DDC
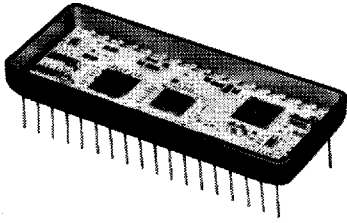## ILC DATA DEVICE CORPORATION®

HSDC-8915 MONOBRID® SERIES*

14 BIT MONOLITHIC HYBRID S/D AND R/D TRACKING CONVERTERS

FULL DATA SHEET AVAILABLE

FEATURES

- *10 RPS TRACKING*

- *LOW POWER:*
  150 mW, Typical

- *ACCURACY:*
  ±4 minutes ±0.9 LSB standard
  ±2.6 minutes high accuracy option

- *3-STATE LATCHED OUTPUTS FOR MICROPROCESSOR DATA BUS*

- *USABLE AS CONTROL TRANSFORMER (CT)*

- *INHIBIT DOES NOT INTERRUPT TRACKING*

- *LOGIC:*
  TTL and CMOS compatible 14 bit parallel binary angle Converter Busy and Inhibit Enable lines for 3-state output

DESCRIPTION

The HSDC-8915 Monobrid® Series is the first complete 14-bit synchro-to-digital or resolver-to-digital converter contained in a single hybrid module. Most of its circuitry has been incorporated into a custom designed monolithic chip, thereby greatly reducing parts count inside the hybrid. The Monobrid combination of monolithic and hybrid technologies allows a more sophisticated design with better performance and additional features to fit inside a standard 36 pin DDIP hybrid package. Power consumption is reduced, reliability is increased, and costs are lower.

New features found in the HSDC-8915 Series are 3-state output in two bytes, and a transparent latch which allows the converter to keep tracking even while an Inhibit is being applied. Innovative features found in other recent DDC hybrid converters are also included, such as a ±2.6 minute high accuracy option, analog velocity signal, error voltage outputs, solid state signal and reference isolation, broadband input, and accommodation to non-standard line-to-line voltage levels.

The HSDC-8915 Series is available in two accuracy grades: ±4 minutes ±0.9 LSB and ±2.6 minutes. The accuracy is not affected by carrier amplitude variation because the conversion is ratiometric. Phase sensitive detection in the error loop rejects quadrature and noise. Adjustments and calibration are never required.

The HSDC-8915 Series accepts broadband inputs: 360 to 1000 Hz or 47 to 1000 Hz. Two kinds of input signal isolation are available: internal differential solid state input with high common mode rejection, and transformer isolation with external transformers. Output angle is natural binary code, parallel positive logic, and TTL/CMOS compatible. Synchronization to a computer is complete via a Converter Busy output and an Inhibit input.

Only one main power supply is required. Its +15V DC nominal level can range from +11 to +16.5 volts with no degradation in performance. The HSDC-8915 is also connected to the external logic power supply. Internal logic is CMOS, and all logic inputs and outputs are buffered to the external logic level. TTL or any external CMOS logic level between +4.5V and the +15V supply level can be accommodated.

APPLICATIONS

With three-state output and an Inhibit that does not stop the tracking process, HSDC-8915 Series converters are especially suited for bus multiplexing and interfacing with microprocessors. These converters are ideal for remotely located and hard to access equipment where low power requirements, small size, and high MTBF are critical. All units are processed to MIL-STD-883. They are well suited to the most stringent and severe industrial or military and avionics applications. In conjunction with other devices, they are easily adapted for closed loop control.

Designed for printed circuit board mounting by standard techniques, the HSDC-8915 Series can be readily incorporated into other equipment by the OEM user. Because of their low cost, they are competitive with discrete S/D converters in many applications.

*Patented

Note: Monobrid® is a registered trademark of ILC Data Device Corporation.

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RELIABILITY

MTBF values are very high because the use of custom monolithics greatly decreases the number of active components, because thin film resistor networks are used, and because of careful thermal design. Summaries of MTBF calculations and susceptibility information are available on request.

