Aural STL System

THE STL PERFORMANCE LEADER

TFT, Inc. is an industry leader in broadcast quality Studio-Transmitter Links (STL) and Intercity Relays for Stereo, Monaural, and Multi-channel program audio applications. Several U.S. Letters Patent pertaining to the design of RF equipment and STL transmitters have been granted to TFT.

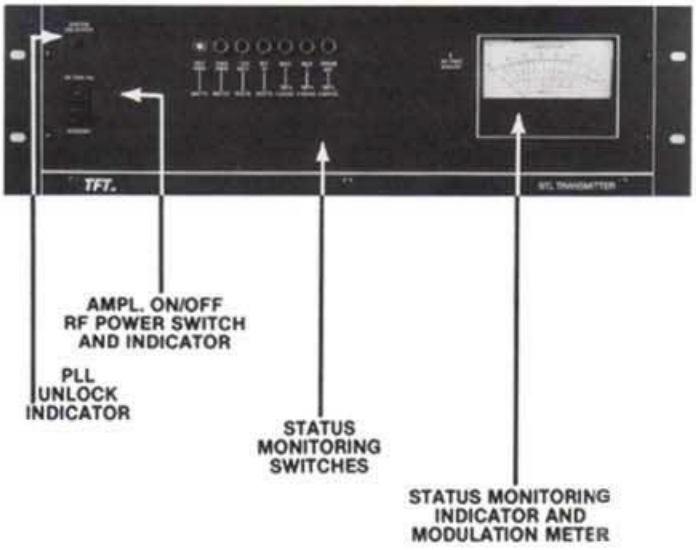
Since the introduction of the 7700B Series, thousands of units have been installed and are operational in the United States and worldwide. This equipment is also frequently used for direct-to-line multiplexing of broadcast programs, voice and data transmission where low intermodulation and excellent group delay characteristics are required.

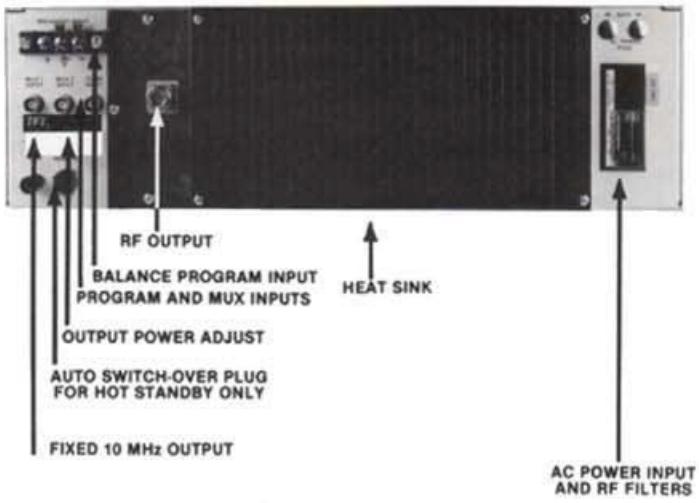
FEATURES

TFT STL's are designed for transmission of high quality broadcast programs using state-of-the-art RF and digital technology. Some of the innovations in the 7700B Series STL include:

- ☐ **IF Modulated Transmitter**—Increases signal-to-noise ratio and stereo performance by providing low distortion and high stereo separation.
- ☐ **Hot Standby**—A fully redundant receiver and transmitter are available, both with automatic transfer and alarm, which provide maximum system reliability in transmission of broadcast programs.
- ☐ **Modular Construction**—Modular construction in the transmitter and receiver contribute to low maintenance cost and ease of field servicing.
- ☐ **Ease of Maintenance**—Calibration of both the transmitter and receiver are easily accessible.
- ☐ **Front Panel Metering**—Forward and reverse power, audio levels, modulation, subcarrier injection and RF input level in microvolts, and other important circuit parameters may all be monitored directly from the front panel.
- ☐ **RFI Protected**—The 7700B Series was designed and field-tested in the most adverse RF environments at many high power broadcast transmitter sites for RFI protection verification.
- ☐ **Wide Selection of Frequency Ranges**—Provides STL capability for most worldwide applications.

7700B SERIES





THE TRANSMITTER

The rugged TFT 7700B Series transmitter represents an innovative approach to STL transmitter design, providing a vast improvement in S/N ratio, frequency stability, and audio performance.

FEATURES

- **IF Modulation**—The transmitter's modulation is applied to an IF frequency to achieve excellent signal-to-noise ratio and stereo performance. The final carrier frequency is obtained by heterodyning the carrier frequency against a stable frequency source and the carrier is then phase-locked to the IF.
- **Fully protected**—The output is fully protected against open and short circuits as well as high VSWR.
- **Excellent Frequency Stability**—Frequency synthesized carrier provides frequency stability of ±1 ppm/year as well as making it easier to change operating frequencies in the field.
- **Accommodates Multiple Subcarriers**—Two FM subcarriers can be inserted in addition to the main and stereo channels for SCA broadcast. One more can be added for remote control or order wire for non-broadcast use.
- **No Subcarrier Beats**—19 kHz harmonically related frequencies are chosen for use as subcarriers to eliminate intermodulation products in the baseband.

