3 Channel 14- & 16-Bit Tracking Synchro/Resolver-to-Digital Converters

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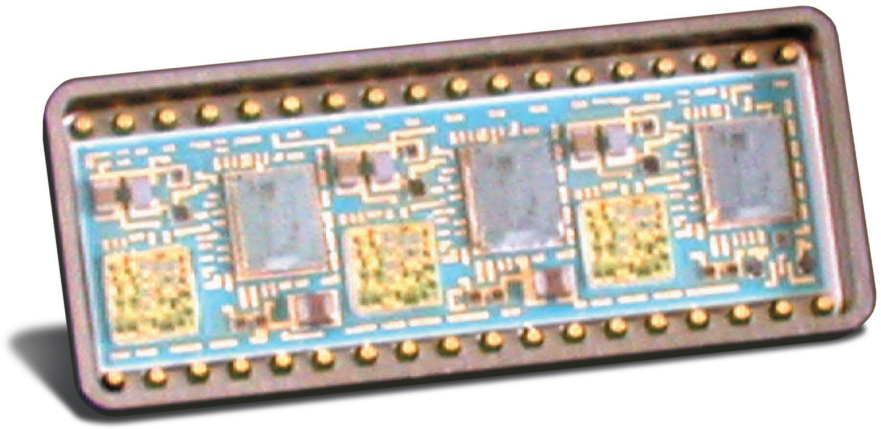
Data Sheet

Models: SDC-14610, SDC-14615



The SDC-14610/15 Series are small low cost three channel Synchro- or Resolver-to-Digital (S/R-D) converters. The three channels are independent tracking types but share digital output pins and a common reference

Applications

- Radar Antenna Positioning
- Navigation Systems
- Fire Control Systems
- Motor Control Applications
- Robotics

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As the world's largest supplier of Solid-State Power Controllers (SSPCs) and Remote Power Controllers (RPCs), DDC was the first to offer commercial and fully-qualified MIL-PRF-38534 and Class K Space-level screening for these products. SSPCs and RPCs replace traditional electromechanical relays and circuit breakers in power distribution and management systems, offering more accurate trip protection with solid-state perfomance. Highly reliable, these products are used in the Bradley Fighting Vehicles and M1A2 Abrams tank.

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DDC provides an assortment of high quality SSPC and RPC cards and components to meet your power switching and distribution needs. DDC's SSPCs and RPCs support real-time digital status reporting and computer control, and are equipped with instant trip, and true I^2T wire protection. We offer custom SSPC / RPC modules that are rated up to 300 amps, and multi-channel boards that are rated up to 25 amps per channel. Multi-channel boards that use this technology are excellent cost effective solutions, as the price per channel is significantly reduced.

Motor Drives and Controllers

DDC also has a wide assortment of quality hybrid motor drives and controllers, which will meet your movement and positioning needs. DDC supplies motor drive and controller components to fit a wide array for applications, including aircraft actuators for primary and secondary flight controls, jet or rocket engine thrust vector controls, missile flight controls, pumps, fans, solar arrays, and momentum wheel controls for space and satellite systems. Motor drives for space applications are rated up to 100k Rads for radiation hardness. We also offer custom motor controllers and motion control systems to satisfy specific requirements not addressed by standard products.

THREE CHANNEL 14- AND 16-BIT TRACKING S/R-D CONVERTERS

SDC-14610/15 DATA SHEET

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Revision	Date	Pages	Description
Rev N	8/2017	All	Updated to new format, S option removed.

1 PREFACE

This data sheet uses typographical conventions to assist the reader in understanding the content. This section will define the text formatting used in the rest of the data sheet.

1.1 Text Usage

- **BOLD**–indicates important information.
- `Courier New`–indicates code examples.
- <…> - indicates user-entered text or commands.

1.2 Special Handling and Cautions

The DSC-14610/15 uses state-of-the-art components, and proper care should be used to ensure that the device will not be damaged by Electrical Static Discharge (ESD), physical shock, or improper power surges and that precautions are taken to avoid electrocution.

Warnings: Turn off power to the computer hardware and unplug from wall.

NEVER insert or remove card with power turned on.

Ensure that standard ESD precautions are followed. As a minimum, one hand should be grounded to the power supply in order to equalize the static potential.

Do not store disks in environments exposed to excessive heat, magnetic fields or radiation.

1.3 Trademarks

All trademarks are the property of their respective owners.

1.4 What is included in this manual?

This data sheet contains a complete description of hardware installation and use.

1.5 Technical Support

In the event that problems arise beyond the scope of this manual, you can contact DDC by the following:

US Toll Free Technical Support:
1-800-DDC-5757, ext. 7771

Outside of the US Technical Support:
1-631-567-5600, ext. 7771

Fax:
1-631-567-5758 to the attention of SYNCHRO Applications

DDC Website:
www.ddc-web.com/ContactUs/TechSupport.aspx

Please note that the latest revisions of Software and Documentation are available for download at DDC's Web Site, www.ddc-web.com.

