Modules
Subsystems

ANALOG DEVICES

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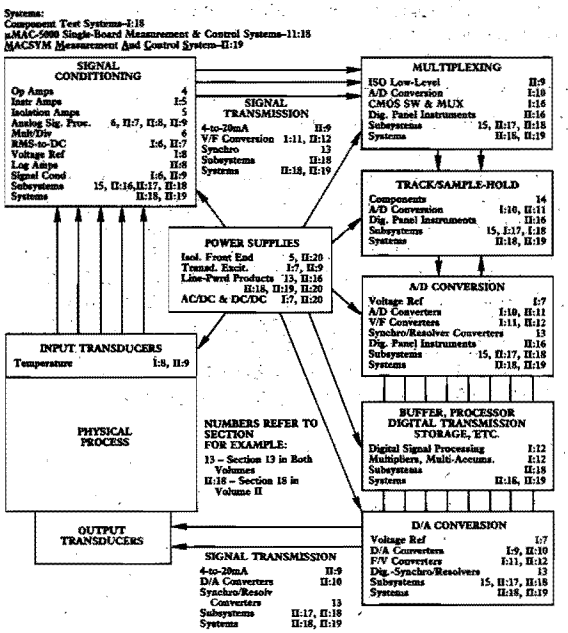
DATA-ACQUISITION DATABOOK 1984

VOLUME II
MODULES-SUBSYSTEMS

PICTORIAL GUIDE TO PRODUCT CATEGORIES



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VOLUME II
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Products in this book may be covered by one or more of the following patents. Additional patents are pending. See individual data sheets for further information:

U.S.: 3,007,114, 3,278,736, 3,355,670, 3,441,913, 3,467,908, 3,500,218, 3,530,390, 3,533,002, 3,685,045, 3,729,660, 3,747,088, 3,793,563, 3,803,590, 3,842,412, 3,868,583, 3,872,466, 3,887,863, 3,890,611, 3,906,486, 3,909,908, 3,932,863, 3,940,760, 3,942,173, 3,946,324, 3,950,603, 3,961,326, 3,978,473, 3,979,688, 4,016,559, 4,020,486, 4,029,974, 4,034,366, 4,054,829, 4,092,698, 4,123,698, 4,136,349, 4,141,004, 4,213,806, 4,250,445, 4,270,118, 4,268,759, 4,286,225, 4,309,693, 4,313,083, 4,323,795, 4,338,591, 4,349,811, 4,363,024, 4,374,314, 4,383,222, 4,395,647, 4,399, 345, 4,400,689, 4,400,690, DES 233,909. U.K.: 964,513, 1,310,591, 1,310,592, 1,364,233, 1,470,673, 1,470,674, 1,537,542, 1,531,931, 1,571,869, 1,590,136, 1,590,137, 1,599,538, 2,008,876, 2,012,135, 2,032,659, 2,040,087, 2,050,740, 2,081,040. France: 70.10561, 71.28952, 74.25263, 75-27557, 76 01788, 76 08238, 77 20799, 79 24021, 80 00960, 111 833. West Germany: 20 14 034, 21 39 560, MR 9379. Italy: 933,798. Japan: 452,263, 1,092,928, 1,101,824, 1,180,463. Canada: 984,015, 1,006,236, 1,025,558, 1,035,464, 1,054,248, 1,141,034, 1,141,820, 1,143,306, 1,150,414, 1,153,607, 1,157,571. Sweden: 7603320-8.

ANALOG DEVICES

Low Profile Synchro/Resolver-to-Digital Converter

SDC1700/1702/1704 SERIES

FEATURES

- Internal Microtransformers for 60Hz, 400Hz and 2.6kHz References
- Low Profile (0.4")
- 10-, 12- or 14-Bit Resolution for 360°
- High Tracking Rates (75 revs/sec)
- Voltage Scaling with External Resistors (Unique Feature)
- DC Voltage Output Proportional to Angular Velocity
- Low Cost
- Lightweight 3oz. (85 grams)
- MIL Spec/Hi Rel Options Available

APPLICATIONS

- Servo Mechanisms
- Retransmission Systems
- Coordinate Conversion
- Antenna Monitoring
- Simulation
- Industrial Controls
- Fire Control Systems
- Machine Tool Control Systems

GENERAL DESCRIPTION

The SDC1700, SDC1702 and SDC1704 are modular, continuous tracking Synchro/Resolver-to-Digital Converters which employ a type 2 servo loop.

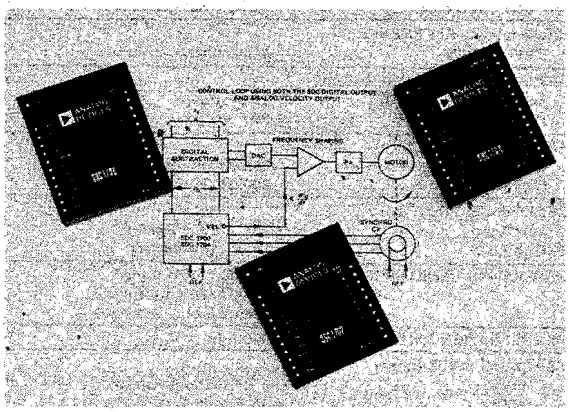
They are intended for use in both Industrial and Military applications.

The input signals can be either 3 wire synchro plus reference or 4 wire resolver plus reference, depending on the option. The outputs will be presented in TTL compatible, parallel natural binary.

