

TC-3550 RECEIVER/PROCESSOR INTERFACE

FUNCTIONAL DESCRIPTION

REV 0.91 01/17/90 WJS

The Triad TC-3550 PCB assembly is a complete micro-processor system, including EPROM and battery-backed RAM memory, serial and parallel I/O, and a data buss interface on a single 4.5" x 6.5" circuit board.

This card is the heart of the LDC/SCU (Laser Disc Controller/Stand-alone Show Control Unit) as well as the STU (Servo Terminal Unit), CTU (Central Terminal Unit) and RTU (Remote Terminal Unit) card frames. Two serial ports are available; one is used for high speed RS-422 serial communication between the local card frame and the CTU (Central Terminal Unit) or TC-560 Data Transmitter Interface, and the other port is used for connection of a terminal. A modular front panel connector is provided for local terminal access for setup, calibration, and diagnostics. The function of the TC-3550 is defined by the firmware in EPROM and the associated hardware in the card frame.

Specifications/Features:

65C02/P4	Embedded 8 bit Micro-Processor/Controller @ 3.6 MHz.
27C256	Firmware/Control and default parameter EPROM
61256	Battery Backed RAM for parameter, data, and setup storage
27C256/27C128	Optional EPROM for expanded program or data storage (Bank Selectable for upper/lower 32K * 8 bit memory)
Comm Port 1:	RS-232 terminal modular connector on front of PCB, or setup and configuration, or for serial control of LDPs and other devices.
Comm Port 2:	RS-422 In (optically isolated), RS-422, RS-232 or TTL output. Used for high-data rate communication with other Triad Show Control system components.
Inputs (2):	Optically isolated inputs for direct E-Stop or other functions
Output (1):	Optically isolated output for external signaling with LED tally
Tally Display	2: Front Panel status LEDs for system status monitoring
Parallel I/O	20 lines, TTL level, input/output on edge connector
Buss Interface	Buffered Address, Data, R/W, O2, and card selection for: TC-3505 Memory Expansion TC-3510 Serial, Parallel and MIDI I/O expansion TC-3518 Serial I/O Controller TC-336 Digital to Analog Output Modules TC-346 Analog to Digital Input Modules Future Expansion
Reset Control	Front panel reset control coupled with watch-dog timer reset
Power Required	+5VDC @ 450 MA (+/- 12 VDC for RS-232C generated on-board)
Form Factor:	4.5" x 6.5" printed circuit board 28/56 .125 gold plated edge connector

APPLICATION (FIRMWARE DEFINED)

The function of the TC-3550 is defined by the firmware in EPROM and the associated hardware in the card frame.

LDC/SCU	Laser Disc/Source Controller, Standalone Show Control Unit
CTU	Central Terminal Unit
STU	Servo Terminal Unit
DTU/RTU	Data Terminal Unit/Remote Terminal Unit

The opto-inputs will normally be defined for two functions:

E-STOP or abort, which shall inhibit operation of the processor following an optional, orderly shutdown sequence.

START or CYCLE, which shall initiate any on-board programmed sequences, including events, real-time data, etc.

The opto output may be used for the following functions:

Heartbeat/alive signal to external equipment
E-STOP/inhibit output to signal system shutdown
ENABLE output to allow power or operation of external devices
RUN tally to indicate operation mode

The RED status LED on the front edge indicates that data is NOT being received from the main system for a CTU, RTU, or STU card frame. When proper data assigned to this frame is recognized, the red LED will extinguish.

The GREEN LED should normally be on, indicating proper operation of the computer. If it is OFF, the CPU has never "booted", (i.e. there is no power). If it FLASHES, it indicates an internal error, such as an invalid application ROM, bad RAM, or some other hardware failure.

ENABLING SECOND RS-232 PORT (TC-3550F and later)

This is a description of changes required on the TC-3550F Processor Board to enable a second RS-232 port.

1. Remove U9, 2602.
2. Add trace (wire) between U4 (TSC232), pin 8 (R21) and U9 (2602), pin 2 (I+).
3. Add trace (wire) between U4 (TSC232), pin 7 (T20) and U7 (26ls31), pin 2 (TX1+).
4. Place Jumper on pins 1 and 2 of JP2 header (TC-3550F).

Note: U7 cannot be removed on this processor board.

Use a DB9M remote connector on card frame with these pins to access the second RS-232 port:

1. GND
2. RXD
3. TXD

A Loopback test should be used to verify whether the second port is working. In order to perform this test, jump pins 2 and 3 together. Under Diagnostic, Port 9 (93.03), Port 0 (96.02). This should allow loopback within a terminal program.

JUMPERS/SWITCHES

- SW1: Front Panel Reset Switch
- Pin 1. Connects to ground
 - Pin 2. Connects to pin 1 (PB) of U10 (DS1232)
- JP1: Terminal/Focus Remote (Front Panel Modular)
- Pin 1. Connects to R5 (10 ohm) which connects to VCC
 - Pin 2. Ground
 - Pin 3. TxD - Transmit Data to the TC-3550
 - Pin 4. RxD - Receive Data from the TC-3550
 - Pin 5. Ground
 - Pin 6. N/C - Reset input on modified boards on all revisions above E
- JP2: Used to select RS-422 or RS-232 data type for the COM2: port
- Pin 1. Jumper to pin 2 for RS-232
 - Pin 2. (RXD2 of U5)
 - Pin 3. Jumper to pin 2 for RS-422 *
- Always jumper pins 2 and 3 (RS-422 vs RS-232 Input)
- JP3: Used to select clock speed for U5 only on revisions C and earlier
- Pin 1. Connects to pin 8 (Output) of U15 4Mhz Osc.
 - Pin 2. Connects to pin 5 (CLK) of U5 (65C52) 3.684 meg.
- JP4: Determines the memory type (RAM/ROM) and address space.
- Pin 1. Connects to pin 10 (RTS2) of U5 (65C52)
 - Pin 2. Connects to pin 1 (A14) of U11 (43256 RAM) (27256 ROM)
 - Pin 3. Connects to VCC
 - Pin 4. Connects to pin 27 (R/W) of U11 (43256 RAM) (27256 ROM)
 - Pin 5. Connects to R/W buss
- Jumper pins 2-3 and 4-5 for normal operation.

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

SOLDER SIDE			COMPONENT SIDE
+5VDC	2	1	+5VDC
CA1	4	3	CB1
DIG0	6	5	PB0
DIG1	8	7	PB1
DIG2	10	9	PB2
DIG3	12	11	PB3
DIG4	14	13	PB4
DIG5	16	15	PB5
DIG6	18	17	PB6
DIG7	20	19	PB7
CA2	22	21	CB2
SA0	24	23	DATA 0 (BUFFERED)
SA1	26	25	DATA 1 (BUFFERED)
SA2	28	27	DATA 2 (BUFFERED)
SA3	30	29	DATA 3 (BUFFERED)
SA4	32	31	DATA 4 (BUFFERED)
SA5	34	33	DATA 5 (BUFFERED)
EXTRST	36	35	DATA 6 (BUFFERED)
BRESET	38	37	DATA 7 (BUFFERED)
DIGST	40	39	ADDRESS 0
ENABLE-	42	41	ADDRESS 1
TX1 +	44	43	ADDRESS 2
TX1 -	46	45	ADDRESS 3
RX1 +	48	47	PHASE 2 02
RX1 -	50	49	R/W
INP1	52	51	IRQ
INP2	54	53	ADDRESS 4
GROUND	56	55	GROUND

VCC = 5VDC @ 550 ma.