2 OVERVIEW

The SDC-14610/15 Series are small low cost three channel Synchro- or Resolver-to-Digital (S/R-D) converters. The SDC-14610 Series are fixed at 14 bits, the SDC-14615 at 16 bits. The three channels are independent tracking types but share digital output pins and a common reference.

The Velocity Output (VEL) from the SDC-14610/15 Series, which can be used to replace a tachometer, is a 4V signal referenced to ground with a linearity of 1% of output voltage.

A $\overline{\text{BIT}}$ output is optional and is a logic line that indicates LOS (Loss Of Signal) or excessive converter error. Due to pin limitations this option will exclude the velocity output. (See option “T”.)

SDC-14610/15 Series converters are available with operating temperature ranges of 0°C to +70°C and -55°C to +125°C, and MIL-PRF-38534 processing is available.

2.1 Features

- Fixed 14- or 16-Bit resolution
- Small size 36-Pin DDIP package
- Three independent converters
- Low cost per channel
- Velocity output eliminates tachometers
- Optional $\overline{\text{BIT}}$ output (LOS)
- High reliabaility single chip monolithic
- -55°C to +125°C operating temperature range
- MIL-PRF-38534 processing available

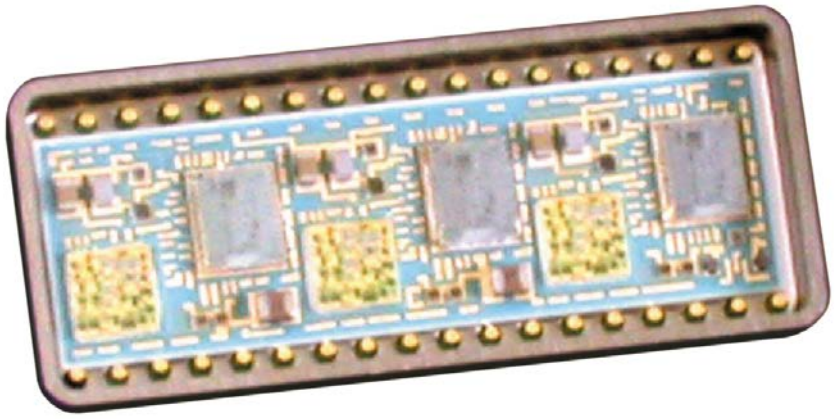


Figure 1. SDC-14610/15 Synchro/Resolver-to-Digital Converter

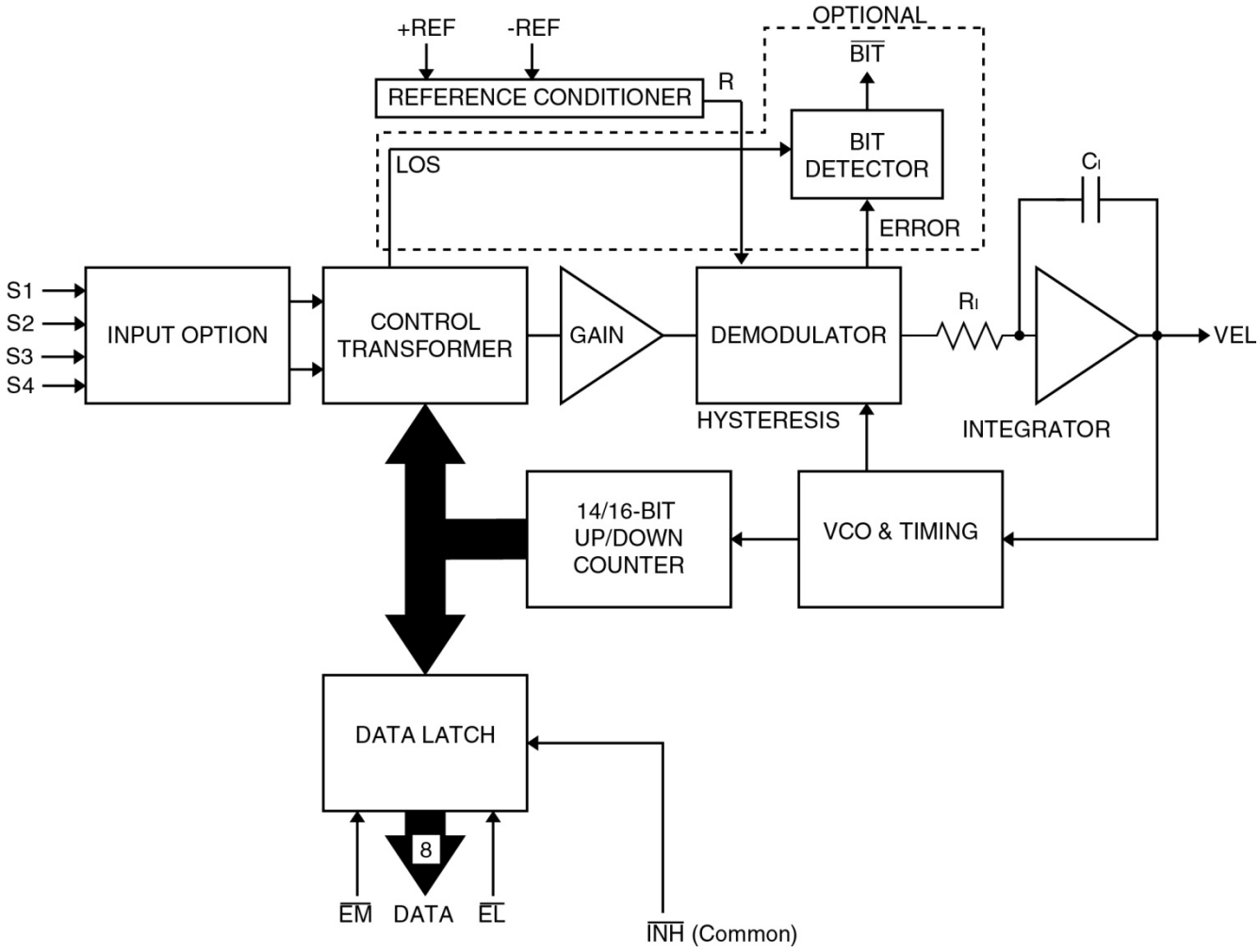


Figure 2. SDC-14610/15 Block Diagram

Table 1. DSC-14610/15 Specification Table

