



AT AUTOCALIBRATION
TECHNOLOGY

- ◆ 16 analog inputs, 16-bit A/D
- ◆ 100KHz maximum sampling rate
- ◆ Multi-channel scan sampling with interrupts and FIFO support
- ◆ Programmable input ranges (see table)
- ◆ Unipolar/bipolar and single-ended/differential modes
- ◆ 512-sample A/D FIFO
- ◆ 4 analog outputs, 12-bit D/A
- ◆ Multi-range autocalibration of A/D and D/A
- ◆ 8 digital inputs
- ◆ 8 digital outputs
- ◆ Counter/timers for A/D control and general use
- ◆ Timer-controlled interrupt feature
- ◆ +5V power supply
- ◆ -40 to +85°C operation
- ◆ FREE Universal Driver software included

The Diamond-MM-16-AT features top performance and flexibility for a mid-range price. It has 16 single-ended / 8 differential analog inputs with both unipolar and bipolar input ranges and programmable gain. It has a maximum sampling rate of 100KHz, supported by a 512-sample FIFO with a 256-sample interrupt threshold. Both single-channel and multi-channel-scan sampling modes are supported, and the A/D can be triggered with a software command, the on-board programmable timer, or an external signal. These features give you maximum flexibility to configure the board to your application.

The board is available with 4 optional analog output channels. The D/A output range can be set to 0-5V, $\pm 5V$, or programmable range in 1mV steps. Outputs may be updated independently or simultaneously.

The advanced autocalibration circuit on Diamond-MM-16-AT calibrates both the analog inputs and outputs under software control. Calibration takes just seconds and can be performed as often as desired using our Universal Driver software shipped with the board.

The 16 digital I/O lines are configured as 8 inputs and 8 outputs. An 82C54 chip on board is provided for counting and timing operations. It gives you one 32-bit programmable timer to control the A/D sample rate and one 16-bit counter/timer for general purpose use, including event counting and square wave generation. This board offers the special feature of timer-controlled interrupts that enable you to run your own custom code at programmable intervals.

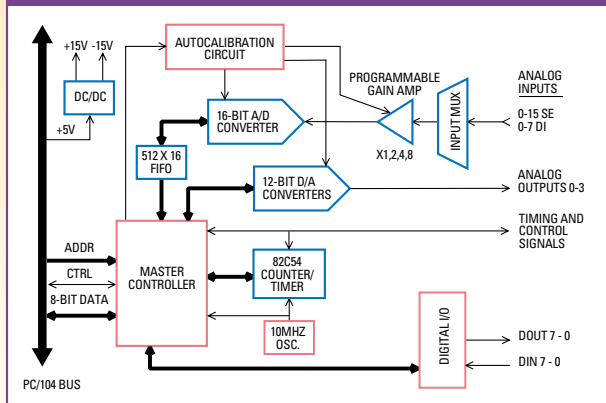
This board requires only a +5V power supply and operates over the temperature range of -40 to +85°C.

ORDERING GUIDE

DMM-16-AT 16 16-bit A/D, 100KHz, 4 12-bit D/A
DMM-16-NA-AT 16 16-bit A/D, 100KHz, no D/A

For cables and accessories, see pages 46-47.

DIAMOND-MM-16-AT BLOCK DIAGRAM



I/O HEADER

VIN 15/7-	1	2	VIN 7/7+
VIN 14/6-	3	4	VIN 6/6+
VIN 13/5-	5	6	VIN 5/5+
VIN 12/4-	7	8	VIN 4/4+
VIN 11/3-	9	10	VIN 3/3+
VIN 10/2-	11	12	VIN 2/2+
VIN 9/1-	13	14	VIN 1/1+
VIN 8/0-	15	16	VIN 0/0+
ANALOG GND	17	18	VREF OUT
ANALOG GND	19	20	VOUT 0
ANALOG GND	21	22	VOUT 1
ANALOG GND	23	24	VOUT 2
-15V	25	26	VOUT 3
ANALOG GND	27	28	DIGITAL GND
CTR IN 0	29	30	CTR OUT 2
CTR OUT 0	31	32	DOUT 6
DOUT 7	33	34	DOUT 4
DOUT 5	35	36	DOUT 2
DOUT 3	37	38	DOUT 0
DOUT 1	39	40	DIN 6
DIN 7	41	42	DIN 4
DIN 5	43	44	DIN 2
DIN 3	45	46	DIN 0
DIN 1	47	48	DIGITAL GND
+5	49	50	

SPECIFICATIONS

ANALOG INPUTS

Number. of inputs	16 single-ended or 8 differential (user selectable)
A/D resolution	16 bits (1/65,536 of full scale)
Bipolar ranges	$\pm 10V$, $\pm 5V$, $\pm 2.5V$, $\pm 1.25V$, $\pm 0.625V$
Unipolar ranges	0-10V, 0-5V, 0-2.5V, 0-1.25V
Input bias current	3nA max
Nonlinearity	$\pm 3LSB$, no missing codes
Conversion rate	100,000 samples/sec. max
Conversion trigger	Software trigger, internal pacer clock, or external TTL signal
A/D FIFO	512 samples; 256 threshold

ANALOG OUTPUTS

Number of outputs	4
D/A resolution	12 bits (1/4096 of full scale)
Output ranges	$\pm 5V$, 0-5V, Programmable
Output current	$\pm 5mA$ max per channel
Settling time	6 μ S max to 0.01%
Relative accuracy	$\pm 1LSB$
Nonlinearity	$\pm 1LSB$, monotonic
Reset	All channels reset to mid-scale (0V for bipolar ranges)

DIGITAL I/O

Number of inputs	8, 5V logic compatible
Input voltage	Logic 0: 0.0V min, 0.8V max Logic 1: 2.0V min, 5.0V max
Input current	$\pm 1mA$ max
Number of outputs	8, 5V logic compatible
Output voltage	Logic 0: 0.0V min, 0.33V max Logic 1: 3.8V min, 5.0V max
Output current	Logic 0: 64mA max per line Logic 1: -15mA max per line

COUNTER/TIMERS

A/D Pacer clock	32-bits (2 82C54 counters cascaded)
Clock source	10MHz on-board clock or ext. signal
General purpose	16-bits (1 82C54 counter)

GENERAL

Calibration	A/D and D/A circuits calibrated under software control
Power supply	+5VDC $\pm 10\%$ @ 350mA typ
Operating temp.	-40 to +85°C
Weight	3.3 oz / 93g

ANALOG INPUT RANGES

INPUT RANGE	RESOLUTION (1 LSB)
0 - 10V	0.153mV
0 - 5V	0.076mV
0 - 2.5V	0.038mV
0 - 1.25V	0.019mV
$\pm 10V$	0.305mV
$\pm 5V$	0.153mV
$\pm 2.5V$	0.076mV
$\pm 1.25V$	0.038mV
$\pm 0.625V$	0.019mV