COMPUTER CONVERSIONS CORPORATION
6 DUNTON COURT, EAST NORTHPORT, N.Y. 11731
PHONE (516) 261-3300 FAX (516) 261-3308

VME 4 CHANNEL ISOLATED DYNAMIC RESOLVER ROTATOR

MODEL # VBWRA6528-X12ACC

A5652-81

~~~~~~~~~~FEATURES:~~~~~~~~~~~~~~~~~

** PROGRAMMABLE POSITION TO .0055°*
** PROGRAMMABLE SPEED TO 960 RPS*
** PROGRAMMABLE ACCELERATION TO 1920 RPS/Sec.*
** UPTO 4 INDEPENDENT CHANNELS/CARD*
** MIX INPUTS & OUTPUTS ON SAME CARD*
** 100% TRANSFORMER ISOLATED SYNCHRO /RESOLVER REFERENCE & I/O SIGNAL LINES*
**HIGH ACCURACY 16 BIT CONVERSIONS*
** RESOLVER , SYNCHRO, AND DC **SINE/COSINE VECTOR GENERATOR MODELS.***
** 47 TO 10 KHz. CARRIER FREQUENCIES*
** **DIRECT ROTARY SLEW CONTROL***
** DIRECT STATIC ANGLE WRITES , DIRECTION, AND **SPEED -TO-ROTATE COMMAND** REGISTERS.*
** DIRECT **RUN/STALL OVERRIDE** COMMAND*
** PERMITS APPLICATION OF COMPLEX PROFILES*
** DYNAMIC REAL-TIME THROUGH-PUT & ROTARY STIMULUS/SIMULATION*

ON BOARD OPTIONS:
** UNIVERSAL, ISOLATED, PROGRAMMABLE AC REFERENCE SUPPLIES.*
** ISOLATED SYNCHRO, RESOLVER AND VECTOR TO DIGITAL CONVERTER FEEDBACK OPTIONS.*

~~~~~~~~~~APPLICATIONS:~~~~~~~~~~~~~~~~~~~~

* MOTOR CONTROL FEEDBACK SIMULATION
* DIGITAL RADAR SWEEPS & ANTENNA TEST-STANDS
* VECTOR COORDINATE GENERATION & DYNAMICS STIMULUS
* REAL TIME/ DYNAMIC SYNCHRO/RESOLVER SIMULATION/MODELLING &DYNAMIC STANDARD
* ACCURATE DIGITAL SPEED REFERENCE CONTROL
*AC/DC DRIVE TRIM/INSTRUMENT FOR FOLLOWING
* ENGINE/MOTOR AND/OR CONTROLLER MANUFACTURING TEST STANDS

DESCRIPTION

Computer Conversions Digital Rotator Series are Digital to Synchro/Resolver and DC Vector Generators that provide high performance dynamic control functions specifically for applications that require: precise, real-time, dynamic rotation stimulus; used in the modeling, testing, and simulation of motor and motion control related apparatus.

The standard model includes up to 4 channels of Digital to synchro/Resolver converters that feature both Digital angle, and Dynamic Rotate functionality which includes both speed and acceleration control. 2 Channel cards can be coupled with up to 4 channels of on-board synchro/resolver or DC SIN/COS vector input converters for complete closed loop feedback real-time continuous observation, and full-operational & dynamic wrap-around test functionality.
All AC inputs and outputs are completely transformer isolated; the Synchro/Resolver Transformers more closely approximate the transformer type output typical of an actual synchro/resolver.

The Synchro/Resolver to Digital Converters utilize their own isolation transformers, allowing them to (non-intrusively) continuously track the actual true field output signals being generated by the D-R converters. In this matter; the actual as loaded output signals are being continuously monitored and verified with no possibility of creating or permitting any ground loops, or allowing any ground interjected noise into the system.

Because all the D-S/R and S/R-D I/O signal and reference terminations are all brought out independently to the I/O connectors; the R-D's (in hardware and software) can also be used for testing and monitoring of both the simulated model, and the actual end-use employed application.

The S/R-D Converters are available with both: High Accuracy 16 Bit Resolution to monitor static to moderate speed operation, and 12 Bit High Speed Resolution functionality; for continuos real-time feedback throughout the guaranteed range of the outputs being generated.

Both Static (angle/position) and Dynamic (speed) based 16 Bit command registers are used for each channel of output signal. Acceleration control input registers are be provided for the more complex applications.

The first command register of each channel provides a high accuracy 16 Bit Digital to Synchro/Resolver command angle input; wherein the 16 bit value directly represents the absolute binary scaled angle data value.