These specs apply over the rated power supply, temperature, and reference frequency ranges; 10% signal amplitude variation, and 10% harmonic distortion. (Values are for each channel unless stated otherwise.

PARAMETER	VALUE		UNITS
RESOLUTION	14	16	Bits
ACCURACY	4 +1 LSB	2 or 4 +1 LSB	Min
REPEATABILITY	1 max		LSB
DIFFERENTIAL LINEARITY	1 max		LSB
REFERNCE INPUT	**(+REF, -REF)**		
Type	**Common to all channels, Differential**		
	2 & 11.8V Units	**90V Unit**	
Voltage Range	2 – 35	10 – 130	Vrms
Frequency	360 – 5000	see note 1	Hz
Input Impedance			
Single Ended	60k	270k min	Ω
Differential	120k	540k min	Ω
Common-Mode Range	50	200, 300 transient	Vpeak
SIGNAL INPUT CHARACTERISTICS	**EACH CHANNEL**		
90V Synchro Input (L-L)			
Zin line-to-line	123k		Ω
Zin line-to-ground	80k		Ω
Common-Mode Voltage	180 max		V
11.8V Synchro Input (L-L)			
Zin line-to-line	52k		Ω
Zin line-to-ground	34k		Ω
Common-Mode Voltage	30 max		V
11.8V Resolver Input (L-L)			
Zin line-to-line	140k		Ω
Zin line-to-ground	70k		Ω
Common-Mode Voltage	30 max		V
2V Direct Input (L-L)			
Voltage Range	2 nom, 2.3 max		Vrms
Max Voltage No Damage	25 cont, 100pk transient		V
Input Impedance	20 M // 10pF min		Ω
DIGITAL INPUT/OUTPUT			
Logic Type	TTL/CMOS compatible		
Inputs	Logic 0 = 0.8V max		
	Logic 1 = 2.0V min		

Table 1. DSC-14610/15 Specification Table

These specs apply over the rated power supply, temperature, and reference frequency ranges; 10% signal amplitude variation, and 10% harmonic distortion. (Values are for each channel unless stated otherwise.

