



**COMPUTER
CONVERSIONS
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PC104-DS SERIES PC104™ Dual Channel Synchro / Resolver Outputs

FEATURES

- Dual Channel Digital Synchro/Resolver Outputs
- Accuracy Grades to + 30 arc Seconds
- Transformer Isolated Reference Input
- Virtually Indestructible Short Circuit Proof Outputs
- Low Output Impedence, Drive 50 ma. + Channel
- Wide Band Frequency DC- 10,000Hz.
- Loss of Reference Detect w/Report
- BIT and EN Support for Synchro Amps
- Supports Multispeed & Multiturn Pairs
- COTS Operating Temp. -40°C to +85°C
- Low Cost, Robust, Highly Reliable Design
- Shorted Stator Models Typical of Aircrafts
- Transformer Isolated Signal Output Options
- True 16 Bit Stack-Through Databus
- Stack Anywhere, No Height Violations!
- 16 Bit Resolution



Applications

- GPS and Gyro Integration
- Radar & Antenna Systems
- LRU's and Display Systems
- Navigation Systems & Upgrades
- Mobile Fire Control Systems
- Portable Synchro Test Sets
- Synchro Retrofit Systems
- Simulators and Trainers

Description:

The PC104-DS Series are Low Cost, Dual Channel, PC104 Compliant Synchro / Resolver Output Cards designed to simulate precision AC synchro and resolver formatted signals for use in Navigation and positioning systems or test sets on both industrial and COTS - military type applications.

All models provide 16 Bits resolution (0.0055°), and model selectable accuracy grades from +/-4 arc. minutes to +/-30 arc seconds.

These units feature virtually indestructible, thermally and transient protected, completely short-circuit proof, low output impedance amplifiers capable of providing up to a full 50ma.+ output drive per channel. Metallic heat sinks are provided to assure high reliability as installed and loaded over the full operating temperature range.

BIT inputs and Enable outputs are facilitated for direct compatibility with external Synchro booster amplifiers for driving very high power loads up to 300 VA.

Models are available in both commercial (parts 0°C to +70°C) and extended COTS - Military / Industrial (parts -40°C to +85°C) operating temperature range selections.

Additionally the PC104-DS Series feature internal micro-transformers for 100% isolation of the AC Reference inputs. They accept either direct 115, 26VAC or user scalable inputs as standard model selections.

The use of internal Isolation Transformers on the reference

inputs provides phasing flexibility, immunity from ground loops or ground reference induced noise, and are an effective barrier to prevent any electrical noise on the reference source input from effecting the users digital control system and the PC104 databus' DC supply rails. Because the AC Reference source is commonly shared or tied to many different destinations (other hardware) in a typical system; isolation on the reference inputs protects not only the user circuitry of the D-R converter, but also every user of the reference source in the system.

When integrated on applications as add-on hardware; the isolation assures the user that the add-on hardware is non-obtrusive, and causes no conflict with any existing apparatus. High input impedance and very low current draw on the reference input (typically less then 1 ma.) assures compatibility with low current drive resolver circuits typically used on R-D converter products and resolver based motion control systems.

On 26/11.8Volt (and lower voltage) systems; considerable cost savings are achieved by using the robust output drivers direct, especially when driving captive (single destination) synchro or resolver loads, or when driving isolated S-D's/ R-D's, or external synchro booster amplifiers.

For synchro resolver outputs driving multiple destinations, or synchro loads driving a grounded stator (Z leg typical of many aircraft app's.), and on 50/60 Hz.

applications; convenient bulkhead mounted external synchro output transformers are provided as options.

The PC104-DS Series use a true 16 Bit databus, and paired multispeed multiturn fine/coarse outputs are facilitated with any ratio, even with either intentional or unintentional fine/coarse offset alignments.

The converter outputs are set to zero angle for predictability on power up, until commanded to the desired angle in the application software. And a reference loss detect is reported in the status word for validation.

The PC104-DS series can be populated with up to 4 different style output converters:

HDR Series: Standard Digital to Synchro / Resolver converter features, lowest cost, standard ratio accuracy grades to +/- 2 arc. minutes, frequencies of 47 to 3KHz. and low scale factor variation

HDVR Series: High performance Digital To Synchro / Resolver converters, absolute accuracies to +/-30 arc. seconds, frequencies to 20KHz.,

HDVL Series: Digital to LVDT and RVDT

HDVDC Series: Digital Vector Generators, providing 16 Bit precision DC Sine/Cosine

To cover the most commonly used requirements the HDR Series are primarily covered in this data file.

