digital to synchro/resolver converter
1.5 va 12 or 14 bit
series 292A700/800

NEW! micro-module series

actual size

FEATURES
- 2" X 2" module outline
- 12 or 14-bit resolution
- Up to 4 minute accuracy
- TTL/CMOS compatibility
- Short circuit and overload protection
- Thermal cutoff protection
- Integral heatsinking
- No +5V supply required

APPLICATIONS
Operational Flight Trainers - Simulators - Fire Control - Flight Instrumentation

GENERAL DATA

The series 292A700/800 is an ultra-miniature digital to synchro/resolver converter capable of driving up to 1.5 VA CT loads without any external heat sinking. The converter is packaged in a 2.0" x 2.0" x 0.395" module and weights less than 1.50 ounces. This new small size rivals that of hybrid converters.

ANALOG OUTPUT

The analog output signals are derived from the reference input excitation RH & RL and are defined as follows:

Synchro outputs:
$$E_{S1\text{-}S3} = KE_{RL\text{-}RH}\sin\theta$$
$$E_{S3\text{-}S2} = KE_{RL\text{-}RH}\sin(\theta + 120)$$
$$E_{S2\text{-}S1} = KE_{RL\text{-}RH}\sin(\theta + 240)$$

Resolver outputs:
$$\text{SIN} = KE_{RH\text{-}RL}\sin\theta$$
$$\text{COS} = KE_{RH\text{-}RL}\cos\theta$$

It is important to note that K in the above equation has the form NR. N is the transformation ratio of the converter, i.e., 26/11.8. R varies between 1.0 and 0.98 every 11.25°. In all synchro/servo systems, scale factor variation is not a source of error. In other applications where the sines and cosines are used independently, you must determine whether the scale factor variation will cause error.

LOGIC INPUTS

The 292A series will accept 14 bits (or less) of natural parallel binary angle data. The inputs are CMOS with 100 Kohm pull-down resistors and therefore nothing need be done with unused input bits.

CAUTION: The digital angle inputs are zener protected; however, permanent damage may occur on unconnected devices subjected to high energy electrostatic fields. Unused devices MUST be stored in conductive foam.

HEAT SINKING AND THERMAL CUTOUT

The top of the 292A consists of metal plate providing all the required heat sinking. Under no load conditions the top plate temperature will be approximately 20°C above ambient. Above that the thermal resistance top plate to free air is 15°C/VA. A thermal cutout is incorporated that disables the output power amplifiers when the top plate reaches 150°C to 170°C. It starts operating again when the top plate temperature drops below 125°C. The top plate should be provided with sufficient air circulation. The thermal resistance may be improved by a factor of three or greater by simply blowing air of sufficient velocity over the plate.

ELECTRICAL SPECIFICATIONS

Parameter	Value
Resolution	12 or 14-bit
Accuracy (1)	±4 minutes for 14-bit models ±6 minutes for 12-bit models
Digital Input(2)	Natural parallel binary angle positive logic, 1 std CMOS load with 100 Kohm pull down
Input Data Rate	4000°/sec max. for 14-bit models 8000°/sec max. for 12-bit models
Analog Outputs	
Synchro(3)	11.8 Vrms max. L-L driving 1.5 VA
Resolver	6.0 Vrms max. driving 1.5 VA
Scale factor variation with digital angle	2%
DC Offset (each line to gnd)	±3 mV max.
Protection	Over current, short circuit and over temperature

ELECTRICAL SPECIFICATIONS - Continued

Parameter	Value
Reference Input(4)	
Voltage	26V or 115V
Frequency	50-440 Hz
Input impedance	
Single ended	90 Kohm @ 26V, 400 Kohm @ 115V
Differential	180 Kohm @ 26V, 800 Kohm @ 115V
Power Supplies	
Voltage	±15V ±10%
Current	70 mA + load
Peak current at power turn on	700 ma
Temperature Ranges	
Operating	°0 to 70°C
Storage	-55° to +125°C
Dimensions	2.0″ x 2.0″ x 0.395″
Weight	1.50 oz.