PARAMETER	VALUE				UNITS
DIGITAL INPUT/OUTPUT (con't)					
	Loading (per channel) = 10 µA				
	max P.U. current source to +5V // 5pF max				
	CMOS transient protected				
Inhibit ($\overline{INH}$) (common)	**EACH CHANNEL**				
	Logic 0 inhibits; Data stable within 0.5µs				
Enables Bits 1 to 8 ($\overline{EM}$)	Logic 0 enables; Data stable within 150ns				
Enables Bits 9 to 14 (16) ($\overline{EL}$)	Logic 1 = High Impendance				
	Data High Z within 100ns				
DIGITAL OUTPUT	**COMMON TO ALL CHANNELS**				
Parallel Data [1 – 14 (16)]	8 parallel lines; 2 bytes natural binary angle, positive logic				bits
Built-In-Test ($\overline{BIT}$) (optional)	Logic 0 = BIT condition ± LSBs of error with a filter of 500µs or LOS				
	EACH CHANNEL				
	50				pF
Drive Capability	Logic 0; 1 TTL loads; -0.4mA at 2.8V min				TTL
	Logic 0; 100mV max driving				TTL
	Logic 1; +5V supply minus 100mV min driving				CMOS
DYNAMIC CHARATERISTICS	**DEVICE TYPE**				
Each Channel	**60Hz**		**400Hz**		
Input Frequency	47-5k		360-5k		Hz
Bandwidth (Closed Loop)	15		103		Hz
Ka	830		53k		$1/s^2$
A1	0.17		1.33		1/s
A2	5k		40k		1/s
A	29		230		1/s
B	14.5		115		1/s
Resolution	**14**	**16**	**14**	**16**	bits
Tracking Rate					
Typical	1.25	0.31	10	2.5	rps
Minimum	1	0.25	8	2	rps
Acceleration (1LSB lag)	18	4.5	1160	290	deg/s^2
Setting Time (179° step max)	1100	2500	140	320	msec

Table 1. DSC-14610/15 Specification Table

These specs apply over the rated power supply, temperature, and reference frequency ranges; 10% signal amplitude variation, and 10% harmonic distortion. (Values are for each channel unless stated otherwise.

PARAMETER	VALUE		UNITS
VELOCITY CHARACTERISTICS	**EACH CHANNEL**		
Polarity	Positive for increasing angle		
Voltage Range (Full Scale)	4.5 typ	4 min	±V
Scale Factor	10 typ	20 max	±%
Scale Factor TC	100 typ	200 max	ppm/°C
Reversal Error	1 typ	2 max	±%
Linearity	0.5 typ	1 max	±%
Zero Offset	5 typ	10 max	mV
Zero Offset TC	15 typ	30 max	µV/°C
Load		20 max	kΩ
Noise	1 typ	2 max	(Vp/V)%
POWER SUPPLIES	**TOTAL DEVICE**		
Nominal Voltage	+5	-5	V
Voltage Range	5	10	±%
Max Volt, w/o Damage	+7	-7	V
Current (each supply)	36 typ, 51 max		mA
TEMPERATURE RANGE			
Operating			
-30x	0 to +70		°C
-10x	-55 to +125		°C
Storage	-65 to +150		°C
Junction-to-case	55		°C/W
JC Thermal Rise	+9 (note 2)		°C
Junction Temperature max	140		°C
PHYSICAL CHARACTERISTICS			
Size	1.70 x 0.78 x 0.21		in
	43.2 x 19.8 x 5.3		mm
Weight	0.66		oz
	1.87		g

Table 1 Notes:

1. 47 – 5k for 90V, 60Hz; 360 – 5k for 90V, 400Hz.
2. Applied to operating.temperature.

3 DETAILED ARCHITECTURE

3.1 Theory of Operation

The SDC-14610/15 Series of converters are based upon a single chip CMOS custom monolithic. They are implemented using the latest IC technology which merges precision analog circuitry with digital logic to form a complete high performance tracking resolver-to-digital converter.

Figure 2 is the Functional Block Diagram of the SDC-14610/15 Series. The converter operates with ±5VDC power supplies. Analog signals are referenced to analog ground, which is at ground potential. The converter is made up of three main sections; an input front-end, a converter, and a digital interface. The converter front-end differs for synchro, resolver and direct inputs. An electronic Scott-T is used for synchro inputs, a resolver conditioner for resolver inputs and a sine and cosine voltage follower for direct inputs. These amplifiers feed the high accuracy Control Transformer (CT). Its other input is the 14-bit digital angle f. Its output is an analog error angle, or difference angle, between the two inputs. The CT performs the ratiometric trigonometric computation of SINqCOSf - COSqSINf = SIN(q - f) using amplifiers, switches, logic and capacitors in precision ratios.

The converter accuracy is limited by the precision of the computing elements in the CT. In these converters, ratioed capacitors are used in the CT instead of more conventional precision ratioed resistors. Capacitors used as computing elements with op-amps need to be sampled to eliminate voltage drifting. Therefore, the circuits are sampled at a high rate to eliminate this drifting and at the same time to cancel out the op-amp offsets.

The error processing is performed using the industry standard technique for type II tracking R/D converters. The DC error is integrated yielding a velocity voltage which, in turn, drives a voltage controlled oscillator (VCO). This VCO is an incremental integrator (constant voltage input to position rate output) which, together with the velocity integrator, forms a type II servo feedback loop. A lead in the frequency response is introduced to stabilize the loop and another lag at higher frequency is introduced to reduce the gain and ripple at the carrier frequency and above.

