
TC-560 TRANSMITTER INTERFACE
DESCRIPTION AND OPERATIONS GUIDE

REV 2.1 11/15/96

TABLE OF CONTENTS

1.0	Functional Description
2.0	Installation
3.0	I/O Ports
3.1	Revision C and Earlier
3.2	Revision E and Later
4.0	Programmer Console Interface
5.0	SMPTE Time Code Reader Interface
5.1	Revision C and Earlier
5.2	Revision E and Later
6.0	Terminal Operation
7.0	Setup and Configuration
8.0	Diagnostics System
9.0	Focus Remote System

This document is intended for the installation and support of Show Control Systems supplied by Triad Productions, Inc. and contains trade secret information regarding proprietary inventions and processes. This information may not be duplicated or revealed in any form without express permission of Triad Productions, Inc.

© 1989-1999 William J. Synhorst/Triad Productions, Inc. All rights reserved.

We believe this information to be correct and accurate at the time of printing. All specifications are subject to change. Triad will not be responsible for any damage related to any use of this equipment or documentation. Please report errors or omissions to Triad Productions.

SECTION 1.0 FUNCTIONAL DESCRIPTION

The Triad TC-560 DMX/TRX Data Transmitter Interface is designed to be the hardware link between the Synthesis Show Programming and Performance system and the physical input/output (I/O) devices connected to and controlled by the Show Control Computer. Data to device controllers is sent and received using RS-422 balanced line drivers and optically isolated receivers for high noise immunity.

There are two high-speed data channels available; the first normally assigned to conform to industry standard, USITT DMX-512 protocol for lighting dimmers and controllers, and the second for Triad-proprietary "TRX" communication protocol for animatronic, audio, and special effects controllers.

In addition, the TC-560 provides connection for two RS-232 level serial ports, used for 300-38.4K baud communication with other serial devices.

One of the RS-232 ports is normally dedicated to use a terminal or terminal emulator to access the various configuration, diagnostic, and utility functions provided by the on-board microprocessor and logic. Setup parameters and default values are stored in non-volatile battery-backed RAM memory. The default values are 9600 baud, no parity and one stop bit. This port may also be used to communicate with other "smart" controller devices.

The second port may be used to interface to a Triad TC-750S SMPTE Reader or other controllers as required in the specific configuration.

Revisions "E" and later consolidate all of the I/O into a single DB-15F connector and have a BNC connector for an external sync signal. This signal may be either video sync or composite video (for frame-lock applications), or SMPTE time code for random access synchronization, based on a jumper setting and the software configuration. The TC-560 is now capable of directly locking to an external sync or decoding SMPTE time code, without requiring a dedicated SMPTE reader.

The physical card is designed for use in PC/AT compatible 286/386/486-based computers, and conforms to the ISA (industry standard architecture) form factor and pin assignments adopted by the majority of "clone" manufacturers. *Neither the hardware or software are designed for use with the IBM MicroChannel architecture machines.*

Only +5VDC at 550 ma. is required for the operation of the card; all other voltages are generated on-board as required. Address and data signals are fully buffered between the PC buss and the TC-560 interface.

On-board proprietary firmware is used to manage all communications, data buffering and formatting, and control of real-time and user interface operations. Multi-tasking routines facilitate concurrent host and terminal control of all downstream devices for maintenance, diagnostic, and setup operation even during show performance.

The ability to update and enhance features and performance through firmware and software updates provides a clean path for future requirements as the system and requirements continue to evolve. Particularly welcome is the ability to standardize with other disciplines, as in the case of DMX-512 for lighting control or other industry standards as they evolve.

SECTION 2.0 INSTALLATION

The TC-560 Data Transmitter is designed to plug into a full-length PC/AT EISA compatible, 16 bit interface slot. The current revisions (REV C and E) only require the use of the eight-bit data bus, so if a 16 bit slot is not available, the card may still be used (assuming that there is clearance below the edge connector for physical installation).

As always, make sure that the hard disk heads are parked and power is disconnected prior to disassembling the computer or removing any cards. Use extreme care when handling any of the circuit boards or components to prevent static electricity or mechanical damage.

Verify that all I.C.'s are properly seated, and there is no mechanical or electrical interference with other cards or components in the computer.

Due to the number of connectors required on the back panel, it was not possible to provide a back-clip for mounting to the rear rail, so use extreme caution to ensure that the card is properly seated and aligned prior to reassembly or making connections. When the DB-9 connectors are properly secured to the hex nuts, the board will be held in a safe and firm position.

