

MB201/MB203 Single Board Precision DVM for 5-1/2 digit resolution applications

Advanced Linear Devices' MB200 Series Precision DVM boards are designed for precision voltage measurement applications featuring 5-1/2 digit readout resolution. Specific applications include embedded high-resolution digital voltmeters, temperature monitoring, weigh scales, laboratory data-logging, customized instrumentation displays and specialized digital panel meters. Provisions for optional onboard input amplifier/scaling circuits make these boards easily adaptable for ratiometric bridge sensor applications.

MB201

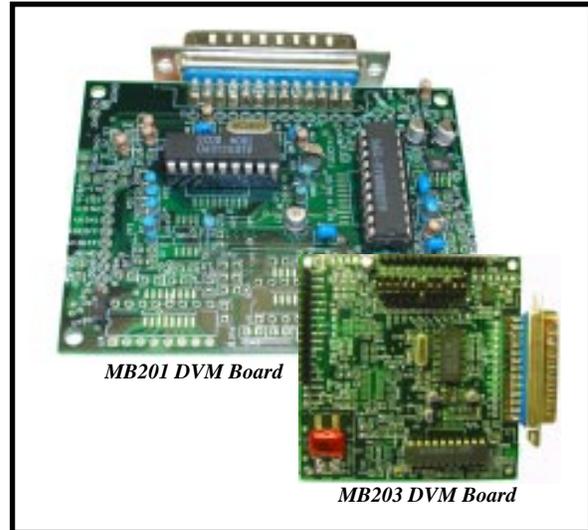
The MB201 is a precision DVM printed circuit board that can be plugged directly into the parallel printer port of a PC computer. It is powered from the computer's internal power supply and utilizes the computer monitor screen to display the measured value. Designed for single and timer activated measurements, the MB201 can conveniently and cost effectively turn your PC or laptop into an instant data acquisition instrument.

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. Software and documentation are provided on the CD-ROM which allow users to change sample periods, display settings and other operating parameters, including Adaptive Smart Filtering™.

MB203

The MB203 (DVM) printed circuit board contains the ALD500R/ALD523D A/D Converter - Display Module Controller chipset. It features a direct 2 x 16 Character Display Module interface, fixed calibrated analog input range, single +5V DC power supply operation, and digital circuitry to communicate with PC or other microprocessors. It is designed to be used as a stand-alone, embedded system component. Direct default full-scale analog input range is ± 2.00000 VDC 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 ALD523D microprocessor IC implements the digital conversion, control mode and I/O functions for interfacing LCD/VFD Character Display Modules containing HD44780 display drivers with up to 3 different display sets.

The basic MB203 board can be populated with different components and configured for operation in 1 of 3 application specific functional modes; Mode A - calibrated reference, Mode B - ratiometric, and Mode C - display only. 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 ratiometric reference voltage such as those required in bridge sensor applications. Mode C is used for display applications and can be programmed to be compatible with most industry standard serial binary input data formats - up to 31 serial bits plus sign bit.



A DB25 connector is provided on-board to conveniently interconnect the MB203 to a personal computer (PC) via the parallel printer port for initial setup and calibration. PC software is also included to configure the ALD523D digital controller chip and establish input scaling and user-defined alphanumeric "Title and Unit fields" for the display module, which are then uploaded and stored in the EEPROM on-board the MB203. Once initial set up and calibration is completed, only a single +5V DC power supply is required for full stand-alone operation, including power for the character display module.

Features

- Measurement Ranges are user configurable & scalable using both hardware and software scaling/conversion
- Converts, scales and displays virtually any DC input voltage with up to seven full digits plus sign (+/- 9999999)
- Auto-polarity and auto-zero.
- User selectable $\pm 3\text{-}1/2$ to $\pm 6\text{-}1/2$ digits displays.
- Includes DOS software for optional user setup/calibration.
- Adaptable ratiometric operation.
- Options include Programmable Serial Input (MB203); 2-Input Multiplexer/Preamplifier/Differential Analog Inputs
- Other user configurable software and hardware parameters.
- Software calibration for positive and/or negative inputs.
- Input Filtering (Sample Averaging) noise reduction
- All solid-state construction.



