	up to 64 DIF	12	*	*	*	baud	No	Yes							
U-RDAG12-8									8	12	1	2	Yes	7 I/O	Yes
USB-DA12-8E									8	12	3	3	No		No
USB-DA12-8A									8	12	3	3	No		ILDA No

Res = resolution \*\*Multiple signal conditioning options Autocal = autocalibration BIP RG = bipolar ranges  
\*Multiple configurations available XT = extended temperature option UNI RG = unipolar ranges

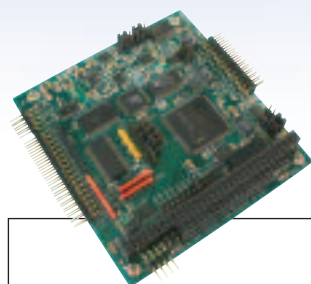
Products	DIGITAL I/O							
	# I/O	Buf	Prog	OPTOS	Relays	# CTRS	Misc	XT
USB-CTR-15		Yes	Yes			15		Yes
USB-DIO-16H	16 I/O, Hi-speed	Yes**	Yes				18 TTL I/O	Yes
USB-DIO-16A	16 I/O, Hi-speed	Yes	Yes				18 TTL I/O	Yes
USB-DI-16A	16 In, Hi-speed	Yes	No				18 TTL I/O	Yes
USB-DO-16A	16 Out, Hi-speed	Yes	No				18 TTL I/O	Yes
USB-DIO-32	32 I/O	Yes	Yes			up to 3		Yes
USB-IDIO-16	16 In/16 Out		No	16	16*		High side FETs	Yes
USB-IDIO-16L	16 In/16 Out		No	16	16*		Low side FETs	Yes
USB-IDO-16	16 Out		No		16*		High side FETs	Yes
USB-IDIO-8	8 In/8 Out		No	8	8*		High side FETs	Yes
USB-IDO-16L	16 Out		No		16*		Low side FETs	Yes
USB-IDIO-8L	8 In/8 Out		No	8	8*		Low side FETs	Yes
USB-IIRO-4	4 In/4 Out		No	4	4			Yes
USB-IIRO-4DB	4 In/4 Out		No	4	4		DB25	Yes
USB-IIRO4-2SM	4 In/4 Out		No	4	4		2 COM ports	Yes
USB-IIRO-8	8 In/8 Out		No	8	8			Yes
USB-II-16	16 In		No	16				Yes
USB-RO-16	16 Out		No		16			Yes
USB-IIRO-16	16 In/16 Out		No	16	16			Yes
U-RDI-54	54 In	Yes	No					Yes

BUF = buffered I/O OPTOS = optically isolated inputs \*Solid State  
PROG = programmable I/O XT = extended temperature option \*\*Large FIFO

Products	SERIAL PORTS					
	RS-232	RS-422	RS-485	Baud	PROT CFG	XT
USB-232	1			921.6K	FIXED	Yes
USB-422		1		921.6K	FIXED	Yes
USB-485			1	921.6K	FIXED	Yes
USB-COM-2SM	up to 2	up to 2	up to 2	*	JUMPER	Yes
USB-COM232-4	4			230.4K	FIXED	Yes
USB-COM-4S		up to 4	up to 4	921.6K	JUMPER	Yes
USB-COM-4SM	up to 4	up to 4	up to 4	*	JUMPER	Yes
USB-IIRO4-2SM	up to 2	up to 2	up to 2	*	JUMPER	Yes

PROT CFG = protocol configuration \* = 230.4K in RS-232 mode, 921.6K in RS-422 and RS-485 modes  
XT = extended temperature option

# PC/104 I/O BOARDS



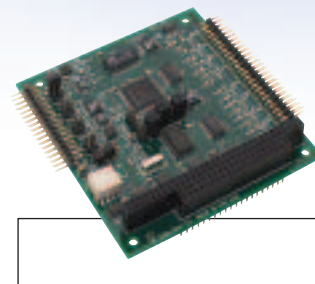
■ **ANALOG**  
16-Bit Analog and Digital I/O  
**104-AIO16A**  
**104-AIO16E**  
(Economy version)

- 500kHz sampling rate
- 16 single-ended or 8 differential inputs
- 11 software/hardware selectable ranges of: 0-1V, 0-2V, 0-4V, 0-5V, 0-10V, ±0.5V, ±1V, ±2V, ±2.5V, ±5V, ±10V
- 1024 sample data FIFO for A/D
- Auto calibration
- Two 12-bit D/A outputs and 16 digital I/O
- Unique software programmable gain channel by channel
- Factory options include extended temperature, FIFO up to 64K sample, programmable amplifier with gains of 1, 10, 100 and 1000, +5VDC only operation, and an economy version



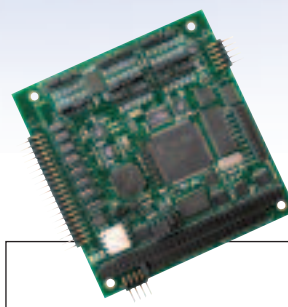
■ **ANALOG**  
12-Bit Analog and Digital I/O  
**104-AIO12-8**  
**104-AI12-8** (No Outputs)  
**104-AO12-4** (No Inputs)

- Eight single-ended or true differential inputs
- Programmable input ranges of: 0-5V, 0-10V, ±5V, ±10V
- 100kHz sampling rate
- On-board pacer clock and counter timers
- Four double-buffered analog outputs
- Jumper selectable output ranges of: 0-5V, 0-10V, ±5V, ±10V
- 24 digital I/O lines, type 82C55 with change-of-state detect on port C, buffers on ports A & B
- Factory options include 4-20mA inputs with offset, channel by channel pre-amplifier gains of 1-100, +5VDC only operation, and extended temperature



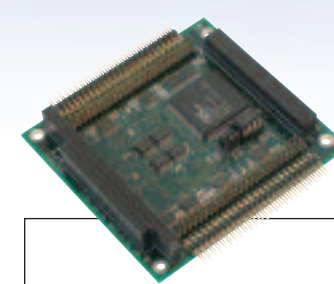
■ **ANALOG**  
32-Channel Analog Input Signal Conditioner  
**104-AIM-32**  
**104-AIM-32A**  
(Includes A/D board)

- Designed to pair with an A/D board to increase channel count and signal conditioning capabilities
- 6 software programmable ranges: ±25mV, ±50mV, ±0.1V, ±2.5V, ±5V, ±10V
- Up to 8 104-AIM-32s can be stacked per A/D board for up to 256 S.E. or 128 diff. inputs
- +5VDC only operation
- Precision 15VDC sensor excitation
- Input signal conditioning options include 4-20mA inputs with offset, RTD measurement, thermocouple measurement, voltage divider on each input, RC filters on each input, bridge completion configuration, and thermocouple break detect



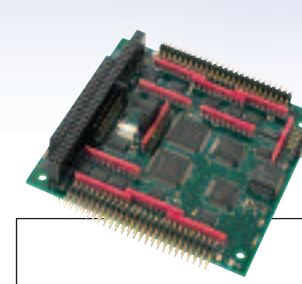
■ **ANALOG**  
12-Bit Analog Output Board with Arbitrary Waveform Generation  
**104-DA12-8A**  
**104-DA12-8**

- Broadly configurable arbitrary waveform generator (ARB)
- DACs independently programmable with unique waveforms
- 128K SRAM for ARB data storage
- Independent 12-bit D/A converter per channel
- DACs independently or simultaneously updated
- Output ranges of 0-5, 0-10, +/-5, +/-10V
- Voltage outputs on separate pins per channel and 4-20mA
- 32-bit counter for precisely timed outputs
- 16-bit counter for IRQ generation
- Available in 4 and 8 channels, with or without the ARB



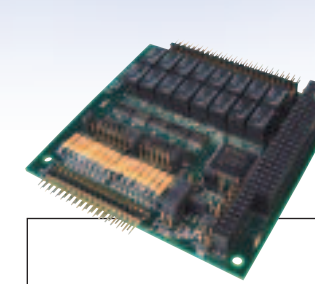
■ **DIGITAL**  
PC/104-Plus 96 Channel High-Speed Digital I/O with Change of State (COS) Detection  
**P104-DIO-96**  
**P104-DIO-96S**

- PC/104-Plus (PCI-104 optional)
- 96 channel TTL-DTL high speed digital I/O
- Software selectable in vs. out as 8 bit and 4 bit ports
- Emulates 4 industry standard 8255 PPIs (mode 0)
- Full 32-bit PCI interface design
- Buffered circuits for higher driving capacity
- Low CPU overhead
- Known power-up states
- Output port status read back
- Standard 50-pin IDC connectors (x4)
- 0 to 70°C and -40 to +85°C versions available



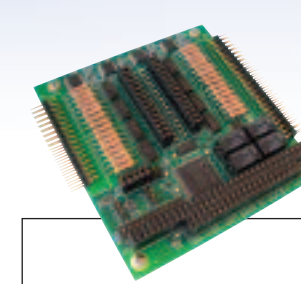
■ **DIGITAL**  
48 or 24 Digital I/O with Change of State (COS) Detection  
**104-DIO-48S (E)**  
**104-DIO-24S (E)**

