



**USB-IIRO4-2SM**  
USB Isolated I/O and Serial  
Communication Module



**FEATURES**

- Multifunction adapter for USB 1.1 and 2.0 port hosts
- Four optically isolated digital inputs
- Four Form C electro-mechanical 1A relays
- Two serial ports, field selectable RS-232/422/485
- All required power drawn from USB port, no external power adapter required
- Expansion USB hub port connector
- PC/104 module size and mounting compatibility
- Small (4" x 4" x 1.8") rugged industrial enclosure

**FACTORY OPTIONS**

- Four digital input/relay output version (USB-IIRO-4DB) available
- DIN rail mounting provision
- OEM (board only) version with PC/104 mounting holes and PCB footprint for added flexibility in embedded applications



**FUNCTIONAL DESCRIPTION**

The USB-IIRO4-2SM is a USB multifunction device, incorporating a USB 4-port hub internally to provide four optically isolated digital inputs, four electromechanical relay outputs and two ports of RS-232/422/485 serial communication in one small product. The digital portion is ideal for adding easy-to-install isolated input and relay output capabilities to any PC or embedded system with a USB port. This single USB multifunction device is ideal for a variety of applications such as industrial monitoring, control and communication.

**DIGITAL**

The isolated, non-polarized inputs may be driven by either DC sources of 3-31 V (or higher by special order) or AC sources at frequencies of 40Hz to 10kHz. Optically isolating the digital inputs from each other, and from the computer, assures smooth, error-free data transmission in noisy, real-world environments. The relay outputs are de-energized at power-up to prevent an unintended control output signal. Data to the relays is latched. The relay contacts and isolated inputs are available via a mounted DB25 connector or, for OEMs, a 26-pin IDC type vertical keyed shrouded header. For testing purposes and low current applications 5VDC and ground pins are provided on the same connector. The digital portion of the USB-IIRO4-2SM is excellent in applications where only a few on-board relays are required and a small number of inputs must be isolated such as in test equipment, instrumentation and process control.

**SERIAL**

The serial section is a two-port asynchronous serial communication adapter designed for use with any computer system equipped with a USB port. Type FT232 UARTs are used as asynchronous communication elements. This includes 384-byte receive / 128-byte transmit FIFO buffers for high data throughput and to protect against lost data in multitasking systems. Crystal oscillators located on the card permit precise baud rate capability up to 230.4K for use in RS-232 mode, using ICL3243 type drivers. Speeds up to 921.6K are achievable using RS-422 & RS-485. The serial communications are conveniently provided through two DB9 board mounted male connectors with adjacent LEDs indicating serial port activity.

**OEM USB/104 FORM FACTOR**

What makes the OEM option unique is that its PCB size and mounting holes match the PC/104 form factor (without the bus connections). This allows our rugged digital/serial board to be added to any PCI-104 or PC/104 stack by connecting it to a simple USB port usually included on-board with embedded CPU form factors such as EBX, EPIC, and PC/104 - especially important since many newer CPU chipsets do not support ISA and have plenty of USB ports. The USB-IIRO4-2SM OEM board can also be added into many pre-existing standard PC/104 based systems and enclosures.

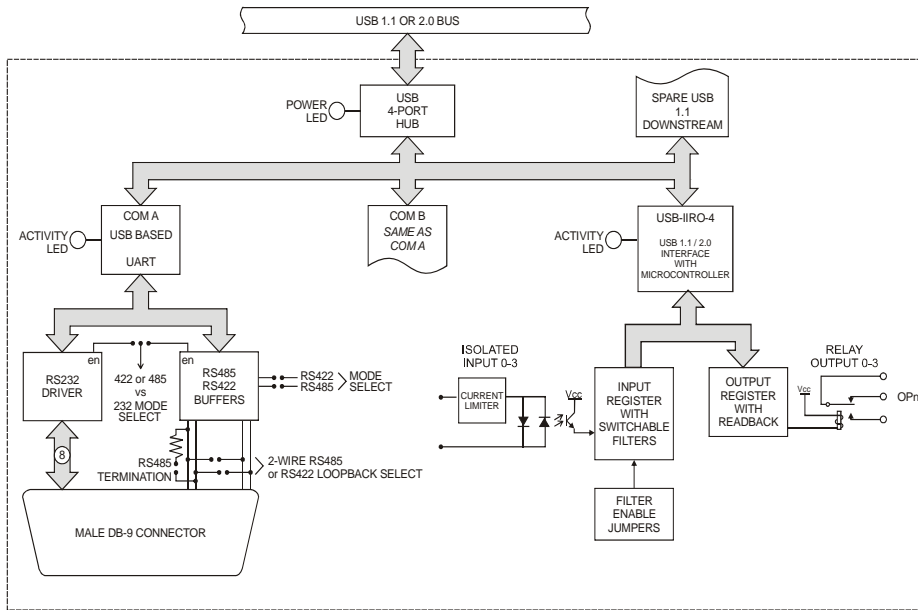
**ACCESSORIES**

The USB-IIRO4-2SM is available with optional external screw terminal board and DIN rail mounting provision.