NOTES

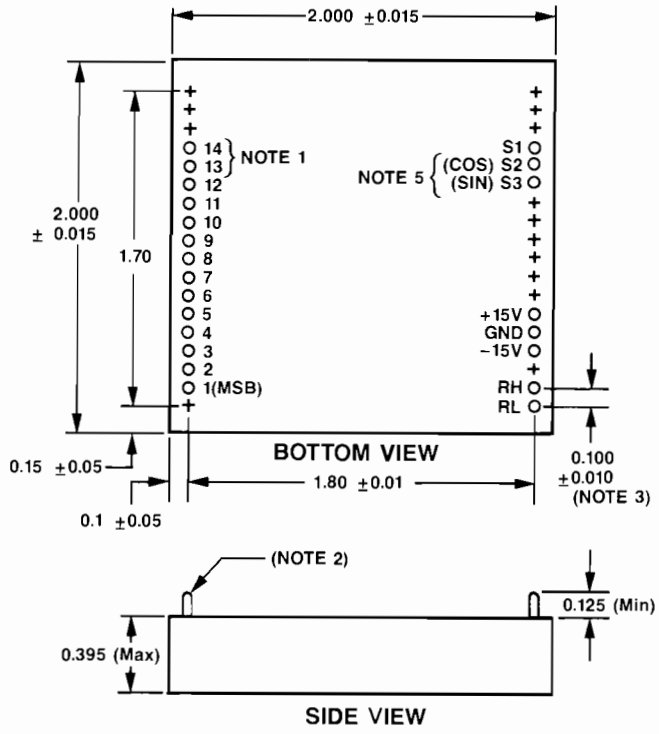
1. Accuracy applies for:
   (a) ±10% variation in power supply voltages
   (b) ±10% reference amplitude variation
   (c) 10% reference harmonic distortion
   (d) any balanced load no load to full load
   (e) over operating temperature range
2. Signals shall not be applied to digital inputs while the device power supply is off. Digital input levels should not go below ground or exceed +5V.
3. Synchro outputs are active operational amplifiers. Do not ground any stator output.
4. Reference input is solid-state differential. Common mode voltages up to specified input voltage have no effect on operation.

ORDERING INFORMATION

292A SUFFIX	OUTPUT VOLTAGE	REFERENCE INPUT	OUTPUT TYPE
X00	11.8V	26V	SYNC
X01	11.8V	115V	SYNC
X02	6.0V	26V	RSVR
X03	6.0V	115V	RSVR

X in part number determines resolution
X = 7 for 14-bit converter
X = 8 for 12-bit converter

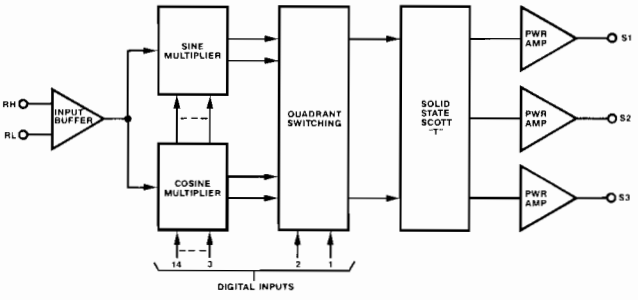
MECHANICAL OUTLINE



NOTES:

1. Pins 13 and 14 deleted in 12 bit models.
2. Rigid 0.025 diameter pins suitable for solder-in or plug-in applications.
3. Non-cumulative.
4. Dimensions are in inches.
5. SIN and COS designation used on resolver models

BLOCK DIAGRAM



WARRANTY

All units warranteed against defects in materials and workmanship for 1 year from date of shipment. Liability is expressly limited to servicing, adjusting, or replacing any CSI product returned to our factory with delivery charges prepaid. In no case shall our liability exceed the original purchase price.

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