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MODEL USB-DA12-8E

Eight Channel Digital to Analog Converter

USER MANUAL

FILE: MUSB-DA12-8E.B1j

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WARNING!!

ALWAYS CONNECT AND DISCONNECT YOUR FIELD CABLING WITH THE COMPUTER POWER OFF. ALWAYS TURN COMPUTER POWER OFF BEFORE INSTALLING A CARD. CONNECTING AND DISCONNECTING CABLES, OR INSTALLING CARDS INTO A SYSTEM WITH THE COMPUTER OR FIELD POWER ON MAY CAUSE DAMAGE TO THE I/O CARD AND WILL VOID ALL WARRANTIES, IMPLIED OR EXPRESSED.

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Prior to shipment, ACCES equipment is thoroughly inspected and tested to applicable specifications. However, should equipment failure occur, ACCES assures its customers that prompt service and support will be available. All equipment originally manufactured by ACCES which is found to be defective will be repaired or replaced subject to the following considerations.

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Chapter 1: Introduction

Features

- High-speed USB 2.0 device, USB 1.1 compatible
- Small, portable 8-channel, 12-bit, digital to analog outputs
- Double-buffered allowing simultaneous update of all DAC's
- Computer generated outputs up to 5kHz simultaneous (up to 40kHz total)
- Analog output ranges of 0-2.5V, 0-5V, 0-10V, ±2.5V, ±5V, ±10V
- Single-ended and differential outputs on separate connectors
- Custom high-speed function driver
- PC/104 module size and mounting compatibility
- Small (4"x4"x1.75") rugged industrial enclosure
- DB25M and DB25F enclosure mounted I/O connectors

Applications

- Portable / Laptop
- Education / Laboratory
- Industrial Automation
- Embedded OEM

Functional Description

This USB product is an ideal solution for adding portable, easy-to-install analog outputs to any computer with a USB port. The unit is a high speed USB 2.0 device, offering the highest speed available with the USB bus. It is fully compatible with both USB 1.1 and USB 2.0 ports. The board is plug-and-play allowing quick connection whenever you need additional I/O on a USB port.

This product features 8 digital-to-analog converters (DACs) with both differential and single-ended outputs on separate connectors. The board features unipolar and bipolar ranges for each DAC giving the user a variety of options. The DACs can be updated individually or simultaneously. 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. Five Volt (5V) Power is supplied to the board either from the USB port via the provided 6' USB cable or an external regulated power supply which powers DC/DC converters to provide ±12V to the operational amplifiers on the board. The I/O wiring depends on the model option(s) ordered. For the OEM version, connections are via industry standard, IDC type 26-pin and 16-pin connectors. For full, standard versions, connections are made to the board via enclosure mounted DB25 connectors, with one screw terminal accessory being included (model ADAP25).

The product 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.

Model Options

Standard	Module installed in an enclosure with two (2) DB25 I/O connectors and one (1) screw terminal accessory (ADAP25)
-OEM	Board only version with I/O headers

Special Order

Resistors in series with differential connector for impedance matching, contact factory with your requirement.

Included with your board

The following components are included with your shipment, depending on options ordered. Please take the time now to ensure that no items are damaged or missing.

- Standard USB Module
- ADAP25, Screw Terminal Adaptor, qty 1
- 6' USB cable
- Software Master CD
- USB I/O Quick-Start Guide

Optional Accessories

- ADAP25(M), Screw Terminal Adaptor (an additional unit could be needed if you intended on using the Single-Ended *and* the Differential Analog Outputs).
- -PR Power Adaptor, AC/DC 5V regulated (if total current >500mA).
- -DIN DIN Rail Mounting Provision

Specifications

Analog Outputs

Number of Outputs:	8 channels
Type of Outputs:	Single-ended or differential
Resolution:	12-bit resolution
Unipolar Ranges:	0-2.5V, 0-5V, 0-10V
Bipolar Ranges:	±2.5V, ±5V, ±10V
Conversion Rate:	5kHz, all channels simultaneous
Relative Accuracy:	±2 LSB typical
Differential Non-linearity:	±0.2 LSB typical
Settling Time:	8us typical, 10us max
Output Current:	6mA per channel
Bus Type	USB2.0 High-speed, USB1.1 Full-speed compatible

Environmental

Operating Temperature:	0^{O} to 70^{O}C
Storage Temperature:	-40^{O} to $+85^{O}$C
Humidity:	5% to 95% non-condensing
Board Dimension:	3.550 x 3.775 inches
Box Dimension:	4 x 4 x 1.75 inches tall

Power
+5VDC provided via USB bus up to 500mA**

** Optional AC/DC adapter can be ordered ("-PR" option) if current use is expected to be greater than what can be supplied by the USB bus. Please check to see how much current your USB port can supply and how much current you anticipate using.