- 48 or 24 parallel lines of 82C55 digital I/O with tristate buffers
- IRQ on input change of state (COS) eliminates the need for constant polling
- High sink/source current (64mA/32mA)
- I/O pulled up to 5V for contact monitoring
- Compatible with industry standard I/O racks
- Factory Options include 82C54 with three 16-bit counter/timers for event counting, frequency output, pulse width and frequency measurement, extended temperature, economy version without COS feature (E), pull-down resistors on I/O lines, and vertical I/O connector pins



■ **DIGITAL**  
32 or 16 Channel Isolated Input/Relay Output with COS  
**104-IIRO-16 (E)**  
**104-IIRO-8 (E)**  
**104-II-16**  
**104-RO-16**

- 16 or 8 optically-isolated, non-polarized CMOS compatible digital inputs accept ±31VDC or AC rms
- IRQ on input change of state (COS) eliminates the need for constant polling
- Slow/fast filter to accommodate AC voltages and noisy DC inputs
- 16 or 8 long-life Form C electro-mechanical relays switch up to 1A each
- Model 104-IIRO-8 also includes 8 non-isolated TTL compatible inputs
- Factory options include economy version without COS feature (E), extended temperature, input only and relay only versions, and expanded input voltage levels



■ **DIGITAL**  
Up to 48-Channels Isolated Input with COS/Relay Output  
**104-II32-4RO**  
**104-IDI-48 Series**

- Up to 48 optically-isolated, non-polarized digital inputs
- Change of State (COS) detection selectable on nybble basis
- 3 to 60 volt AC or DC signals
- Switchable filters and schmitt trigger buffers
- 4 Form C (NC, NO, C) SPDT relay outputs
- Contact ratings 24VDC @ 1A and 115VAC @ 0.5A
- +5V power with onboard resettable fuse for external circuits



■ **DIGITAL**  
USB/104 Digital Input/Output Module  
**USB-DIO-32 OEM**

- High-Speed USB 2.0 device, USB 1.1 compatible
- 32-channel USB digital I/O module

- PC/104 module size and mounting compatibility
- Four 8-bit ports independently selectable for inputs or outputs
- All 32 I/O lines buffered with Sink 64mA / Source 32mA current capabilities
- High-speed API (no HID!)

- Standard 50-pin IDC connector with key
- **Factory Options**
- Up to three 82C54 counter/timers
- Rugged industrial enclosure
- Screw-terminal adaptor for easy wiring

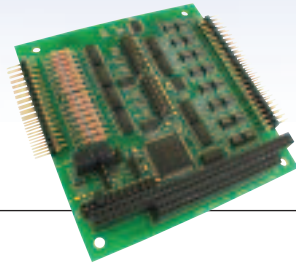


■ **DIGITAL**  
USB/104 16 Isolated Input and 16 Relay Output Digital I/O Module  
**USB-IIRO-16 OEM Series**

- High-Speed USB 2.0 device, USB 1.1 compatible
- 16 optically isolated inputs
- 16 Form C electromechanical 1 Amp relays
- High-speed API (no HID!)
- PC/104 module size and mounting compatibility

- Factory options include input only and relay only versions, eight and four I/O versions, removable screw terminal board for easy wiring, and a small (4" x 4" x 1.25") rugged industrial enclosure

# PC/104 I/O BOARDS

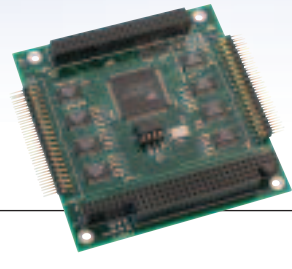


**DIGITAL**

32 or 16 Channel Optically-Isolated Digital I/O with COS

- 104-IDIO-16 (E)
- 104-IDIO-8 (E)
- 104-IDO-16
- 104-IDO-8

- 16 or 8 optically-isolated, non-polarized CMOS compatible digital inputs accept ±31VDC or AC rms
- IRQ on input change of state (COS) eliminates the need for constant polling
- Slow/fast filter to accommodate AC voltages and noisy DC inputs
- 16 or 8 optically-isolated fully protected high-current solid state outputs
- Factory options include extended temperature, economy version without COS feature (E), input only and output only versions, expanded input voltage levels

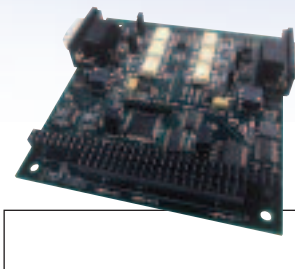


**SERIAL**

PC/104-Plus 8 Port RS-232 Serial Communication

**P104-COM232-8**

- PC/104-Plus (PCI-104 optional)
- 8 independent asynchronous RS-232 serial COM ports
- High performance octal UART, 16550 compatible register set
- Speeds up to 460.8K, full duplex
- Data transfer in byte, word, and doubleword size
- 64-byte transmit and receive FIFOs per UART
- Sixteen-bit counter/timer for IRQ generation

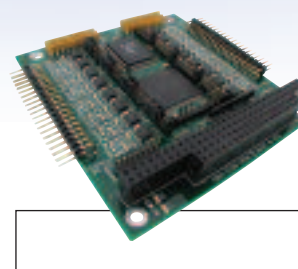


**SERIAL**

2 Port Isolated and Non-Isolated RS-422/485 Serial Communication

**104-COM-25**

- 2 independent optically-isolated asynchronous serial COM ports
- Field selectable RS-422 and RS-485, independent for each port
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Fixed bias and jumper selectable termination provided on each transmit and receive channel simplifies cabling
- Speeds up to 115.2K
- Factory options include 16850 UART with 128-byte FIFO, speeds up to 460.8K, extended temperature, non-isolated version available

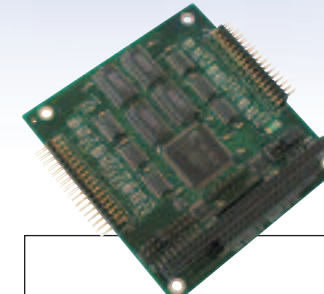


**SERIAL**

8, 4, or 2 Port RS 232/422/485 Serial Communication

**104-COM-8SM Series**

- 8, 4, or 2 independent asynchronous serial COM ports
- Field selectable RS-232, RS-422 and RS-485, independent for each port
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Speeds up to 921.6K
- Fixed bias and jumper selectable termination provided on each transmit and receive channel simplifies cabling
- Programmable non-volatile base addresses and IRQs simplify installation
- Factory options include extended temperature, 16850 UARTs with 128-byte FIFO, RS-232 and RS-422/485 only versions available



**DIGITAL**

8 or 4 Channel Quadrature Encoder Input Board

**104-QUAD-8**

**104-QUAD-4**

- 4 or 8 channels of quadrature encoder inputs and channel index inputs
- Counts outputs from eight quadrature encoders
- Three differential channels per encoder, including dual axis and index
- Input ranges: ±25V and ±7V common mode
- 4.3MHz maximum clock rate
- Individual software reset for each channel
- Standard counting and alarm functions
- Programmable for counting, speed, and direction; limit setting with interrupts
- Factory flexible interrupt options



**DIGITAL**

Counter/Timer Module

**USB-CTR-15 OEM**

- High-speed USB 2.0 device, USB 1.1 compatible
- Fifteen independent 16-bit counter / timers (5 x 82C54-10)

- PC/104 module size and mounting compatibility
- Clock, gate, and out signals from all 15 channels buffered and accessed via 1 connector
- Standard configuration adaptor pre-configured for event counting, frequency measurement, pulse width measurement, or frequency generation

- User wiring adaptor card provided for flexible yet easy counter concatenation
- Power provided via USB cable (no AC needed)
- Factory options include rugged industrial enclosure and screw terminal board

Products	ANALOG INPUTS							ANALOG OUTPUTS					MISC				
	#Inputs	Res	BIP	UNI	RG	Gain	Speed	Autocal	FIFO	#Outputs	Res	BIP	UNI	RG	4-20mA	#Dig I/O	XT
104-AIO16A	16 SE, 8 DIF	16	2	2	Jumper	500kHz	Yes	1024*	2	12	2					16 I/O	Yes
104-AIO16E	16 SE, 8 DIF	16	2	2	Jumper	250kHz	Yes	1024*	2	12	2					16 I/O	Yes
104-AIO12-8	8 SE, 8 DIF	12	2	2	Program	100kHz			4	12	2	2				24 I/O	Yes
104-AI12-8	8 SE, 8 DIF	12	2	2	Program	100kHz										24 I/O	Yes
104-AO12-4									4	12	2	2				24 I/O	Yes
104-DA12-8A									8	12	2	2	Yes				Yes
104-DA12-8									8	12	2	2	Yes				Yes
104-AIM-32	PC/104 stackable 32 Channel Analog Input Signal Conditioner & Multiplexer																

Res = resolution BIP RG = bipolar ranges UNI RG = unipolar ranges Autocal = autocalibration  
XT = extended temperature option \*optional FIFO up to 64K