3.2 Transfer Function and Bode Plot

The dynamic performance of the converter can be determined from its functional block diagram and its Bode plots (open and closed loop); these are shown in Figure 3.

The open loop transfer function is as follows:

$$\text{Open Loop Transfer Function} = \frac{A^2\left(\frac{S}{B}+1\right)}{S^2\left(\frac{S}{10B}+1\right)}$$

where A is the gain coefficient
and B is the frequency of lead compensation

The components of gain coefficient are error gradient, integrator gain, and VCO gain. These can be broken down as follows:

- Error Gradient = 0.011 volts per LSB (CT + Error Amp + Demod)

- Integrator Gain = $\frac{1}{R_i C_i}$ volts per second per volt

- VCO Gain = $\frac{1}{1.25\ R_v\ C_v}$ LSBs per second per volt

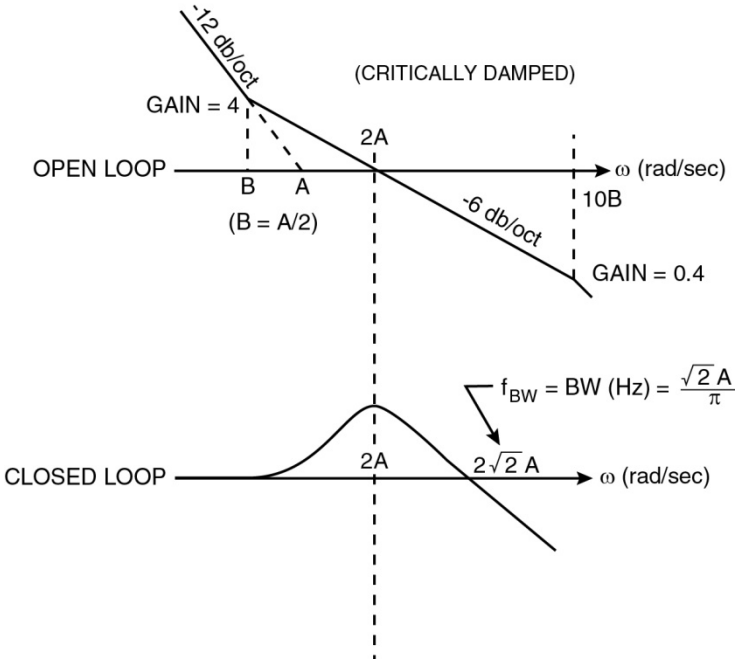


Figure 3. Bode Plots

3.3 General Setup Considerations

The following recommendations should be considered when connecting the SDC-14610/15 Series converters:

1. Power supplies are ±5VDC. For lowest noise performance it is recommended that a 0.1 µF or larger cap be connected from each supply to ground near the converter package.
2. Direct inputs are referenced to AGND.
3. Connect pin 5 (GND) to pin 6 (AGND) close to the hybrid.

3.4 Inhibit and Enable Timing

The Inhibit ($\overline{\text{INH}}$) signal is used to freeze the digital output angle in the transparent output data latch while data is being transferred. Application of an Inhibit signal does not interfere with the continuous tracking of the converter. As shown in Figure 4, angular output data is valid 500 nanoseconds maximum after the application of the low-going inhibit pulse.

Output angle data is enabled onto the tri-state data bus in six bytes. The Enable MSB ($\overline{\text{EM}}$ -A, $\overline{\text{EM}}$ -B, or $\overline{\text{EM}}$ -C) is used for the most significant 8 bits and Enable LSB ($\overline{\text{EL}}$ -A, $\overline{\text{EL}}$ -B, or $\overline{\text{EL}}$ -C) is used for the least significant bits. As shown in Figure 5, output data is valid 150 nanoseconds maximum after the application of a low-going enable pulse. The tri-state data bus returns to the high impedance state 100 nanoseconds maximum after the rising edge of the enable signal.

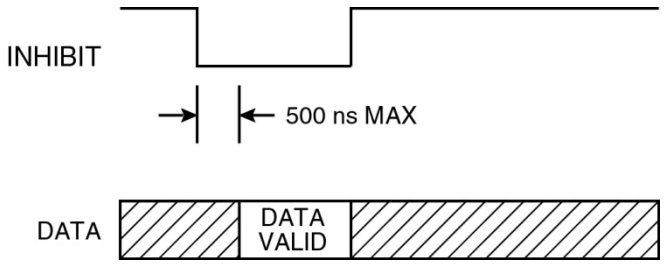


Figure 4. Inhibit Timing

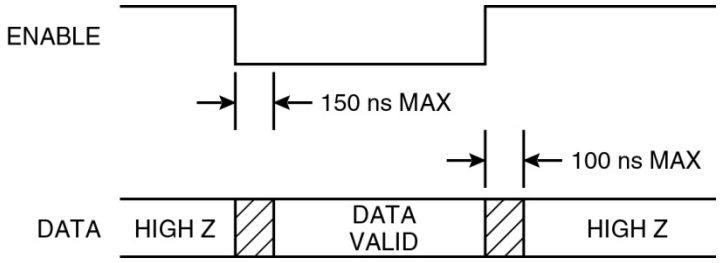


Figure 5. Enable Timing

3.5 $\overline{\text{BIT}}$, Built-In-Test (T option)