The 16 Bit digital data is binary weighted angle. The input data is converted to AC resolver type signals representing the sine and cosine of the digital angle, at the carrier frequency of the reference input (Resolver outputs, Synchro Outputs are: Sine, Sine +120°, and Sine +240° at the carrier frequency of the reference input). The output signals continuously tracks the reference input, always preserving the transformation ratio like that of a resolver or synchro itself. The ratio accuracy of the HDR series makes them ideal for use in driving R-D converters, resolver/synchro chains and repeaters, and R-D based motion control systems.

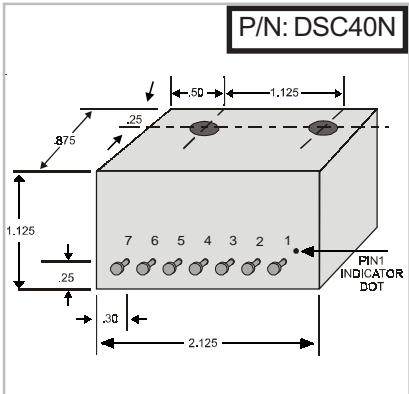
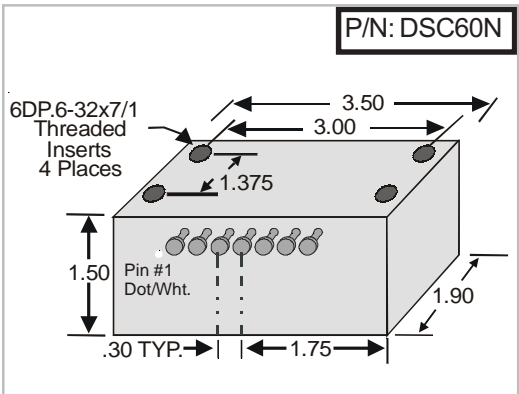
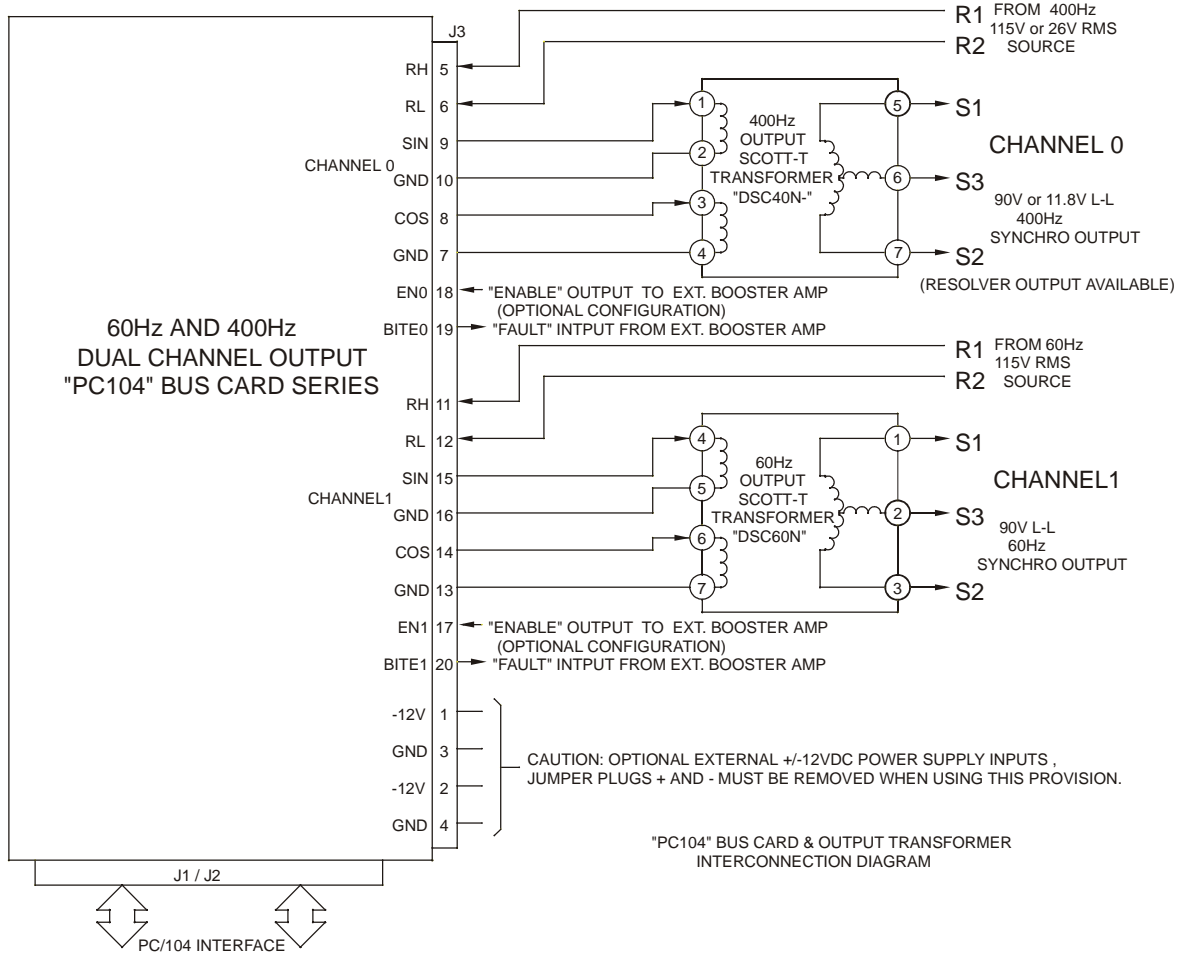
These units are ideal for many GPS type applications, heads-up display systems, field test equipment mobile antenna's, air and nautical navigation aids.

