



ADVANCED  
LINEAR  
DEVICES, INC.

## MB1S(MB1SA2V)/MB1SA20V

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### Single Board Precision DVM with direct PC Interface

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The ALD MB1S is a precision  $\pm 5 \frac{1}{2}$ -digit Digital Voltmeter (DVM) printed circuit board that contains the ALD500R/ALD521D A/D Converter chipset that directly plugs into the parallel printer port of a PC computer. It features calibrated analog input (w/scalable input ranges), and digital circuitry to communicate with PC or other microprocessors. It is designed to be used as a stand-alone, embedded system component in a variety of applications including digital panel meters, customized instrumentation displays, temperature monitoring, high resolution DVM's, weigh scales and others. Direct Full-scale analog input range is  $\pm 2.00000$  V DC with a linearity of 0.005%. ALD's 18-bit plus sign integrating dual-slope analog processor (ALD500) functions as the input device and the ALD521D microprocessor IC implements the digital conversion, control mode and I/O functions.

Two optional versions of the basic MB1S, each populated with different components and configurations, are: Mode A version- calibrated reference and Mode B version – ratio-metric. Mode A is used primarily for measurements against a calibrated reference voltage typically required in precision voltmeter applications. Mode B is intended for measurements against a ratio-metric reference voltage such as those required in weigh scale applications. Standard Mode A version is available as MB1S. Mode B is a simple application specific adaptation of the standard MB1S.

The MB1S board has provision for PC interface, included DOS setup, operating and calibration software, Basic programming interface modules, and input resistor divider network for input scaling. DC Inputs are single ended or optionally fully differential, and features automatic zero and automatic input polarity detection. A DB25 connector is provided on-board to conveniently interconnect the MB1S to a personal computer (PC) via the parallel printer port for operation, initial setup and calibration.

#### Hardware and Software Features

- Directly plug into a PC parallel printer port and displays readings on the monitor.
- Measurement Range:  $\pm 2.00000$  VDC direct input.  
(Other ranges are user configurable and scalable, using both hardware and software scaling)
- Self-powered from PC computer or external +5 VDC power source
- All solid-state construction.
- 24 bit serial output. (23 bit plus sign bit)
- User selectable  $\pm 3 \frac{1}{2}$  to  $\pm 6 \frac{1}{2}$  digits.
- Differential analog inputs with auto-polarity and auto-zero.
- Simple to install and operate.
- Includes DOS software for user operation, setup, and calibration.
- Includes embedded application software modules.
- Calibration for positive and/or negative inputs.
- Provision for input voltage scaling attenuator network.
- Smart Input Filtering (Sample Averaging) selection for noise reduction and accurate displays.

## Key Specifications

### MB1S (MB1SA2V)

- Direct Full Scale Analog Input Range: +/- 2.00000V DC
- Input Impedance: 1 G Ohm min, 100 G Ohm typical.
- Optional on-board input resistor divider network for wide input voltage ranges
- Resolution: +/- 1 digit, (+/- 10 uV) @  $V_{in} = 1.00000$  V (16x input averaging)
- Overvoltage Protection: 20V DC
- Conversion Sample Rate: 3-samples/sec (from 1 sample/min. to 10 samples/sec.)
- No external power source necessary, draws power directly from the PC printer port
- Optional external Power Supply: +4.5 to +5.5V max @ 6mA max.
- Accuracy +/- 0.01% (After 2 hour warm-up)
- Linearity of +/- 0.005% full-scale (23°C, +/- 1°C).
- Logic Compatibility: CMOS inputs and outputs.

### MB1SA20V

- Direct Full Scale Analog Input Range: +/- 20.000V DC
- Input Impedance: 10 MEG Ohm nominal
- Optional on-board input resistor divider for wide input voltage ranges
- Resolution: +/- 1 digit, (+/- 100 uV) @  $V_{in} = 10.0000$  V (16x input averaging)
- Overvoltage Protection: 200V DC
- Conversion Sample Rate: 3-samples/sec (from 1 sample/min. to 10 samples/sec)
- No external power source necessary, draws power directly from the PC printer port
- Optional external Power Supply: +4.5 to +5.5V max @ 6mA max.
- Accuracy +/- 0.02% (After 2 hour warm-up)
- Linearity of +/- 0.01% full-scale (23°C, +/- 1°C).
- Logic Compatibility: CMOS inputs and outputs.

## Applications

Applications for the MB1S Board include embedded digital panel meters, customized instrumentation displays, temperature monitoring, high resolution DVM's, weigh scales, signal conditioners, laboratory data-logging, process monitors, portable/field troubleshooting and calibration.

## Configuration & Outline Drawing

MB1S boards include a DB25 pin connector that plugs directly into the parallel printer port of a desktop or laptop PC computer for operation, initial setup & calibration. The board outputs 24 bit serial data ( 23 bit serial data plus sign bit ) to the PC or other digital processors for further data processing.

## **ALD500/ALD521D Chipset**

For complete technical information and operating specifications for the ALD chipset as well as other ALD products, you can download complete datasheets on-line.

### **Environmental**

- Operating Temperature Range: 0 to 50 degrees C.
- Storage Temperature: -40 to +85 degrees C.
- Humidity: To 90% (no condensation).
- Protection: No shielding — open board construction.

### **Mechanical**

- Outline Dimensions: 2.00 in. x 2.40 in. x 0.5 in.
- Mounting Holes: 0.125 in. diameter @ 0.125 in from 4 corners
- Weight: 1 ounce (28 grams) Nominal

### **Ordering Information**

- ALD MB1S or ALD MB1SA2V (MODE A, DVM Mode)
- ALD MB1SA20V
- ALDMB1S-ND Tyyyy  
where Tyyyy is a Custom Part Number designator
- ALDMB1SAxxV (Custom Option)  
where xx specifies the input voltage range,  
e.g. xx=20 for +/- 20V input voltage range