The Dynamic Target Speed-Rotate register for each channel contains 4 control bits and a 12 bit digital "Speed command value" representing the desired rotate-speed when used in the dynamic rotate mode of operation, plus a "X16 speed bit" that is used as an electronic gear shift to achieve very high speed target rotates. The standard low speed target speed control is scaled over a 60 RPS range, whereby; 0 to 4095 (or 0FFFh) represents a 0 to 59.9854 RPS target speed. When the "X16 speed bit" is active (1= High); the

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12 Bit target speed command is scaled over a 960 RPS range whereby 0 to 4095 (0FFF) represents *0 to 959.765 RPS..

*Note: Any Target Speed under 60 RPS must be programmed in the low speed range (with the "X16 speed bit" clear = 0). Any Target Speed 60 RPS or higher must be programmed in the high speed range (with the "X16 speed bit" set = 1).

The Dynamic-Rotate Control Status Bits provided include: Static/Dynamic mode select, Up/Down Direction Control, a X16 digital speed accelerator/resolution select, and a Run/Stall overide command.

The Dynamic Acceleration register for each channel uses a 12 bit digital Acceleration command value; representing the desired acceleration and deccelereleration from the current rotate speed command This allows the user to simply program the desired speed, which will be automatically slewed to at the rate of acceleration specified in the acceleration command word register. This allows true real time stimulus independent of the host processor, while preventing runaways and amplifier saturation in motor test stand applications.

Models with the Programmable acceleration feature will automatically gear shift the resolution in a smooth continuous fashion (at the same accel/deccel rate), between 16 bits (slow speed) and 12 bit (high speed) resolution, as the speed (by virtue of its new command) traverses over and under the high speed verses low speed range.

The acceleration is programmed via a 16 bit command word using a 12 bit variable representing 0 to 1920 RPS/Sec. Once set the resolver output will rotate from the current speed setting to any new (desired) speed setting at the rate of acceleration selected. The acceleration setting applies for both acceleration to higher speeds and decceleration to lower speeds and or a stop (0 speed command). The User program does not need to modify for any change of speed setting if the accel. value already set is not changing. The Acceleration does not apply to a) static verses dynamic switching, b) run verses stall switching, or, c) position angle commands.

When used to test motor controls employing the use of tracking Resolver to Digital Converters; the programmable accel/decel, assures that speed changes that are seen as infinite accelerations don't activate the BIT (built-in-test) fault detect outputs built into many of these converters and allows for true testing of the converters dynamic performance.

VME DYNAMIC-ROTATOR ADDRESS MAP

HEX	R/W	Channel	CONVERTER FUNCTION
00h	WRITE	0	RESOLVER COMMAND ANGLE 16 Bit (Static)
02h		1	
04h		2	
06h		3	
08h	WRITE	0	DYNAMIC ROTATE TARGET SPEED COMMAND AND DYNAMICS CONTROL SWITCHES (See Register Details)
0Ah		1	
0Ch		2	
0Eh		3	
10h	WRITE	0	ACCELERATION COMMAND WORD 12 Bits, 0 to 4096 (0000h to 0FFFh) Reprenting 0 to 1919.53125 Revolutions/Sec./Sec., (Scale 1920 = 4096)
12h		1	
14h		2	
16h		3	
18h	READ	0	STATUS REPORT
1Ah		1	
1Ch		2	
1Eh		3	

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VME QUAD CHANNEL ISOLATED DYNAMIC RESOLVER ROTATOR

MODEL # VBWRA6528-X12

REGISTER DETAILS

NOTES:
1) STATUS WORD CONTENTS, & WIRING DETAILS; SAME AS SHOWN ON VB SERIES DATA-FILES

DYNAMIC ROTATE TARGET SPEED COMMAND WORD DETAILS

CONTROL BITS				DYNAMIC-ROTATE SPEED COMMAND										LSB	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Digital Rotate "SPEED" COMMAND VALUE (if D12 is:)
0 = 16 Bits; 0 - 60RPS (0 - 3600 RPM) Elect.= 0-4095,
Resolution ~.005º, 1LSB = 5.273435º/Sec. ,or
1 = 12 Bits; 0 - 960 RPS Elect. (57600 RPM) = 0-4095 for scale
Resolution ~.088º, 1LSB = 84.375º/Sec. = (16)
NOTE: Speeds under 60 RPS must use D12 = 0 ; Low Speed range,
speeds 60 RPS and faster must use D12 = 1 ; High Speed range.

