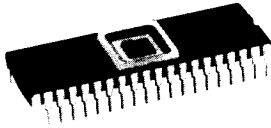


MONOLITHIC TRACKING RESOLVER (and LVDT) TO DIGITAL CONVERTERS



**SEE RDC-19220 FOR LATEST
 16 BIT DESIGN**

DESCRIPTION

The RDC-19210 Series are low cost versatile monolithic state-of-the-art Resolver (and LVDT) to Digital Converters. These single chip converters are available in small 40 pin DDIP, 28 pin DDIP, or 44 pin PLCC packages and offer programmable features such as resolution, bandwidth, and velocity output scaling.

Resolution programming allows selection of 10, 12, or 14 bits, with accuracies to 21 min, 8.5 min, and 5.3 min respectively. This feature combines the high tracking rate of a 10 bit converter with the precision and low speed velocity resolution of a 14 bit converter in one package.

The velocity output (VEL) from the RDC-19210 Series, which can be used to replace a tachometer, is a 4V signal referenced to

ground with a linearity of 0.75% of output voltage. The full scale value of VEL is set by the user with a single resistor.

RDC-19210 Series converters are available with operating temperature ranges of 0° to +70°C and -55° to +125°C, and military processing is available (consult factory).

APPLICATIONS

With its low cost, small size, high accuracy, and versatile performance, the RDC-19210 Series converters are ideal for use in modern high performance industrial and military control systems. Typical applications include motor control, radar antenna positioning, machine tool control, robotics, and process control.

FEATURES

- ONLY 5 EXTERNAL PASSIVE COMPONENTS
- PROGRAMMABLE:
 - Resolution 10, 12, or 14 bits
 - Bandwidth to 530 Hz
 - Tracking to 800 RPS
- RESOLVER AND LVDT INPUT MODES
- VELOCITY OUTPUT ELIMINATES TACHOMETER
- BUILT-IN-TEST (BIT) AND LOSS-OF-SIGNAL (LOS) OUTPUTS
- SMALL SIZE: 28 OR 40 PIN DDIP OR 44 PIN PLCC
- -55° TO +125°C OPERATING TEMPERATURE

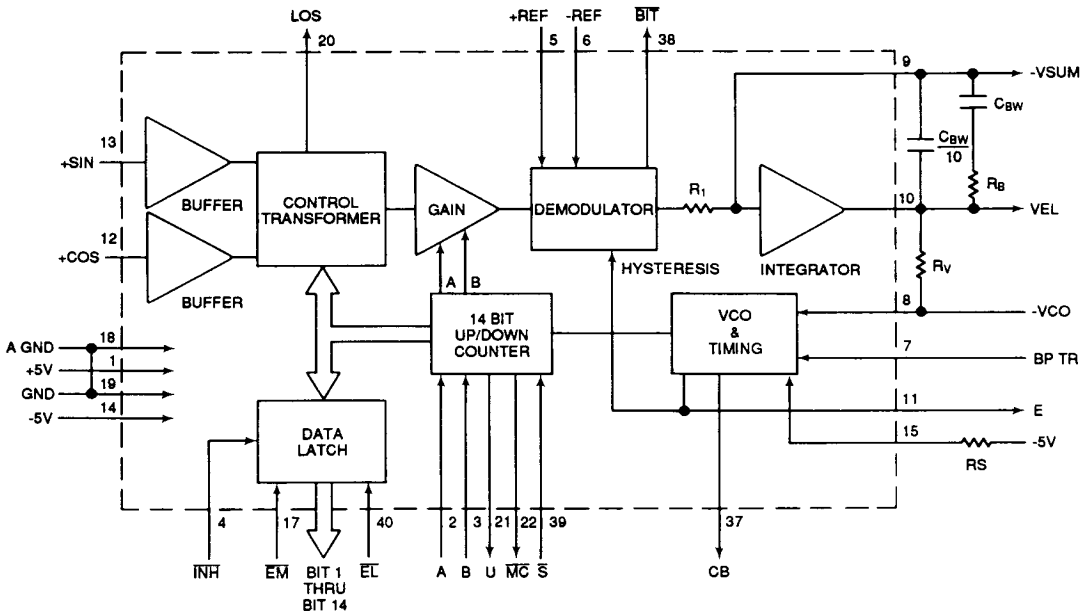


FIGURE 1. RDC-19210 BLOCK DIAGRAM (40 pin DDIP package)

TABLE 1. RDC-19210 SPECIFICATIONS
 These specs apply over the rated power supply, temperature, and reference frequency ranges; and 10% signal amplitude variation & 10% harmonic distortion.