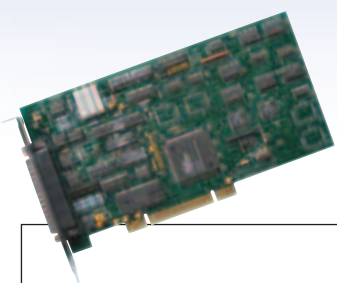
Products	DIGITAL I/O							
	#I/O	Buf	Prog	OPTOs	Relays	CTRS	COS	XT
104-DIO-24S	24 I/O	Yes	Yes			UP to 3	Yes	Yes
104-DIO-24E	24 I/O	Yes	Yes			UP to 3		Yes
104-DIO-48S	48 I/O	Yes	Yes			UP to 3	Yes	Yes
104-DIO-48E	48 I/O	Yes	Yes			UP to 3		Yes
P104-DIO-96	96 I/O	Yes	Yes				Yes	Yes
104-IIRO-8	8 In/8 Out	Yes		Yes	8		Yes	Yes
104-IIRO-8E	8 In/8 Out	Yes		Yes	8			Yes
104-IIRO-16	16 In/16 Out	Yes		Yes	16		Yes	Yes
104-IIRO-16E	16 In/16 Out	Yes		Yes	16			Yes
104-II32-4RO	32 In/4 Out	Yes		Yes	4		Yes	Yes
104-II-16	16 In	Yes		Yes			Yes	Yes
104-RO-16	16 Out	Yes			16			Yes
104-IDIO-16	16 In/16 Out	Yes		Yes	16SS*		Yes	Yes
104-IDIO-16E	16 In/16 Out	Yes		Yes	16SS*			Yes
104-IDIO-8	8 In/8 Out	Yes		Yes	8SS*		Yes	Yes
104-IDIO-8E	8 In/8 Out	Yes		Yes	16SS*			Yes
104-IDO-16	16 Out	Yes			16SS*		Yes	Yes
104-IDO-8	8 Out	Yes			8SS*			Yes
104-IDI-48	48 In	Yes		Yes			Yes	Yes

Buf = buffered I/O Prog = programmable I/O COS = change of state detection XT = extended temperature option \*Solid State

Products	SERIAL PORTS					OPTIONS		
	RS-232	RS-422	RS-485	Baud	PROT CFG	ADDR CFG	LRG FIFO	XT
104-COM232-2	2			230.4K		Jumper	Yes	Yes
104-COM232-4	4			230.4K		Jumper	Yes	Yes
104-COM232-8	8			230.4K		Jumper	Yes	Yes
P104-COM232-8	8			460.8K		Software	Yes	Yes
104-COM-2S		2	2	115.2K	Jumper	Jumper	Yes	Yes
104-ICOM-2S*		2	2	115.2K	Jumper	Jumper	Yes	Yes
104-COM-2SM	2	2	2	921.6K	Jumper	Jumper	Yes	Yes
104-COM-4S		4	4	921.6K	Jumper	Jumper	Yes	Yes
104-COM-4SM	4	4	4	921.6K	Jumper	Jumper	Yes	Yes
104-COM-8S		8	8	921.6K	Jumper	Jumper	Yes	Yes
104-COM-8SM	8	8	8	921.6K	Jumper	Jumper	Yes	Yes

PROT CFG = protocol configuration \*optically isolated XT = extended temperature option

# PCI BUS I/O CARDS

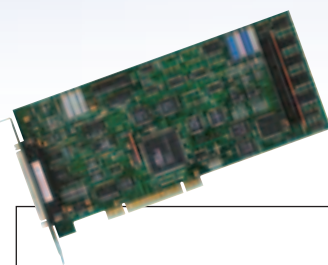


**ANALOG**

16-Channel, 12-Bit Analog Input Card

**PCI-AI12-16A  
PCI-AI12-16**

- 16 single ended / 8 differential analog inputs
- 12-bit resolution, 100kHz A/D converter
- Eight programmable voltage ranges (unipolar & bipolar) and 4-20mA current range
- FIFO data and point list buffers ("A" version). Both FIFO's 2K
- On-board pacer clock and counter/timers
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Number of analog inputs can be expanded up to 256 by use of our external signal conditioners/sub-multiplexers

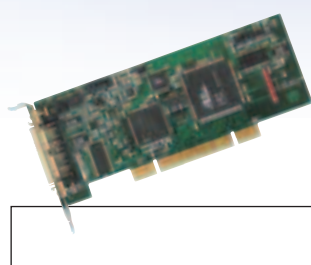


**ANALOG**

16-Channel, 12-Bit Analog I/O Card

**PCI-A12-16A**

- 16 single ended / 8 differential analog inputs
- 12-bit resolution, 100kHz A/D converter
- Two 12-bit analog outputs
- Eight programmable voltage ranges (unipolar & bipolar) and 4-20mA current range
- FIFO data and point list buffers. Both FIFOs 2K
- On-board pacer clock and counter/timers
- 24 channels of buffered TTL/CMOS digital I/O available via cabled connector on adjacent mounting bracket
- Universal PCI, PCI-X, 3.3V & 5V compatible

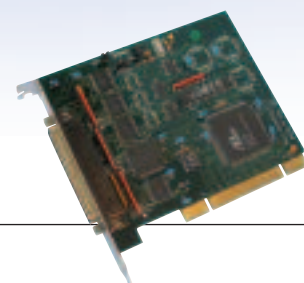


**ANALOG**

High-Speed, Multifunction, 16-Bit Analog I/O Board

**LPCI-AIO16A  
LPCI-AIO16E**

- Up to 500kHz sampling rate
- 16 single-ended or 8 differential inputs
- Auto calibration and oversampling for accurate data
- Unique channel-by-channel programmable gain feature
- 1024 sample data FIFO for A/D (optional up to 64k samples)
- Two 12-bit D/A outputs and 16 digital I/O lines
- Software selectable synchronous, asynchronous and timed trigger modes
- 11 software/hardware selectable ranges from 0-1V to ±10V
- Meets Universal PCI and MD2 Low Profile PCI Bus Specifications

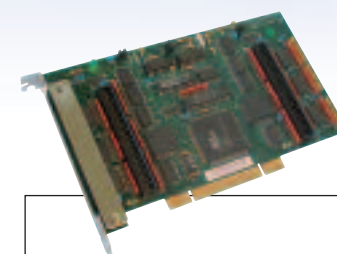


**DIGITAL I/O**

24 Channel Digital Input/Output Cards

**PCI-DIO-24D  
PCI-DIO-24H**

- 24 channels of buffered TTL/CMOS digital I/O
- Four and eight bit ports independently selectable for I/O
- I/O buffers can be enabled/disabled under program control
- Pull-ups on I/O lines
- Resettable fused +5 VDC output
- Universal PCI, PCI-X, 3.3V & 5V compatible
- "H" version compatible with industry-standard I/O racks
- Up to 3 optional 1 MHz counters
- No base address or IRQ switches to set
- DB-37(-D) or 50-pin IDC (-H) connectors

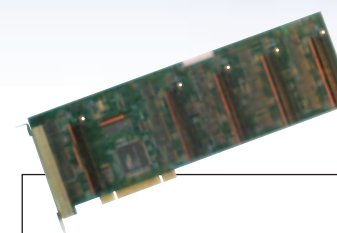


**DIGITAL I/O**

24 or 48 Channel Digital Input/Output Cards

**PCI-DIO-48S Series**

- 24 or 48 channels of TTL/CMOS digital I/O buffered by tri-stateable transceivers
- Software configurable interrupt generation on input change of state
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Four and eight bit ports independently software selectable for I/O / tri-state
- Input hysteresis and choice of pull-up or pull-down resistors on I/O lines
- Resettable-fused +5VDC available for external use
- Compatible with industry-standard I/O racks
- Factory options include a variety of connectivity options and economy models with no change of state feature

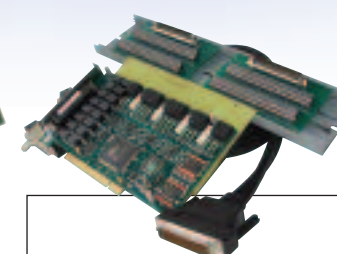


**DIGITAL I/O**

72, 96, or 120 Channel Digital Input/Output Cards

**PCI-DIO-120 Series**

- Up to 120 channels of TTL/CMOS buffered digital I/O
- On each 24-bit port, four and eight bit groups independently selectable for input or output
- Input hysteresis and choice of pull-up or pull-down resistors on I/O lines
- Interrupt and interrupt-disable capability
- Tri-stateable I/O ports under software control
- Universal PCI, PCI-X, 3.3V & 5V compatible
- +5 V supply available to the user
- Compatible with industry standard I/O racks
- Three 82C54 counter/timers available on Model PCI-DIO-96C3
- No base address or IRQ switches to set