SPECIFICATIONS	
Form Factor: Stack-Through PC104 Compliance: PC104 No Exceptions Data Bus: 16 Bit Word Access Data Type: Unsigned Integer, Binary Weighted Angle	
Resolution: 16 Bits (.005°) Accuracy: ±4 arc. Minutes -HA Units +/-2.3' + 1LSB Response: <100 Usec. Reference Input: Internally Transformer " Isolated" 5ma. Max. See Table 1 Output Signals: See Table 1 Output Control: "EN" to enable Ext. Synchro Booster/Chan. Status: Loss of Reference Detect/Chan. Bit Feedback from Ext. Synchro/Booster/Chan.	
Power Required: +5VDC @ 125 ma., ±12 See Table 1	
Temperature: Operating : -1=0° to +70°C, -3=-40°C to +85°C Storage: -55°C to +125°C	
Humidity: 0 to 95% Non-Condensing Vibration: 3.5mm. 5-9Hz.; 1.0G 9-150Hz. Shock: 15 g's for 11msec	

TRANSFORMER OUTPUT UNITS (1):					OUTPUT DRIVE		±12VDC Current/Chan.		
PART #	OUTPUT	REF	Outputs	FREQ.	VA.	OHMS	AVG.	FULL LOAD	FLDBK (4)
CODE	FORMAT	VRMS	V. L-L	HZ.					
01	SYNCHRO	115	90	60	.6	12k	150 ma.	250 ma.	600 ma.
02		26	11.8	400	.6	175			
03		115	11.8		.6	175			
04		115	90		.6	10k			
05	RESOLVER	26	11.8		.6	232			
06		7	3.5	2500	.17	800			
SOLID STATE OUTPUT UNITS :									
50	SYNCHRO	26	11.8	400	.9	115	200	350	1A.
51	(2)	115	11.8		.9	115	200	350	1A.
52	RESOLVER	26	11.8	2500		2k	40	N/A	
53		7	3.5		2k	40			
54	S/R (3)	115	6.0	60		2k	40		
55				400		2k	40		
Notes: (1)Uses External Output Transformer (included with part number). (2)Do not use Synchro type Solid State Output Units on systems with 1 stator leg grounded. (3)Sin/Cos outputs to drive External Synchro Booster Amplifiers to 300VA. (4)+/-12VDC Supplies jumper select from PC104 Bus or external. Supplies should feature foldback/current limiting, to enable supplies to gradually increase voltage with load surge caused during power-turn-on, most reasonable supplies (including switchers) feature this.									