The TC-560 Processor will reset and restart automatically whenever the host computer is powered-up or receives a hardware reset signal. If the interface does "crash", or needs to be reset, there is a set of pins (JP7) above the yellow "STOH" tellback LED that may be shorted together to reset the on-board processor without interfering with the host computer. This manual reset may be required when performing special configurations or diagnostics. These pins may be brought to a rear-panel reset button using a .1" 2 pin female header if desired.

On revisions "E" and later, the jumper has been replaced by a momentary push button accessible on the rear edge of the board, above the BNC sync connector.

The firmware is programmed into a 27C256 EPROM (U30) located on the lower left corner of the card. The firmware consists of the Triad/65 system monitor in addition to the routines that control all aspects of the transmitter (XMIT:) interface functions and interactive menus.

The RAM module (U24) is installed in a special battery back-up socket and should not be removed unless directed by Triad. The RAM contains all of the configuration information for the interface, the current value of all of the analog, digital, and serial data, the default presets, plus all of the temporary information required to process the various data and functions. If it is necessary to remove the RAM, do not separate the RAM from the battery; remove the battery and RAM from the socket together!

Unless instructed otherwise, there should be no jumpers on JP2.

There should be a jumper between pins 1 and 2 of JP3 (rev C) or between 2 and 3 (rev E) for the first or only TC-560 installed in the host computer.

SECTION 3.0 I/O PORTS

SECTION 3.1 REVISIONS "C" AND EARLIER

There are two RS-232 level 6 pin modular "telco" style data ports and two RS-422 level DB-9F connectors located on the rear edge in addition to a 13x2 dual header parallel connector located at the top left edge of the interface card assembly. The header connector is used to connect a Triad TC-564PC Show Programming Console to the TC-560 Data Interface Card, and if used, requires a IDC header, ribbon cable, and DB-25F connector assembly for termination on a rear panel plate.

DMX Data Port

The upper nine pin DB-9F connector is normally used for lighting control applications and sends data in USITT DMX-512 data format. Current specifications and implementations of DMX-512 do not support a reverse data channel, so the RX lines are not used in this application. Other applications or future expansion to the DMX spec may allow use of the optical receiver provided on this port.

TRX Data Port

The lower DB-9F connector is used for Triad format show data connected to a Central Terminal Unit or other I/O frames. TRX data does support full duplex communication, so the RX lines should be connected to the TX lines of the CTU or terminal device.

The DMX and TRX ports are electrically identical, but care should be taken to connect the data to the correct port. Low capacitance, twisted pair shielded data cable should be used for all RS-422 data communication. The data receiver circuitry is optically isolated on all Triad processors (including the TC-560), eliminating the need for a common ground connection at both ends, which can result in ground loops and other noise or interference problems. The shield should be connected at the TC-560 end only for TRX data. A common may be required for certain dimmer manufacturers using DMX-512.

DATA/RS-422 CONNECTOR WIRING DIAGRAM

PIN	DESCRIPTION	WIRE COLOR
1	FRAME	Shield
2	RX +	White
3	TXA +	Red
4	TXB +	
5	No Connection	
6	RX -	Green
7	TXA -	Black
8	TXB -	
9	Common	

NOTES:

- DB-9F connector requires DB-9M mating connector.
- Wire color code shown is for Belden #8723 data cable.
- Substitute Black for Green for Belden #9829.
- TXB is a second 422 driver that can be used for a handshake line or a second, buffered data output. Consult Triad for application.

Terminal Data Connector

The upper modular port is used for terminal operations to setup and configure the TC-560 Transmitter Interface. The signals conform to RS-232 data levels. In some applications, this port may be used to communicate with other "intelligent" controllers. +5 VDC power is supplied through a 10 ohm current-limiting resistor on pin 6 to provide power to a handheld terminal. Use caution not to ground this signal, or to terminate to RS-232 output signals of an external controller.

Auxiliary Serial Data Connector

The lower modular port is used for additional RS-232 data communication. The current implementation of the firmware uses this port for SMPTE time code data from a TC-750S SMPTE Reader or a LDC (Laser Disc Controller) I/O frame. Again use caution not to terminate the +5 volt supply to other voltages or ground.

Terminations are made using 6 pin, crimp-on telco style connectors. Use cable designed specifically for modular interconnection. For applications that do not require the 5 volt supply, four pin connectors and cable may also be used. Configuration of the communications protocol and all serial communications is under control of the TC-560 firmware; there are no hardware jumpers or dip switches that must be preset for operation. Diagnostic routines within the firmware allow loopback and communications test with all of the serial ports.

6 PIN MODULAR RS-232 TERMINAL CONNECTOR

PIN	DESCRIPTION	WIRE COLOR
1	No Connection	Blue
2	Common	Yellow
3	RXD	Green
4	TXD	Red
5	Common	Black
6	+5VDC	White

NOTES:

- Triad "Standard" used on TC-3550, TC-560, TC-3518 cards.