PARAMETER	UNIT	VALUE																								
RESOLUTION	Bits	10, 12, or 14																								
ACCURACY	Min	8 or 4 + 1 LSB (note 3)																								
REPEATABILITY	LSB	1 max																								
DIFFERENTIAL LINEARITY	LSB	0.5 max in the 14th bit																								
REFERENCE		(+REF, -REF)																								
Type		differential																								
Voltage: differential	V	±10 max																								
single ended	V	±5 max																								
overload	V	±25 continuous																								
Frequency	Hz	47 - 5,000 (note 4)																								
Input Impedance	Ohm	10M min //20 pf																								
SIGNAL INPUT		(+SIN, +COS)																								
Type		Resolver, single ended, groundbased																								
Voltage: operating	Vrms	2 ±15%																								
overload	V	±25 continuous																								
Input impedance	Ohm	10M min //10 pf.																								
DIGITAL INPUT/OUTPUT		TTL/CMOS compatible																								
Logic Type		Logic 0 = 0.8V max.																								
Inputs (type1)		Logic 1 = 2.0V min.																								
		Loading = 10µa max P.U. current source to +5V //5pf max. CMOS transient protected																								
Inhibit (INH)		Logic 0 inhibits; Data stable within 0.3µs																								
Enable Bits 1 to 8 (EM)		Logic 0 enables; Data stable within 150 nS																								
Enable Bits 9 to 14 (EL)		Logic 1 = High Impedance Data High Z within 100 nS																								
Resolution and Mode Control(A & B) (see notes 1 and 2.)		<table border="1"> <thead> <tr> <th>Mode</th> <th>B</th> <th>A</th> <th>Resolution</th> </tr> </thead> <tbody> <tr> <td>resolver</td> <td>0</td> <td>0</td> <td>10 bits</td> </tr> <tr> <td>"</td> <td>0</td> <td>1</td> <td>12 bits</td> </tr> <tr> <td>"</td> <td>1</td> <td>X</td> <td>14 bits</td> </tr> <tr> <td>LVDT</td> <td>0</td> <td>-5V</td> <td>10 bits</td> </tr> <tr> <td>"</td> <td>1</td> <td>-5V</td> <td>12 bits</td> </tr> </tbody> </table>	Mode	B	A	Resolution	resolver	0	0	10 bits	"	0	1	12 bits	"	1	X	14 bits	LVDT	0	-5V	10 bits	"	1	-5V	12 bits
Mode	B	A	Resolution																							
resolver	0	0	10 bits																							
"	0	1	12 bits																							
"	1	X	14 bits																							
LVDT	0	-5V	10 bits																							
"	1	-5V	12 bits																							
Inputs (type 2)		Logic 0 = 0.8V max.																								
		Logic 1 = 3.5V min.																								
		Loading = 10µa max P.U. current source to +5V //5pf max. CMOS transient protected																								
Set (S)		Logic 1 = normal operation																								
		Logic 0 = set, asynchronous																								
Parallel Data (Bits 1-14) Outputs																										
Parallel Data (1-14)	bits	10, 12, or 14 parallel lines; natural binary angle, positive logic (see note 3)																								
Converter Busy (CB)		0.3 to 2.0 µsec positive pulse leading edge initiates counter up-date.																								
Up/Down Count (U)		Logic 1 when counting up Logic 0 when counting down																								

NOTES: 1. Unused data bits are set to logic "0".
 2. In LVDT mode, Bit 14 is LSB for 12 Bit resolution or Bit 12 is LSB for 10 Bit resolution.
 3. Accuracy in LVDT mode is 0.15% + 1LSB.
 4. Full Accuracy.

TABLE 1. RDC-19210 SPECIFICATIONS (continued)

PARAMETER	UNIT	VALUE
DIGITAL INPUT/OUTPUT (continued)		
Outputs (continued)		
Major Carry (MC)		Logic 0 at major carry.
North Reference Pulse	(NRP)	Logic 0 at all 0s [ENL to -5V]
Built-in-Test (BIT)		Logic 0 for BIT condition.
		±100 LSBs of error with a filter of 500 µs
Loss-of-Signal (LOS)		Logic 1 for Loss of Signal.
Drive Capability		50 pF + Logic 0; 1 TTL load, 1.6 mA at 0.4V max Logic 1; 10 TTL loads, -0.4 mA at 2.8V min Logic 1; CMOS load, 4.5V min High Z; 10 uA //5 pF max
ANALOG OUTPUTS		
E	Vdc	-1.25V/1LSB error (±1LSB max)
DYNAMIC CHARACTERISTICS		(at maximum bandwidth)
		Resolution
		10-bit 12-bit 14-bit
Tracking Rate (min)	RPS	800 200 33
Bandwidth(Closed Loop)	Hz	530 * 375
Ka	1/s ²	1.4M * 700k
A1	1/sec	5.8 * 4.4
A2	1/sec	250k * 160k
A	1/sec	1200 * 850
B	1/sec	600 * 425
Acceleration (1LSB lag)	deg/s ²	490k 120k 15k
Settling Time(179° step)	msec	10 13 40
VELOCITY CHARACTERISTICS		
Polarity		Positive for increasing angle
Voltage Range(Full Scale)	V	±4
Voltage Scaling	RPSFS	Tracking Rate (maximum)
Scale Factor	%	10 typ 20max
Scale Factor TC	PPMC	100 typ 200 max
Reversal Error	%	1 typ 2max
Linearity	%	0.25 typ 0.50 max
Zero Offset	mv	5 typ 10max
Zero Offset TC	µV/C	15 typ 30max
Load	kohm	8 max
POWER SUPPLIES		
Nominal Voltage	V	+5 -5
Voltage Range	±%	5 10
Max Volt. w/o Damage	V	+7 -7
Current	mA	14 typ, 24 max
TEMPERATURE RANGE		
Operating		
-30X	°C	0 to +70
-10X	°C	-55 to +125
Storage	°C	-65 to +150
PHYSICAL CHARACTERISTICS		
Size:		
40 pin DDIP	in (mm)	2.0 x 0.6 x 0.2 (50.8 x 15.24 x 5.08)
28 pin DDIP		1.4 x 0.6 x 0.2 (35.56 x 15.24 x 5.08)
44 pin PLCC		0.690 square (17.526)
Weight:		
40 pin DDIP	oz (g)	0.94 (26.65)
28 pin DDIP		0.66 (18.71)
44 pin PLCC		0.5 (14.18)

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