

## FEATURES

## MODEL USB-AO-ARB1

- HIGH-SPEED USB 2.0 DEVICE (USB 3.0+ COMPATIBLE), w/HIGH-RETENTION USB CONNECTOR
- FAST WAVEFORM OUTPUT; UP TO 8M SAMPLES/SEC
- SMALL, PORTABLE DIGITAL TO ANALOG SINGLE-ENDED OUTPUT AT 16-BIT RESOLUTION
- 16 K SAMPLE FIFO BUFFER ON-BOARD
- JUMPER SELECTABLE ANALOG OUTPUT RANGES OF 0-2.5V, 0-5V, 0-10V,  $\pm 2.5V$ ,  $\pm 5V$ ,  $\pm 10V$
- TWO 4-BIT I/O PORTS INDEPENDENTLY SELECTABLE FOR INPUTS OR OUTPUTS
- ALL 8 DIO LINES BUFFERED WITH SINK 32MA / SOURCE 32MA CURRENT CAPABILITIES
- JUMPER SELECTABLE 10K OHM PULL-UP/PULL-DOWN RESISTORS ON DIO LINES
- STANDARD 16-PIN IDC CONNECTOR FOR DIO AND GATE
- BNC CONNECTORS FOR DAC OUTPUT AND GATE CONTROL
- PC/104 MODULE SIZE AND MOUNTING COMPATIBILITY
- ALTERNATE EMBEDDED USB CONNECTOR
- SMALL, RUGGED, INDUSTRIAL ENCLOSURE

### Factory Options include:

- OEM Board only, without enclosure, features PC/104 module size and mounting compatibility
- T Extended Temperature (-40°C to 85°C)
- PR +5VDC regulated AC/DC supply and onboard DC-power input jack
- ST Screw terminals installed for DC-power input (no jack, no wall-wart)
- LV Replaces +5VDC digital logic with +3.3V I/O



## FUNCTIONAL DESCRIPTION

The USB-AO-ARB1 is an ideal solution for adding portable, easy-to-install high-speed analog output capabilities to any computer with a USB 2.0 port. The USB-AO-ARB1 is a USB 2.0 High-Speed device and is plug-and-play allowing quick connect or disconnect whenever you need additional I/O on your USB port.

The USB-AO-ARB1 features 1 single-ended analog output on a standard female BNC connector, at up to 8MHz of continuous transfers through a 32 kByte (16kSample) on-board FIFO. A programmable frequency source allows configurable output rates from 1K through more than 8MHz. A jumper-selected analog output range of 0-2.5V, 0-5V, 0-10V,  $\pm 2.5V$ ,  $\pm 5V$ , or  $\pm 10V$  ensures broad application compatibility. The analog output is enabled/gated by a signal applied to either a pin on the IDC or the second BNC.

In addition to the analog output, there are 8 digital I/O channels configurable as 2 4-bit ports for input or output (see block diagram). The digital I/O wiring connections are via a standard, 0.1" spacing, 2x8 pin, male, shrouded, keyed connector.

All required power is normally supplied to the board via the USB cable. For higher current sourcing capabilities external power may be used. The USB-AO-ARB1 is designed to be used in rugged industrial environments but is small enough to fit nicely onto any desk or testing station. The board itself 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 pre-drilled mounting holes match the PC/104 form factor (without the bus connections). This ensures easy installation using standard standoffs inside most enclosures or systems. The board can be added to any PC/104, PCI-104, or PCI/104-Express stack by connecting it to a USB 2.0 port usually included on-board with embedded CPU form factors. This is especially important since many newer CPU chipsets do not support ISA and have plenty of USB ports. The USB-AO-ARB1 OEM board can also be installed using standoffs inside other enclosures or systems. For embedded OEM type applications, an additional miniature USB input header is provided in parallel with the type B connector.

## SPECIAL ORDER

Please contact ACCES with your precise requirement. Examples of special orders would be conformal coating, custom software, and more. We will work with you to provide *exactly* what is required.

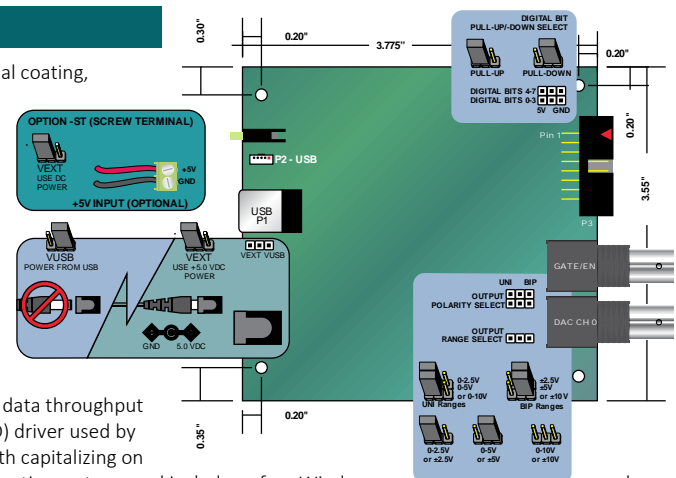
## ACCESSORIES

### Available accessories include:

- UTBK-16 Direct-connect 16-pin Screw Terminal board
- CAB-BNC-6 Standard 6-foot co-axial cable, male BNC connectors
- CAB-BNC-CLIP 3-foot co-axial BNC to minigrabber test clip cable
- MP104-DIN DIN-rail mounting kit

