AD5

Four Quadrature Encoders to SEI Adapter

Description:

The **AD5** quadrature encoder to **SEI** adapter is a simple, quick and convenient way of interfacing up to four incremental encoders to US Digital's **SEI** bus, which can easily be interfaced to an RS232 Port. The **AD5** is available in single-ended finger-latching, single-ended modular, and differential finger-latching. The **AD5** connects to the **SEI** bus and simultaneously tracks up to four incremental encoders (*see the SEI data sheet*). DIN rail mounting is available.

The **AD5** is powered by the **SEI** bus or by a separate power supply. It then supplies power to the incremental encoders which are attached. The **AD5** retains configuration settings when power is removed, but not count values. If power is lost, the counters reset to zero and a home cycle is needed. Providing an uninterruptable power source to the **AD5** by inserting an **SEI-UPS** in line, with the **SEI** cable feeding the **AD5** solves this issue (*see the SEI-UPS data sheet*).

The **AD5** supports both indexed and non-indexed encoders in QUAD1, QUAD2, QUAD4, or Non-Quadrature modes. It provides independent, bidirectional counts from each of its four ports. From -8,388,608 to 8,388,607 at rates of up to 2MHz in non-quadrature mode, and 230 KHz in quadrature mode. It provides count modes of Normal Count, Modulo-N, and Range Limit.

US Digital offers three **SEI** interfaces: the **AD2-B** adapter for interface to a standard 9-pin RS232 port, the **AD2-A** adapter for interface to a 25-pin RS232 port, and the **USB1** encoder interface for a USB port. One of these products is required in order to interface the **A2** to a PC via our **SEI** bus. The wall-mount **PS-9V** power supply furnishes the power for all devices on the **SEI** bus (*see each product's data sheet*).

Note: The encoder interface IC used in this product can be purchased separately. More detailed information can be found on the **LS7266R1** data sheet.

Features:

➢ Four ports allow simultaneous reading of up to 4 incremental encoders
➢ Each port independently configurable
➢ DIN rail mounting is available
➢ All features accessible using simple commands over the **SEI** bus
➢ Count speeds up to 2 MHz (230KHz in quadrature mode)
➢ Quadrature sensing (up to 4 times resolution)
➢ Digital filtering of quadrature signals
➢ Retains configuration settings when power is removed
➢ Uses standard PC data rates up to 115 Kbaud
➢ -0° to 70°C operating temperature
➢ Host software and C source code available
➢ Rugged, simple, low cost
➢ US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.
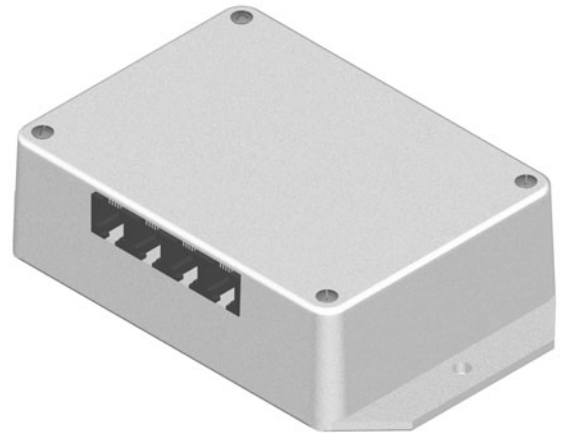
SEI Software:

The software includes a demo/configuration utility which detects encoders on the network and displays their position on the screen. The **SEI** software recognizes encoders on the bus, automatically assigning them unique addresses. The utility includes diagnostics which display status, assigned address, serial number, model, and version of each encoder, verifying that the **SEI** bus is operating correctly. It also allows the user to change the resolution, address, mode and zero position of each encoder. The **SEI** software has the ability to record positions to file. The format is Windows 95/98/ME, Windows NT/2000/XP compatible software on a CD-ROM. A "readme" file contains additional information.

Part# **USD-SW** (Included with every order.)

Absolute Maximum Ratings:

Parameter	Min.	Max.	Units
Storage Temperature	-40	70	°C
Operating Temperature	0	70	°C
Humidity (non-condensing)	0	95	%
➢ESD warning: Normal handling precautions should be taken to avoid static discharge.			

Ordering Information:

Price:
$195 / 1
$175 / 10
$165 / 50
$155 / 100
$145 / 500
$135 / 1K

Part #:

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Interface:
S = 5-pin single-ended.
S6 = 6-pin single-ended.
D = 10-pin differential.

