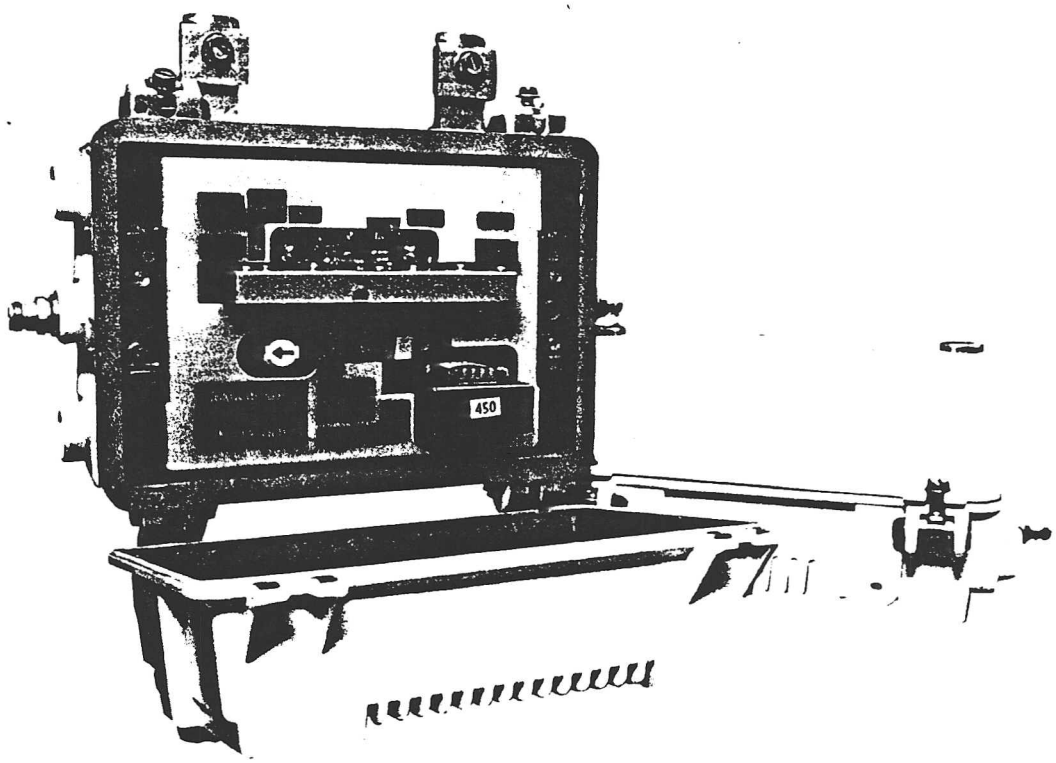
Texscan
CORPORATION

CATV Instruction Manual

Model T8LET/T9LET

Thermal Line Extender Module



Changes which occur after this field instruction manual has been printed will be described in instruction manual Revision Bulletins. These bulletins will give the reader a detailed description of each change and can be attached to the basic manual for reference purposes. Copies may be obtained by contacting Texscan Communication Products Division at the address shown in the adjacent block.

The instructions in this manual do not cover all details on the equipment it supports, nor do they provide for all circumstances that could arise during equipment maintenance. The instructions included are intended to be performed only by an experienced CATV service technician. However, if further information is desired, or if certain problems arise which are not covered in this manual, please contact Texscan Communication Products Division.

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Information, Parts, and Servicing Facility Location:

Texscan Corporation
Communication Products Division
10841 Pellicano Drive
El Paso, Texas 79935
(915) 594-3555

Attn: Customer Service Representative

THERMAL LINE EXTENDER MODULE
INSTRUCTION MANUAL

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1. GENERAL INFORMATION

1.1 Scope of Manual

This manual provides information and instructions to support the Thermal Line Extender (TxLET) Module in the field. Included are procedures to set up and service the module, troubleshoot and repair malfunctions to the replaceable module/component level, and to realign the module if required.

