



ANALOG OUTPUT RUBY-MM-1612

12-BIT D/A, 16 CHANNELS INCLUDES 24 DIGITAL I/O



- ◆ 12-bit D/A resolution (1/4096)
- ◆ 16 analog outputs
- ◆ Unipolar and bipolar output ranges
- ◆ User-adjustable output range
- ◆ External reference input capability
- ◆ Simultaneous update of all channels
- ◆ 24 digital I/O lines (82C55)
- ◆ -40 to +85°C operating temperature
- ◆ FREE Universal Driver software included

Ruby-MM offers 16 full-featured analog outputs using quad 12-bit D/A converter chips. Each chip has its own user-configurable full-scale references, so each group of 4 channels can have its own output range (see table). The 2.5V range can be adjusted anywhere between 0V and 2.5V. Calibration circuitry is provided on board to ensure maximum accuracy of the analog outputs to ± 1 LSB. Analog output specifications include 6 μ s settling time and ± 5 mA max output current per channel.

The board contains an 82C55 chip to provide 3 8-bit digital I/O ports with programmable direction. Each digital I/O line has a 10K Ω pull-up resistor.

ANALOG OUTPUT RANGES

OUTPUT RANGE	RESOLUTION (1 LSB)
0 - 10V	2.44mV
0 - 5V	1.22mV
0 - 2.5V	0.61mV
± 10 V	4.88mV
± 5 V	2.44mV
± 2.5 V	1.22mV

The output range can be configured independently for each group of 8 output channels.

I/O HEADER

AGND	1	2	VOUT 0
AGND	3	4	VOUT 1
AGND	5	6	VOUT 2
AGND	7	8	VOUT 3
AGND	9	10	VOUT 4
AGND	11	12	VOUT 5
AGND	13	14	VOUT 6
AGND	15	16	VOUT 7
VOUT 8	17	18	VOUT 9
VOUT 10	19	20	VOUT 11
VOUT 12	21	22	VOUT 13
VOUT 14	23	24	VOUT 15
DIO A7	25	26	DIO A6
DIO A5	27	28	DIO A4
DIO A3	29	30	DIO A2
DIO A1	31	32	DIO A0
DIO B7	33	34	DIO B6
DIO B5	35	36	DIO B4
DIO B3	37	38	DIO B2
DIO B1	39	40	DIO B0
DIO C7	41	42	DIO C6
DIO C5	43	44	DIO C4
DIO C3	45	46	DIO C2
DIO C1	47	48	DIO C0/EXT TRIG
+5V	49	50	DGND

SPECIFICATIONS

ANALOG OUTPUTS

Number of outputs	16, voltage output
Resolution	12 bits (1 part in 4096)
Fixed output ranges	± 10 V, ± 5 V, 0-10V, 0-5V
Adjustable ranges	Preset to 2.5V for ± 2.5 V, 0-2.5V ranges Adjustment range 0-2.5V
External reference	0V min, 10V max
Settling time	6 μ s max to $\pm 0.1\%$
Accuracy	± 1 LSB
Integral nonlinearity	± 1 LSB max
Differential nonlinearity	± 1 LSB max, guaranteed monotonic
Output current	± 5 mA max per channel
Minimum load	2K Ω
Update method	Simultaneous update
D/A reset voltage	0V for bipolar ranges, mid-scale for unipolar ranges

DIGITAL I/O

Number of lines	24, CMOS / TTL compatible (82C55)
Input voltage	Logic 0: -0.5V min, 0.8V max Logic 1: 2.0V min, 5.5V max
Output voltage	Logic 0: 0.0V min, 0.4V max Logic 1: 3.0V min, Vcc - 0.4V max
Output current	± 2.5 mA max per line
Pull-up resistor	10K Ω on each I/O line
External trigger	Active high edge

GENERAL

Power supply (Vcc)	+5VDC $\pm 10\%$
Required current	430mA typical, all outputs open
Operating temp.	-40 to +85°C
Size	3.55" x 3.775"
Data bus	8 bits
Weight	3.0oz / 85g

RUBY-MM-1612 BLOCK DIAGRAM