SECTION 3.2 REVISIONS "E" AND LATER

On revision TC-560E and later revision processors, the I/O has been consolidated to simplify the data interconnect and to allow room for the additional sync connector and reset button. All data is available on a DB-15F connector, but the terminal serial port is duplicated on a 6 pin modular "telco" style data connector for use with a focus remote/setup terminal.

A BNC connector is provided above the terminal connector to allow connection of either video sync (or composite video), or audio line level SMPTE time code.

There is also a 13x2 dual header parallel connector located at the top left edge of the interface card assembly, used to connect a Triad TC-584PC Show Programming Console to the TC-560 Data Interface Card, and if used, requires a IDC header, ribbon cable, and DB-25F connector assembly for termination on a rear panel plate.

Terminal Data TCOM1:

This port, available on both the DB-15 DATA and the modular connectors, is used for terminal operations to setup and configure the TC-560 Transmitter Interface. The signals conform to RS-232 data levels. In some applications, this port may be used to communicate with other "intelligent" controllers. +5 VDC power is supplied through a 10 ohm current-limiting resistor on pin 6 to provide power to a handheld terminal. Use caution not to ground this signal or to terminate to RS-232 output signals of an external controller.

Auxiliary Serial Data TCOM2:

This is a second serial port, used for RS-232 level communications. The current implementation of the firmware uses this port for SMPTE time code data from a TC-750S SMPTE Reader or a LDC (Laser Disc Controller) I/O frame.

DMX Data

The lines labeled "DMX" are normally used for lighting control applications and transmit data in USITT DMX-512 data format. Current specifications and implementations of DMX-512 do not support a reverse data channel, so the RMX lines are not used in this application. Other applications or future expansion to the DMX spec may allow use of the optical receiver provided on this port.

TRX Data

The pins labeled "TRX" are used for Triad format show data when connected to a Central Terminal Unit (CTU) or other Triad I/O frames. TRX data does support full duplex communication, so the TRX lines should be connected to the TX lines of the CTU or terminal device.

The DMX and TRX ports are electrically identical, but care should be taken to connect the data to the correct port, as the data formats are not compatible. Low capacitance, twisted pair shielded data cable should be used for all RS-422 data communication. The data receiver circuitry is optically isolated on all Triad processors (including the TC-560), eliminating the need for a common ground connection at both ends, which can result in ground loops and other noise or interference problems. The shield should be connected at the TC-560 end only for TRX data. A common may be required for certain dimmer manufacturers using DMX-512. This is not defined in the USITT specification.

DATA CONNECTOR WIRING DIAGRAM

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Common	9	Common
2	TXD 1 (TCOM1:)	10	TXD 2 (TCOM2:)
3	RXD 1	11	RXD 2
4	DMX - (DMX-512)	12	DMX +
5	RMX +	13	RMX -
6	TRX -	14	TRX +
7	RRX +	15	RRX -
8	Common		

NOTES:

- DB-15F connector requires DB-15M mating connector.
- TX+ and TX- are incorrectly labeled on the silk-screen.

6 PIN MODULAR RS-232 TERMINAL CONNECTOR

PIN	DESCRIPTION	WIRE COLOR
1	No Connection	Blue
2	Common	Yellow
3	RXD	Green
4	TXD	Red
5	Common	Black
6	+5VDC	White

NOTES:

- Triad "Standard" used on TC-3550, TC-560, TC-3518 cards.
- Do not use if TCOM1: is already connected through the DB-15.

SECTION 4.0 PROGRAMMER CONSOLE INTERFACE

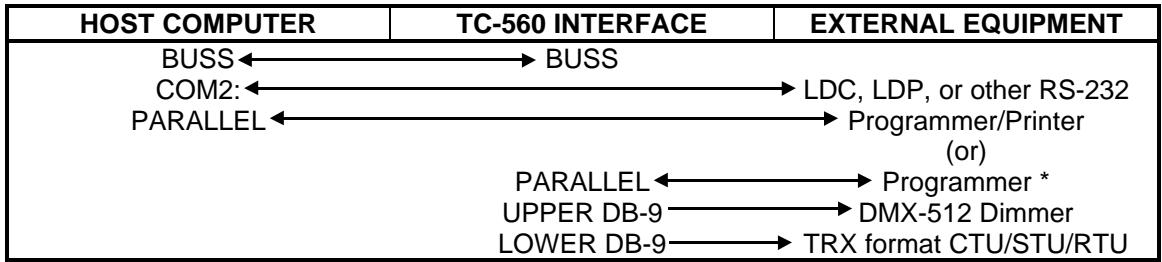
At the present time, the Show Programming Console is connected directly to the host computer and not to the TC-560 Data Interface Adapter. When the 26 pin header is connected to a DB-25F connector using an IDC ribbon cable, the pin assignment will be compatible with the IBM standard for parallel printer ports. Other applications for this port may include direct inputs for lighting presets, operator control consoles, etc.

