

FEATURES

- High-speed USB 2.0 device, USB 1.1 compatible
- Small, portable 16-channel, 16-bit resolution digital to analog converter (DAC) outputs
- Jumper selectable analog output ranges of 0-10V and $\pm 5V$ (contact factory for additional available ranges)
- Zero and span software calibration for each DAC
- Analog outputs on female 37-pin D type connector
- Analog inputs 2-channel 16-bit resolution 0-5V
- 16 digital I/O lines (DIO) on male 37-pin D connector
- Digital I/O buffers tri-stated under program control
- All 16 I/O lines pulled up for dry contact monitoring, buffered for 10mA source or 24mA sink capabilities
- Resettable 0.5A fused +5V available to the user
- Rugged steel powder coated enclosure
- Includes 115VAC to +12V regulated external power supply adaptor

FACTORY OPTIONS

- Extended operating temperature version
- 8- and 4-channel 16-bit analog output versions
- 16- and 8-channel 12-bit resolution output versions
- Analog output ranges ($\pm 10V$, 0-5V)
- No analog inputs
- Screw terminals for 12V power (no DC power jack)
- Pull-downs on digital I/O lines
- OEM (board only) version with PC/104 mounting holes and footprint for flexibility in embedded applications



FUNCTIONAL DESCRIPTION

This product features 16 digital-to-analog converters (DACs) with single-ended outputs on a female 37-pin D type connector. The board features jumper selectable $\pm 5V$ or 0-10V ranges for the DACs. Additional ranges can be achieved as factory options giving the user a variety to select from. The DACs can be updated individually or simultaneously. Each channel can be factory calibrated or calibrated specific to the user's requirements through software. To ensure that there will not be excessive outputs to external circuits when the board is plugged in, automatic circuits limit analog outputs to zero volts until initialized via software command.

16 digital I/O lines are provided on a male 37-pin D type connector in two groups of 8 bits. Both digital bytes are individually configured as inputs or outputs. Each 8-bit digital I/O group can be configured for either 5V CMOS or 3.3V LVTTTL signaling via jumper selection.

A 2-channel 16-bit analog-to-digital converter (ADC) is also optionally available.

The USB-AO16-16A is designed to be used in rugged industrial environments but is small enough to fit nicely onto any desk or testing station. The board is PC/104 sized (3.550 by 3.775 inches) and ships inside a steel powder-coated enclosure with an anti-skid bottom.

OEM USB/104 FORM FACTOR

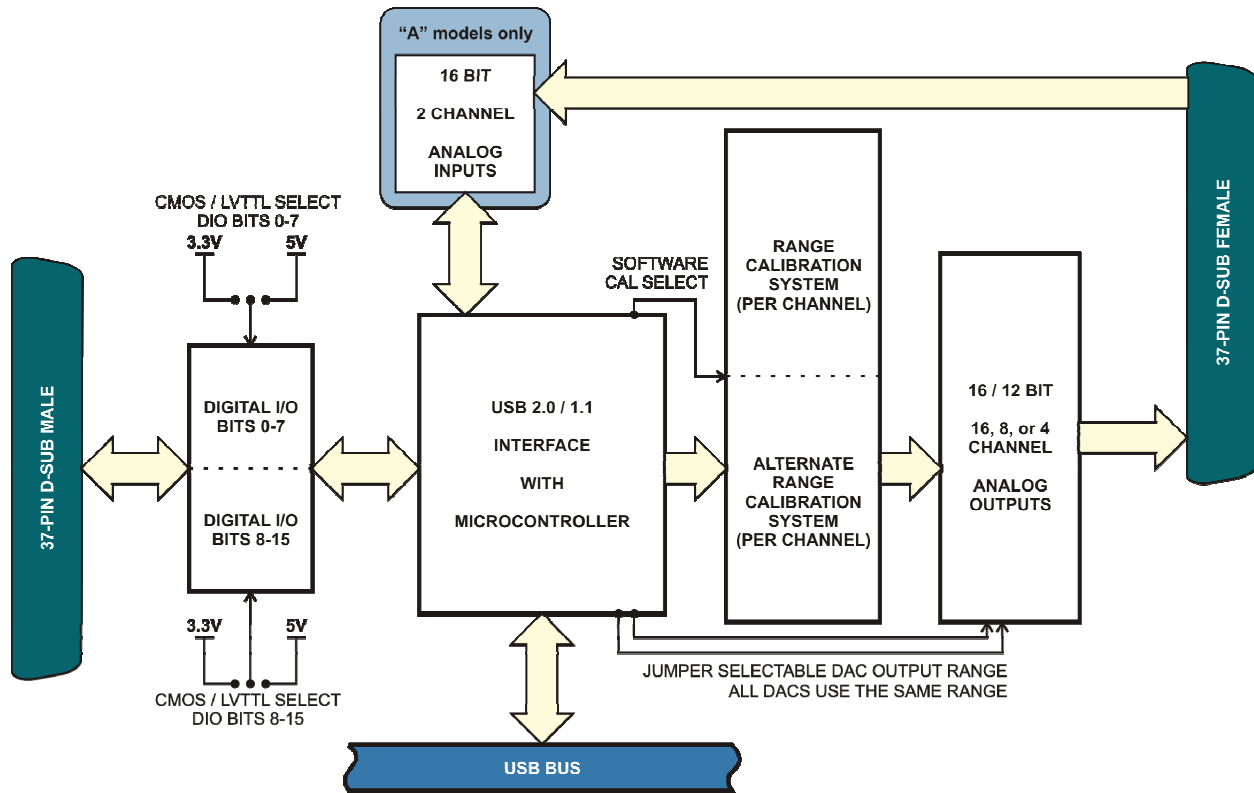
The OEM (board only) version is perfect for a variety of embedded applications. What makes the OEM option unique is that its PCB size and mounting holes match the PC/104 form factor (without the bus connections). This allows our rugged digital board to be added to any PCI-104 or PC/104 stack by connecting it to a simple USB port usually included on-board with embedded CPU form factors such as EBX, EPIC, and PC/104. This is especially important since many newer CPU chipsets do not support ISA and have plenty of USB ports. The USB-AO16-16A OEM board can also be installed using standoffs inside other enclosures or systems.

