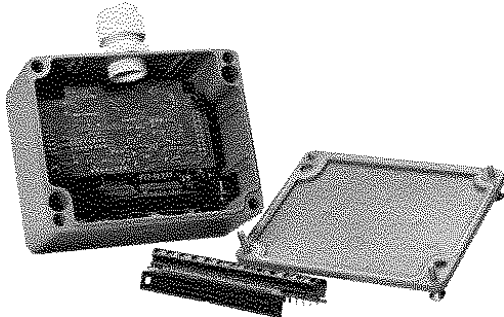


# Model RSPAD128



## Remote Sealed Pod for Analog & Digital I/O



### FEATURES

- *Remote Analog & Digital I/O w/ Opto-Isolated RS-485 Link to Host Computer*
- *NEMA 4 Enclosure for Harsh Atmospheric Environments*
- *All Programmable, NO Switches to Set*
- *8-Channel A/D w/ 12-Bit Resolution*
- *8-Digital I/O Lines, Bit Programmable*
- *3 Crystal Controlled Counter/Timers*

### DESCRIPTION

The Remote Sealed Pod, Model RSPAD128, is an intelligent, 8-channel analog-to-digital converter unit that interfaces to a host computer through an asynchronous serial port. The unit is housed in a NEMA 4 enclosure for remote installation in harsh environments. The pod also contains eight digital I/O lines and three 16-bit counter/timers.

A built-in watchdog timer resets the pod if, for some unexpected reason, the microcontroller “hangs up” or the power supply voltage drops below 4.75VDC. Also, data collected by the pod is stored in local RAM for later access through the computer’s serial port.

#### Analog Inputs

The RSPAD128 accepts up to eight single-ended analog inputs. Input ranges of  $\pm 10V$ ,  $\pm 5V$ , 0-10V, & 0-5V are programmable on a channel-by-channel basis and all inputs are overvoltage protected up to  $\pm 16.5V$ . The RSPAD128 uses a 12-bit successive approximation A/D capable of 33,000 conversions per second. A/D conversions may be initiated in one of three ways: 1) by software command, 2) by an on-board programmable timer, or 3) by an external trigger.

For applications that require more than eight input channels, the RSPAD128 is fully compatible with the AT16-P analog input expansion multiplexer. Each AT16-P provides capability to connect sixteen differential or single-ended inputs. Therefore, as many as 128 differential inputs can be accepted when an RSPAD128 is used with a full compliment of AT16-Ps. The RSPAD128 is also fully compatible with the LVDT8-P signal conditioner card for linear displacement measurements.

#### Digital I/O

Eight bits of TTL/CMOS compatible digital I/O are provided. These can be configured on a bit-by-bit basis as either inputs or outputs. When used as outputs, a maximum of seven bits are available. Each output provides compliance with user-supplied voltages up to 50V and the maximum current per output bit is 350mA. For the seven-bit group, there is a maximum combined total of 650 mA current.

There are an additional eight bits that are used strictly for digital output. These are normally used for gain select and channel select when using the AT16-P with the RSPAD128.

#### Counter/Timers

Three 16-bit Counter/Timers are provided on the RSPAD128. Counter/Timer0 is enabled by a digital input and may be clocked either by the output of Counter 1 or by an external source up to 10MHz. This counter is not committed on the card and its clock, gate, and output lines are available at the I/O connector.

Counter/Timers 1 & 2 are concatenated to form a 32-bit counter/timer for timed A/D conversions. Counter 1 may be enabled by a digital input and is clocked by an on-board, crystal-controlled 10MHz oscillator. The output of Counter 1 provides the clock for Counter 2 and is also available at the I/O connector. The output of Counter 2 is connected to input T0 of the microprocessor and provides the means to initiate timed A/D conversions.

## SOFTWARE

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A disk is provided that is ASCII-based. ASCII programming permits the user to write applications in any high-level language that supports ASCII string functions. The communication protocol has two forms: non-addressed and addressed. Use non-addressed protocol if only one pod is in use. If more than one pod is in use, then addressed protocol is required. The difference is that, in addressed mode, an address command is sent to enable communication with the specific pod. That address command needs to be sent only once to enable communication with that pod and disables communications with all other pods on the network. The command structure is seven data bits, even parity, and one stop bit. All numbers sent to and received from the pod are in hexadecimal form. Commands are issued in simple, easy to learn letter and number combinations.

### Operating Systems Supported

DOS 3.3 and higher  
Windows 3.1x  
Windows 95  
Windows NT

### Languages Supported

Any high-level language that supports ASCII string functions

### Demo/Example Programs Included

Examples in C, and Pascal are included.

### Drivers Provided

No "Task" call drivers are included.

## SPECIFICATIONS

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### ANALOG INPUTS

#### Channels

8, singled ended

#### Resolution

12 bits

#### Voltage Ranges

$\pm 5V$ ,  $\pm 10V$ , 0-10V, 0-5V

#### Coding

True binary for unipolar inputs.  
Offset binary for bipolar inputs.

#### Throughput

33,000 conversions per second

#### Monotonicity

Guaranteed over operating temperature

#### Gain Drift

$\pm 5$  PPM/ $^{\circ}C$

#### Trigger Source

Software command, on-board timer, external

### DIGITAL I/O

#### Logic Input High

2.0 to 5.0VDC @ 20mA max

#### Logic Input Low

-0.5 to 0.8VDC @ -0.4mA max

#### Logic-Low Output Current

350mA max.

#### High-Level Output Voltage

Open collector, up to 50VDC (user supplied) or can be pulled up to +5VDC via 10k resistors

### PROGRAMMABLE TIMER

#### Number

Three 16-bit down counters, two permanently concatenated

#### Type

82C54-2

#### Output Drive

2.2mA @ 0.45V (5 LSTTL loads)

#### Input Gate

TTL/CMOS compatible

#### Clock Input Frequency

dc to 10MHz

#### Active Count Edge

Negative edge

## SPECIFICATIONS

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### Minimum Clock Pulse Width

30nS high/50nS low

### Timer Range

2.5MHz to <1 pulse per hour

## ENVIRONMENTAL

### Temperature

**Operating:** 0° to 65°C (de-rated according to power supply used)

**Storage:** -50° to +120°C

### Humidity

Meets NEMA 4 requirements

### Dimensions

4.53" x 3.54" x 2.17" (115mm x 90mm x 55mm)

### Power Requirements

Power for the opto-isolated section can be applied from the computer's +12VDC power supply via the serial communications cable if a four-wire cable is used. Power for the rest of the pod can be provided by a local power supply.

### Opto-Isolated Section

7.5 to 35VDC @ 7mA

### Local Power

7.5 to 18VDC @ 150mA

## ORDERING GUIDE

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### Model RSPAD128

Unit, software, manual



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