SECTION 5.0 SMPTE TIME CODE READER INTERFACE
SECTION 5.1 REVISION C AND EARLIER

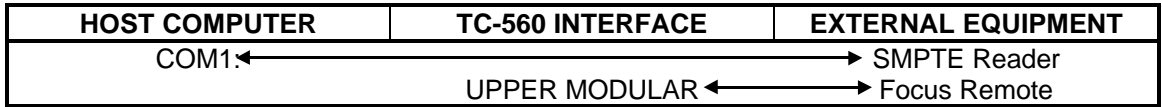
Beginning with release 89.12 of the transmitter firmware and Synthesis software, it is possible to connect a Triad TC-750S SMPTE Time Code Reader/Controller directly to the TC-560 Transmitter card using either a serial port or the buss interface to the host computer.

Normally, the SMPTE Reader connects directly to the COM1: port of the host, but by routing the SMPTE data into the transmitter card, the COM1: host port may now be used to talk to the transmitter card OR freed up for other applications.

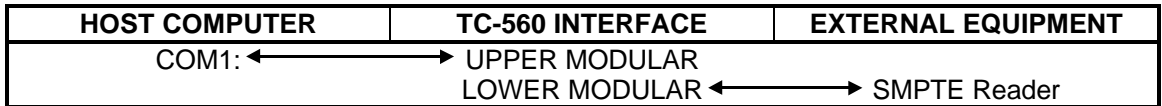
The RS-232 level signals from the TC-750S are connected to LOWER modular port on the TC-560 Interface card. The UPPER modular port may now be connected to either the focus remote terminal **or** the COM1: port of the host as follows:



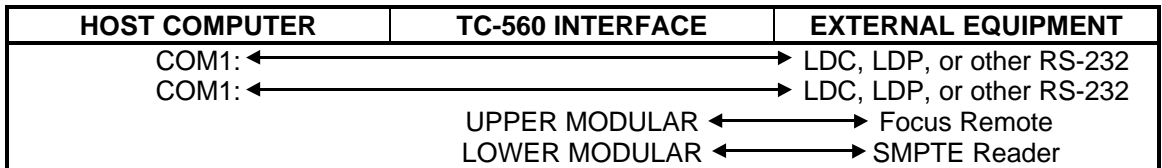
A. Not using transmitter card for SMPTE:



B. SMPTE transferred to host over COM1: or buss, allows setup and focus/diagnostics on the transmitter card or SMPTE reader through COM1: using the Terminal emulator in the synthesis software.



C. SMPTE transferred to host over buss, allows use of focus remote and COM1: for other equipment.



* Not implemented at this time.

SECTION 5.2 REVISION E AND LATER

Decoded SMPTE data in serial format may still be relayed from the TCOM2: port to the buss or the PC's serial port as described above (although the modular ports do not apply the same way). However, beginning with revision E of the TC-560 Data Transmitter Interface, it is now possible to read and decode SMPTE time code directly, eliminating the requirement of a separate reader and tying up one of the serial ports. (This is particularly useful for Show Programming, when the reader is already installed in the equipment rack!)

Note however some of the following limitations, compared with using a TC-750S SMPTE Reader/Controller interface:

- At the present time, ONLY 30 FPS, non-drop code format is supported.
- There is no "jam-sync", offsets, or other manipulation that can be performed on the code.
- There is no pilot or tach "fallback", i.e. for projectors.
- There is no deck control or auto-cueing capabilities.
- The level of error detection/correction is very limited compared to the "smart" routines in the TC-750.
- Only unbalanced, line level signals may be used.

The signal should be at a nominal level of no lower than -10db referenced to 1 volt and free of dropouts or level shifts. We recommend the use of a phono to BNC adapter on the TC-560, with the audio terminated in a phono plug. There is a jumper (JP8) immediately above the reset button that should be set across pins 2 and 3 (labeled "S") on the silk-screen.

If video sync is to be used, 75 ohm coaxial cable should be terminated in a BNC connector. The signal can either be a composite NTSC video signal or video sync (nominal -4 V P-P). In this case, set JP8 to the top two pins, labeled "V".

SECTION 6.0 TERMINAL OPERATION

A "dumb" terminal or terminal emulator (i.e. within the Synthesis system) may be connected to the **upper** modular port of the TC-560 to access the diagnostics, configuration, focus remote, and other system options directly. Please refer to the reference section for information on the TechTerm terminal.