ACCESSORIES

The USB-AO16-16A is available with optional cable assemblies and screw terminal boards.

SOFTWARE

The USB-AO16-16A is plug-and-play which allows quick connect or disconnect whenever you need additional I/O on your USB port. The module 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 USB-AO16-16A is supported for use in most operating systems and includes a free Linux and Windows 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 includes Windows XPe.



BLOCK DIAGRAM

SPECIFICATIONS

Analog Outputs

Number of Outputs: 16 channels
 Type of Outputs: Single-ended
 Resolution: 16-bit (12-bit versions available)
 Unipolar Ranges: 0-10V, (0-5V factory option)
 Bipolar Ranges: $\pm 5V$, ($\pm 10V$ factory option)
 Conversion Rate: 4kHz, all channels simultaneous
 Relative Accuracy: ± 4 LSB typical
 Diff. Non-linearity: ± 0.25 LSB typical
 Settling Time: 8 μ s typical, 10 μ s max
 Output Current: ± 12 mA per channel

Digital Inputs

3.3V configuration
 Logic High: 2VDC min, 5.5VDC max
 Logic Low: 0.8VDC max, -0.5VDC min
 5V configuration
 Logic High: 3.5VDC min, 5.5VDC max
 Logic Low: 1.5VDC max, -0.5VDC min

Digital Outputs

3.3V configuration
 Logic High: 2.4VDC min, source 10 mA
 Logic Low: 0.55VDC max, sink 24 mA
 5V configuration
 Logic High: 3.8VDC min, source 10 mA
 Logic Low: 0.55VDC max, sink 24 mA

Analog Inputs

Number of channels: Two, Single-Ended
 ADC Type: Successive approximation
 Sampling Rate: 4k samples per second per channel
 Resolution: 16-bit
 Unipolar range: 0-5V

Environmental

Operating Temp.: 0° to 70°C
 Storage Temp.: -40° to +85°C
 Humidity: 5% to 95% non-condensing
 Board Dimension: 3.550 x 3.775 inches

Power

+12VDC:

External AC/DC regulated adaptor included with all models

@ 100 mA typical, no-load on any outputs
 @ 520 mA typical, full-load on DIO buffer sourced outputs and DAC outputs

Ordering Guide

USB-AO16-16A	16-chl 16-bit analog outputs with 2 analog inputs
USB-AO16-16E	16-chl 16-bit analog outputs
USB-AO16-8A	8-chl 16-bit analog outputs with 2 analog inputs
USB-AO16-8E	8-chl 16-bit analog outputs
USB-AO16-4A	4-chl 16-bit analog outputs with 2 analog inputs
USB-AO16-4E	4-chl 16-bit analog outputs
USB-AO12-16A	16-chl 12-bit analog outputs with 2 analog inputs
USB-AO12-16E	16-chl 12-bit analog outputs
USB-AO12-8A	8-chl 12-bit analog outputs with 2 analog inputs
USB-AO12-8E	8-chl 12-bit analog outputs

Model Options

-OEM	Board only version (no enclosure)
-T	Extended Temperature Operation (-40° to +85°C)
-10B	Bipolar $\pm 10V$ output range
-5V	Unipolar 0-5V output range
-ST	Screw terminals for 12V power input (no DC jack)

Accessories

ADAP37M	37-Pin male D connector to screw terminal board
ADAP37	37-Pin female D connector to screw terminal board
STB-37	Cabled termination solution, 37-Pin male D screw terminal board, DIN-rail mountable (2 needed for a complete solution)
DIN-SNAP	1 foot length of snap-track with clips for mounting to DIN-rail, accepts two STB-37's
CAB37MF-36	36 inch flat ribbon cable Male to Female
CAB37-36	36 inch flat ribbon cable Female to Female
CUSB-EMB-6	6' USB cable type A to Micro-fit connector