1.2 General Description

The TxLET Module, illustrated in Figure 1.2.1, is used in T Series CATV System line extender stations to provide distribution amplification in the 47 to 450 MHz spectrum. Dual hybrid amplifiers in the forward TxLET Module provide a selection of 28, 32, or 36 dB gain, and plug-in Pads and Equalizers are used with Thermal (Auto) or Manual gain and slope controls to allow the TxLET Module to be used with almost any CATV system. Insertion of a plug-in output splitter/coupler allows the RF output to be split between two output ports. The TxLET Module can be powered by either 30 or 60 VAC. An AC crowbar circuit and surge protecters provide trouble-free operation and surge protection.

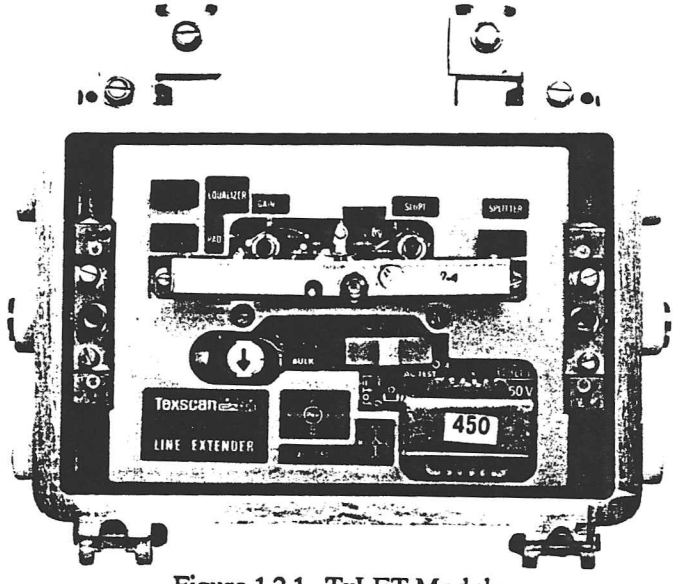


Figure 1.2.1 TxLET Module

The following TxLET models are used in systems with frequency spectrums of up to 330 MHz:

Model	Gain Availability	Frequency Range
T8LETM28	28 dB gain	47-330 MHz
T8LETM32	32 dB gain	47-330 MHz
T8LETM36	36 dB gain	47-330 MHz

The following TxLET Models are used in systems with frequency spectrums of 400 or 450 MHz:

Model	Gain Availability	Frequency Range
T9LETM28	28 dB gain	47-450 MHz
T9LETM32	32 dB gain	47-450 MHz
T9LETM36	36 dB gain	47-450 MHz

Reverse operation can be added to the TxLET Module by inserting the T4RE Reverse Amplifier Module, illustrated in Figure 1.2.2.

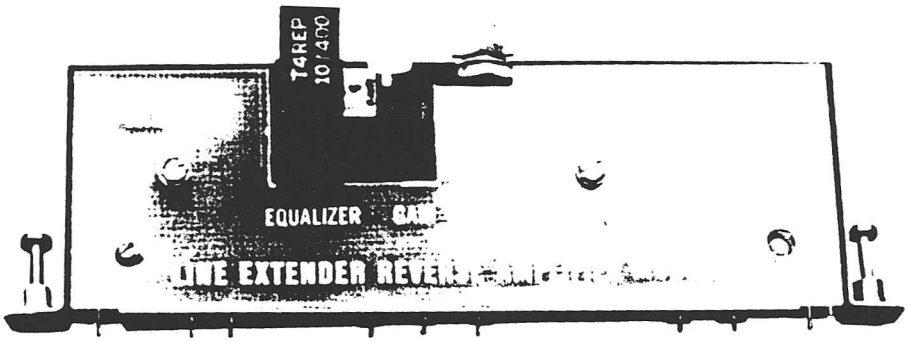


Figure 1.2.2 T4RE Reverse Amplifier Module

When reverse operation is desired, but no amplification is needed, the T4RP Reverse Passive Module, illustrated in Figure 1.2.3, can be inserted into the TxLET Module.

