

TC-346 ANALOG INPUT MODULE FUNCTIONAL DESCRIPTION

REV 1.01 05/25/90 WJS

The TC-346 is an analog input module designed to interface devices requiring feedback or other analog input to the Show Control system. Twenty-four inputs may be sampled by the TC-346. The first 16 are normally used for feedback for loop closure, while the other eight are available for setup and calibration, external tracking inputs, or other applications. The module provides four individually buffered on-board +/-10 volt output reference signals which can be fed to external devices (e.g. feedback potentiometers) and then read back as full twelve bit analog values by the firmware on the TC-3550 Processor.

Typically the TC-346 is located near the animated figure or controlled device so that the wire lengths to the feedback potentiometers will be as short as possible. Triad manufactures a Servo Terminal Unit (STU) card frame that contains companion TC-336 Analog Output cards and a TC-3550 STU/PID Processor card to close the loop for servo control. In addition to eliminating many setup pots, this system allows PID (Proportional, Integral, and Derivative) calculations for more sophisticated servo control.

I/O is terminated through a 26 pin dual-row (13x2) male header connector on the TC-636 backplane with four 10 VDC reference voltage outputs and four common grounds for driving up to four 10K (nominal) pots each.

TC-35xx Buss compatible, 24 channel A/D converter subsystem with:

- 16 external 0-10 VDC (or others with custom pre-scalers)
- 4 front panel setup pots assignable for span, error gain, or other parameters (currently only one pot is provided)
- 4 remote analog inputs along with Vref and ground accessible via a 6 pin telco modular connector on the front of the card, usable for a remote pendant or joy-stick input control
- 1 assignable analog input for closed-loop read-back of D/A output cards from the TC-636 Backplane card (setup and real-time?)
- 12 bit (1/4096) resolution
- 8 bi-directional data bits (D0-D7)
- 5 address lines (A0-A4)
- BOARDSEL-, R/W-, IRQ-, RESET-, ENABLE-

Physical Dimensions:

4.5" x 6.5" printed circuit board
28/56 .125 center gold plated edge connector

Power Requirements:

+5V @ 100MA, +/-15V @ 100 MA

Related Documents:

SC-7.12 Pin assignment and cable information
TC346.ASM Assembly diagram

SETUP AND ADJUSTMENT PROCEDURES

The TC-346 requires two calibration adjustments that are performed at the factory prior to shipping. If the variable resistors mounted on the TC-346 get out of calibration from troubleshooting or are replaced, then follow the two procedures below.

PROCEDURE 1

VR5 Reference voltage adjustment.

Prerequisites.

The STU is powered off.

The air and/or hydraulics are turned off.

A Vector 3690-16 or equivalent 28/56 pin extender card.

A small flat blade screwdriver.

A digital volt/ohm meter or oscilloscope.

- Step 1. **Remove power to STU. Turn off air and/or hydraulics to figures.**
- Step 2. Remove the TC-346 from the STU card frame.
- Step 3. Install the TC-346 onto the Vector 3690-16 board extender.
- Step 4. Connect the negative lead of the DVM to pin 55 of the card extender. This pin is located on the component side and is the bottom pin.
- Step 5. Connect the positive lead of the DVM to pin 9 of the card extender. This pin is located on the component side and is the 5th pin down from the top.
- Step 6. Install the extender with TC-346 back into the STU card frame.
- Step 7. Apply power to the STU.
- Step 8. Adjust VR5 for 10 volts DC +/- .02 VDC.
- Step 9. Remove power to STU.
- Step 10. Remove card extender and re-install TC-346.

- Step 16. Connect the other end of the clip lead to pin 9 of the card extender. This pin is located on the component side and is the 5th pin down from the top.
- Step 17. Move the clip lead from R1 to R2 through R16 and verify the values in step 12 for each resistor. This will be 16 separate checks.
- Step 18. Remove power to STU.
- Step 19. Remove card extender and re-install TC-346.
- Step 20. The STU and TC-346 should be returned to normal operation.

I/O PORTS

JP1: RJ11 6 pin Connector used for remote analog inputs.

- Pin 1. Connects to +10 Vref
- Pin 2. Connects to R30 1k to pin 8 (S4) of U7 (ADG528A)
- Pin 3. Connects to R31 1k to pin 10 (S5) of U7 (ADG528A)
- Pin 4. Connects to R32 1k to pin 11 (S6) of U7 (ADG528A)
- Pin 5. Connects to R33 1k to pin 12 (S7) of U7 (ADG528A)
- Pin 6. Connects to Analog Ground

**Free Edge Buss Connector
Rear View**

SOLDER SIDE		COMPONENT SIDE	
+5VDC	2	1	+5VDC
IN 1	4	3	IN 14
IN 2	6	5	IN 15
IN 3	8	7	IN 16
IN 4	10	9	REF 1
IN 5	12	11	REF 2
IN 6	14	13	REF 3
IN 7	16	15	REF 4
IN 8	18	17	REF G
IN 9	20	19	REF G
IN 10	22	21	REF G
IN 11	24	23	DATA 0 (BUFFERED)
IN 12	26	25	DATA 1 (BUFFERED)
IN 13	28	27	DATA 2 (BUFFERED)
REF G	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 2	42	41	ADDRESS 1
INBUSS	44	43	ADDRESS 2
	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.
 +15VDC @ 100 ma.
 -15VDC @ 100 ma.

NOTES