Configuration parameters, initial defaults, and other operating parameters are stored in battery-backed RAM memory when the interface is powered down. The standard communications parameters for the terminal are as follows:

9600 baud, No parity, 8 data bits, 1 stop bit

Normally, there is a "sign-on" message displayed whenever the TC-560 is reset and the dip switch is not set to zero (0). Otherwise, the display is quiet until a specific request is entered from the terminal. An exception to this is when the terminal port is being used to buffer SMPTE data from the lower modular connector (SMPTE reader) to COM1: of the host. In this case, the characters displayed will appear as "garbage" data.

To get the TC-560's attention for manual control, press the ESC (escape) key on the terminal. The TC-560 should respond with a menu roughly as follows:

```
XMIT:    C.fig D.iag F.focus R.un ?                *Version 95.11
```

*There are many version numbers so to verify your version number, press the letter "V" (version) when you see the XMIT prompt. The display should read:

```
TC-560E XMIT V95.11  
(Copr.) 1994 WJS
```

If your XMIT menu is different, you have an older version. Please contact Triad and we will assist you with understanding your particular menu.

Options are normally selected by pressing the letter key corresponding to the desired operation, i.e. "C" for configure, "D" for diagnostics or "F" for focus. Once again, pressing "V" (version) will give information about the current release of the firmware that is installed (not shown on the menu.)

Most operations are case-insensitive. Although the interface will continue to transmit DMX and TRX data to the remote devices and buss communication is maintained with the host computer, several tasks are not possible while the menu functions are being used. **Therefore, it is essential that the interface be placed into the R.un mode (or reset) when all terminal operations are complete.**

The **Escape** key is generally always used to terminate any operation, and to return to the next higher selection or menu level. Pressing ESC from the XMIT: (main) menu will also cause the system to restart similar to R.un. If ESC is pressed two times within a second at the XMIT: menu, the system will drop into the Triad/65 monitor and debugger and all functions will cease. The only (known) exception is when it is necessary to 'exit' the terminal mode. In this case, CTRL-A is used to exit terminal operation and return to the Diagnostic menu. To restart the system from the monitor, either do a hardware reset, or type in the following command:

```
C000G (that's zero, not "o"!)
```

An additional function is available from most menus. Pressing "?" will give more information or help about what the commands or options do.

Refer to the section "References" TechTerm operation, for more information regarding the hand held terminal used for diagnostics, maintenance, and focus operations.

NOTE: The Focus Remote and Diagnostics systems will "blind" channels accessed locally from the host programming system, such that control becomes that of the terminal connected to the TC-560, not the host system until explicitly R.estored or R.eset by the operator.

SECTION 7.0 SETUP AND CONFIGURATION

Please note that for the transmitter card to talk to the Synthesis software, the Synthesis XMIT status needs to be set to DMX/TRX. To do this:

- Enter the main Synthesis menu
- "o" for Operator
- "d" for Diagnostics
- "shift s" for Setup
- Press "x" until it toggles the XMIT display line to read DMX/TRX. Now the card can talk to Synthesis.

In dealing with the transmitter card again, the CONFIG: menu is used to display and set characteristics of the TC-560 Transmitter Interface. It is accessed by selecting "C" from the main menu. The terminal will display a menu similar to the following:

```
CONFIG:C.om D.ip F.mt {CTU} P.rt Sync T.xd X. Z.ap          Version 95.11
```

- C.om Displays the current configuration of each of the four serial ports. It currently only displays these values (no change can be made), and is only valid for release "C" and earlier boards. The display for the four serial ports should read:

```
TC1: 9600, DS, 8, 1
TC2: 9600, DS, 8, 1
TC3: EXTN, DS, 8, 2
TC4: EXTN, DM, 8, 1
```

- D.ip Displays and sets a "soft" switch, which is a carry-over from earlier systems that used hardware switch settings to control operations. There are no significant functions assigned to this switch in the TC-560 firmware, so a value of 00 is recommended. The display should read DIP=00.

Remember:
DIP=00 means no sign on message
DIP=10 means has a sign on message

- F.mt Used to select the transmission format for the TRX (Triad format) data. A submenu showing the format options and current configuration will be shown, similar to the following:

```
FMT:  CTU: F0 B *STU: A0 00 D0 O ESL:
```

The asterisk (*) shows the current mode, and the other parameters for each data format are also displayed.

The normal setting is CTU (Central Terminal Unit), which in turn will talk to STU, DTU, or RTU I/O frames. There are two parameters for a CTU, the FRAME ID which is normally F0 for the first CTU frame, and 'B' which signifies that a break is used as the "wakeup" call for each data packet.