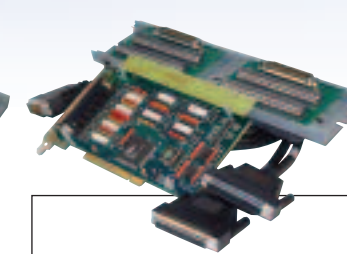


**DIGITAL I/O**

8 or 16 Channel Isolated Digital Input/Relay Output Cards

**PCHIRO-16  
PCHIRO-8  
LPCHIRO-8**

- Eight or sixteen optically isolated inputs AC or DC, 5-24V
- Opto-isolated channel to channel and channel to ground
- Eight or sixteen electromechanical relay outputs
- Can detect input state change and assert interrupt
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Low Profile version meets Universal PCI and MD1 Low Profile PCI Bus Specifications
- Selectable input circuit filters (10mS)

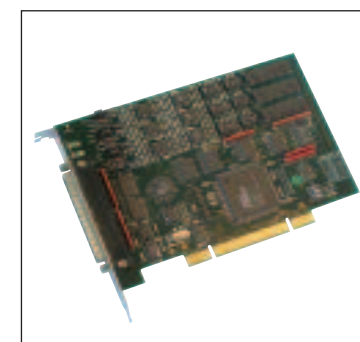


**DIGITAL I/O**

16 Channel Isolated Digital Input/Output Card

**PCI-HDIO-16**

- Sixteen optically-isolated, non-polarized digital inputs
- Opto-isolated channel to channel and channel to ground
- Sixteen fully protected FET outputs
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Can detect input state change and assert interrupt
- No switches or jumpers to set, all options software selectable



**ANALOG**

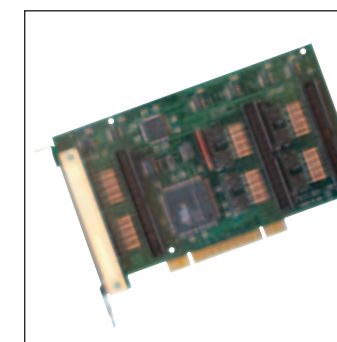
12-Bit Analog Output Cards

**PCI-DA12-2/4/6  
PCI-DA12-8/16**

- 2, 4, 6, 8 or 16 12-bit, double-buffered, D/A converters
- Software selectable individual or simultaneous DAC update

- Counter/timer (8/16) or external signal (2/4/6) generated DAC updates and/or IRQs
- Unique, automatic control of DAC outputs to prevent spurious outputs at power-on
- 24 (8/16) or 16 (2/4/6) channels of TTL/CMOS digital I/O buffered with tri-stateable transceivers

- Pull-ups on digital I/O lines
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Three 16-bit down counters (8/16 only)
- Resettable-fused +5VDC available for external use (+12V also available with 2/4/6 models)



**DIGITAL I/O**

Up to 48 Isolated Inputs or Outputs

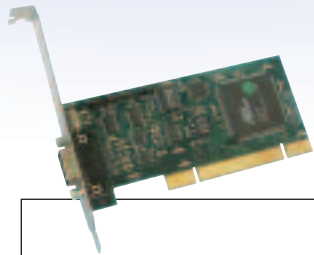
**PCHDI-48 Series  
PCHDO-48 Series**

- 16, 32, or 48 individually optically isolated digital inputs or solid state relay outputs

- Polarity insensitive digital inputs accept 3-31VDC or 31V AC rms
- Opto-isolated channel to channel and channel to ground
- Optional interrupt generation on input change of state
- Solid-state design permits higher throughput than possible with electromechanical relays

- Load voltages up to 60 Volts at up to 2A
- Lower cost per point than externally-racked solid-state relay modules
- Universal PCI, PCI-X, 3.3V & 5V compatible

# PCI BUS I/O CARDS

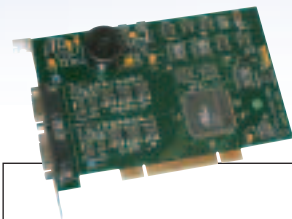


**SERIAL**

Single-Port RS-422/485 Isolated and Non-Isolated Serial Communication

**LPCI-COM-1S  
PCI-ICM-1S**

- Supports RS-422 and RS-485 protocols
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Type 16550 UART with 16-byte FIFO buffers
- Speeds up to 460.8K
- Universal PCI, PCI-X, 3.3V & 5V compatible
- PCI-ICM-1S has optical isolation
- LPCI-COM-1S meets MD1 PCI Low Profile Specification
- Detected as standard COM port by all operating systems
- No base address or IRQ switches to set
- Optional 16850 UART with 128-byte FIFO

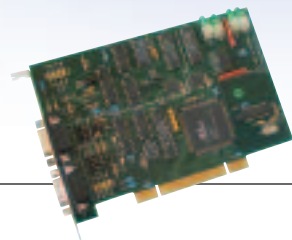


**SERIAL**

Dual-Port RS-422/485 Serial Communication

**PCI-ICM-2S**

- Optically-isolated asynchronous serial communications
- Two independent ports each supports RS-422 or RS-485
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Type 16550 UARTs with 16-byte FIFO buffers
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Speeds up to 460.8K
- Detected as standard COM port by all operating systems
- No base address or IRQ switches to set
- Optional 16850 UART with 128-byte FIFO

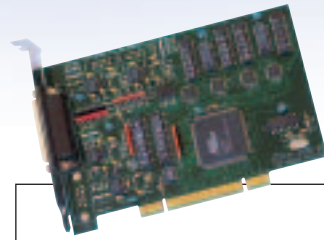


**SERIAL**

Dual-Port RS-232/422/485 Serial Communication Cards

**PCI-COM-2S  
PCI-422/485-2  
PCI-COM232/2**

- Supports RS-232, RS-422, and RS-485 protocols
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Type 16550 UARTs with 16-byte FIFO buffers
- Speeds up to 460.8K
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Detected as standard COM port by all operating systems
- No base address or IRQ switches to set
- Optional 16850 UART with 128-byte FIFO
- RS-232 or RS-422/485 only versions available

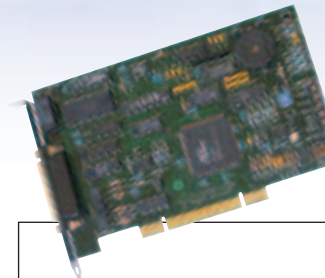


**SERIAL**

Four-Port Isolated and Non-Isolated Serial Communication Cards

**PCI-COM422/4  
PCI-COM485/4  
PCI-ICM422/4  
PCI-ICM485/4**

- Supports RS-422 and RS-485 protocols
- Auto-RTS feature makes half-duplex RS-485 communications effortless
- Type 16550 UARTs with 16-byte FIFO buffers
- Speeds up to 460.8K
- Choice of I/O connection methods
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Detected as standard COM port by all operating systems
- No base address or IRQ switches to set
- Available with optical isolation
- Optional 16850 UART with 128-byte FIFO



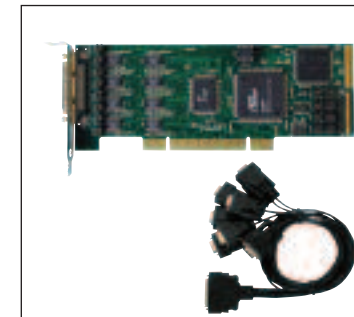
**WATCHDOG**

Watchdog Timer Card  
**PCI-WDG-CSM**

- Watchdog timer to detect computer malfunction including application software
- Relay and semiconductor "reset" outputs
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Easy plug-and play installation

**Factory Options**

- Computer power supply and temperature monitor
- Measurement of computer internal temperature
- Fan-failure detection and fan speed control
- Watchdog time-out buzzer and opto-isolated reset output



**SERIAL**

Low Profile, Multi-Port, Multi-Protocol Serial Communication

**LPCI-COM-8SM Series**

- Four or eight-port Low Profile serial communication cards

- Selectable RS-232/422/485 (2-wire and 4-wire)
- Includes a Type 16L788 UART with 64-byte read/write FIFO buffers
- Universal PCI, PCI-X, 3.3V & 5V compatible
- Speeds up to 921.6K
- Meets MD2 Low Profile PCI Bus specification

- Detected as standard COM port by all operating systems
- No base address or IRQ switches to set
- RS-232, RS-422 or RS-485 only versions also available

Products	ANALOG INPUTS							ANALOG OUTPUTS					DIG I/O				
	#Inputs	Res	BIP	RG	UNI	RG	Gain	Speed	FIFO	#Outputs	Res	BIP	RG	UNI	RG	4-20mA	#Dig I/O
PCI-AI12-16	16 SE, 8 DIF	12	4	4	Software	100kHz											4 prog
PCI-AI12-16A	16 SE, 8 DIF	12	4	4	Software	100kHz	2K*										4 prog
PCI-AI2-16A	16 SE, 8 DIF	12	4	4	Software	100kHz	2K*	2	12	3	3						24 prog
LPCI-AIO16A***	16 SE, 8 DIF	16	6	5	Mixed	500kHz	1K**	2	12								16 prog
LPCI-AIO16E***	16 SE, 8 DIF	16	6	5	Mixed	250kHz	1K**	2	12								16 prog
PCI-DA12-2									2	12	3	4	Yes				24 prog
PCI-DA12-4									4	12	3	4	Yes				24 prog
PCI-DA12-6									6	12	3	4	Yes				24 prog
PCI-DA12-8									8	12	3	4	Yes				24 prog
PCI-DA12-16									16	12	3	4	Yes				24 prog