APPLICATIONS

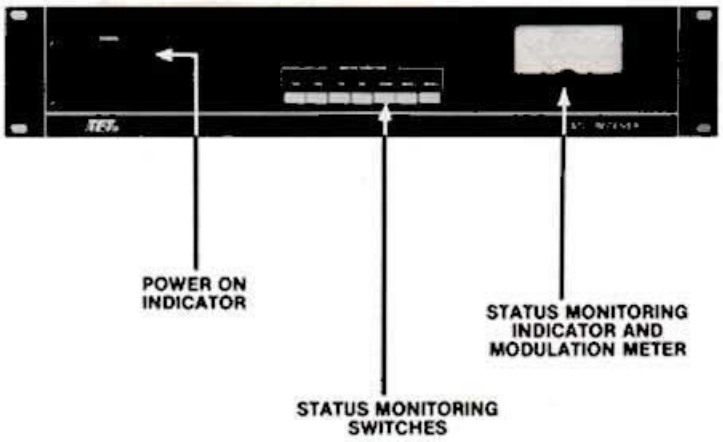
The broadband characteristics of the TFT 7700B Series STL Systems allow for many specialized applications beyond the standard aural studio-transmitter link for a composite stereo baseband signal. Among these are:

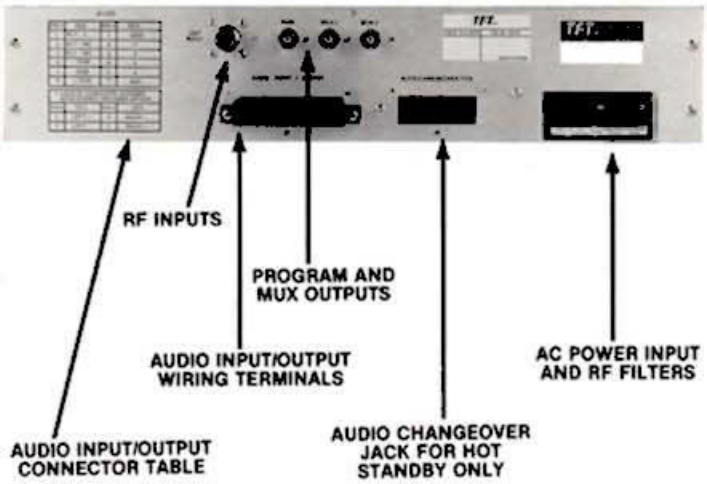
- **Intercity Relay Systems**—By linking a number of STL transmitters and receivers in series, broadcast quality audio links between cities may be achieved, providing high quality stereo or multi-channel audio service to each city.
- **Remote Control**—With the addition of an FM subcarrier, the 7700B series STL can carry remote control signals from the studio to the transmitter site.
- **Multi-channel Audio**—Up to 4 channels of high quality radio programs or a mixture of audio and data can be transmitted via the 7700B Series STL by using FM Subcarriers and/or direct-to-line multiplex baseband equipment.
- **Stereo Decoder and AM Stereo**—An optional built-in stereo decoder can be installed in the 7700B Receiver to provide L and R channel outputs for monitoring purposes or AM stereo program transmission when the transmitter is used in conjunction with a standard FM stereo generator.

FACTORY ASSISTANCE

Application Engineering and STL Application Guides for equipment selection and path calculations are available upon request.

Aural STL System





THE RECEIVER

The design of the TFT 7700B Series receiver incorporates several unique features that provide low noise, high gain and great versatility. All receivers allow for automatic changeover to hot standby in the event of a detected malfunction.

FEATURES

- **Crystal Controlled Triple Conversion Superheterodyne Design**—Provides excellent SNR and frequency stability.
- **Low Noise RF Amplifier**—A high gain and wide dynamic range RF front end provides a 2.0 dB noise figure.
- **Pulse-counting Discriminator**—A unique pulse-counting discriminator circuit provides ultra-linear FM demodulation to achieve low harmonic and intermodulation distortion.
- **Remote Operation and Status Check**—The receiver can be interrogated by existing remote control equipment to determine receiver change-over status. Receiver switching can also be activated by remote command when it is used in conjunction with the Model 7773, Receiver change-over unit.

ACCESSORIES AND OPTIONS

Model 7770 Transmitter Automatic Changeover: A 1¾" rack mount unit which monitors critical parameters in the transmitters. If a malfunction occurs in the main transmitter, it automatically switches to the hot standby transmitter. Changeover can also be accomplished by a front panel switch or a pair of relay contact closures in the remote control equipment. The unit is self-powered and has a built-in coaxial relay rated at 1 KW.

Model 7773 Receiver Automatic Changeover: Similar to the Model 7770, Model 7773 monitors critical parameters in the receivers. The unit switches the program channel output as well as both subcarrier outputs.