This output is a logic line that will flag an internal fault condition, or LOS (Loss-Of-Signal). The internal fault detector monitors the internal error and, when it exceeds ±100 LSBs, will set the line to a logic 0; this condition will occur during a large-step input and will reset to a logic 1 after the converter settles out. (The error voltage is filtered with a 500 µs filter) $\overline{\text{BIT}}$ will set for an overvelocity condition because the converter loop can't maintain input/output sync. $\overline{\text{BIT}}$ will also be set if a total LOS (loss of all signals) occurs.

3.6 No False 180° Hangup

This feature eliminates the "false 180° reading" during instantaneous 180° step changes; this condition most often occurs when the input is "electronically switched" from a digital-to-synchro converter. If the "MSB" (or 180° bit) is "toggled" on and off, a converter without the "false 180° reading" feature may fail to respond.

The condition is artificial, as a "real" synchro or resolver cannot change its output 180° instantaneously. The condition is most often noticed during wraparound verification tests, simulations, or troubleshooting.

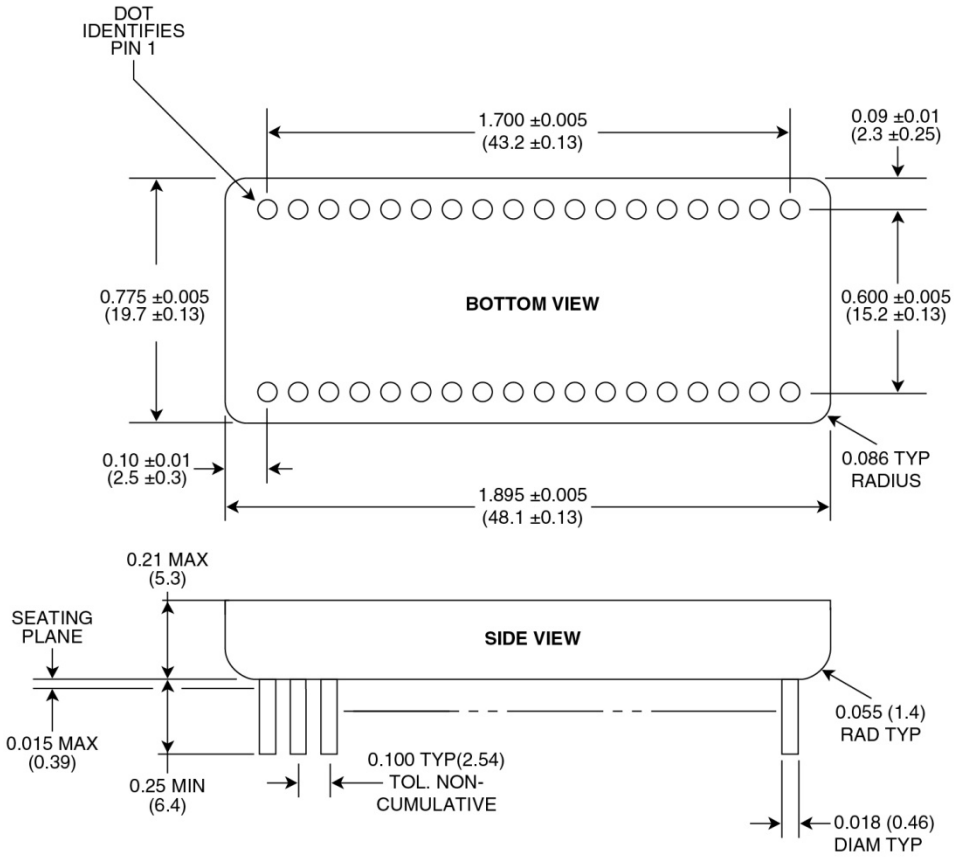
3.7 Pinout

Table 2. Pinouts (36 Pin)