Res = resolution \*Has a 2k sample buffer and a 2k pointlist buffer BIP RG = bipolar ranges \*\*Larger FIFOs available for this card UNI RG = unipolar ranges \*\*\*Low Profile

Products	DIGITAL I/O						
	#I/O	Buf	Prog	OPTOs	Relays	CTRS	COS
PCI-DIO-24D	24 I/O	Yes	Yes			Up to 9	
PCI-DIO-24H	24 I/O	Yes	Yes			Up to 9	
PCI-DIO-24S	24 I/O	Yes	Yes				Yes
PCI-DIO-48S	48 I/O	Yes	Yes				Yes
PCI-DIO-48	48 I/O	Yes	Yes				
PCI-DIO-72	72 I/O	Yes	Yes				
PCI-DIO-96	96 I/O	Yes	Yes				
PCI-DIO-96C3	96 I/O	Yes	Yes			9	
PCI-DIO-120	120 I/O	Yes	Yes				
PCI-IIRO-8	8 In/8 Out	Yes		Yes	8		Yes
LPCI-IIRO-8**	8 In/8 Out	Yes		Yes	8		Yes
PCI-IIRO-16	16 In/16 Out	Yes		Yes	16		Yes
PCI-IDIO-16	16 In/16 Out	Yes		Yes	16SS*		Yes
PCI-IDI-48	48, 32 or 16 In	Yes		Yes			Yes
PCI-IDO-48	48, 32 or 16 Out	Yes		Yes	48SS*		

\*Solid State \*\*Low Profile Buf = buffered I/O Prog = programmable I/O COS=change of state detection CTRS=counter/timers

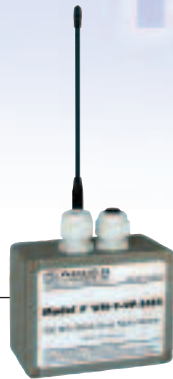
Products	SERIAL PORTS				PROT CFG	LOW PROF	OPTIONS
	RS-232	RS-422	RS-485	Baud			
LPCI-COM-1S	1	1	1	460.8K	Jumper	Yes	Yes
PCI-ICM-1S*		1	1	460.8K	Jumper		Yes
PCI-422/485-2		2	2	460.8K	Jumper		Yes
PCI-ICM-2S*		2	2	460.8K	Jumper		Yes
PCI-COM-2S	2	2	2	460.8K	Jumper		Yes
PCI-COM232/2	2			921.6K	Fixed		
PCI-COM232/4	4			921.6K	Fixed		
LPCI-COM232-4	4			230.4K	Fixed	Yes	
LPCI-COM-4SM	4	4	4	921.6K	Jumper	Yes	
PCI-COM422/4		4		115.2K	Fixed		Yes
PCI-ICM422/4*		4		460.8K	Fixed		Yes
PCI-COM485/4			4	921.6K	Fixed		Yes
PCI-ICM485/4*			4	460.8K	Fixed		Yes
LPCI-COM232-8	8			230.4K	Fixed	Yes	
LPCI-COM422-8		8		921.6K	Fixed	Yes	Yes
LPCI-COM485-8			8	921.6K	Fixed	Yes	Yes
LPCI-COM-8SM	8	8	8	921.6K	Jumper	Yes	

PROT CFG = protocol configuration \*optically isolated XT = extended temperature option LOW PROF=low profile form factor



# REMOTE

# RT-BOX



### Wireless Data Acquisition Wireless Series

- Wireless serial data transfer to any system with a serial port
- NEMA4 enclosure for harsh atmospheric, industrial, or marine environments
- Seamlessly and transparently integrate ACCES Wireless Modem into existing interfaces
- RS-232 or RS-422/485 interface options on the Base Station Assembly
- Distances up to 7 miles with the standard dipole antenna (up to 20 with optional high-gain antenna)
- Several advanced networking options and topologies supported
- Wireless I/O solutions include analog output, analog input, digital and isolated I/O
- OEM versions available without NEMA4 enclosure



### NEMA4 Remote Data Acquisition Series

- Intelligent, sensor to computer interfaces
- Connect up to 255 pods on a two-wire RS-485 network
- NEMA 4 enclosures withstand harsh industrial and marine environments
- All products include integral microcontroller, software programmable baud rate, software upgradeable firmware, EEPROM for configuration storage, RS-485 serial operation at up to 57.6K (optical isolation available)
- Models include 12-bit, 8 channel D/A, 12-bit, 16 channel A/D, 12-bit, multifunction I/O, 24-bit Sigma Delta 2 differential input A/D with isolated digital I/O, 24 channel digital I/O, and 54 channel digital input



### Remote Intelligent Data Acquisition and Control Systems

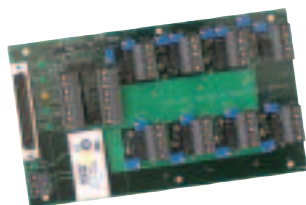
#### RIDACS

- Remote intelligent analog and digital I/O unit with opto-isolated RS-485 multi-drop interface to host computer
- Eight-channel programmable gain, 12-bit resolution A/D converter
- Wide variety of configurations for analog, digital, and mixed configurations
- NEMA4 enclosure for harsh environments
- Data stored in RAM can be accessed at the convenience of the computer
- All communication is ASCII-based command/response protocol at rates up to 57.6Kbaud
- Industry-standard 8051 compatible microcontroller



### Wired-Wireless Pairs

- No PC or software needed
- Eliminates long cabling to monitor contact closures or analog signals
- WWP-IIRO-8 consists of two modified WM-IIRO-8's
- One unit monitors eight discrete inputs and transparently controls the corresponding eight relays of a second unit
- The second unit monitors eight discrete inputs and controls the relays of the first unit
- WWP-RA1216-I is a direct sensor signal conditioner and A/D, paired with a WWP-RDAG12-8, an analog output model
- The input unit accepts eight analog inputs of 4-20mA then communicates with and controls eight analog outputs at the sensed level of 4-20mA on the second unit

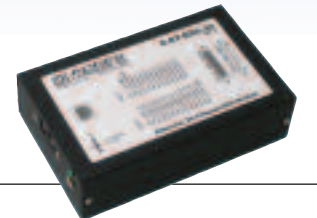


### LVDT-8U Eight Channel Signal Conditioner Board

- Eight channels of AC LVDT conditioning on one board
- Full-bridge and Half-bridge LVDTs supported
- Offset and wide-range gain calibration pots
- Removable screw terminal blocks for easy connection and serviceability
- Use easily with PLC or PC-based Data Acquisition
- Voltage level LEDs for operating verification of connected LVDTs
- Onboard DC/DC converter with reverse power protection

### RT-Box Series - Rugged, Integrated, Connectorized I/O Units with Modular Choice of Interface Bus

- Steel, black powder coated enclosure, with DB25 pinout and signal names on label
  - Two DB25s for I/O Interface (one male, one female)
  - Unit power via DC Jack with "Power On" LED
  - Units completely self-contained without lead wires or dangling appendages make for a clean I/O unit to work with DIN-Rail Mounting Option
- E - Ethernet; U - USB; WM - Wireless Modem; S - RS-232 DB9; RT - RS-485 DB9

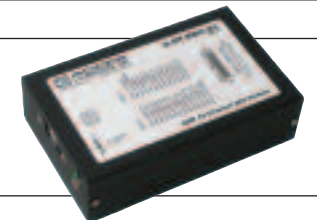


### Ethernet

- Ethernet to RS-485 converter board mounted inside enclosure via L-bracket
  - LEDs built-in to RJ-45 Ethernet Jack indicate activity, greatly facilitates set-up and testing
  - Com-port re-director software included to communicate using Windows COM port driver
- Models: E-RDG-24 Ethernet 24-channel DIO module  
 E-RAG128 Ethernet 8-channel analog in, expandable to 256 channels  
 E-RA1216 Ethernet 16-channel analog in w/signal cond. + 3 analog outs  
 E-RDAG12-8 Ethernet 8-channel analog out w/optional high current capabilities

### USB (complimentary to native USB I/O line)

- USB to RS-485 converter board mounted inside enclosure via L-bracket
- Models: U-RA1216 USB 16-channel analog in w/signal cond. + 3 analog outs  
 U-RDAG12-8 USB 8-channel analog out w/optional high current capabilities

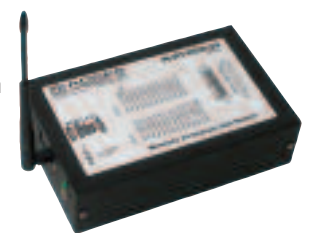


### RS-232 or RS-485 on DB9

- For use within legacy applications where a standard RS-232 port is to be used.
  - The RS-485 version is still a preferred choice of engineers that know how solid and simple this serial communications bus is to work with.
- Models: S-RDG-24 RS-232 24-channel DIO module  
 S-RAG128 RS-232 8-channel analog in, expandable to 256 channels  
 S-RA1216 RS-232 16-channel analog in w/signal cond. + 3 analog outs  
 S-RDAG12-8 RS-232 8-channel analog out w/optional high current capabilities  
 RT-RDG-24 RS-485 24-channel DIO module  
 RT-RAG128 RS-485 8-channel analog in, expandable to 256 channels  
 RT-RA1216 RS-485 16-channel analog in w/signal cond. + 3 analog outs  
 RT-RDAG12-8 RS-485 8-channel analog out w/optional high current capabilities