**SOFTWARE**

The USB-IIRO4-2SM is plug-and-play which allows quick connect or disconnect whenever you need additional I/O on your USB port. The USB-IIRO4-2SM is supported for use in most USB supported operating systems and includes a free Linux and Windows 98se/Me/2000/XP/2003 compatible software package. This package contains sample programs and source code in Visual Basic, Delphi, C++ Builder, and Visual C++ for Windows. Also incorporated is a graphical setup program in Windows. Third party support includes a Windows standard DLL interface usable from the most popular application programs. Embedded OS support include Windows Xpe. For serial communications the package includes an easy to use terminal program for testing out your COM ports. Use in other operating systems may also be supported, contact Factory.

**BLOCK DIAGRAM**



**SPECIFICATIONS**

**Isolated Inputs**

Number: Four  
 Type: Non-polarized, optically isolated from each other and from the computer (CMOS compatible)  
 Voltage: 3 to 31 DC or AC RMS (40 to 1000 Hz)  
 Isolation: 500V\* (see manual) channel-to-ground and channel-to-channel  
 Resistance: 1.8K ohms in series with opto-coupler  
 Filter Response: Rise Time = 4.7 mS / Fall Time = 4.7 mS  
 Non-Filter Response: Rise Time = 10 uS / Fall Time = 30 uS

**Relay Outputs**

Number: Four SPDT form C  
 Contact Type: Single crossbar; Ag with Au clad  
 AC Load: 0.5 A at 125 VAC (62.5 VA max.)  
 DC Load: 1A at 24 VDC (30 W max.)  
 Switching Voltage: 125 VAC, 60 VDC max.  
 Switching Current: 1A max.  
 Contact Resistance: 100 mOHM max  
 Contact Life: mech'l: 5 million operations min.  
 Operating Time: 5 msec max.  
 Release Time: 5 msec max.

**Communications Interface**

I/O Connections: All RS-232 signals are supported and present at the DB9 connectors.  
 RS-422 data signals – Tx+, Tx-, Rx+, Rx-, GND  
 RS-485 data signals –  
 + 2 wire: Tx/Rx+, Tx/Rx-, GND  
 + 4 wire: Tx+, Tx-, Rx+, Rx-, GND  
 Serial Data Rates: Up to 230.4K bps, asynchronous for RS-232  
 Up to 921.6K bps, asynchronous for RS-422 and RS-485  
 Multidrop: Compatible with RS-485 specifications. Up to 32 drivers and receivers allowed on line. Driver / Receivers used are type SP491.  
 Character Length, Parity, Stop Interval: 5,6,7, or 8 bits; Even, odd, or none; 1, 1.5, or 2 bits  
 Receiver Sensitivity: ±200 mV differential input  
 Common Mode Voltage: +12V to -7V  
 Transmitter Output Drive: 60 mA with thermal shutdown  
 Termination: Jumper selectable per channel for RS-485 mode  
 Bias: On-board from factory on transmit lines for RS-485 & RS-422

**Bus Type**

USB1.1 Full-speed, USB2.0 High-speed compatible

**Environmental**

Operating Temperature Range: 0° to 60° C  
 Storage Temperature Range: -50° to +120° C  
 Humidity: 5% to 95% RH, non-condensing.  
 Board Dimension: 3.550 x 3.775 inches.  
 Box Dimension: 3.780 x 4.170 x 1.80 inches high.

**Power**

+5VDC provided via USB bus up to 500mA  
 5V @ 120mA Quiescent, 329mA maximum  
 20mA for each activated relay(80 max)  
 0-60mA for each COM channel

**Ordering Guide**

USB-IIRO4-2SM Enclosure, multifunction module  
 USB-IIRO-4DB Enclosure, module with 4 isolated digital inputs and 4 relay outputs

**Options**

-OEM Board only version (no enclosure)  
 -DIN DIN rail mounting provision

**Accessories**

ADAP25-M DB25 connector external-mounted screw termination board  
 ADAP9 DB9 connector external-mounted screw termination board



## Assured Systems

Assured Systems is a leading technology company with over 1,500 regular clients in 80 countries, deploying over 85,000 systems to a diverse customer base in 12 years of business. We offer high-quality and innovative rugged computing, display, networking and data collection solutions to the embedded, industrial, and digital-out-of-home market sectors.

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