

Addressable RS-485 Data Acquisition Module

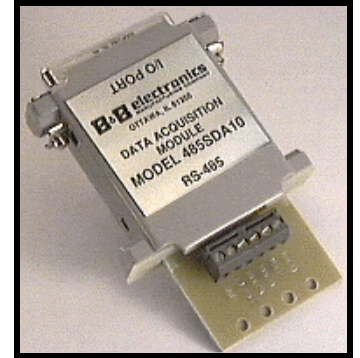
Model 485SDA10

Description

The 485SDA10 provides a low-cost, easy-to-use solution for serial port data acquisition. The 485SDA10 offers 11 channels of 10-bit A/D inputs, 3 digital outputs and 3 digital inputs. With these features, the module can be used to sense a variety of external conditions and to control a variety of devices. The 485SDA10 comes with a demo program in QuickBASIC. A data logging utility is included to provide a simple way to import data into other programs and spreadsheets (such as EXCEL). RS-232 and 12-bit A/D versions are available (232SDA10, 232SDA12, and 485SDA12).

Features

- 11 channels of 10-bit A/D
- 2.44mV A/D resolution (with 2.5Vdc Reference)
- 3 digital inputs (-30Vdc to +30Vdc)
- 3 digital outputs (0Vdc to 5Vdc)
- Automatic baud rate detection
- 256 unique user defined addresses



Commands

There are only three commands required to control the 485SDA10: the read A/D command, read digital I/O command and the set output states command. There are also four commands that are used to configure the module: set power up states command, set turn-around delay command, set module address command, and the read module configuration command. The configuration parameters are stored in non-volatile memory. The command string consists of four or five bytes: the "!" character, an address byte, two command characters, and a data byte (if required).

485SDA10 Commands

Function	Command	Response
Read A/D Channels	!{addr}RA{#}	{ch#msb}{ch#lsb}{ch(#-1)msb}...{ch0msb}{ch0lsb}
Read Digital I/O	!{addr}RD	{I/O states}
Set Output States	!{addr}SO{#}	no response
Set Module Address	!{addr}SA{new addr}	no response
Set Powerup States	!{addr}SS{#}	no response
Set Turn-around Delay	!{addr}SC{#}	no response
Read Configuration	!{addr}RC	{addr}{powerup states}{turn-around delay}

NOTE: Each {...} represents one byte.

In addition to the normal "!" (21h) commands, an extended set of commands using "#" (23h) as the first character have been added to provide bit-error identification by sending complements of character bytes after the fourth byte of the command and in all response character bytes.

485SDA10 Extended Commands

Function	Command	Response
Read A/D Channels	#{addr}RA{#}~{#}	{ch#msb}~{ch#msb}{ch#lsb}~{ch#lsb}{ch(#-1)msb}~{ch(#-1)msb}...{ch0msb}~{ch0msb}{ch0lsb}~{ch0lsb}
Read Digital I/O	#{addr}RD	{I/O states}~{I/O states}
Set Output States	#{addr}SO{#}~{#}	no response
Set Module Address	#{addr}SA{new addr}~{new addr}	no response
Set Powerup States	#{addr}SS{#}~{#}	no response
Set Turn-around Delay	#{addr}SC{#}~{#}	no response
Read Configuration	#{addr}RC	{addr}~{addr}{powerup states}~{powerup states}{turn-around delay}~{turn-around delay}

NOTE: Each ~{...} represents complement of one byte.

A/D Converter

The 485SDA10 has 11 channels of 10-bit A/D inputs. The full-scale voltage can be set anywhere from 2.5Vdc to 5.0Vdc. A 5Vdc reference is available to provide a 0 to 5Vdc range without any external components. The A/D converter has a conversion time around 20 microseconds, however the sampling rate is limited by the serial communications. The actual sampling rate for a single channel is around 120 samples per second (at 9600 baud). This rate drops to 25 samples per second when sampling all of the channels. The A/D inputs are available on a DB-25S (female) connector.

