



**SERIES
1501**

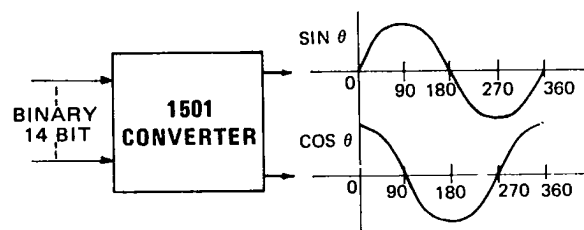
Revised March 1987

14 BIT DIGITAL TO DC SINE/COSINE CONVERTER [non-variant]

MODEL 1504 IS A MULTIPLYING VERSION OF THE 1501

FEATURES:

- 0.05% max. magnitude variation
- 14 Bit resolution and ± 4 arc minutes accuracy
- Short circuit and overcurrent protected output
- No calibration, adjustments or warmup
- Low power TTL inputs eliminate the need for special precautions against static electricity.
- Reverse polarity protected
- Available for either 0°C to $+70^{\circ}\text{C}$, or -55° to $+105^{\circ}\text{C}$ operation
- Hermetically sealed units on request
- Meets MIL-STD-202D, Methods 204B, 205D, 106C, 107C, 101C and 105B
- High reliability 883B or MIL-M-38510 upon request



This solid state model converts a 14 bit digital input into two DC output voltages that are proportional to the sine and cosine of the indicated input angle. The output voltages are insensitive to power supply changes and are therefore ideally suited for radar display systems or computing applications.

An external +10VDC reference input capability is provided to enable our converter to track with the reference voltage of a computing system.

SPECIFICATIONS**Code A****Code B**

Resolution: 14 BITS (1 LSB = 1.3 arc minutes)

Accuracy*: ± 4 arc minutes

Magnitude (DC Outputs):** $\pm 0.05\%$

12 BITS (1 LSB = 5.3 arc minutes)

± 8.5 arc minutes

$\pm 0.05\%$

*Angle accuracy is determined by the ratio of $\frac{\sin \text{Out}}{\cos \text{Out}}$

*Accuracy and magnitude apply over indicated temperature range and $\pm 5\%$ power supply variations.

** Both sine and cosine outputs have their amplitude vs. angle variation corrected to less than 0.05%. However, if an external reference is used, the magnitude will vary with the stability of that reference.

Logic, Input:

Parallel, positive logic, Low power TTL levels, binary coded angle.

Fan In:

1 Low power TTL Load.

Output:

Two DC voltages, each varying from 0 to $\pm 10\text{VDC}$ nominal, one representing the sine, and the other the cosine of the input angle from 0° to 360°

Output Impedance:

One ohm maximum for each output.

Drive Capability:

5mA maximum for rated accuracy. Output is short circuit proof.

Output Load:

2K minimum

Noise:

2 mV RMS maximum

External Reference: +10 VDC

Offset:

3 mV maximum

Input Z 7K

Settling Time (to 1 LSB):

20 μs with resistive load

Slewing Speed: Output will settle within 25 μs of a 5V reference step input.

Power Requirements:

$\pm 15\text{VDC} \pm 5\%$ at 50mA maximum [1]
 $+5\text{VDC} \pm 5\%$ at 50mA maximum
 [1] $\pm 12\text{VDC OPERATION AVAILABLE}$. See part number designation.

Operating Temperature:

Model C: 0°C to $+70^\circ\text{C}$
 Model M: -55°C to $+105^\circ\text{C}$

Storage Temperature:

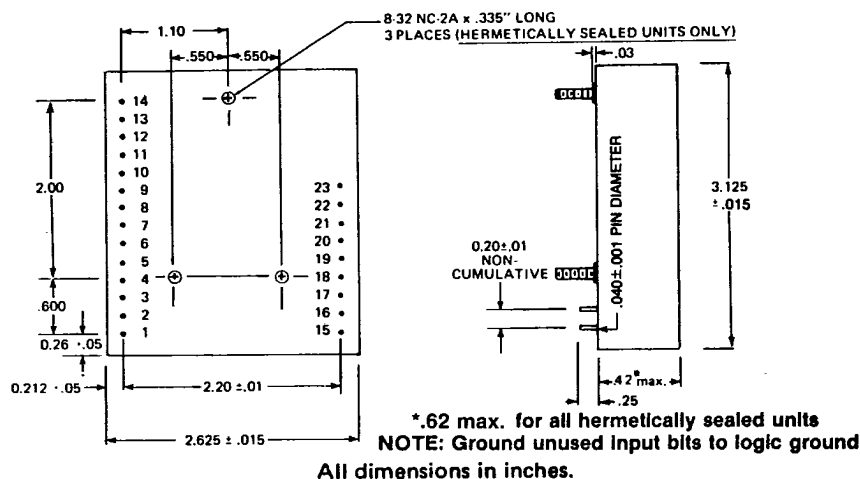
-65°C to $+125^\circ\text{C}$

Potting:

All units are potted.

Weight:

3.0 oz.

**PIN ASSIGNMENTS**

1	MSB (180°)	15	EXT. REF.
2		16	INT. REF.
3		17	+5VDC
4		18	-15VDC
5		19	LOGIC GROUND
6		20	ANALOG GROUND
7	BINARY	21	+15VDC
8	INPUTS	22	SIN OUT
9		23	COS OUT
10			
11			
12			
13			
14	LSB (.02197°)		

FOR INTERNAL REF. CONNECT PIN 15 TO 16

PART NUMBER DESIGNATION

1501 *****

- Add 883 for HI-REL
- Add H for Hermetic Seal
- Add D for separate logic ground
- Add 12 for ± 12 VDC operation
- Accuracy: (A = 4 minutes; B = 8.5 minutes)
- Temperature Range: (C or M)



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