D12 SPEED SHIFT/RESOLUTION CONTROL;
0 = 16 Bits; 0 - 60RPS (0 - 3600 RPM) Elect.
1 = 12 Bits; 0 - 960 RPS Elect. (0 - 57600 RPM) = (16)

D13 = RUN/STALL: (DYNAMIC OVER-RIDE) 0=RUN, 1 = STALL,
When Run is recovered from stall, rotation will commence from angle of stall.

D14 = U/D:DIRECTION SELECT, 1=DOWN, 0 = UP/CW/FWD, direction of rotate
0 = Test Bus is Driving (an active driver is on the Bus

D15 = STATIC/DYNAMIC MODE SELECT: 0 = STATIC, 1= DYNAMIC/ROTATE

Notes:

1) Programmable to 57600 RPM, Full performance rated to 30,000 RPM only.

2) When program jumps from static to dynamic (D15 from 0 to logic 1);
Value will increment/rotate from the set programmed D-S/R angle; in the direction commanded to the speed achieved by this "Dynamic-Rotate Command Word"

3) Dyn./Static mode select dictates standard D-S/R verses dynamic functionality

4) a) Set "static" and to zero speed (2000h),
b) Set/Command a desired static angle,
c) Command a desired acceleration
d) Set Dynamic switch (D15 = 1),
Direction switch (D14 = 0 = Fwd.) ,
Run switch (D13 = 0 = run)
Set desired target speed with gear shift (D12).

To set desired target speed (with D12 gear shift) use this formula:

Low Speed Scaling (under 3600 RPM Electrical) Clear D12 to 0 ;
Desired RPM's (1.1378) = Binary command value,
If value is 4096 or higher set D12 to 1
and use High Speed Scaling. .

High Speed Scaling (3600 RPM and above Electrical) Set D12 to 1 ;
Desired RPM's (.07111) = Binary command value ,
If value is 256 or lower Clear D12 to 0 ;
and use Low Speed Scaling. .

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SPECIFICATIONS

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Digital to Resolver Converters

Resolution: --- Angle --- ;

Static and Dynamic modes upto speed shown:

16 Bits .00549316º Static-60 RPS = 3600 RPM

(3-Speed = /3 =.00183º Static to 1200 RPM)

High Speed X16 Dynamic Mode:

12 Bits ~.087º to 960 RPS = *57600 RPM

*(3-Speed = /3 = ~.0292968º to 320 RPS = *19200 RPM)*

Resolution: --- Speed--- ;

Dynamic mode upto speed shown,

12 Bit Resolute Speed Command

@ 16 Bits/turn: Static to 60 RPS = 3600 RPM

increments/1 LSB = 5.273435º/Sec.

(3-Speed increments/1 LSB = 1.7578117º/Sec.)

@ High Speed X16 Dynamic Mode:

12 Bits/turn to 960 RPS = *57600 RPM

increments/1 LSB = 84.375º /Sec.

(3-Speed increments/1 LSB = 28.125º/Sec.)

Acceleration: From any current speed setting to any concurrent (desired) speed setting, 12 Bit command representing 0 to 1920 RPS/Sec.

Accuracy: Static to 60RPS: 3 arc minutes +1 LSB @ 16 Bits Angle,

(3-Speed = /3 = 1 arc minute +1LSB)

(Higher Accuracy Models Available).

High Speed mode: 9 arc minutes +1LSB,

Speed; precision crystal controlled base.

Reference Inputs: **2.85 VRMS @ 10KHz. into 2 ma. max.

Internally Transformer Isolated to 500VDC

Signal Outputs: Output Characteristics Same as DSL Types shown on VBW Series VME output card data sheets.

**2.2 V. L-L @ 10KHz., virtually indestructable short-circuit proof outputs, overvoltage and transient protected.

Drives upto a 100 ma. load, Transformer Isolated

Notes: 1)* = Rated speed to 30,000RPM (elect.) max. operation, perfomance above this not assured.

2)** Output voltages change proportionate to reference input voltages, ratio maintained.

Rev. A 7/24/96 Dynamics/Resolution R-D Section

POWER SUPPLIES:

Completely Bus Powered,

NO EXTERNAL SUPPLIES REQUIRED,

uses off P1:

+5VDC @ 1.2A. max.,

+/- 12VDC @ 1.5Amp max., 740ma. avg.

VME FORM FACTOR

6U H, double slot width, A24:D16 VME Slave,

Simple High Speed Register Based I/O,

No interupts required