

**CSI****synchro/resolver to digital converter  
bcd tracking 3 and 4 decade****series 168E700/168E600****FEATURES**

- Low Power consumption
- Broadband 50 to 1200 Hz
- True Type II tracking converter
- Industry standard pin-out
- 1000% overvoltage protection
- Insensitive to amplitude and frequency variations

**APPLICATIONS**

Radar Tracking Systems —  
Navigation Systems —  
Industrial Control Systems —  
Collision Avoidance Systems

**GENERAL DATA**

The series 168E600 and 168E700 are a second generation of low power, high performance synchro/resolver to BCD tracking converters. Units feature typical power consumption of 1 watt compared to 3.75 watts for older designs. Inputs may be 3-wire synchro or 4-wire resolver with 3 to 130 Vrms line-to-line, 50 to 1200 Hz. Only +15V and +5V power are required. Outputs are positive true logic with a range of 0 to 359.9° or 0 to  $\pm 180.0^\circ$ . Since the converters are true Type II servo loop devices, the analog synchro/resolver input angle is accurately and continuously converted into a BCD output angle with no velocity errors and only minor acceleration errors.

**ELECTRICAL SPECIFICATIONS**

Parameter	Value	
	168E600	168E700
<b>Resolution</b>	0.1°	1.0°
<b>Accuracy<sup>(1)</sup></b>	$\pm 6$ minutes $\pm 0.9$ LSB	1.0 degree $\pm 0.5$ LSB
<b>Synchro Input Rates</b>		
Maximum Tracking	10 rps	10 rps
Acceleration $K_A$	2000 sec <sup>-2</sup>	2000 sec <sup>-2</sup>
<b>Power Supplies<sup>(2)</sup></b>	Max Typ	Max Typ
	(mA)	(mA)
+15V	50 45	50 45
+ 5V	75 65	75 65
<b>Digital Outputs<sup>(3)</sup></b>		
Parallel Angle		
Unipolar	4-decade BCD	3-decade BCD
Bipolar <sup>(4)</sup>	4-decade BCD	3-decade BCD
	+ sign	+ sign
Converter Busy <sup>(4)</sup>	2-microsecond positive pulse	

**ELECTRICAL SPECIFICATIONS (continued)**

Parameter	Value
<b>Inhibit Input<sup>(5)</sup></b>	Logic '0' = INH
<b>Synchro/Resolver Inputs<sup>(6)</sup></b>	11.8 Vrms L-L @ 100 Kohms 90 Vrms L-L @ 600 Kohms 10-130 Vrms, 50-1200 Hz @ 400 Kohms
<b>Reference Input<sup>(6)</sup></b>	
<b>Temperature Range</b>	
Operating	0° to 70°C
Storage	-55° to +125°C
<b>Dimensions</b>	2.62" x 3.12" x 0.8"
<b>Weight</b>	7.5 oz.