## SOFTWARE

The USB-AO-ARB1 utilizes a high-speed custom function driver optimized for maximum continuous data throughput of 16 MB/s that is hundreds to thousands of 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 on the advantage of high-speed USB 2.0. The boards are supported for use in most USB supported operating systems and includes a free Windows and Linux compatible software package. This package contains sample programs and source code in C# (.NET), Delphi, and Visual C++, for Windows. Third party support includes a Windows standard DLL interface usable from the most popular application programs and includes example LabVIEW VIs. Embedded OS support includes XP Embedded and Windows Embedded Standard.



## PC Interface

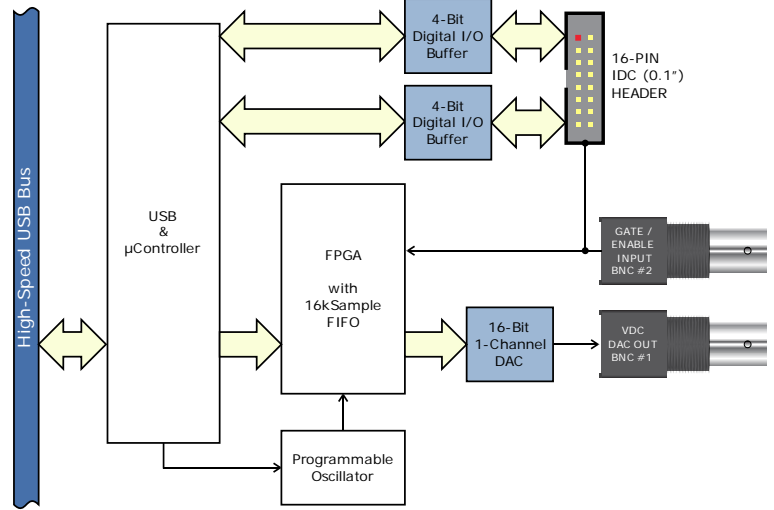
<b>USB</b>	USB 2.0 or 3.0+, High-Speed
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## Analog Output Interface

<b>Output Connector</b>	BNC, female
<b>Analog Output</b>	1, Single-Ended
Resolution	16-bit
Unipolar Ranges	2.5V, 5V, 10V
Bipolar Ranges	±2.5V, ±5V, ±10V
Waveform Output Rate	1kHz to ≥8MHz via onboard oscillator
Relative Accuracy	±4 LSB, typical
Differential Non-Linearity	±2 LSB, typical
Settling Time	70ns, typical
Output Current	±6mA
<b>Waveform Features</b>	16kSample FIFO (32kBytes) GATE input Onboard intelligence

## Digital Input / Output Interface

<b>I/O Connector</b>	Right-angle IDC 16-pin (0.1") boxed and keyed header
<b>Gate Connector</b>	BNC, female; also on IDC pin 16
<b>Digital Outputs</b>	<b>5V Logic</b>
High-output Voltage	3.8VDC, min
Low-output Voltage	0.55VDC max
Sink Current	32mA
Source Current	32mA
	<b>3.3V Logic</b>
High-output Voltage	2.4VDC, min
Low-output Voltage	0.55VDC max
Sink Current	24mA
Source Current	24mA
<b>Digital Inputs</b>	<b>5V Logic</b>
High-input Voltage	3.5VDC min, 5.5VDC max
Low-input Voltage	1.5VDC max, -0.5VDC min
	<b>3.3V Logic</b>
High-input Voltage	2.0VDC min, 5.5VDC max
Low-input Voltage	0.8VDC max, -0.5VDC min



## PHYSICAL

<b>Size</b>	3.550 x 3.775 inches <i>PC/104-size</i>
<b>Enclosure Size</b>	3.9 x 4.075 x 1 inches
<b>Weight</b>	75.5 grams



		Signal		Signal			
		Pin	Names	Description	Pin	Names	Description
direction group 0	1	DIO #0	Digital I/O bit 0	2	GND	Ground	
	3	DIO #1	Digital I/O bit 1	4	GND	Ground	
	5	DIO #2	Digital I/O bit 2	6	GND	Ground	
	7	DIO #3	Digital I/O bit 3	8	GND	Ground	
direction group 1	9	DIO #4	Digital I/O bit 4	10	GND	Ground	
	11	DIO #5	Digital I/O bit 5	12	GND	Ground	
	13	DIO #6	Digital I/O bit 6	14	GND	Ground	
	15	DIO #7	Digital I/O bit 7	16	/TX_EN	GATE Input	

## Environmental

<b>Operating temperature</b>	Commercial (Standard) 0° to 70°C Industrial (-T) -40° to 85°C
<b>Storage temperature</b>	-50° to 125°C
<b>Humidity</b>	5% to 95%, non-condensing
<b>Power required</b>	370 mA typical (no load) +5VDC, regulated

## ORDERING GUIDE

<b>USB-AO-ARB1</b>	1-channel 8MHz 16-bit Analog Waveform Output on USB
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