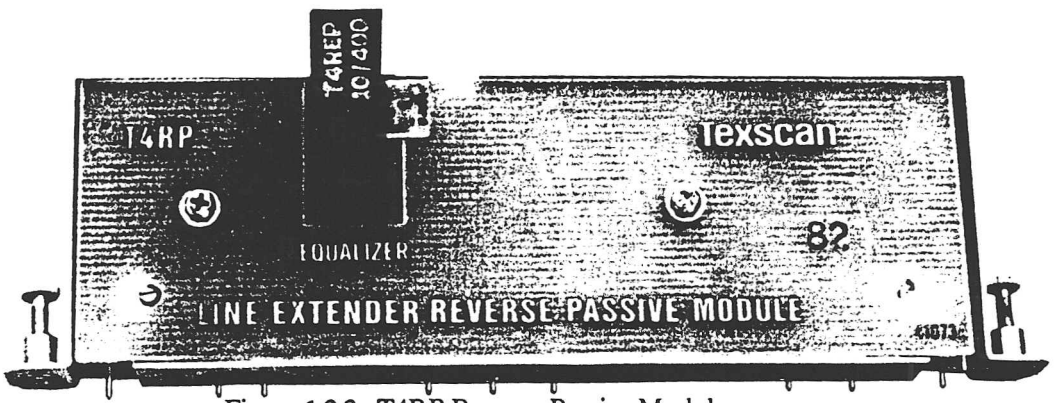


Figure 1.2.3 T4RP Reverse Passive Module

The modular equipment design provides a high degree of system flexibility to meet present and future equipment needs. The versatility of the TxLET Module allows the line extender station to be easily adapted to most CATV systems.

NOTE: Since the TxLET Module can be configured for different types of operation, some sections of this manual may not apply to your particular system. Reference the Texscan *CATV Systems Application Handbook, T300-T400 Equipment* for system applications.

Reference Section 1.5 for TxLET Module Model Identification, and reference Section 1.6 for Hybrid Amplifier Module Identification.

1.3 Specifications

Model	T8LET	T9LET	T4RE	T4RP
Operational Bandwidth (MHz)	47-330	47-450	5-30	5-30
Response Flatness (dB)	±0.5	±0.5	±0.5	±0.5
Minimum Module Full Gain (dB)	28, 32, 36	28, 32, 36	24	N/A
Recommended Station Gain (dB)	26, 30, 34	26, 30, 34	22	N/A
Typical Station Levels (dBmV)				
Input	20, 16, 12	20, 16, 12	12	N/A
Output	+38/46	+37/46		
Distortion Characteristics (dB)	**Channel 40**	**Channel 60**		
XM	64, 64, 64	63, 63, 63	95	N/A
2IM	71, 71, 71	70, 70, 70	68	N/A
CTB	65, 65, 65	62, 62, 62	N/A	N/A
Noise Figure	10	10	10	N/A
Return Loss	17	17	16	16
Power Requirements @ 60 VAC				
Watts	25, 26, 27	25, 27, 28		
Amperes	.390, .410, .440	.430, .460, .490		
AC Bypass Capability (Amps)	7	7	N/A	N/A
Hum Modulation (dB)	70	70	70	N/A

Specifications are subject to change without notice. Texscan Communication Products Division reserves the right to ship product meeting current specifications.

Notes:

1. Operating levels are typical based upon an amplifier cascade of 20 trunk stations, plus a bridger module and one line extender station. Derate the station input and output levels by 3 dB if two line extenders are used in cascade. Tilt is comprised of trunk tilt with additional slope as required to equal 4 dB for distribution of 40 channels or less and 9 dB for distribution of 60 (or 52) channels.

2. Hum modulation specification for the Model T4RE reverse module covers channels T8, T9, and T10, and the power requirements listed are those required in addition to the values listed under the 60 and 40 channel operation columns.