During programming or for special applications, the format may be set to STU (Servo Terminal Unit), which allows the transmitter card to communicate directly with a STU, DTU, or RTU I/O frame. The analog and digital bank parameters must be set to match the I/O frame settings as mapped into the full system, and consists of two analog banks (A0-AF), a digital group (D0 or D1), and a format parameter of O or E. Check the notes section at the end of this section to see if any updates are applicable to this information.

ESL is an option that allows use of Electrosonic Ltd. I/O frames through RS-232 serial communication in "U-format" data messages. Please contact Triad or Electrosonic for further information or application assistance.

P.rt Will print (display) the software revision and current configuration settings. A communications program (such as ProComm) may be used to capture this information for future reference. (We also suggest that the analog and digital presets be logged.) The display should read:

```
TC1: 9600, DS, 8, 1
TC2: 9600, DS, 8, 1
TC3: EXTN, DS, 8, 2
TC4: EXTN, DM, 8, 1
DIP= 00
FMT: CTU: F0 B *STU: A0 00 D0 O ESL:
SYNC: I.ntV *S.MPTE P.il R.em sX=45
T= 0C
X= 40
```

Sync Used to configure how the time code reader is interfaced to the Synthesis Show Control System via the TC-560 Interface card. An asterisk (*) next to one of the menu items means that it is the currently selected sync mode. For sync choices press the first letter of a source; for sX press "x". The menu should read:

```
SYNC: I.ntR or I.ntV *S.MPTE P.il R.em sX=45
```

I.ntR (Internal) is used when it is necessary to run on an internal clock, with all other behavior similar to SMPTE I.ntV on the SCU. Internal real time display reads I.ntR. Pressing "I" selects real time internal sync at 60 Hz.

I.ntV Internal video time display reads I.ntV. Pressing "V" selects video time internal sync at 59.94 Hz.

Configure the Synthesis software to read "S.sync S.mpte", with a source of "TC-560". To accomplish this:

Escape to the main XMIT menu, press "r" to Run. Hit ALT X to exit the transmitter menu, escape back to the main Triad Synthesis menu, hit "o" for operator, hit "d" for diagnostics, "shift s" for setup, press letter "s" until line 2 of screen (Ssrc) toggles to TC560. Escape back to main Synthesis menu. Press "s" for sync, press "s" for SMPTE, upper right hand corner of screen should read Sync: SMPTE. Escape back to main Synthesis menu. To return to the transmitter menu, hit "o" for operator, hit "t" for terminal, hit escape and transmitter menu should be up.

S.MPTE Used to select SMPTE time code recovery from longitudinal time code applied to the sync input connector. Refer to Section TC-750S.4.

P.il (Pilot) selects reading 59.94/60 Hz. pilot signals derived from video sync, composite video, or line

frequency sync injected into the BNC sync connector (TC-560 rev. E or later versions).

R.em (Remote) should be used when a TC-750S SMPTE Reader/Controller, LDC/SCU I/O frame or TC-550 BART Controller used as a source of time code is connected to the TCOM2: (or lower modular port of the TC-560 for revision C or lower hardware versions).

sX=45 Parameter for bit programming of SMPTE. Allows you to adjust SMPTE bit timing if SMPTE errors are occurring. For number value change, select x, then use > (greater than) or < (less than) to change to your desired value.

- T.xd A time-out delay that determines the automatic refresh rate of the TC-560 Transmitter when the interface is not being updated by the Show Control Computer as a result of E.xecuting with time code. This refresh is essential for DMX dimmers, which will go to black after 30 seconds of lost data. Triad I/O frames hold the last received data "forever", although it is a good idea to keep fresh data coming. The default value is \$0C (hex), and will be configured on-site.
- X. Factor is a software delay associated with the timing of the DMX/TRX data. The normal value is between \$30 and \$50 (hex) and will be specified during installation and setup.
- Z.ap Provides a means of performing a "soft" reinitialization of the TC-560 interface. This restores all settings to their original defaults, and should only be performed as a last resort and ONLY if you have a log of the correct configuration and settings for the specific installation and application. When Z.ap is selected, you will be prompted "Are you sure?". Respond with an upper case "Y" to confirm, or Escape to cancel.

SECTION 8.0 DIAGNOSTICS SYSTEM

DIAG MENU

D.iag is the Diagnostics menu, and is used to exercise analog and digital channels, display channel status, test serial communications, and so on.

**** IMPORTANT ****

When any digital or analog channel is selected in the D.iagnostics system, it is automatically "blinded" from receiving any data from a higher source, in this case, the Show Control Computer. Otherwise, data from the SCU device would "wipe out" any local settings. The channel WILL REMAIN BLIND until explicitly reset by using the R.eset command. The R.eset command is in the Synthesis Software main menu. From the Diagnostics menu hit Alt x, hit Escape, hit r for Reset, and you should be back to your default settings (the system is now reset). To return to the Diagnostics menu in the transmitter card, hit "o" for Operator, "t" for terminal, and then hit escape. The Diagnostic menu for the transmitter card should be on the screen.