### Wireless

- Removable di-pole antenna from exterior for convenience in transporting and installation
  - LEDs mounted on antenna bracket to indicate transmission or reception of data, provides installation personnel an invaluable tool in setting systems up and monitoring performance.
- Models: WM-RDG-24 Wireless 24-channel DIO module  
 WM-RAG128 Wireless 8-channel analog in, expandable to 256 channels  
 WM-RA1216 Wireless 16-channel analog in w/signal cond. + 3 analog outs  
 WM-RDAG12-8 Wireless 8-channel analog out w/optional high current capabilities



RUGGED, INTEGRATED PC/104 EMBEDDED DATA ACQUISITION SYSTEMS

EMBEDDED DAS

- Military/Defense
- Avionics/Aerospace
- Communications/Networking
- Automotive/Transportation
- Process Control/Factory Automation
- Data Acquisition/Security

■ Easy to use, Ethernet-enabled, Embedded and Environmentally adaptable PC/104-based Data Acquisition System

A line of rugged, conduction cooled, integrated PC/104 embedded DAQ systems. Designed for embedded applications requiring superior performance and a high degree of protection from damaging vibration and shock environments commonly encountered in military and defense, avionics, communications, process control, automation and other real-world applications.

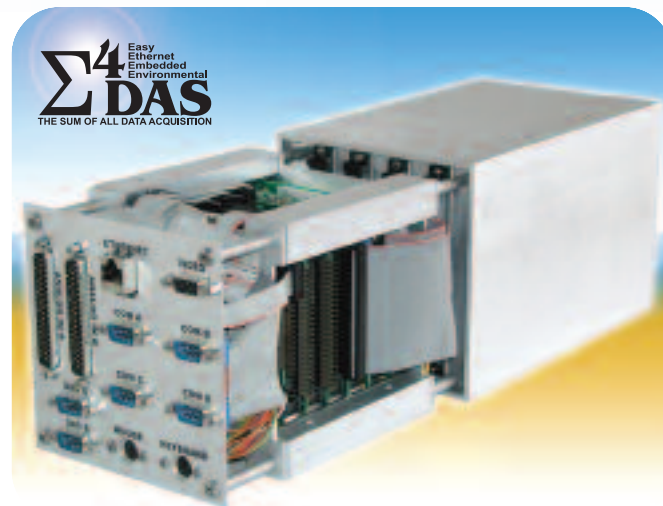
E4-DAS

Features

- Easily removable railed card cage subassembly
- Ethernet enabled data transfers for simplified cabling
- Embedded, high-performance fanless operation and conduction cooling
- PC/104 and PC/104-Plus processors up to 1.8GHz can be integrated, even at extended temperatures
- Accepts from two to six PC/104 or PC/104-Plus boards
- Scalable and flexible I/O interfacing
- Compact size - 4 board system measures just 6.75 x 5 x 5"
- Custom configurations available-consult factory

Functional Description

Model E4-DAS, takes its name from being an Easy to utilize, Ethernet enabled, Embedded and Environmentally adaptable PC/104-based Data Acquisition System. This line of systems from ACCES is designed for rugged embedded applications requiring superior performance and a high degree of protection from damaging vibration and shock environments commonly encountered in military and defense, avionics, communications, process control, automation and other real-world applications. The completely integrated E4-DAS is packaged in a lightweight aluminum enclosure with a railed card-cage subassembly for easy serviceability. Internal elastomer inserts are also provided for vibra-



tion and shock mitigation. The system's fanless design is fully conduction cooled, enabling the box itself to dissipate the heat by heat-sinking the CPU and power supply on each end of the stack. The E4-DAS can accommodate stacks of two to six PC/104 boards (including the CPU and power supply), allowing the unit to incorporate a wide range of analog and digital I/O, serial communications, relay and TTL output, wireless, Ethernet and other functions. An internal single (+5 V), or optional triple (+5, ±12 V) output DC/DC power supply is used to accept system power sources of 12, 24, or 48 V. I/O is accessed via connector cutouts on the unit's end plates.

Advanced and Custom Systems

Every application is different, and ACCES can easily tailor a system to a user's specific needs. After listening to our customers, ACCES has developed a system design and integration team focused on the development of powerful, yet simple to use, data acquisition systems. These include extensive CPU and peripheral capabilities and the integration of a generous selection of our (or customer-specified) data acquisition, I/O, or special-function PC/104 boards. Custom development can include minor variations of standard boards and systems to completely custom interfaces and configurations. ACCES has the in-house engineering resources to design, develop, supply and support custom embedded systems at the board, software and system level. For more information please visit our System Integration and Custom Hardware Design web page.

Contact ACCES today for more information and support for designing a system which meets your precise requirements.

■ Intelligent, Embedded Data Acquisition System for PC/104 and PC/104-Plus configurations. Packaged in a rugged steel enclosure with threaded inserts for panel, DIN rail, and rack-mount installations, the fully integrated IE-DAS supports a stack of up to four PC/104 or PC/104-Plus boards plus CPU for analog and digital I/O, serial communications, relay and TTL output, wireless Ethernet options, and more.

IE-DAS

Features

- Fanless operation with convection cooling via vented enclosure sidewalls
- Supports EBX, EPIC, PC/104 and other CPUs
- External 115VAC power supply
- Compact size-9" x 7" x 4 1/2"
- Includes pre-loaded board software, utilities and tool software with a variety of drivers
- Custom configurations available-consult factory

Basic System

The basic system includes a 300MHz Pentium EBX CPU and standard peripheral ports including VGA, keyboard and mouse, dual USB ports, dual 10/100BaseT Ethernet, dual RS-232 and one RS-232/485 port.

Existing Configuration 1

Comes with standard computer peripherals, including 2 LAN ports, 2 USB ports, 3 RS-232 ports; keyboard, mouse and video available from CPU board, brought to connectors in enclosure.

Existing Configuration 2

Based on specifications of our PC/104 Multifunction Analog-to-Digital board model 104-AIO12-8. All Data Acquisition I/O is accessed by DB25 connectors.

Package includes Configuration 1, plus:

- 8 Differential Analog Inputs, 12-bit resolution for sensor or voltage monitoring
- 4 analog outputs, 12-bit resolution
- 24 lines of Digital I/O
- 3 Counter timers, 16-bit

Contact ACCES today for more information and support for designing a system which meets your precise requirements.



Existing Configuration 3

Based on specifications of our PC/104 Analog Signal Conditioner model 104-AIM-32. Package includes Configuration 2, plus:

- 23 Differential Analog Inputs, 12-bit resolution, for direct sensor or voltage monitoring (optional conditioning for RTD's, Thermocouples, 4-20mA inputs, etc.)
- 4 Analog Outputs, 12-bit Resolution
- 24 lines of Digital I/O

Existing Configuration 4

Based on specifications of our PC/104 8-Port Serial Communications Board model 104-COM-8SM. Package includes Configuration 1, plus:

- 8 additional RS-232/422/485 standard serial communication ports with 64-byte transmit/receive FIFO buffers

Existing Configuration 5

Based on specifications of our PC/104 High-Resolution, High-Speed Multifunction Analog I/O Model 104-AIO16A. Package includes Configuration 1, plus:

- 8 differential or 16 single-ended analog inputs with 16-bit resolution for sensor or voltage monitoring
- 16 lines of digital I/O
- 2 analog outputs, 12-bit resolution
- 3 counter timers, 16-bit

ETX EMBEDDED DATA ACQUISITION BASEBOARDS & SYSTEMS

Custom ETX Baseboard Solutions

# ETX SYSTEM SOLUTIONS

- Kiosk
- Military and Defense UAV
- Robotics
- Building Management and Control
- Transportation
- Medical

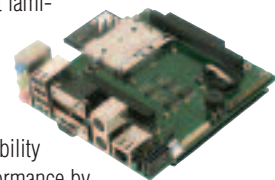
■ ETX is one of the fastest-growing concepts in the embedded world based on the "computer-on-module" or COM approach. The COM approach takes the traditional concept of a computer motherboard with plug-in I/O modules and turns it around so that the motherboard, now called a baseboard, contains all the I/O and the CPU with its core support chips and memory plug in as a module. The result of this reversal is an approach that blends the advantages of custom design with those of standard products. Products based on the COM approach maintain long-term viability while retaining access to the latest in computer technology.



## ETX ADVANTAGES

There are many advantages to ETX. Developers have as much control as they need over the size and shape of the baseboard, the I/O capabilities to be included, and the number and type of connectors to be used, while having a range of CPU types and performance levels available. This results in a highly individualized design at much lower cost and less development time than a full custom approach.

The ETX approach also encourages design reuse, with its attendant cost and time efficiencies. Product families with differing features and performance levels can stem from a single baseboard that uses differing CPU options. ETX even allows a product's viable installed lifetime to be extended because it assures the availability of an upgrade path for increasing CPU performance by means of a simple module exchange.