3. Cross modulation (XM) measurements taken on worst channel; composite triple beat (CTB) measured on spectrum analyzer with 30 kHz bandwidth and zero scan width or in accordance with NCTA recommended paractices.

4. Noise figure measurements taken with 0 dB plug-in equalizer installed in amplifier module. Actual performance calculations must include loss for plug-in equalizing network.

5. Thermal compensation circuitry is included in the T8 and T9 LETM designated modules to maintain level over a ±70°F change within ±2.0 dB or less.

1.4 Equalizer Selection Table

Model	T8LET		T9LET		
Gain	28, 32	36	28	32	36
EQ-6		4-7		4-7	4-7
EQ-8	4-7	8-9	4-7	8-9	8-9
EQ-10	8-11	10-11	8-11	10-11	10-11
EQ-12	12-15	12-13	12-15	12-13	12-13
EQ-14	16-17	14-15	16-17	14-16	14-16
EQ-16	18-19	16-17	18-19	16-17	16-17
EQ-18	20-22	18-19	20-22	18-19	18-19
EQ-20		20-22		20-22	20-21
EQ-22					22

HOW TO USE THIS TABLE

1. The values displayed in the table are approximate; however, the Equalizer specified will very closely match the value required in the field.

2. Determine (from your system map or from your system design) the length of cable used with the TxLET Module being set up. Determine (from your cable manufacturer specifications) the attenuation per 100 feet for the cable used in that system segment. USE THE ATTENUATION FIGURE FOR THE UPPER FREQUENCY OF THE MODULE BEING USED. Refer to the column under the TxLET model number and find the attenuation of the cable segment with respect to the gain of your TxLET Module. The Equalizer model will then be found in the far left hand column.

3. Install the Equalizer and measure the slope during field setup. Change the Equalizer as required to bring the slope as close as possible to the required level. Reference Section 3.3, Step 12 for a description of this procedure.

4. The frequency in MHz immediately follows the Equalizer model designation. For example, EQ-6/400 = 400 MHz, 6 dB of equalization.

5. The chart reflects cable compensation and typical device tilt.

1.5 TxLET Model Identification

Bandwidth

DES	MHz
8	300/330
9	400/450

Level Control

DES	TYPE
T*	Built-in Therm Control

Minimum Full Gain

DES	GAIN
28	28 dB
32	32 dB
36	36 dB

Outputs

DES	TYPE
Blank	Single
D	Dual

Reverse

DES	TYPE
Blank	No Reverse
R	T4RE Reverse 5–30 MHz
P	T4RP Reverse Passive

* *Module may be operated in either thermal or manual mode -- no additional plug-ins are required*

1.6 Hybrid Amplifier Module Identification

Model Number		T8LET			T9LET	
Gain	28	32	36	28	32	36
Hybrid P/N						
15-20540-0001	1					
15-20540-0002	1	1				
15-20574-0001		1	1			
15-20574-0002			1			
15-20478-0001				1		
15-20478-0002				1	1	
15-20476-0001					1	2

2. FUNCTIONAL DESCRIPTION

2.1 TxLET Module

The TxLET Module is used in T Series line extender stations to provide distribution amplification in the 50 to 450 MHz spectrum. Reference Figure 2.1.1 for a functional block diagram of the TxLET Module.