ORDERING INFORMATION

1. Converters may be ordered as follows.

HSDC - 8915 —1 —a —883B

Reliability Grade:
- 883B = Fully compliant with MIL-STD-883
- B = Screened to MIL-STD-883 but without QCI testing.
- Blank = Standard DDC procedures.

Accuracy:
- Blank = ±4 minutes ±0.9 LSB (Standard)
- a = ±2.6 minutes max. (High Accuracy)

Operating Temperature Range:
- 1 = —55"C to +125˚C
- 3 = 0˚C to +70˚C

Input Type:
Voltage Follower Buffer (requires external signal conditioner such as an isolation transformer):
- 8915 = 400 Hz
- 8916 = 60 Hz

Solid State Synchro (direct input):
- 8917 = 400 Hz, 11.8V L-L
- 8918 = 400 Hz, 90V L-L
- 8919 = 60 Hz, 90V L-L

Solid State Resolver (direct input):
- 8920 = 400 Hz, 11.8V L-L
- 8921 = 400 Hz, 26V L-L
- 8922 = 400 Hz, 90V L-L

2. Reference and signal transformers for the voltage follower buffer input converters must be ordered separately as follows:

Type	Frequency	Ref. Voltage	L-L Voltage	Part Numbers	
				Ref. Xfmr.	Signal Xfmr.
Synchro	400 Hz	115V	90V	21049	21045*
Synchro	400 Hz	26V	11.8V	21049	21044*
Resolver	400 Hz	115V	90V	21049	21048*
Resolver	400 Hz	26V	26V	21049	21047*
Resolver	400 Hz	26V	11.8V	21049	21046*
Synchro†	60 Hz	115V	90V	24133-1	24126-1
				24133-3	24126-3

*The part number for each 400 Hz synchro or resolver isolation transformer includes two separate modules as shown in the outline drawings.

†60 Hz synchro transformers are available in two temperature ranges:
- 1 = —55˚C to +105˚C
- 3 = 0˚C to +70˚C

MECHANICAL OUTLINE
36 PIN DOUBLE DIP *

NOTES

1. Dimensions shown are in inches.
2. Lead identification numbers are for reference only.
3. Lead cluster shall be centered within ±0.10 of outline dimensions. Lead spacing dimensions apply only at seating plane.
4. Pin material meets solderability requirements of MIL-STD-202E, Method 208C.
5. Package is Kovar with electroless nickel plating.
6. Case is electrically floating.

*Flatpack available, consult factory.

At DDC's option, this part can be supplied in a ceramic package. See page 116 for ceramic mechanical outline.

PIN CONNECTION TABLE

PIN	FUNCTION			PIN	FUNCTION
	Solid St. Resolver	Solid St. Synchro	Volt. Fol. Buffer		
1	S1	S1	N.C.	19	RH (Ref. High)
2	S2	S2	COS	20	RL (Ref. Low)
3	S3	S3	SIN	21	N.C.
4	S4	N.C.	N.C.	22	E (Filtered DC Error Out)
5	Bit 1	MSB		23	θ (Analog Velocity Out)
6	Bit 2			24	CB (Converter Busy)
7	Bit 3			25	EN 7-14 (Enable, Bits 7 to 14)
8	Bit 4			26	EN 1-6 (Enable, Bits 1 to 6)
9	Bit 5			27	e (AC Error Out)
10	Bit 6			28	VL (Logic Voltage Input)
11	Bit 7			29	GND
12	Bit 8			30	S
13	Bit 9			31	Ge (Gain Control)
14	Bit 10			32	+15V (Power Supply In)
15	Bit 11			33	INH (Inhibit)
16	Bit 12			34	V (Internal DC Ref.)
17	Bit 13			35	BC (Buffered Cos)
18	Bit 14	LSB		36	BS (Buffered Sin)

NOTES

BS and BC pins are used in other applications.

D-ABR