These advantages make ETX appealing for many markets. Gaming systems, point-of-sale kiosks, and medical instruments, all benefit greatly from ETX's advantages. Medical systems, for example, require expensive and time-consuming regulatory approval of new designs. By working with an already approved baseboard design, developers can create new systems with higher performance while cutting in half the effort needed to gain regulatory approval.

More recent markets that are benefiting from the ETX approach include mobile systems and security, both requiring continual performance upgrading, which is easily handled with CPU module exchanges. Another new market for ETX is military systems. Module vendors have begun creating ruggedized CPU modules, allowing development of systems that satisfy the military's need for extremely long field life out of commercial off-the-shelf (COTS) embedded products. Basing a design on a ruggedized ETX module ensures that these systems will have compatible replacement modules available regardless of an individual CPU's rapid obsolescence.

## ACCES I/O's ETX Solutions

ACCES I/O's Semi-Custom approach allows developers to speed the development of their baseboards by accessing a large library of analog, digital, and serial I/O functions from an exclusive I/O manufacturer. During development, customers can pick and choose the I/O their baseboard requires and integrate it with their custom logic to quickly arrive at a finished design. Since the library functions are already proven, the resulting baseboard requires much less debug and test effort than a full custom design. The library functions come with full software support, so the software design, debug, and test efforts are reduced as well.



Implementing a design using the Semi-Custom approach is a simple, three-step process. First, developers define all the I/O their baseboard and application will require. Next, they obtain an ACCES I/O development baseboard and select ACCES I/O modules that correspond to their requirements. This combination serves as the hardware and software development platform during the early design stages. Once the hardware design stabilizes, ACCES I/O can develop a prototype baseboard with all of the I/O choices integrated while the developer continues application software development on the evaluation hardware. Developers can then verify their software and applications against the prototype, typically with first-pass success, before ordering production units.

The result of following this approach is a considerable reduction in development time. Experience has shown that creating a baseboard from scratch can take as long as 24 weeks. By using library I/O functions and software, design times are typically cut in half, allowing market entry of the final product as much as three months earlier. The approach also reduces production costs. Since the final baseboard design utilizes the same components as ACCES I/O's COTS modules, the customer gains the benefits of ACCES I/O's greater buying power, superior delivery, and reduced inventory costs. Thus, both the time and cost thresholds for creating an embedded solution are reduced.

**Contact ACCES today for more information and support for designing a system which meets your precise requirements.**

■ The NANO I/O SERVER CD is one of the smallest embedded systems available featuring an Intel Core Duo Low Voltage 1.66GHz or Ultra Low Voltage 1.2GHz CPU in a fanless enclosure. The system was designed to support an extensive collection of available COTS PC/104 modules and external USB I/O devices along with the high-performance benefits of ETX. This allows for added versatility and is useful in a wide variety of applications.

## NANO I/O Server CD

### FEATURES

- Intel Core Duo LV 1.66GHz & ULV 1.2GHz fanless computer
- Small size-only 5" W x 6.25" D x 3" H (127mm x 159mm x 76mm)
- 2.5" laptop drive mount
- Accepts two PC/104, PCI-104 or PC/104-Plus I/O boards
- Flush side opening for Compact Flash card
- Rugged, black anodized aluminum enclosure
- Rear I/O panel (custom openings)
- Front mounting of computer connections
- 12VDC to ATX 120W P/S with front power switch and LED

### ETX-NANO-104 MOTHERBOARD FEATURES

- Wide range of ETX CPUs - up to 1.66GHz Intel Core Duo
- Small size only 120mm by 125mm (4.72" by 4.92" )
- Full PC/104-Plus I/O expansion
- Four board mounted USB 2.0 ports
- VGA, PS/2 mouse and keyboard
- One RS-232 and one RS-232/422/485-selectable COM ports
- 10/100 Ethernet LAN
- Flat panel, IDE and Compact Flash support
- Standard 1/8" (3.5mm) audio with Line In, Line Out, and MIC

### FUNCTIONAL DESCRIPTION

The system is housed in a rugged, black anodized aluminum enclosure measuring only 5" wide, 6.25" deep and 3" high. The enclosure offers physical protection for industrial environments and features a bulkhead mounting provision. The unit is quietly powered by an included 12VDC to ATX power supply with no fans. External connections provided include VGA, four USB 2.0 root ports, one RS-232 and one RS-232/422/485-selectable COM ports, PS/2 keyboard and mouse, 10/100 Ethernet and standard PC sound. This tiny system is the first fanless Intel Core Duo to highlight full PC/104, PCI-104 and PC/104-Plus I/O expansion.

The NANO I/O Server CD with Core Duo 1.66GHz processor has almost twice the performance of a 1.8 Pentium M CPU processor commonly used in other small embedded systems but with far less wattage. The Core Duo 1.2GHz processor has almost twice the performance of a LV 1.4 Pentium M CPU but 7 watts less on average than the 1.66GHz Core Duo. The NANO sized system is passively cooled but still provides performance equal to more than ten times the benchmark comparison of any other NANO-ITX sized motherboard system. The system internally sup-

ports either a laptop SATA or IDE 2.5" hard drive or a Compact Flash card. It has room to support up to two PC/104, PCI-104 or PC/104-Plus I/O modules depending on whether the Compact Flash or hard drive is used. A removable plate can be customized to bring out customer-specified I/O cables or connectors. Input to the 12VDC ATX power supply is provided by a standard laptop-type plug receptacle so that a standard external AC brick to 12VDC power supply can be used to avoid excess heat within the system.



The NANO I/O Server is unique due to the capability of utilizing any embedded ETX CPU board that meets the ETX standard for its processing, while providing PC/104 I/O module expansion. Whether the application requires a top-end 1.66GHz Intel Core Duo, high performance/low wattage ULV 1.2GHz Core Duo, a mid-range 800MHz Celeron M, or a very low wattage AMD LX800 processor, ACCES I/O can provide a fanless system solution to match a specific requirement. Although smaller than the EPIC embedded boards, the NANO still supports PC/104-Plus I/O modules in an upward stack. In addition to the ETX-NANO-104 motherboard I/O, the NANO has supplemental onboard I/O connectors for flat-panel support, IDE, Compact Flash, and an extra RS-232 serial port. The system includes a tiny 120W DC to DC ATX power supply that connects directly into the small 12-pin micro-fit power connector on the motherboard. A 12VDC regulated external power plug exists outside the system to allow insertion of an external AC to 12VDC laptop type brick power supply. ATX type power switch is included to control internal ATX power supply. An external green LED provides power indication. All this is contained in the rugged, black anodized aluminum enclosure which provides passive fanless cooling, even with the latest LV 1.66GHz Core Duo from Intel. Cooling is directly conductive from the CPU and chipset through a heat spreader attached to the bottom of the enclosure and isolated from expansion I/O cards.

The NANO I/O Server CD is the perfect product for users ranging from high-volume OEMs to small, simple evaluation/prototype systems. By combining the benefits of both the ETX and PC/104 standards, a more cost effective time to market is achieved no matter what the quantity. Large quantity OEMs can use the wide range of COTS PC/104 and ETX products for simple and easy prototyping and evaluation purposes. For small quantity embedded users, your next system can include all the benefits of this combo motherboard/system. These benefits include the capability to easily choose and upgrade your ETX CPU and the high availability of COTS PC/104 modules. Your next system can have the best of all worlds. Once again, time to market is dramatically reduced and future upgrades are as easy as choosing a new ETX CPU and/or PC/104 module. This system has highest computer MIPS per WATT per SIZE available with I/O expansion.

USB/104

**Poker Table Card Placement Controller:** The USB-DIO-32 digital I/O module was designed into a new poker monitoring system. The system provider is well known in poker tournament circles as the designers of the premier real-time poker hand display system used to televise the players hands in major tournaments. The company is using the USB-DIO-32 in their next-generation design that will allow them to drastically reduce the capital investment and overhead incurred by casinos when deploying such a system.

Inputs: IR and optical sensors detect when playing cards are correctly positioned. The system then decodes information about the cards.

Outputs: Once decoded, the system lights indicators for the players and the dealer, letting them know the cards are valid and play can continue.

ACCES I/O was selected as the I/O provider because of the versatility of the board design, simplicity of the hardware and software interface, and product quality and value.

**Emergency Vehicle event logger:** The USB-II-16 Discrete Isolated Input Board has been selected by a team of engineers in the industry for use in a system to monitor and log events that take place while the vehicle is in use. Some of the items monitored are the light bar, siren, wireless microphone and in-dash video-camera operation. Targeted for numerous metropolitan markets, the USB-II-16 was chosen due the bus interface, flexible power options, and the non-polarity sensitive inputs.



