ADVANCED LINEAR DEVICES, INC.

# MB203A2V/MB203A20V

## Single Board Precision DVM with direct Character Display Module Driver

The ALD MB203 is a precision +/-5½-digit Digital Voltmeter (DVM) printed circuit board that contains the ALD500R/ALD523D A/D Converter – Display Module Controller chipset. It features direct 2 x 16 Character Display Module interface, 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 +/-2.00000V 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 ALD523D microprocessor IC implements the digital conversion, control mode and I/O functions for interfacing with a variety of LCD/VFD multi-line Character Display Modules. In addition, the MB203 also drives and manages a 2x16 LCD or VFD Character Display Module.

The MB203 supports three optional Mode versions, each populated with different components and configurations:

- Mode A – calibrated reference mode, used primarily for measurements against a calibrated reference voltage, typically required in precision voltmeter applications. Mode A is the default version of MB203A.

- Mode B – ratio-metric mode, intended for measurements against a ratio-metric reference voltage, such as those required in weigh scale applications. Mode B is a simple application specific adaptation of the standard MB203A.

- Mode C – Display only mode, 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. Mode C is a simple application specific adaptation of the standard MB203A.

The MB203 board has a provision for PC interface (DB25), BASIC interface modules, and input resistor divider network for input scaling. Optional MS-DOS Software (P/N - MBCDROM) is also available for user setup and calibration. Only one copy of the software is necessary, regardless of the number of boards in use. Inputs are single ended or optionally fully differential, and features automatic zero and automatic input polarity detection. There are also optional socket/footprints for input pre-amplifier and 2-input differential input analog switch. 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. Standard PC software is 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 the MB203. Once initial set up and calibration is completed, the MB203 board only requires a single +5V DC power supply to operate.

### Hardware and Software Features

- User switch-selectable Display Ranges with pre-programmed Unit fields.
- Measurement Range: +/-2.00000V DC direct input.
  (Other ranges are user configurable and scalable, using both hardware and software scaling)
- All solid-state construction.
- User selectable +/-3½ to +/-6½ digits.
- Differential analog inputs with auto-polarity and auto-zero.
- User configurable software and hardware parameters.
- Calibration for positive and/or negative inputs.
- Smart Input Filtering (Sample Averaging) selection for noise reduction and accurate displays.
- Optional MS-DOS software for user operation, setup, and calibration is sold separately.

## Key Specifications

### MB203A2V

- Direct Full Scale Analog Input Range: +/- 2.00000V DC
- Input Impedance: 1GΩ min, 100GΩ typical.
- Optional on-board input resistor divider/preamplifier network for wide input voltage ranges
- Resolution: +/-1 digit, (+/-10µV) @ Vin = 1.00000V (16x input averaging)
- Overvoltage Protection: Not available
- Conversion Sample Rate: 3-samples/sec (from 0.5 sample/min. to 10 samples/sec.)
- External Power Supply: +4.5 to +5.5V max @ 9mA max.
- Accuracy +/-0.02% (After 2 hour warm-up)
- Linearity +/-0.005% full-scale (23º C, +/-1º C).
- Logic Compatibility: CMOS inputs and outputs.

### MB203A20V

- Direct Full Scale Analog Input Range: +/-20.000V DC
- Input Impedance: 10MEGΩ nominal
- Optional on-board input resistor divider for wide input voltage ranges
- Resolution: +/-1 digit, (+/-100µV) @ Vin = 10.0000V (16x input averaging)
- Overvoltage Protection: 200V DC
- Conversion Sample Rate: 3-samples/sec (from 1 sample/min. to 10 samples/sec)
- External Power Supply: +4.5 to +5.5V max @ 9mA max.
- Accuracy +/-0.02% (After 2 hour warm-up)
- Linearity +/-0.01% full-scale (23º C, +/-1º C).
- Logic Compatibility: CMOS inputs and outputs.

## Applications

Applications for the M203 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

All MB203 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. After initial setup, the board may be unplugged from the PC and operated in the stand-alone mode. Depending on a specific application, each board can be readily modified and populated with different components for other modes of operation.

## 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 50º C.
- Storage Temperature range: -40 to +85 ºC.
- Humidity: to 90% (no condensation).
- Protection: no shielding - open board construction.

### Mechanical

- Outline Dimensions: 3.00 in. x 2.95 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

- MB203A2V (MODE A, DVM Mode)
- MB203Tyyyy
  where Tyyyy is a Custom Part Number designator
- MB203AxxV (Custom Option)
  where xx specifies the input voltage range,
  e.g. xx=20 for +/- 20V input voltage range
- MB203LCD (optional LCD display)
- MBCDROM (optional MS-DOS software for user operation, setup, and calibration, and user design documentation.)

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