A system reset can also be accomplished by depressing the button on the side of the transmitter card, or by turning the computer off and then on again so that all settings can return to their defaults.

If you do not want a complete system reset and you want to unblind separately an analog OR a digital channel or channels, this can be done by staying in the transmitter card, Diagnostics menu. To accomplish this: select "a" for analog or "d" for digital, then "r" for R.st (Restore) and "u" for U.nb (Unblind)--see options below for more detailed explanations.

DIAG: A.na D.ig S.ts T.rm Esc

Version 95.11

A.na: C.hn P.re R.st S.ts U.nbl Z.ap

C.hn (Channel) Selects an analog channel to exercise, and allows setting or ramping the current level. A channel that is actually changed is blinded until U.nb (Unblind) is selected from the Diagnostics menu, or a transmitter card is reset by either pressing the reset button, or selecting R.un from the menu.

P.re (Preset) Makes the current analog settings the default preset for when the transmitter card is reset. The prompt will read "Are you Sure?". Respond with "shift Y" to proceed, or "shift N" to cancel this operation. If the value for an analog channel is P.reset to 255, then when the transmitter card is reset, the analog channel will remain at the last value set (from 0 to 255) and will not be cleared or set to a default value.

****Please note that there should not be different presets for the transmitter card and Synthesis software.****

The purpose of presets is to have a safe power up condition. Every aspect of the show needs to be in a safe home position when powered up. For this reason, the presets in the transmitter card should match what is in the Synthesis software preset. To accomplish this match, hit "u" for Unblind, hit escape twice, hit "r" for Run, hit "Alt x" to exit the transmitter card menu, hit escape to enter the Synthesis software main menu, hit "r" for reset, re-enter the transmitter diagnostic menu by hitting "o" for operator, "t" for terminal, hit escape once or twice, hit "d" for diagnostic, hit "a" for analog, hit "p" for preset, hit "shift y" for yes (for answer to--Are you sure?). Hit escape, hit "d" for digital, hit "P" for preset, hit "shift y" for yes (for answer to--Are you sure?) The preset values for Synthesis software and the transmitter card preset should now

match. To check the status refer to the status section instructions listed below.

R.st (Restore) Sets the values to the default (preset) value, unless the preset was set to 255 as described above. If data is being received from the Show Control Unit, the current show level will be assumed. Please note that Restore does not unblind a channel! USE CAUTION WHEN RESTORING/UNBLINDING ANALOG CHANNELS!

S.ts (Status) Displays the current status of the analog output channels configured in the system. Channels are shown as an 8 bit value displayed as 000-255. A 'b' next to a channel indicates that the channel is currently blinded. To control scrolling of the status data, hit "Ctrl s".

U.nbl (Unblind) Unblinds all analog channels from local control, and immediately returns control of the analogs to the host computer.

NOTE: Channels become blinded automatically whenever the diagnostic or focus remote systems "touch" (change) one or more channels. In this case, control is through the terminal to the TC-560 Transmitter card directly. Data from the host Synthesis computer is not allowed when a channel is blinded.

USE EXTREME CAUTION WHEN UNBLINDING CHANNELS, especially for animation and show action equipment that may move in an unsafe manner.

Z.ap Resets all analog channels to a value of 000. Unless this is also made a P.reset (see above), the channels will revert to their preset values when the channels are R.st (Restored) or a system restart is performed. A prompt of "Are You Sure?" is presented; respond with "shift Y" to confirm clearing of all channels, "shift N" to decline.

D.ig: C.hn P.re R.st S.ts U.nb Z.ap

These are the digital diagnostics options, used to set/clear any or all of the digital channels in the local (or downstream remote) card frame(s).