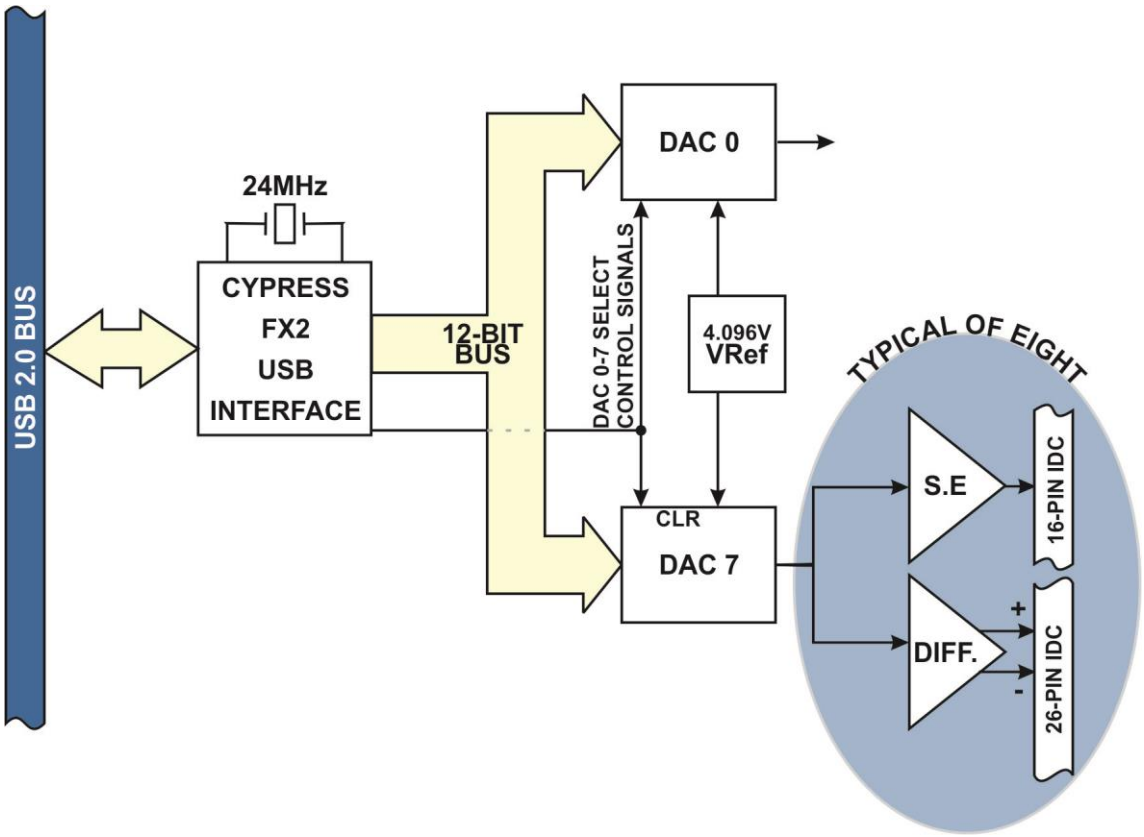


Figure 1-1: Block Diagram

Chapter 2: Installation

Software CD Installation

This paragraph is intended to detail the software installation steps.

The software provided with this board is contained on one CD and must be installed onto your hard disk prior to use. To do this, perform the following steps as appropriate for your software format and operating system. Substitute the appropriate drive letter for your CD-ROM or disk drive where you see d: in the examples below.

WIN95/98/Me/NT/2000/XP/2003

a. Place the CD into your CD-ROM drive.
b. The CD should automatically run the install program. If the install program does not click START | RUN and type d:install, click OK or press ENTER.
c. Follow the on-screen prompts to install the software for this board.

Hardware Installation

The board can be installed in any USB 2.0 or USB 1.1 port. Please refer to the USB I/O Quick Start Guide which can be found on the CD, for specific, quick steps to complete the hardware and software installation.

USB I/O Quick-Start Guide

Provides quick and straight-forward steps to complete the software and hardware installation of this product in your system.

Chapter 3: Option Selection

Refer to the setup programs on the CD provided with the board. Also, refer to the Block Diagram and the Option Selection Map when reading this section of the manual.