Pin	Description			Pin	Description
	Synchro	Resolver	Direct (note 5)		
1	S1A	S1A	N.C.	19	$\overline{EM}$ -C (Enable MSBs)
2	S2A	S2A	+COSA	20	$\overline{EL}$ -C (Enable LSBs)
3	S3A	S3A	+SINA	21	VEL C (Velocity Output) (note 1)
4	N.C.	S4A	N.C.	22	Bit 1/Bit 9
5	GND (Ground) (note 3)			23	Bit 2/Bit 10
6	AGND (Analog Ground) (note 3)			24	Bit 3/Bit 11
7	S1B	S1B	N.C.	25	Bit 4/Bit 12
8	S2B	S2B	+COSB	26	Bit 5/Bit 13
9	S3B	S3B	+SINB	27	Bit 6/Bit 14
10	N.C.	S4B	N.C.	28	Bit 7/Bit 15 (note 2)
11	-5V (Power Supply)			29	Bit 8/Bit 16 (note 2)
12	+5V (Power Supply)			30	$\overline{EL}$ -B (Enable LSBs)
13	S1C	S1C	N.C.	31	$\overline{EM}$ -A (Enable MSBs)
14	S2C	S2C	+COSC	32	VEL B (Velocity Output) (note 1)
15	S3C	S3C	+SINC	33	$\overline{INH}$ (Inhibit)
16	N.C.	S4C	N.C.	34	$\overline{EL}$ -A (Enable LSBs)
17	-REF (-Refernce Input)			35	$\overline{EM}$ -A (Enable MSBs)
18	+REF (+Refernce Input)			36	VEL A (Velocity Output) (note 1)

Table 2 notes:

1. Replaced with BIT – T option
2. SDC-14615 Series only
3. Connect pin 5 (GND) to pin 6 (AGND) close to the hybrid
4. (MSB = Bit 1) (LSB = Bit 14 or 16 depending on resolution set)
5. Digital = 2V Resolver Direct



Notes:
1. Dimensions are in inches (millimeters).
2. Lead identification numbers are for reference only.
3. Lead clusters shall be centered withing ±0.01 of outline dimensions. Lead spacing dimensions. Lead spacing dimesions apply only at seating plane.
4. Pin material meets solderability requirements to MIL-STD-202E, Method 208C.
5. Case is electrically floating.

Figure 6. SDC-14610/15 Mechanical Outline

4 ORDERING INFORMATION

SDC-1461X X-X X X X

Supplemental Process Requirements:
- **S** = Pre-cap source inspection
- **L** = 100% pull test
- **Q** = 100% pull test & pre-cap source insepection
- **K** = One lot date code
- **W** = One lot date code & pre-cap source inspection
- **Y** = One lot date code & 100% pull test
- **Z** = One lot date code, pre-cap source inspection, & 100% pull test
- **Blank** = None of the above

Accuracy: (note 4)
- **2** = 4 minutes + 1LSB
- **4** = 2 minutes + 1LSB (not available with 14-bits)

Process Requirements: (note 2 unless stated otherwise)
- **0** = Standard DDC Processing, no burn-in (Table 3)
- **1** = MIL-PRF-38534 compliant
- **2** = B (note 1)
- **3** = MIL-PRF-38534 compliant w/ PIND testing
- **4** = MIL-PRF-38534 compliant w/Solder Dip
- **5** = MIL-PRF-38534 compliant w/PIND testing & Solder Dip
- **6** = B with PIND testing (note 1)
- **7** = B with PIND testing and Solder Dip
- **8** = B with PIND testing and Solder Dip
- **9** = Standard DDC Processing w/Solder Dip, no burn-in (Table 3)

Temperature Grade/Data Requirements:
- **1** = -55°C to +125°C
- **2** = -40°C to +85°C
- **3** = 0°C to +70°C
- **4** = -55°C to +125°C with Variables Test Data
- **5** = -40°C to +85°C with Variables Test Data
- **8** = 0°C to +70°C with Variables Test Data

Option:
- **Blank** = Standard Velocity Output (VEL)
- **T** = Built-in-Test Output (LOS), instead of VEL

Input Option:
- **0** = 11.8V, Synchro,14-bit, 400Hz
- **1** = 11.8V, Resolver, 14-bit, 400Hz
- **2** = 90V, Synchro, 14-bit, 400Hz
- **3** = 2V, Direct, 14-bit, 400Hz
- **4** = 90V, Synchro, 14-bit, 60Hz
- **5** = 11.8V, Synchro,16-bit, 400Hz
- **6** = 11.8V, Resolver, 16-bit, 400Hz
- **7** = 90V, Synchro, 16-bit, 400Hz
- **8** = 2V, Direct, 16-bit, 400Hz
- **9** = 90V, Synchro, 16-bit, 60Hz

Notes:

1. Standard DDC Processing with burn-in and full temperature test – see Table 3.
2. MIL-PRF-38534 product grading is designated with the following dash numbers:
   Class H is a-11X, 13X, 14X, 15X, 41X, 43X, 44X, 45X
   Class G is a -21X, 23X, 24X, 25X, 51X, 53X, 54X, 55X
   Class D is a -31X, 33X, 34X, 35X, 81X, 83X, 84X, 85X
3. These products contain tin-lead solder finish as applicable to solder dip requirements. Contact factory for custom Flat-Pack requests.
4. Contact factory for 1 minute custom part requirements.