- C.hn (Channel) Allows selection of an output card and subchannel on the card and shows the current status (on/off). Pressing the ENTER key will toggle the status of the channel on->off->on, and blind the output from Show Control.
- P.re (Preset) Makes the current digital status of all digital channels (on or off) the default preset when the transmitter card is restored or a system restart is performed. The prompt "Are you Sure?" will be presented; respond with "shift Y" to proceed, or "shift N" to cancel this operation.
- R.st (Restore) Sets the values to the default (preset) value, unless the preset was set to 255 as described above. If data is being received from the Show Control Unit, the current show level will be assumed. Please note that Restore does not unblind a channel! USE CAUTION WHEN RESTORING/UNBLINDING ANALOG CHANNELS!
- S.ts (Status) Displays the current status of the digital output channels configured in the system. Channels that are off are shown as a '-' character, those that are on are shown as a '*'. A 'b' next to a channel indicates that it is currently blinded. To control scrolling, hit "Ctrl s".
- U.nb (Unblind) Unblinds all digital channels from local control or lockout, and allows the host computer to control their status.
- Z.ap Resets all digital channels to clear or off. Unless this is also made a P.reset (see above), the channels will revert to their preset values when the channels are R.st (Restored) or a system restart is performed. A prompt of "Are You Sure?" is presented; respond with "shift Y" to confirm clearing of all channels and "shift N" to decline.
- S.ts (Status) Displays the current status of all of the analog and digital channels configured in the system. To control scrolling, hit "Ctrl s". Note that this display will overload the focus remote terminal, and will only be useful on a 24x80 display screen.
- T.rm (Terminal) Allows communication between the terminal port and devices connected to one of the auxiliary comm ports on the TC-560 Transmitter Interface. No buffering of data is performed in this mode, so the maximum communications speed is limited to the SLOWEST of the device baud rates. The TC-560 will prompt for the port to use:

PORT 0 - TCOM1:	top modular connector (software loopback)
PORT 1 - TCOM2:	lower modular connector (rev C)
PORT 2 - DMX Port	upper DB9 RS-422 port (rev C)
PORT 3 - TRX Port	lower DB9 RS-422 port (rev C)

Note that it is not possible to simulate the entire data format of meaningful DMX or TRX data using normal terminal communications; however, it is possible to do "loopback" tests to confirm the operation of the hardware and wiring.

Use Control-A to exit terminal communications. ESC.ape exits the diagnostics menu and returns to the main XMIT: menu.

SECTION 9.0 FOCUS REMOTE SYSTEM

The Focus Remote subsystem allows a "dumb" terminal connected to the terminal (upper modular) port of the TC-560 Transmitter Interface the ability to select individual channels or a range of channels connected to the DMX interface port, and manually set levels from -- (off) to FL (full level). Please refer to the reference section for information on the TechTerm terminal.

This provision is made to allow independent testing of the lighting system, without requiring intervention of other show programming functions or an additional lighting controller.

When specific channels are accessed through the focus remote system, they become automatically "blinded" from the main programming system and will not respond to Show Control programming until manually released or R.st (Restore)d at the focus remote terminal, or a system reset is performed.

*IMPORTANT NOTE - It is possible to address all 512 analog channels directly from the focus remote system, including channels that **may** be used by audio, animatronics, special effects, or other devices. Sudden changes of any kind may not be tolerated or may be potentially dangerous to devices that require real-time programming and visual observation for safe operation. Please be sure that you **ONLY** address analog channels specifically designated for lighting when using the focus remote terminal (especially when using ranges or groups!). Future revisions will include the capability to automatically lock-out any "illegal" channels, in the meantime, use extreme caution.*

To access the focus system with a terminal, first press the "ESC" key to call up the XMIT: menu. The menu should appear (roughly!) as follows:

```
XMIT: C.fig D.iag F.ocus R.un
```

This is the "Main" menu, from which several sub-functions may be selected. ***When you have finished with the focus session, it is necessary to put the system back to dedicated transmitter operation by pressing the "R" (R.un) key, or pressing ESC.ape once to re-initialize the system.***

Next press the "F" key to enter the Focus subsystem. (It is not necessary to use the shift key when selecting menu options.) The display should now resemble the following:

```
FOCUS: Pst Rst Sts Ubl Zap
chn/- chn = lvl
001
```

The number on the bottom is the default/starting channel that will be used for the next entry. A channel number may now be keyed in directly, using any number from 1 to 512. The terminator character or keys described below define which functions are available. For example, to state a range, enter your channel range numbers, say 1-10 (make sure to use the dash between the numbers) then hit your "enter" key. The @ sign should appear. You can now enter a value by pressing ">" or "<" to increment the number, or just manually enter a value, say 50. Hit enter again. The lights on channels 1-10 should be up at 50%. Remember that if you want lights at full level use the term FL. Terminator character definitions are as follows:

- SPACE or "/" (forward slash) - accept the current number, and prepare to enter another channel number. Each channel is a single channel to be addressed in this "cue", and this may be repeated as many times as required to include all individual channels requesting a new level.
- "-" (dash) - accept the current number as the start of a range of channels, and prepare to enter the ending range channel number. All channels from the first - (through) the final channel inclusive will be set to the target level.
- "<" or "," key - reduce the currently displayed channel by one, but do not advance to the next field.
- ">" or "." key - increment the currently displayed channel by one, but do not advance to the next field.