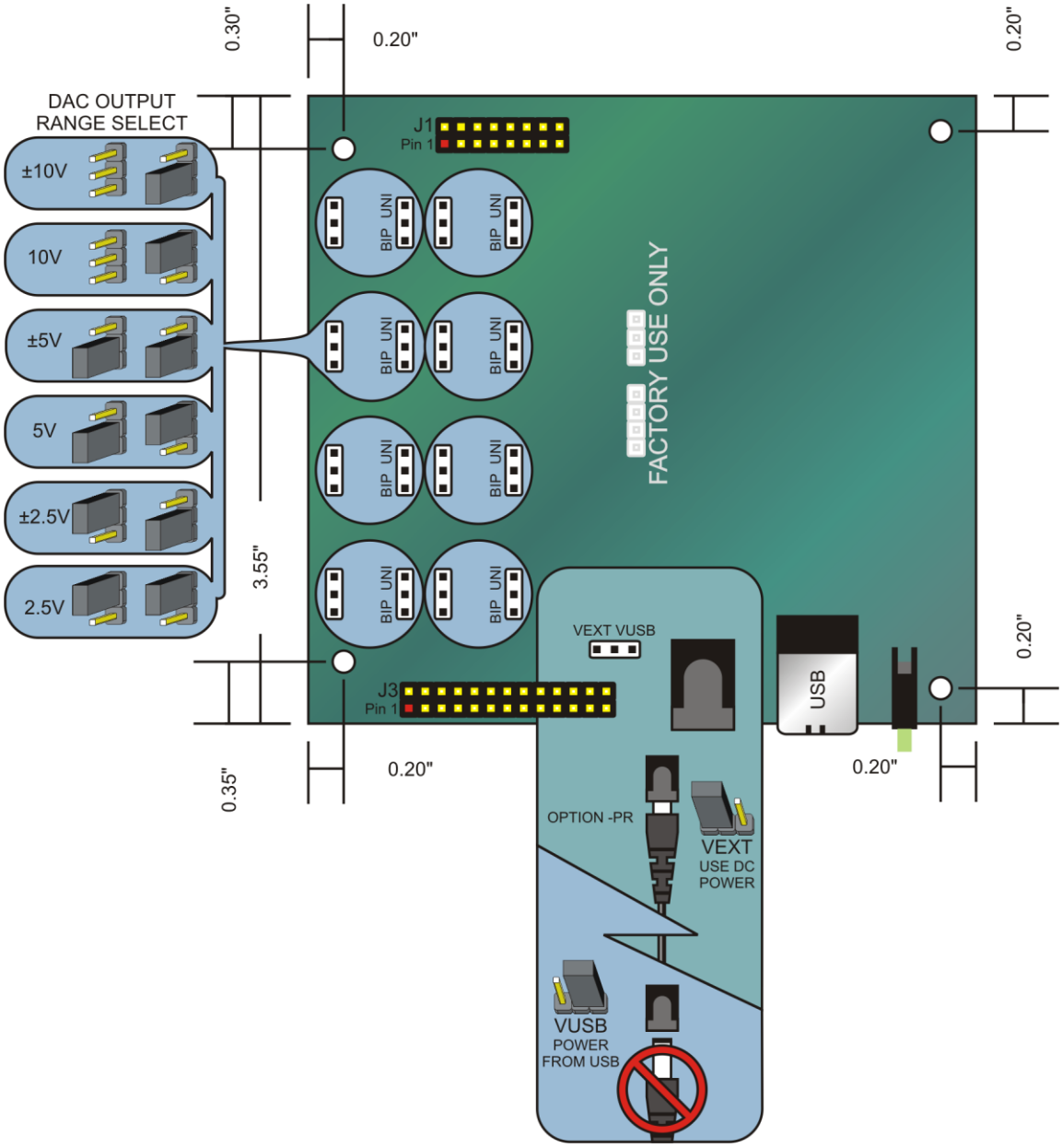


Figure 3-1: Option Selection Map

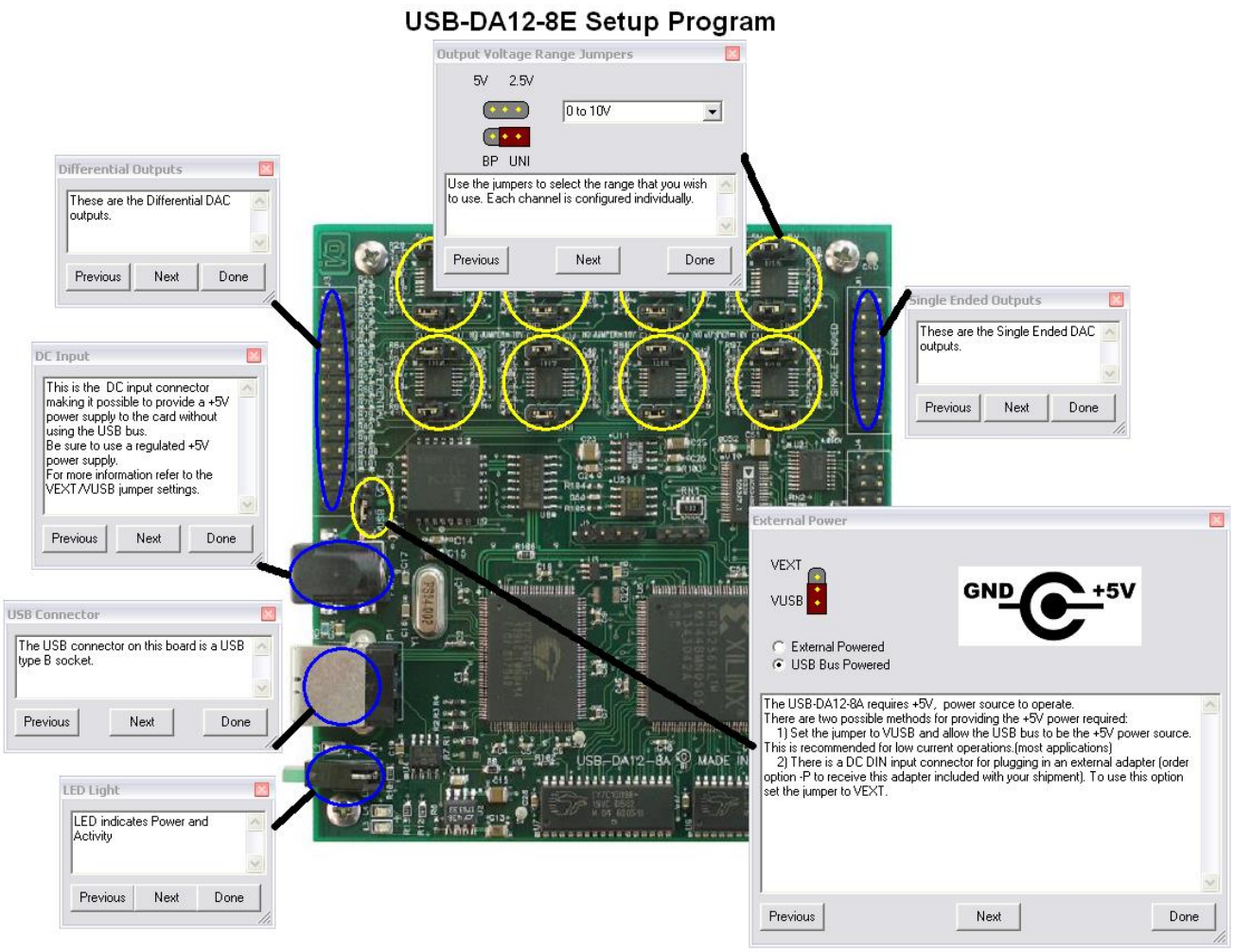


Figure 3-2: Setup Program Screen Shot

External Power Jumper Selection
The board requires +5VDC power to operate. There are two possible methods for providing the +5V power required:

1) Set the jumper to VUSB and allow the USB bus to be the +5V power source. This is recommended for low current operations.
2) There is a DC DIN input connector for plugging in an external adapter (order option -PR to receive this regulated adapter included with your shipment). To use this option set the jumper to VEXT.

DC Power Jack
This is the DC input connector making it possible to provide a regulated +5V power supply to the card without using the USB bus. Be sure to order option -PR so this wall adaptor will be included with your shipment.

Output Voltage Range Jumpers
Use the jumpers to select the range that you wish to use. Each channel is configured individually for the following output possibilities.

0 to 2.5V	0 to 5V	0 to 10V	-2.5 to +2.5V	-5 to +5V	-10 to +10 V

Differential Outputs (J3)
These are the Differential DAC outputs.

Single Ended Outputs (J1)
These are the Single Ended DAC outputs.

USB Connector
The USB connector on this board is a USB type B.

LED Light
LED indicates Power and Activity.

