

TC-336 16 CHANNEL ANALOG OUTPUT MODULE FUNCTIONAL DESCRIPTION

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The Triad TC-336 is an 16 channel, 12 bit digital to analog converter module. The card is a 4.5" x 6.5" double-sided board, fully socketed, with a 28/56 gold card edge connector. The TC-336 is capable of either twelve or eight bit accuracy depending on the configuration settings and software application running.

The outputs are capable of driving approximately 50 MA. per channel, or a 500 ohm load at +/- 10 VDC. Designed for show control and motion base applications, the TC-336 is used to drive lighting dimmers, servo controls for electric, pneumatic and hydraulic actuators, mechanical feedback servo valves, VCAs (voltage controlled attenuators), VCO's (voltage controlled oscillators) and other devices requiring full analog control.

This card replaces the TC-330 Eight Channel D/A (digital to analog) Output card but with double the number of channels. It replaces the setup pots with header/strappable options for the output voltages and spans. Also, the need for the TC-350 demultiplexer has been eliminated.

Up to four TC-336 D/A Output cards may be installed in a card frame using a TC-636 Backplane Assembly. Data buss buffering and signal demultiplexing are performed by a TC-3550 Data Receiver/Processor card.

Closed loop or servo applications are provided via a digital closed loop system using the TC-336 in conjunction with the TC-346 Analog Input card and the TC-3550 STU/PID Processor card.

When used with a bipolar 15 volt supply, an overall span of up to 20 volts may be achieved. The normal ranges used are -10 to +10, 0 to 5, and 0 to 10 VDC, where a value of 000 from the show control computer is the most negative and 255 (hex \$FF) or 4095 (\$0FFF) is the most positive voltage.

Although eight (8) bit (256 discrete values) resolution is standard, full 12 bit configurations are available for special applications (such as motion bases) using two logical channels on the Show Control system for each output. The current implementation uses 12 bit resolution for all channels, with the four LSB's used for software trimming in 8 bit applications, and using 1% and 5% tolerance components, which eliminates the need for trimmer pots or setup.

The output on the backplane is a 26 pin DIP male header (2x13). Using an IDC ribbon cable assembly, the output on the termination panel is normally a 25 pin female DB connector with outputs on pins 1-16 and common on pins 17-25.

A built-in analog demultiplexer under software control allows any of the sixteen output channels to be connected to a single test point (or to the input of a TC-346 Analog Input card for self-calibration) to monitor any of the output channels without having to manually switch channels or physically move a scope or meter probe.

JUMPERS/SWITCHES

- JP1: Configures the analog output swing. (0-10) (0-5) (-5/+5)
 Pin 1. Connects to pin 19 (RFB) of U5 (AD7248)
 Pin 2. Connects to pin 2 (ROFS) of U5 (AD7248)
 Pin 3. Connects to pin 3 (REFOUT) of U5 (AD7248)
 NOTE: The pins are reversed in order (3-2-1) on the PCB.
- JP2: Configures the output range. (0-5, -5/+5) (0-10)
 Pin 1. Connects to analog ground (VSS)
 Pin 2. Connects to pin 1 (VSS) of U5 (AD7248)
 Pin 3. Connects to -5VDC (VO) of U9 (LM7905)

OUTPUT CONFIGURATION MATRIX

OUTPUT VOLTAGE SELECTION	JP1 JUMPERS	JP2 JUMPERS
0 - 5 Volts DC	Pin 1 to Pin 2	Pin 1 to Pin 2
0 - 10 Volts DC	No Jumpers	Pin 2 to Pin 3
-5/+5 Volts DC	Pin 2 to Pin 3	Pin 1 to Pin 2 *

Notes:

It is possible to have the DAC output voltage swings doubled by modifying the feedback circuit R34 of U20A. This DAC output doubling is the current configuration when shipped from Triad. 01-17-1990 TWR

Jumpers JP1 and JP2 should both be on the left-most pins in all present configurations, using the -5 to +5 span and voltage doubled described above. The span and offsets are configured and controlled under software! 10/19/92 WJS

The TC-336 uses sensitive CMOS and analog devices. Do NOT insert or remove a TC-336 analog module from an active card frame. Power must be off or the module will be damaged. The TC-336 module is supplied with metal plates to cover both the component and solder sides of the board. It is recommended that the cover plates be left installed at all times.

The TC-336 is designed to "fail" at a mid-point level should the processor be unable to update the D/A converter and outputs. Thus, in -10 to +10 applications, the output voltage will go to 0 volts, or a mid position for all channels.

The buss interface is compatible with Triad TC-35xx series cards:
 8 bi-directional buffered data bits (D0-D7)
 5 address lines (A0-A4)
 BOARDSEL-, R/W-, IRQ-, RESET-, ENABLE-

Physical Dimensions:

4.5" x 6.5" printed circuit assembly with metal shield plates
 28/56 .125 center gold edge connector

Power Requirements:

+5 VDC @ 150 MA
 +/-15 VDC @ 400 MA

Related Documents:

TC336.ASM Assembly drawing
 PIN336.TXT Edge connector pin assignments

I/O PORTS**Free Edge Buss Connector
Rear View**

SOLDER SIDE			COMPONENT SIDE
+5VDC	2	1	+5VDC
OUT 1	4	3	OUT 14
OUT 2	6	5	OUT 15
OUT 3	8	7	OUT 16
OUT 4	10	9	AGND 1
OUT 5	12	11	AGND 2
OUT 6	14	13	AGND 3
OUT 7	16	15	AGND 4
OUT 8	18	17	AGND 5
OUT 9	20	19	AGND 6
OUT 10	22	21	AGND 7
OUT 11	24	23	DATA 0 (BUFFERED)
OUT 12	26	25	DATA 1 (BUFFERED)
OUT 13	28	27	DATA 2 (BUFFERED)
AGND 8	30	29	DATA 3 (BUFFERED)
AGND	32	31	DATA 4 (BUFFERED)
AGND	34	33	DATA 5 (BUFFERED)
SEL	36	35	DATA 6 (BUFFERED)
RES	38	37	DATA 7 (BUFFERED)
ENBL	40	39	ADDRESS 0
SPARE	42	41	ADDRESS 1
SPARE	44	43	ADDRESS 2
MONOUT	46	45	ADDRESS 3
- 15VDC	48	47	PHASE 2 02
+15VDC	50	49	R/W -
N/C	52	51	IRQ
N/C	54	53	ADDRESS 4
GROUND	56	55	GROUND

VCC = 5VDC @ 150 ma.
+15 @ 400 ma. max.
-15 @ 400 ma. max.

NOTES