**NOTES:**

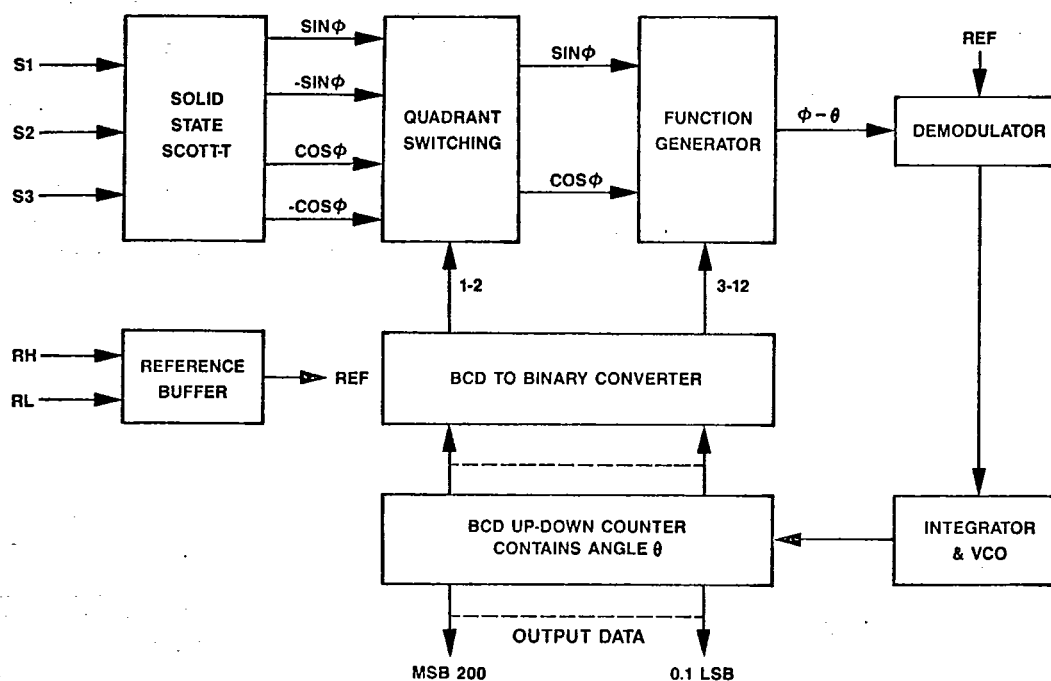
- Accuracy applies for:
  - $\pm 10\%$  signal amplitude variations
  - 25% harmonic distortion
  - over power supply range
  - over operating temperature range
- Voltage tolerances are  $\pm 10\%$  for +15V and  $\pm 5\%$  for +5V.
- Fan-out 3 TTL loads.
- Sign bit; logic '0' = (+), logic '1' = (-).
- Fan-in 2 LSTTL loads.
- Solid-state input, any one stator and/or rotor line may be grounded. Common mode voltages up to specified L-L voltage have no effect on operation.

## TIMING

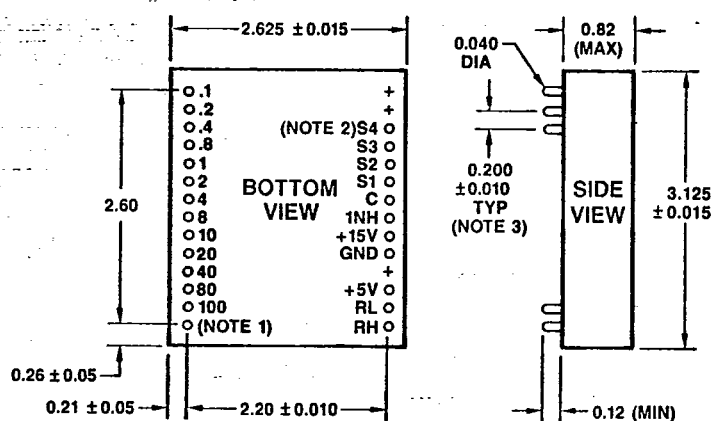
Whenever an input angle change occurs, the converter changes the digital angle in steps of 1 LSB and generates a converter busy pulse. During the 2-microsecond converter busy pulse, the output data is changing and should not be transferred. The converter will ignore an inhibit command applied during the converter busy interval. Because the converter is a "tracking" type and the outputs are not buffered, the inhibit line should not be pulled low (logic '0') in excess of 10 microseconds.

There are two methods of interfacing with a computer: (1) synchronously, and (2) asynchronously. A simple method of synchronously loading is to: (a) apply the inhibit, (b) wait 5 microseconds, (c) transfer the data, and (d) release the inhibit. Asynchronous loading is accomplished by transferring data on the trailing edge of the converter busy pulse.

## BLOCK DIAGRAM



## MECHANICAL OUTLINE



## NOTES:

1. 200 on unipolar converter. SIGN on bipolar converter.
2. S4 pin appears on multiple and resolver input models only.
3. Noncumulative.
4. Weight 7.5 oz.

## ORDERING INFORMATION

168E SUFFIX	INPUT TYPE	L-L VOLTAGE	FULL SCALE OUTPUT
X00	SYNC	11.8V	0 - 359.9°
X01	SYNC	90V	0 - 359.9°
X02	SYNC	11.8V	0 - ± 180.0°
X03	SYNC	90V	0 - ± 180.0°
X04	RSVR	11.8V	0 - 359.9°
X05	RSVR	90V	0 - 359.9°
X06	RSVR	11.8V	1 - ± 180.0°
X07	RSVR	90V	0 - ± 180.0°

X in part number determines resolution

X = 6 for 4 decade BCD

X = 7 for 3 decade BCD

## WARRANTY

All units warranted against defects in materials and workmanship for 1 year from date of shipment. Liability is 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.