Digital I/O Lines

The 485SDA10 has 3 digital inputs and 3 digital outputs. The 3 digital outputs are CMOS/TTL compatible. The digital inputs are CMOS/TTL compatible and can handle voltages from -30Vdc to +30Vdc. The digital I/O lines are available on a DB-25S (female) connector.

I/O Connector Pinout

DB-25S Pin #	Function	DB-25S Pin #	Function
1	GND	14	Digital Output #0
2	+12Vdc Output*	15	Digital Output #1
3	Digital Input #0	16	Digital Output #2
4	Digital Input #1	17	+5Vdc Output
5	Digital Input #2	18	A/D Ref. Input +
6	Digital GND	19	A/D Ref. Input -
7	Analog GND	20	No connection
8	A/D Input #0	21	A/D Input #6
9	A/D Input #1	22	A/D Input #7
10	A/D Input #2	23	A/D Input #8
11	A/D Input #3	24	A/D Input #9
12	A/D Input #4	25	A/D Input #10
13	A/D Input #5		

*Actual output is equal to power supply input minus 0.7Vdc

Communications

The 485SDA10 connects to the host computer's RS-485 or RS-422 serial port using terminal blocks. The 485SDA10 will work with 2-wire or 4-wire RS-485. The unit automatically detects baud rates from 1200 to 9600. A data format of 8 data bits, 1 stop bit and no parity is used. The address and turn-around delay are software programmable to allow for use of multiple devices or connection to existing systems.

Optical Isolation: If optical isolation is required, use B&B's 485HSPR high-speed optically isolated converter with this product.

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RS-485 Connector Pinout

TB Label	Signal	485SDA10 Function	Notes
TD(A)	Transmit Data (A)	Output	Connection is required. [Loop to RD(A) for 2-wire hookup]
TD(B)	Transmit Data (B)	Output	Connection is required. [Loop to RD(B) for 2-wire hookup]
RD(A)	Receive Data (A)	Input	Connection is required. [Loop to RD(A) for 2-wire hookup]
RD(B)	Receive Data (B)	Input	Connection is required. [Loop to RD(B) for 2-wire hookup]
GND	Ground	-	Connect Signal GND and Power Supply GND
+12V	+12 Vdc Power Input	Input	Connection is required

Specifications**Analog to Digital Converter**

Resolution: 10 bit
Channels: 11
Reference Range: 5.0 Vdc max. (4.888 mV per bit)
2.5 Vdc min. (2.444 mV per bit)
A/D Ref. Input - 0 Vdc to 2.5Vdc
A/D Ref. Input +2.5 Vdc to 5.0 Vdc
Input Voltage Range: -0.3 Vdc to 5.3 Vdc
Total Unadjusted Error: +/- 1 LSB max.
A/D input channels must be driven from a source impedance less than 1k ohm.

5 Volt Reference

Output Voltage: 4.975 Vdc to 5.025 Vdc (5.0 Vdc typ.)
Accuracy: +/- 0.5 %
Maximum Output Current: 5 milliamps max.

Digital Inputs

Channels: 3
Voltage Range: -30 Vdc to 30 Vdc
Low Voltage: -30 Vdc to 1.0 Vdc
High Voltage: 2.0 Vdc to 30 Vdc
Leakage Current: 1 microamp max.

Digital Outputs

Channels: 3
Low Voltage: 0.6 Vdc @ 8.7 milliamps
High Voltage: 4.3 Vdc @ -5.4 milliamps

Power Supply

Input Voltage: 9Vdc to 18Vdc @ 25 milliamps (Doesn't include power consumption of external devices.)
Connection: Terminal block

Communications

Standard: RS-422/485
Addresses: 256
Turn-around Delay: Software programmable from 0 to 255 character transmission times
(1 character transmission time @ 9600 = 1 millisecond)
Baud Rate: 1200 to 9600 (automatic detection)
Format: 8 data bits, 1 stop bit, no parity
Connector: Terminal blocks

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