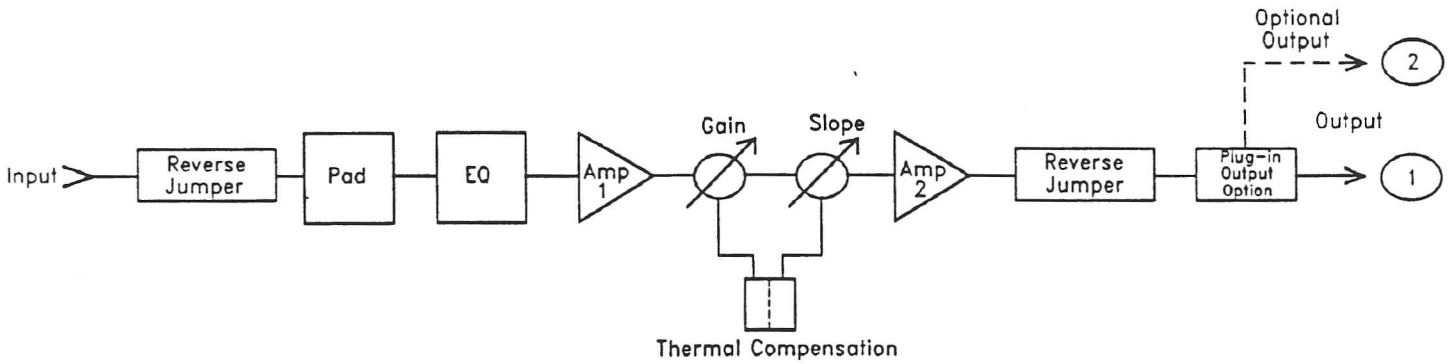


Figure 2.1.1 TXLET Module Block Diagram

The RF signal entering the TxLET module is fed through an input matching (power coupling) circuitry where the following takes place: A power coupling network tranfers AC power from the RF transmission line to or through the LET module, and a power blocking capacitor blocks power from the RF transmission line to the rest of the TxLET circuitry. The input matching circuitry also includes a surge arrestor which protects the TxLET Module from high-level transient voltages, and a matching capacitor and coil which, when properly aligned, provide the best possible return loss.

The input jumper and output jumper are where a determination of forward or reverse operation takes place. When the TxLET Module is configured for forward operation only, jumper plugs are inserted in both the input and output jumpers. When the TxLET Module is configured for reverse operation, the jumper plugs are removed and a reverse module (T4RE or T4RP) is inserted.

A plug-in Pad sets the gain for various flat losses; the value of the Pad must accurately reflect the amount of flat loss in the system. A plug-in Equalizer sets up the system for various lengths of cable; the value of the Equalizer must accurately reflect the length of cable and any other slope or tilt in the system.

Dual input and output hybrid amplifiers in the (forward) module amplify the RF signal, allowing for a selection of 28, 32, or 36 dB gain. The gain control circuitry and the slope control circuitry provide Thermal (Auto) or Manual gain and slope control. (The Auto or Manual option is determined by the position of a blue, plug-in Mode Selector Plug. Reference Figure 3.3.4.) The gain control circuitry consists of a PIN diode gain control with an operational amplifier. The slope control circuitry consists of a PIN diode slope control with an operational amplifier. A diode reference is used for Thermal (Auto) compensation. The gain and slope control provide compensation of $\pm$0.5 dB over the temperature range of -20° to + 120° F for a cable length of 14 dB.

A prepackaged output plug-in coupler/splitter configures the TxLET for single or dual outputs. The RF signal leaving the TxLET module is fed through an output matching circuitry where the following takes place: a power coupling network transfers AC power from the transmission line to or through the TxLET, and a power blocking capacitor blocks power from the RF to the rest of the TxLET circuitry. The output matching circuitry also includes a surge arrestor which protects the TxLET from high level transient voltages, and a matching capacitor and coil which, when properly aligned, provide the best possible return loss. The dual output TxLET module has two output matching circuits.

2.2 Reverse Amplifier Module (T4RE)

Reverse operation with amplification can be added to the TxLET Module by removing the input and output jumper plugs and inserting the T4RE Reverse Amplifier Module. Reference Figure 2.2.1 for a functional block diagram of the T4RE.