Chapter 4: USB Address Information

Use the provided driver to access the USB board. This driver will allow you to determine how many supported USB devices are currently installed, and each device's type. This information is returned as a Vendor ID (VID), Product ID (PID) and Device Index.

The board's VID is "0x1605", and its PID is "0x4003".

The Device Index is determined by how many of the device you have in your system, and provides a unique identifier allowing you to access a specific board at will.

Chapter 5: Programming

The installation program on the CD will install four PDF manuals to your hard drive. These are the USB I/O Quick-Start Guide, User Manual, Software Reference Manual, and super-software-tech manual; Vendor Requests.

Software Reference Manual

Details our various drivers and sample programs in a number of programming languages as well as providing insight into the most optimum combination of language, environment/OS and hardware selection available. A search for “Product Name” will quickly lead you to the relevant sections of this document.

Vendor Requests

This file provides information on a RAW USB INTERFACE for very low-level programming, generally in Operating Systems other than Windows.

Chapter 6: Connector Pin Assignments

Two header connectors provide a means to interface with the on-board signals. There is a 26 pin header for differential analog outputs and a 16 pin header for single ended analog outputs. When ordered as a standard unit (no options selected) the board is installed in a steel powder coated enclosure with mounted DB25 connectors. One ADAP25 screw terminal accessory is included and can be plugged onto the single ended DB25 connector. The second DB25 is the opposite sex of the first, to avoid plugging onto the wrong connector which has a different pinout than the first.

IDC 16 Pin
SINGLE ENDED CONNECTOR
IDC 16-Pin Header Male



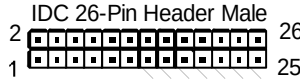
Function	Pin	Pin	Function
DAC 0	1	2	Ground
DAC 1	3	4	Ground
DAC 2	5	6	Ground
DAC 3	7	8	Ground
DAC 4	9	10	Ground
DAC 5	11	12	Ground
DAC 6	13	14	Ground
DAC 7	15	16	Ground

Table 6-1: J1, Single-Ended Analog Outputs, 16-Pin IDC Assignments

DB25F	Function	IDC	DB25F	Function	IDC
1	DAC 0	1	14	Ground	2
2	DAC 1	3	15	Ground	4
3	DAC 2	5	16	Ground	6
4	DAC 3	7	17	Ground	8
5	DAC 4	9	18	Ground	10
6	DAC 5	11	19	Ground	12
7	DAC 6	13	20	Ground	14
8	DAC 7	15	21	Ground	16
9	N/C	17	22	N/C	18
10	N/C	19	23	N/C	20
11	N/C	21	24	N/C	22
12	N/C	23	25	N/C	24
13	N/C	25	NC	N/C	26

Table 6-2: Single-Ended Analog Outputs, DB25M Connector Pin Assignments

IDC 26 Pin DB25
DIFFERENTIAL CONNECTOR



Function	Pin	Pin	Function
DAC 0 +	1	2	DAC 0 -
DAC 1 +	3	4	DAC 1 -
DAC 2 +	5	6	DAC 2 -
Connects to pin 8	7	8	Connects to pin 7
DAC 3 +	9	10	DAC 3 -
DAC 4 +	11	12	DAC 4 -
DAC 5 +	13	14	DAC 5 -
DAC 6 +	15	16	DAC 6 -
DAC 7 +	17	18	DAC 7 -
N/C	19	20	N/C
N/C	21	22	N/C
N/C	23	24	N/C
Ground	25	26	Ground

Table 6-3: J3, Differential Analog Outputs, 26-Pin IDC Assignments

DB25	Function	IDC	IDC	Function	DB25
1	DAC 0+	1	2	DAC 0-	14
2	DAC 1+	3	4	DAC 1-	15
3	DAC 2+	5	6	DAC 2-	16
4	To DB25F pin 17	7	8	To DB25F pin 4	17
5	DAC 3+	9	10	DAC 3-	18
6	DAC 4+	11	12	DAC 4-	19
7	DAC 5+	13	14	DAC 5-	20
8	DAC 6+	15	16	DAC 6-	21
9	DAC 7+	17	18	DAC 7-	22
10	N/C	19	20	N/C	23
11	N/C	21	22	N/C	24
12	N/C	23	24	N/C	25
13	Ground	25	26	N/C	N/C

Table 6-4: Differential Analog Outputs, DB25F Connector Pin Assignments

Customer Comments

If you experience any problems with this manual or just want to give us some feedback, please email us at: ***manuals@accesio.com***. Please detail any errors you find and include your mailing address so that we can send you any manual updates.

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