Table 3. Standard DDC Processing for Hybrid and Monolithic Hermetic Products

TEST	MIL-STD-883	
	Method(s)	Condition(s)
Inspection	2009, 2010, 2017, and 2032	—
Seal	1014	A and C
Temperature Cycle	1010	C
Constant Acceleration	2001	3000g
Burn-in	1015 (note 1), 1030 (note 2)	Table 1

Notes:

1. For process requirements “B” (refer to ordering information), devices may be non-compliant with MIL-STD-883, Test Method 1015, Paragraph 3.2. Contact factory for details.
2. When applicable.

Data Device Corporation

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Data Device Corporation (DDC) is a world leader in the design and manufacture of high-reliability Connectivity, Power and Control solutions (Data Networking; Power Distribution, Control and Conversion; Motor Control and Motion Feedback) for aerospace, defense, space, and industrial applications. With awards for quality, delivery and support, DDC has served these industries as a trusted resource for more than 50 years... providing proven solutions optimized for efficiency, reliability, and performance. Data Device Corporation brands include DDC, Beta Transformer Technology Corporation, National Hybrid Inc., North Hills Signal Processing Corporation, Pascall Electronics Ltd., and XCEL Power Systems Ltd. DDC is headquartered in Bohemia, NY and has manufacturing operations in New York, California, Mexico, and the United Kingdom.

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XCEL Power Systems and Pascall Electronics are divisions of DDC Electronics, Ltd., a subsidiary of Data Device Corporation. DDC Electronics, Ltd. specializes in the design and manufacture of power supply solutions for extreme environments. With over 30 years of experience in the defense, aerospace and industrial sectors, DDC Electronics is a trusted source for complete solutions in the design, development and manufacture of electronic power conversion products – from single converters to complex multi- function conversion systems. DDC Electronics products are the first choice for power with In-Flight Entertainment & Connectivity (IFEC) and defense systems. There are more than 170,000 Pascall power supply units installed on commercial aircraft. XCEL and Pascall power supply units are in service with Ground, Air and Naval forces across the world, powering state of the art electronic systems, and trusted by industry leaders to deliver reliable proven performance in some of the most challenging environments to be found anywhere. DDC Electronics, Ltd. headquarters, along with the XCEL Power Systems design operations and the Pascall Electronics factory are located in the UK.

DDC Microelectronics, a division of Data Device Corporation and formerly the space microelectronics division of Maxwell Technologies, is a leading developer and manufacturer of innovative, cost-effective, space-qualified microelectronics solutions for satellites and spacecraft. DDC Microelectronics has provided space-qualified radiation-tolerant and radiation-shielded products, including semiconductors and single-board computers, to the space industry for more than two decades. DDC radiation mitigated power modules, memory modules, and single board computers incorporate powerful commercial silicon for superior performance and high reliability in space applications. DDC Microelectronics specializes in understanding the radiation performance of commercial semiconductors, qualifying selected components for use in space, integrating them with proprietary radiation mitigation technologies, and manufacturing and screening these products in a DLA approved MIL-PRF-38534 facility, located in southern California.

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Power

Power Supplies
DDC supplies highly customized power products to the aerospace, defense, maritime and satellite communications industries.

Solid-State Power Controllers
DDC's programmable solid-state power controllers provide simple and reliable power management for aerospace and defense systems.

Control

Motor Controllers and Drives
DDC is the world leader in high reliability torque, speed, and position controllers and drives engineered to operate in demanding environments.

Motion Feedback
DDC is the world leader in the design and manufacture of Synchro/Resolver-to-Digital and Digital-to-Synchro/Resolver converters.

Certifications

Data Device Corporation is ISO 9001:2008, AS 9100 Rev C, EN 9100, and JIS Q9100 certified. DDC has been granted certification by the Defense Logistics Agency, Land & Maritime (DLA) for manufacturing Class D, G, H, and K hybrid products in accordance with MIL-PRF-38534. Industry documents used to support DDC's certifications and Quality system are MIL-STD-883, ANSI/NCSL Z540-1, IPC-A-610, MIL-STD-202, JESD-22, and J-STD-020.

Beta Transformer Technology Corporation (BTTC) and its subsidiaries are ISO 9001:2008 and AS 9100 Rev C certified. BTTC has been granted certification as a qualified source of transformers by the Defense Logistics Agency, Land & Maritime (DLA) and is listed on the QPL for products MIL-PRF 21038/27-01 through -31 Product Levels C, M and T.

DDC Electronics, Ltd.'s XCEL Power Systems and Pascall Electronics manufacturing operations are ISO 9001:2008, AS 9100 Rev C, EN9100 and ISO 14001:2004 certified.

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