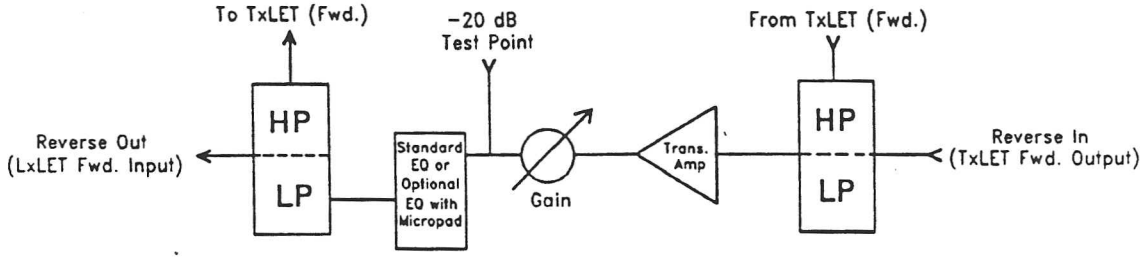


Figure 2.2.1 T4RE Reverse Amplifier Module Block Diagram

The T4RE Reverse Amplifier Module is a two-stage transistor amplifier with gain control. A plug-in Equalizer and a -20 dB Test Point are provided. This module utilizes on-board input and output diplex filters to separate the frequency spectrum into two bands: one for the forward signal and one for the reverse signal. The T4RE Reverse Amplifier Module obtains its power from the TxLET Module.

2.3 Reverse Passive Module (T4RP)

Reverse operation without amplification can be added to the TxLET Module by removing the input and output jumper plugs and inserting the T4RP Reverse Passive Module. Reference Figure 2.3.1 for a functional block diagram of the T4RP.

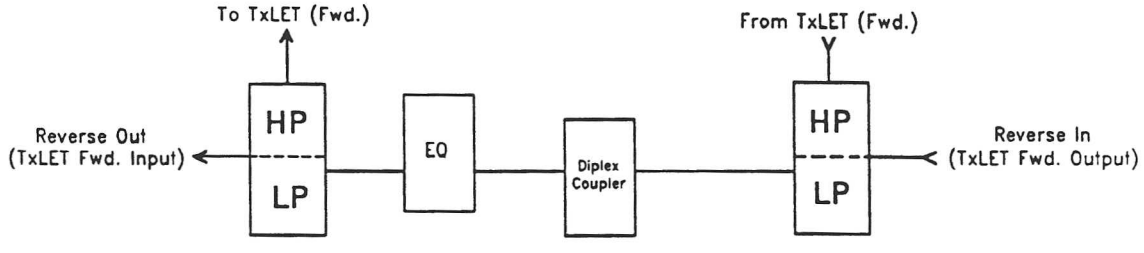


Figure 2.3.1 T4RP Reverse Passive Module Block Diagram

The T4RP Reverse Passive Module is a passive device containing no amplification circuitry. This module uses input and output diplex filters (with a diplex coupling network between the filters) to complete the reverse signal path. A plug-in Equalizer is inserted into the T4RP module to compensate for varying cable requirements.

3. FIELD SETUP

3.1 General

This section provides TxLET Module field setup procedures. Complete system setup, housing mounting procedures, and coaxial cable installation are provided in the Texscan *CATV Systems Application Handbook, T300-T400 Equipment.*

Prior to shipment, the TxLET Module is factory-aligned in the "Auto" mode for thermal compensation and flat gain amplification. Proper operation of the TxLET Module requires the use of specific Pad and Equalizer values. The setup procedure required for proper Pad and Equalizer selection is also described in this section. In setting up the module, reference Figure 3.1.1 for TxLET Module control and part locations.