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Key Electrical Specifications

MB201A

- Direct Full Scale Analog Input Voltage Range:
 ± 2.00000 VDC (*Input Impedance: 1 G Ohm minimum, 100 G Ohm typical; Overvoltage Protection is not available.*)
- Optional Full Scale Analog Input Voltage Range:
 ± 20.0000 VDC (*Input Impedance: 10 MEG Ohm; Overvoltage Protection is 200 VDC.*)
- Optional on-board input resistor divider/preamplifier network for wide input voltage ranges.
- Resolution: ± 1 -digit or $\pm 10\mu\text{V}$ @ $V_{in} = 1.00000\text{VDC}$ (16x input averaging)
- Accuracy $\pm 0.02\%$ (after 2 hour warmup)
- Linearity $\pm 0.005\%$ full-scale (23 deg C, ± 1 deg C)
- Conversion Rate: 3 samples/sec. typical (adjustable from 1 sample/min. to 10 samples/sec.)
- Logic Compatibility: CMOS inputs and outputs

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- Resolution: ± 1 -digit or $\pm 10\mu\text{V}$ @ $V_{in} = 1.00000\text{VDC}$ (16x input averaging)
- Up to 3 Sets of Full Scale Display Ranges: ± 9999999 (up to 7 full digits).
- Conversion Rate: 3 samples/sec. typical (user selectable from 0.5 sample/min. to 10 samples/sec.)
- Power Supply: +4.5 to +5.5V max. @ 9mA max.
- Accuracy $\pm 0.02\%$ (after 2 hour warmup)
- Linearity $\pm 0.005\%$ full-scale (23 deg C, ± 1 deg C)
- Logic Compatibility: CMOS inputs and outputs.

Ordering Information

MB201 Board

Part No.	Description
MB201A2V (Mode A)	± 2.00000 VDC Input Voltage Range
MB201A20V (Mode A)	± 20.0000 VDC Input Voltage Range
MB201Tyyyy	(where Tyyyy is a custom part no.)
MB201AxxV	(option where xx specifies the input voltage range, e.g. xx=10 for ± 10 VDC input voltage range)

MB203 Board

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MB203A2V (Mode A)	± 2.00000 VDC Input Voltage Range
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MB203Tyyyy	(where Tyyyy is a custom part no.)
MB203AxxV	(option where xx specifies the input voltage range, e.g. xx=10 for ± 10 VDC input voltage range)

Mechanical

- Outline Dimensions (MB201): 3.20 in. x 2.45 in. x 0.5 in.
- Outline Dimensions (MB203): 3.00 in. x 2.95 in. x 0.5 in.
- Mounting Holes: 0.125 in. dia. @ 0.125 in. from 4 corners.
- Weight: 1 ounce (28 grams) nominal.

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.

Initial Setup & Calibration

All DVM boards are calibrated at the factory before shipment to standard default specifications and settings.

MB201 DVM boards include a DB25 connector that plugs directly into the parallel printer port of a desktop or laptop PC computer for initial setup, calibration and operation. The MB201 board outputs 24 bit serial data to a PC (or a microprocessor), which is the primary interface for changing the boards' operating parameters and displaying the measured value on the PC monitor.

MB203 DVM boards also include a DB25 connector that can be plugged directly into the parallel printer port of a desktop or laptop PC computer for optional setup & calibration. Users may alter the default factory setup using the computer interface and software provided. Subsequently, the board may be unplugged from the PC and operated in the stand-alone mode. Depending on a specific application, each board can also be readily modified and populated with different components for other modes of operation.

ALD Chipset & Board Products

For complete technical information and operating specifications for the ALD 500R/521D and ALD 500R/523D chipsets as well as other ALD printed circuit board products, e.g., MB1S you can download complete datasheets on-line.

Advanced Linear Devices, Inc. develops and manufactures a proprietary line of precision CMOS linear integrated circuits, including analog switches, data converters, voltage comparators, timers, operational amplifiers, conventional and EPAD[®] MOSFET transistors.

Most standard devices are available as ASIC cells.

ALD also serves customers through expertise in full custom design engineering, including device and process development.