One of the outstanding features of the converters is the use of precision Scott T and reference microtransformers. *This has made it possible to include the transformers within the module, even on the 60Hz option, and yet still maintain the profile height of 0.4".*

Particular attention has been paid in the design, to achieving the highest tracking rates and accelerations possible, compatible with the resolution and carrier frequency used, while at the same time obtaining a high overall accuracy.

When SDC's are used in control loops, it is often useful to have a voltage which is proportional to angular velocity. This voltage is available and has been brought out on all the SDC1700 converters.



Extended temperature range versions of all the converters are available.

MODELS AVAILABLE

The three Synchro-to-Digital Converters described in this data sheet differ primarily in the areas of resolution, accuracy and dynamic performance as follows:

Model SDC1702XYZ is a 10-bit converter which has an overall accuracy of ±22 arc-minutes and a resolution of 21 arc-minutes.

Model SDC1700XYZ is a 12-bit converter with an overall accuracy of ±8.5 arc-minutes and a resolution of 5.3 arc-minutes.

Model SDC1704XYZ is a 14-bit converter with an overall accuracy of ±2.2 arc-minutes ±1LSB and a resolution of 1.3 arc-minutes.

The XYZ code defines the option thus: (X) signifies the operating temperature range, (Y) signifies the reference frequency, (Z) signifies the input voltage and range, and whether it will accept synchro or resolver format.

More information about the option code is given under the heading of "Ordering Information".

NOTE
For all the standard options, no external transformers are needed with these converters.

SPECIFICATIONS (typical @ +25°C unless otherwise noted)

MODELS	SDC1702	SDC1700	SDC1704
ACCURACY[1] (max error)			
60Hz	±22 arc-minutes	±8.5 arc-minutes	±2.9 arc-minutes ±1LSB
400Hz	±22 arc-minutes	±8.5 arc-minutes	±2.2 arc-minutes ±1LSB
2.6kHz	±22 arc-minutes	±8.5 arc-minutes	±2.9 arc-minutes ±1LSB
RESOLUTION	10 Bits (1LSB = 21 arc-mins)	12 Bits (1LSB = 5.3 arc-mins)	14 Bits (1LSB = 1.3 arc-mins)
OUTPUT (In Parallel)	10 Bits (Natural Binary)	12 Bits (Natural Binary)	14 Bits (Natural Binary)
SIGNAL AND REFERENCE FREQUENCY	60Hz, 400Hz, 2.6kHz	*	*
SIGNAL VOLTAGE (Line-to-Line)			
Low Level	11.8V rms	*	*
High Level	90V rms	*	*
SIGNAL IMPEDANCES			
Low Level	26kΩ (Resistive)	*	*
High Level	200kΩ (Resistive)	*	*
REFERENCE VOLTAGE			
Low Level	26V (11.8V Signal)	*	*
High Level	115V (90V Signal)	*	*
REFERENCE IMPEDANCE	270kΩ (115V Signal)	*	*
	56kΩ (26V Reference)	*	*
	(Impedance is Resistive)	*	*
TRANSFORMER ISOLATION	500V dc	*	*
TRACKING RATE (min)			
60Hz	5 Revolutions Per Second	*	500°/sec
400Hz	36 Revolutions Per Second	*	12 Revolutions Per Second
2.6kHz	75 Revolutions Per Second	*	25 Revolutions Per Second
Accel.[1] Constant K_a			
60Hz	1880/sec²	*	520/sec²
400Hz	110,000/sec²	*	36,000/sec²
2.6kHz	518,000/sec²	*	170,000/sec²
STEP RESPONSE (179° Step) (For 1LSB Error)			
60Hz	1.5sec	*	*
400Hz	125ms	*	*
2.6kHz	50ms	*	*
POWER LINES	±15V @ 25mA, +5V @ 70mA ±5%	*	±15V @ 30mA, +5V @ 85mA ±5%
POWER DISSIPATION	1.1 Watts	*	1.3 Watts
DATA LOGIC OUTPUT[2] (TTL Compatible)	2TTL Loads SDC17026YZ 4TTL Loads SDC17025YZ	2TTL Loads SDC17006YZ 4TTL Loads SDC17005YZ	2TTL Loads on All Options
BUSY LOGIC OUTPUT, POSITIVE PULSE (1 TTL Load)			
60Hz	9.0µs ±30%	*	9.0µs ±30%
400Hz	2.0µs ±30%	*	2.0µs ±30%
2.6kHz	2.0µs ±30%	*	1.3µs ±30%
MAX DATA TRANSFER TIME			
60Hz	40µs	*	35µs
400Hz	5.0µs	*	3.0µs
2.6kHz	1.8µs	*	0.8µs
INHIBIT INPUT (To Inhibit)	Logic "0" 1 TTL Load	*	Logic "0" 2 TTL Loads
WARM UP TIME	1 sec to Rated Accuracy	*	*
TEMPERATURE RANGE			
Operating	0 to +70°C Standard	*	*
	-55°C to +105°C Extended	*	*
Storage	-55°C to +125°C	*	*
DIMENSIONS	3.125" x 2.625" x 0.4" (79.4 x 66.7 x 10.2mm)	*	*
WEIGHT	3 ozs. (85 grams)	*	*

NOTES
*Specifications same as SDC1702.
[1] Specified over the appropriate operating temperature range of the option and for: (a) ±10% signal and reference amplitude variation (b) 10% signal and reference Harmonic Distortion (c) ±5% power supply variation (d) ±10% variation in reference frequency.
[2] It is recommended that buffers should be used if the above converters are required to drive over a distance greater than 6".

Specifications subject to change without notice.

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