Table 1.0

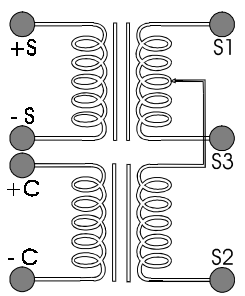
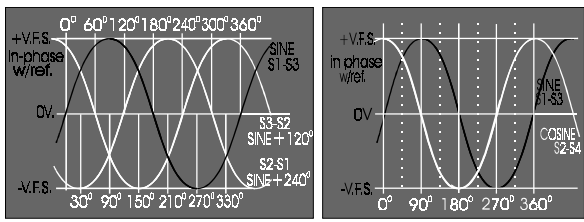
TYPICAL CONFIGURATION TRANSFORMER OUTPUT MODELS:



Standard Synchro Loads

MIL-STD Class MIL-S-20708	Impedance ZSO	Load VA
26v 08 CT 4c	100 + j490	0.2784
26v 11 CT 4d	21.0 + j132	1.0417
11 CT 4e	838 + j4955	1.6118
15 CT 4b, & c	1600 + j9300	0.8584
15 CT 6b, & c	1170 + j6780	1.1773
18 CT 4b, & c	1420 + j13260	0.6074
18 CT 6b, & d	1730 + j510	4.491
23 CT 4, & a	1460 + j11050	0.7267
23 CT 4b, & c	1950 + j14000	0.573
23 CT 6, & a	1250 + j3980	1.9417
23 CT 6c & d	1350 + j4300	1.7972

Notes: 1) 6 = 60 Hz, 4 = 400 Hz. units
 2) 26V = 26Vsystem, 11.8VL-L signals
 else; 115Vsystem, 90VL-L signals typ



ADDRESSING AND CONFIGURATION

J3 I/O CONNECTIONS		
PIN	FUNCTION	
1	+12VDC	
2	-12VDC	
3	PWR GND	
4	PWR GND	
5	RH	Channel 0
6	RL	
7	S1 or GND	
8	S2 or COS	
9	S3 or SIN	
10	GND or GND	
11	RH	Channel 1
12	RL	
13	S1 or GND	
14	S2 or COS	
15	S3 or SIN	
16	GND or GND	
17	EN1	
18	EN0	
19	BITE0	
20	BITE1	

J3 = TYCO/ AMP #104130-4

ADDRESS MAP						
ADDRESS	FUNCTION	READ/WRITE	SA3	SA2	SA1	SA0
BASE+0	CHN.0 DATA	WRITE	0	0	0	0
BASE+2	CHN.1 DATA	WRITE	0	0	1	0
BASE+4	CONTROL	WRITE	0	1	0	0
BASE+6	STATUS	READ	0	1	1	0

Register Details

CHN. 0 and CHN. 1 Data: 16 Bit Angle Binary Weighted Word.
 "D15" = 180°, "D14" = 90°, "D0" + 0.00549°.

CONTROL WORD BIT DETAILS (WRITE ONLY)
D0 External Synchro Amplifier Enable For Channel 0:
Enable Outputs = "1" Disable Outputs = 0
D1 External Synchro Amplifier Enable For Channel 1:
Enable Outputs = "1" Disable Outputs = 0
D2 Dual Channel Simultaneous Write for Multispeed Pairs:
0=Two Independent Channels 1=Paired Multi-Speed
Note: When Paired for Multispeed Data written to Channel 0 is held in an intermediate register until data is written to channel 1, at which time both data words are simultaneously transferred to both outputs assuring no skew between.

STATUS WORD DETAILS (READ ONLY)
D0 External Synchro Amplifier Enable for Channel 0
"1" = Fault "0" = No Fault Detected
D1 "0" = Loss of Reference Detect Channel 0.
D2 External Synchro Amplifier BIT Report for Channel 1:
"1" = Fault "0" = No Fault Detected
D3 "0" = Loss of Reference Detect Channel 1.

SELECTING BASE ADDRESS
Sliding Switches on Assembly Side of Card A4-A15.
SELECTING ±12VDC POWER SOURCE
To source from th PC104 Databus use as shipped
To source as external input: Remove the only 2 jumper plugs on assembly side of car.
Note: ±12VDC always present on field I/O connector

Model Selection Guide

example:
PC104DS'-01-02-3HA

a) Use Base Model: PC104DS

Then add:

b) -01-55 Code for I/O Channel #1
 c) -01-55 Code for I/O Channel #2
 (See table 1.0 inpec's)
 d) -1 0 to 70° operating temp. or,
 -3 -40 to +85°C operating temp.
 e) Blank for ± 4' accuracy
 -2 for ±2.3' accuracy

Example above:
 Channel 1= 115/90V @ 60 Hz.,
 Channel 2= 26/11.8V @ 400Hz.,
 Includes external output transformers, -40 to +85°C operating temp., ±2.3' accuracy.

Your Local Representative Is:

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