USBP-DIO16RO8
16 TTL/LVTTL Digital I/O
and 8 Relay Outputs Module

USB 2.0

FEATURES
- **High-speed USB 2.0 device, USB 1.1 compatible**
- **16-channel TTL/LVTTL digital I/O**
- **All 16 I/O lines buffered with 32mA sink/source current capabilities**
- **8 Form C electro-mechanical relays switch 1A**
- **Custom high-speed function driver**
- **Alternate embedded USB connector**
- **All required power drawn from USB port, no external power adapter required**
- **PICO-I/O™ module size (60mm x 72mm) & mounting capability**

FACTORY OPTIONS
- **Extended temperature**

FUNCTIONAL DESCRIPTION
The USBP-DIO16RO8 is an ideal OEM USB solution for adding embedded, easy-to-install buffered TTL/LVTTL digital I/O and relay output capabilities to any computer with a USB port. The USBP-DIO16RO8 is a USB 2.0 (1.1 compatible) high-speed device, offering the highest speed available with the USB Bus. The unit is hot pluggable allowing quick connect or disconnect whenever you need additional I/O in your system.

The unit can be installed in single or multiple stack configurations. It can also be mounted alone near I/O sensors or devices to be controlled in a star configuration away from the USB ports of its host embedded computer. The module is always connected by USB cable to any computer USB port via its external micro B connector or on-board friction-lock micro-fit connector.

Featuring 8 Form C (SPDT) electro-mechanical relays and 16 TTL/LVTTL buffered digital I/O lines, the unit is the smallest of its kind for digital monitoring and control using USB. The digital I/O lines have 32mA of both sink and source to drive external components and are available via a 34-pin IDC type vertical header. The pinout allows a simple accessory cable to interface to our 50-pin external signal conditioning products. The board can be switched from 5V to 3.3V signaling to match a particular device connected. The 8 relay outputs are de-energized at power-up to prevent an unintended control output signal. Data to the relays is latched. The relay contacts are available via a 26-pin IDC vertical header-keyed box type connector.

The USBP-DIO16RO8 draws all required power from the USB port, no external power adapter is required. The small size and easy connection makes the unit an excellent choice for a variety of embedded applicatiuons such as mobile, robotics, kiosks, and embedded medical and machine equipment.

The USBP-DIO16RO8 is designed to be used in rugged, industrial, and mobile environments and has the option to be upgraded to extended temperature specifications. The board is tiny PICO-I/O™ sized (60mm by 72mm) making it ideal for the smallest of embedded applications.

OEM USB/PICO™ FORM FACTOR
This standard OEM version is perfect for a variety of embedded applications. What makes the USBP-DIO16RO8 unique is that its PCB size and mounting holes match the PICO-I/O™ form factor (without the SUMIT A connector). This allows our rugged digital board to be added to any PICO-ITXe stack by connecting it to an available USB port, especially if a SUMIT B only express I/O board was already used with the PICO-ITXe embedded CPU. The USBP-DIO16RO8 board can also be installed using standoffs inside other enclosures or systems either stand-alone or in multiple stacks without a CPU in the stack.

ACCESSORIES
The USBP-DIO16RO8 is available with optional cable assemblies, screw terminal boards and external signal conditioning boards supporting high current relays, 120/240AC modules and optical isolated inputs.

SOFTWARE
The USBP-DIO16RO8 utilizes a high-speed custom function driver optimized for a maximum data throughput that is 50-100 times faster than the USB human interface device (HID) driver used by many competing products. This approach maximizes the full functionality of the hardware along with capitalizing the advantage of high-speed USB 2.0. The USBP-DIO16RO8 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.

BLOCK DIAGRAM
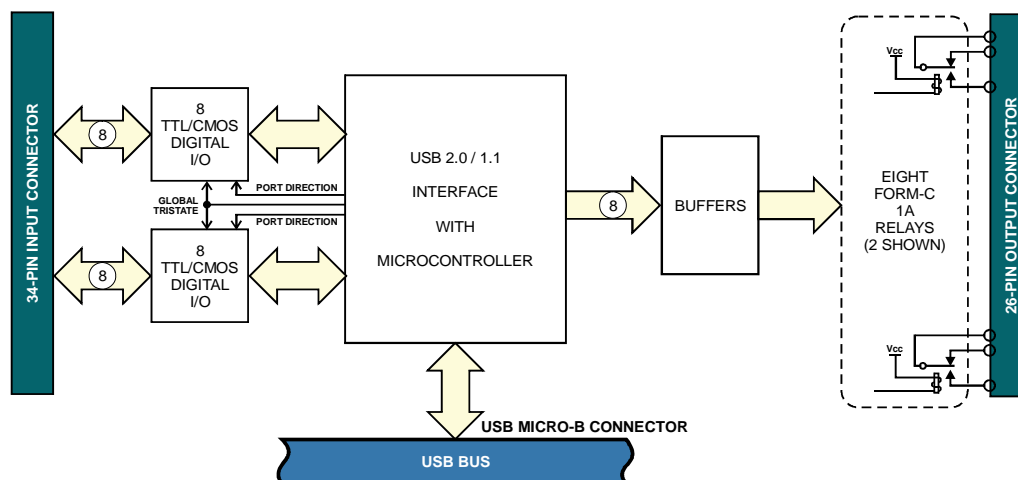
SPECIFICATIONS

Digital I/O
Number: 16
Connector: 34-pin vertical IDC header
Signaling: 5V/3.3 signaling selectable

Digital Inputs (TTL Compatible) 5V signaling
Logic High: 2.0 to 5.0 VDC
Logic Low:: -0.5 to +0.8 VDC

Digital Outputs 5V signaling
Logic High: 2.0 VDC minimum, source 32 mA
Logic Low: 0.55 VDC maximum, sink 32 mA

Relay Outputs
Number: Eight(8) SPDT form C
Connector: 26-pin vertical ID keyed box header
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.

Bus Type
USB 2.0 high-speed, USB 1.1 full-speed compatible

Bus Connectors
USBP-DIO16RO8   Micro B external connector, 5-pin micro-fit connector on-board

Environmental
Operating Temperature Range: 0˚ to 70˚ C (-40˚ to +85˚ C extended temperature option)
Storage Temperature Range: -40˚ to +85˚ C
Humidity: Maximum 90% RH, without condensation.
Board Dimension: 60mm x 72mm.

Power
+5VDC provided via USB bus up to 500mA**
5V@ 30mA, typical (all relays off, add 30mA per relay)
5V@ 270mA, typical (all relays ON)

**If the application expects to have (all relays On), the amount of power to source any of the 16 digital I/O must be limited to less than 230mA or an average of 14mA per channel.

Example: If eight of the channels are being used as inputs, then eight other digital lines could source 28mA average on their outputs.

Ordering Guide
USBP-DIO16RO8   16 digital I/O and 8 relay outputs, USB/PICO™ remote OEM version

Options
-T   Extended temperature option