Stereo Decoder (Option 15): Plug-in FM stereo board for decoding left and right channels. (For external audio monitoring or providing L and R channels for AM stereo broadcast.)

Frequency Division Multiplex (FDM) Baseband Encoder and Decoder: Multiple broadcast programs can be transmitted with full audio bandwidth by using optional FDM encoders and decoders. Please consult the factory.

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TFT INC SPECIFICATIONS TFT INC

SYSTEM

Frequency Ranges ..... 140–175 MHz, 200–240 MHz, 300–330 MHz, 440–470 MHz, 806–960 MHz

Baseband Frequency Response ..... Program Audio
Composite: 50 Hz–75 kHz (105 kHz optional)
Monaural: 50 Hz–15 kHz
Multiplex
Composite: 110 to 220 kHz
Monaural: 39 to 67 kHz

Harmonic and Intermodulation Distortion ..... Composite: 0.2% from 30 Hz to 15 kHz; 0.3% other frequencies
Monaural: 0.2% from 30 Hz to 15 kHz

Signal-to-Noise Ratio ..... Greater than 70 dB below 100% modulation (±75 kHz RF Carrier deviation and with 75 μs de-emphasized left and right channel.)

Modulation Capability (deviation for 100% modulation) ..... Program Channel: ±75kHz
Multiplex Channel 1: ±6 kHz
Multiplex Channel 2: ±6 kHz

RECEIVER

RF Input Connector ..... 50 ohm, Type "N" Female

Sensitivity ..... Composite Models: 40 μV for 60 dB SNR, de-emphasized
Monaural Models: 20 μV for 60 dB SNR, de-emphasized

1 mV RF input without de-emphasis ..... Composite Models: 60 dB Min. (75 kHz B.W.)
Monaural Models: 65 dB Min. (15 kHz B.W.)

1 mV input with 75 μsec de-emphasis ..... Composite Models: 800 μV for 70 dB SNR with de-emphasis 800 μV for 60 dB SNR without de-emphasis
Monaural Models: 400 μV for 70 dB SNR with de-emphasis 400 μV for 60 dB SNR without de-emphasis

Selectivity (3 dB Bandwidth) ..... Composite Models: 320 kHz Min.
Monaural Models: 170 kHz Min.

Selectivity (60 dB Bandwidth) ..... Composite Models: 2.4 MHz Max.
Monaural Models: 1.4 MHz Max.

Demodulated Audio Program Output ..... Composite Models: +10 dBm (2.48V RMS) into 600 ohm balanced, +4 dBm (1.24V RMS) into 600 ohm unbalanced, 500 Hz to 105 kHz
Monaural Models: +10 dBm (2.48V RMS) into 600 ohms balanced, +4 dBm (1.24V RMS) into 600 ohms unbalanced, 50 Hz to 15 kHz.

Multiplex ..... Composite Models: −3.7 dBm (0.50V RMS), 600 ohms, 110 to 220 kHz unbalanced
Monaural Models: −3.7 dBm (0.50V RMS), 600 ohms, 39 to 67 kHz unbalanced

Stereo Separation ..... Composite Models: 48 dB at 1 kHz (50 dB typical), 40 dB minimum at other audio frequencies.

Crosstalk ..... Main to Sub:
Composite Models: 46 dB Min
Monaural Models: 46 dB Min
Sub to Main:
Composite Models: 46 dB Min
Monaural Models: 46 dB Min

Baseband Response ..... ±0.1 dB:
Composite Models: 50 Hz to 60 kHz
±0.2 dB:
Monaural Models: 30 Hz to 15 kHz
±0.5 dB:
Composite Models: 20 Hz to 75 kHz

Alarm Output (Relay Closure) ..... 1 A at 24 VDC, 0.5 A at 115 VAC

Temperature Range ..... 0°C to +50°C

Power Requirements ..... 120/240V AC, 50–60 Hz, 12 W

Dimensions ..... 3.25" (8.3 cm) H × 19" (48.3 cm) W × 15.5" (39.4 cm) D

Weight ..... 11 lbs (5 kg) net; 15 lbs (6.8 kg) shipping

TRANSMITTER

RF Power Output (max) ..... 10–12 watts 806–960 MHz (15—20 watts, other bands)

Output Connector ..... 50 ohm, Type "N" Female

Frequency Stability ..... 1 ppm/yr

Frequency Accuracy ..... 0°C to +50°C, 0.0001%

Spurious Signal Suppression ..... Harmonically and Non-harmonically Related: 65 dB

Modulation Input Levels .... Composite: 1.24V rms into 10 K ohms
Monaural: 1.24V rms into 10 K ohms or +10 dBm (2.48V rms) into 600 ohms balanced
Multiplex: 0.53V rms into 10 K ohms

AC Line Power ..... 70 watts, (120/240 VAC, 50, 60 Hz)

Operating Temperature Range ..... 0°C to +50°C

Dimensions ..... 5.25" (13.3 cm) H × 19" (48.3 cm) W × 13" (33 cm) D

Weight ..... 29 lbs (13 kg) net, 34 lbs (15.3 kg) shipping