**Advanced Traffic Signal I/O Controller:** The USB-IDIO-16L Discrete Isolated Input board and Low-side FET output board was selected for use in the proof-of-concept phase of deployment by a "Think-Green" company. This system replaces existing traffic signal controls which rely on in-pavement inductive loops to detect the presence of a vehicle to trigger the signal to change. The new system uses a single high-tech 360 degree camera and software algorithm to identify vehicles, pedestrians, motorcycles and traffic patterns to reduce fuel wasted sitting at a red light when there is no other traffic around. Existing controllers use low-side switching (pulling the load to ground) and require extended temperature operation. ACCES I/O re-designed a high-side FET switch board with low-side "smart-FETs" to facilitate integration into the existing architecture.

PC/104



**Automatic Antenna System:** A state-of-the-art automatic antenna system depends on a PC/104 analog I/O board to operate. Specifically designed for mobile operations, the system is low profile, lightweight and incorporates a directional antenna and continuous rotation positioner encapsulated within a non-conductive radome. ACCES I/O Products Inc. model 104-AIO12-8 provides analog input and output for antenna signal control and closed loop operation between the directional transmit and central receive antenna. This closed loop solution allows the operator at the studio or command center to control both ends of the microwave link with advanced automatic alignment functions, simplifying the operation and reducing setup time.

**Gas Station Kiosk Controller:** The 104-COM-8SM PC/104 Multi-Protocol Eight-Port Serial Communication Board has been selected by an international point of sale solutions provider for use in their embedded kiosk system. In deployment throughout the Netherlands, these units drive outdoor price displays and printers and communicate with keyboards, card readers, and fuel pumps as well as automated carwash equipment using a mix of RS-232, RS-422 and RS-485 channels. The 104-COM-8SM was chosen due to configuration flexibility, more drive current per port than competitors, high quality and value, as well as the quality of support provided by ACCES I/O during system design and development.

ETX

**ETX in AUV:** Autonomous Underwater Vehicles require more processing power and less wattage due to the fact they perform far more pre-programmed complex tasks than a simple tethered remotely controlled mobile craft. The ETX-NANO-104 was chosen as the main computer for use in the SONIA AUV Autonomous Underwater Vehicle to compete in AUVSI/ONR's 11th AUV competition in San Diego at the US Navy's SPAWAR facility. The vehicle on its own had to:

1. Navigate through an underwater gate
2. Inspect a pipeline and follow it
3. Find and connect with an underwater buoy
4. Drop a marker in a bin with a specific shape
5. Navigate through an air duct
6. Locate acoustic beacon (pinger) position and navigate towards it
7. Pick up a safe box
8. Surface within a specific zone over the acoustic beacon with the safe box

Out of 25 entries in 2008, SONIA's AUV finished 3rd with no computer failure.

ETX (continued)

**ETX in Robotics:** As robots move beyond being just toys, they are requiring more computing performance along with a smaller size and lower power use. Besides just moving themselves, robots will have to be more nimble, gather and process more information, make intelligent decisions and then take new actions. A research institution has developed an upright robot using ACCES' ETX-NANO-104 motherboard and quadrature PC/104 decoder board 104-QUAD-8 that can move on two wheels, climb stairs and leap over objects then catch its balance with built-in gyros.

Robots will have to process video and data acquisition information requiring more CPU performance than traditional small embedded PCs. The ETX-NANO-104 has varied processor choices such as the ULV Core Duo 1.2GHz which processes more data faster, in a fan-less enclosure and requiring very little power (15W average) to preserve battery life. At the same time a full PC/104 Plus I/O interface allows everything from motion control cards, image capture boards and data acquisition I/O boards to all be mounted in a PC/104 stack. All this is available with a motherboard only 120mm across at its I/O connections, making the ETX-NANO-104 the smallest, most powerful embedded computer supporting PC/104 on the market.



WIRELESS



**Refinery Security Gate Access Controller:** A remote station needed the ability to monitor and control gate access at an oil refinery in the great state of Texas. Running wires to accomplish this was not an option, so the ACCES I/O WM-IIRO-8 and Wireless Modem WM-DP-9-485 were selected. The modem at the remote station provides the communications from the host computer and application software out to the WM-IIRO-8 which is tied into the access point at the gate. Based on this wireless communications from the remote station, relays in the WM-IIRO-8 would activate to allow access, as well as turning on Red and Green lights indicating status. This provided a reliable, low-cost solution to adding these remote gate controls.

REMOTE/DISTRIBUTED

**Theme Park Ride Safety System:** A popular Theme Park motion simulator ride was built in the 1990's and is still thrilling visitors today. The simulator uses pitch, yaw, and propulsion motors simultaneously. Six pitch motors use resolvers as the primary position sensing feedback device. LVDT's are the secondary device. Safety devices in a ride system require active redundant sensors that must match the position of the primary. Each time a set of instructions are carried out and the controller is happy with the motor positions (resolver and LVDT vs. command) the sequencer is allowed to step to the next set of commands. If a mismatch occurs, the vehicle initiates a stop command.

Due to the years of service time and issues contributing to ride down time, the Theme Park decided to invest in a complete overhaul of the wiring and relocation of many components. The ACCES I/O LVDT-8U provides real-time independent signal conditioning for up to eight sensors per board. This board was selected for a high-channel count, removable screw terminal connectors for ease of service, reliability and low-cost per point.

PCI

**Anthrax Detection System:** The United States Postal Service (USPS) implemented and has in operation Biohazard Detection Systems (BDS) at 282 mail-processing facilities around the country which can detect anthrax in the mail. These detection systems use rapid, automated DNA testing and are the USPS's front-line defense against an anthrax attack.

ACCES I/O Products, Inc. card model PCI-IIRO-8 was chosen which provides on-board hardware monitoring of eight isolated discrete inputs without requiring application software to constantly poll the card. The card generates an interrupt whenever one of those inputs changes state, then application software polls the card once to determine which piece of mail was detected as having a positive sample. A positive detection causes the relays of the PCI-IIRO-8 to energize activating a series of annunciators and warning lights notifying postal employees of a danger condition. A major factor contributing to selection of this card was the input Change-of-State (COS) hardware monitoring capability which dramatically reduces processor overhead.

Other Applications Include:

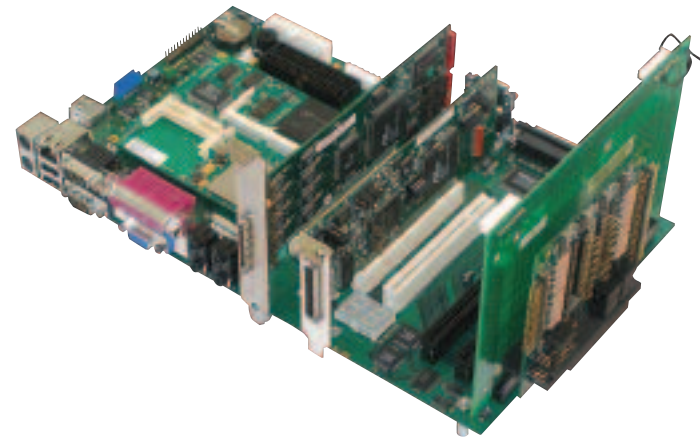
Acoustical Data Acquisition	Factory Automation	Laboratory Automation	Process Monitoring
Datasource Emulation	HVAC Control	Machine Health Monitoring	Robotics
Embedded Machine Control	Image Capture	Manufacturing Test	Security Systems
Embedded Motion Control	Industrial Machinery	Monitoring and Process control	Semiconductor Manufacturing
Energy Management	Industrial ON/OFF Control	Precision Measurement, Analysis, Monitoring and Control	Testing and Debugging
Environmental Monitoring	Instrumentation		

If you don't see exactly what you're looking for, ask about our quick-turnaround, in-house custom design and engineering capability. ACCES is fully equipped to design, develop, supply and support custom embedded systems at the board, software and system level.

Our custom software department will take your specification for any data acquisition routine, driver, or even full-fledged application, and quickly develop a solution to your satisfaction-at a competitive price. With one of the shortest times to market in the business, ACCES is proud of its tradition of delivering completed hardware and software solutions, on time and on-budget.

Our cost-effective engineering services also include expert systems integration, whether for a prototype or volume production need. Development, documentation, sourcing and procurement, assembly, software, thorough testing and support result in a

high-quality system you can count on. ACCES maintains strategic alliances with various leading embedded hardware manufacturers to ensure a wide range of affordable, reliable and complete solutions.



## ACCESSORIES

To increase the flexibility of our data acquisition cards, and to make them even more versatile and user-friendly, ACCES also offers a full spectrum of high-quality accessories and support equipment for your unique application, including:

- Signal conditioning, relay and solid-state I/O boards and modules
- Watchdog Timers—computer monitoring functions for PCI & ISA buses, with and without serial ports
- Screw-Terminal Accessories—large assortment of termination cards & adapters, snaptrack, etc.
- Cables for every pin on every board we sell. A wide selection of ribbon cables, serial breakout cables, along with "Y" and round-wire cables allows for a broad range of connectivity options
- PC/104 Power Supplies—ultra-wide range input models with versions accepting 12V, 24V, or 48VDC inputs with either 3A or 5A fully protected outputs on 5V lines.
- Enclosures—line includes NEMA, conduction cooled extrusions, hinged and gasketed enclosures, 1U I/O rackmount PC/104 servers, and an economy line offering simple physical protection.