Options:
R = DIN rail (35mm wide) mounting.
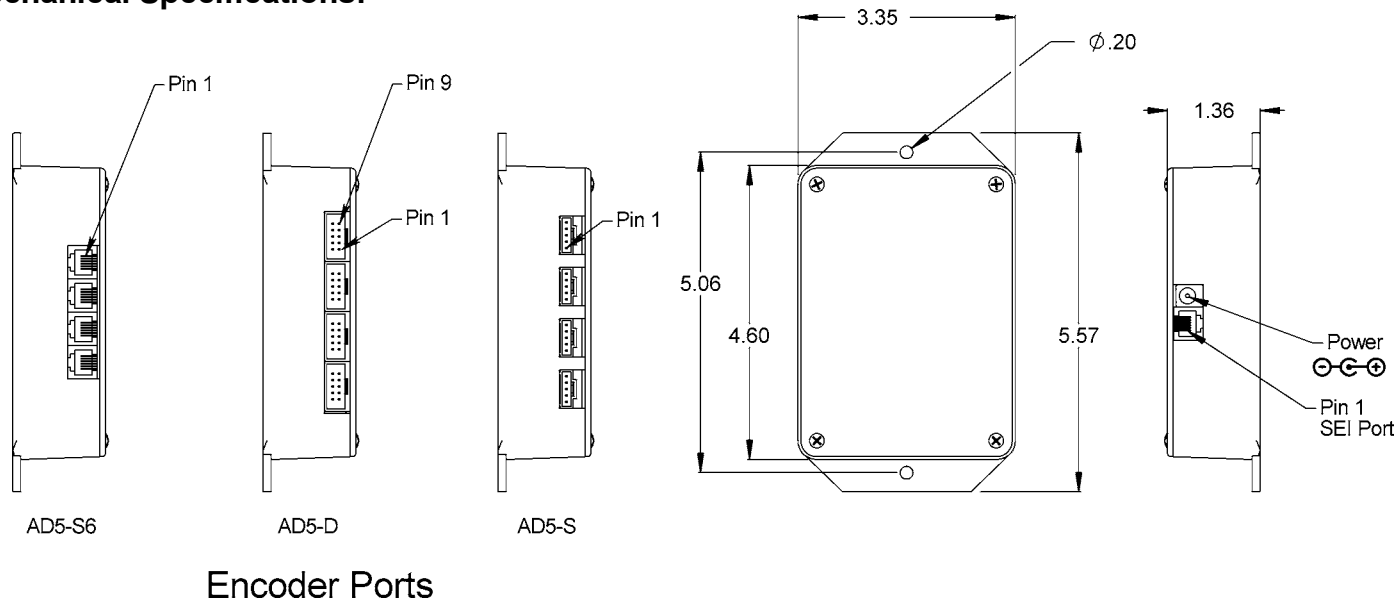NP = No power supply (PS-9V).

Cost Modifiers:
Add $15 for **D**-interface.
Add $10 for **R**-option.
Subtract $5 for **NP**-option.

Includes:
➢ PS-9V (power supply).
➢ USD-SW (software).

Technical Data, Rev. 04.02.03, April 2003
All information subject to change without notice.

Mechanical Specifications:

AD5-S6   AD5-D   AD5-S

Encoder Ports

Encoder Port (5-pin Finger-latching):

Pin	Name	Description
1	GND	Ground, common for power and data
2	I	Index input, high = true
3	A	Quadrature input
4	PWR	Power supply output to encoder
5	B	Quadrature input

Encoder Port (6-pin Modular):

Pin	Name	Description
1	I	Index input, high = true
2	GND	Ground, common for power and data
3	A	Quadrature input
4	PWR	Power supply output to encoder
5	B	Quadrature input
6	GND	Ground, common for power and data

Notes:

➢ The power output to the encoder is +5V regulated from the power input (PWR). When using long cables, consider the voltage drop due to the current consumption of the encoder. If a long cable is required then use either a low gauge cable or an additional power supply next to the encoders.

➢ All inputs have 2.2 KOhm pullups to +5V and 51 Ohm resistors in series with diodes to reduce reflection.

Encoder Port (10-pin Finger-latching):

Pin	Name	Description
1	GND	Ground, common for power and data
2	GND	Ground, common for power and data
3	I-	Index input, high = true
4	I+	Index input, high = true
5	A-	Quadrature input
6	A+	Quadrature input
7	PWR	Power supply output to encoder
8	PWR	Power supply output to encoder
9	B-	Quadrature input
10	B+	Quadrature input

SEI Port:

Pin	Name	Description
1	GND	Ground, common for power, data and busy pairs
2	Busy+	Bidirectional differential acknowledge line
3	Busy-	Bidirectional differential acknowledge line
4	PWR	Power supply input
5	DataL	Bidirectional differential data line
6	DataH	Bidirectional differential data line

Electrical Characteristics:

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (PWR)	9.0	-	16	Volts
Supply Current (no encoders)	-	21	60	mA
A+, B+, I+ Encoder Inputs Low	-	-	1.6	Volts
A+, B+, I+ Encoder Inputs High	3.2	-	-	Volts
Output Voltage to Encoders	4.9	5.0	5.1	Volts
Output Current to All Encoders	-	-	340	mA

➢ Specifications apply over entire operating temperature range.
➢ Typical values are specified at Vcc=12V and 25°C.