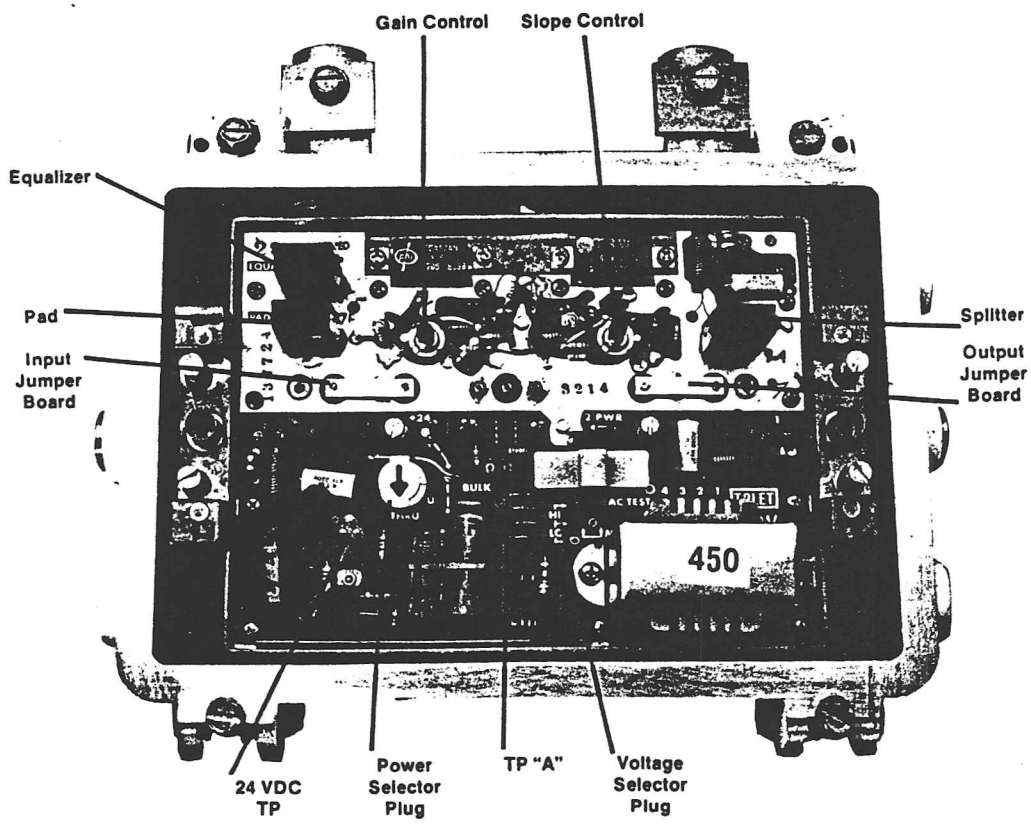


Figure 3.1.1 TxLET Module Control and Part Locations

CAUTION: DO NOT ADJUST any TxLET Module controls unless specifically instructed to do so. Incorrect adjustment of controls will cause the TxLET Module to operate outside the control range of its thermal compensation circuitry.

NOTE: The TxLET Module must be bench aligned prior to field setup. New TxLET Modules are aligned at the factory prior to shipment; however, if the control settings have been changed since factory alignment, or if the module has been repaired in the field, alignment must be performed as described in Section 6.

3.2 Test Equipment Required (or equivalent)*

1. Field Strength Meter	Texscan Spectrum 700
2. Volt Ohm Meter	Triplett 630-na
3. Test Probe	Texscan XR2TP, T6TP-20A or T6UTP-20A (-20 dB, Power Blocked)

*All Test Equipment must be properly calibrated.

3.2.1 Optional Test Equipment (or equivalent)*

1. Sweep Test Set	VS60CZ/CD75N/RCB3/75N
2. Reverse Alignment System	Texscan 9557/9558

*All Test Equipment must be properly calibrated.

3.3 Forward Setup Procedure (Auto Mode)

1. Open the housing by loosening (DO NOT REMOVE) the 4 slotted head bolts. Disengage the top 2 bolts by pushing upward to exit the slot on the cover. Swing the cover open.

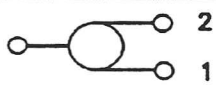
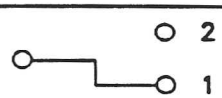
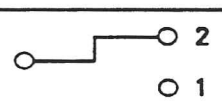
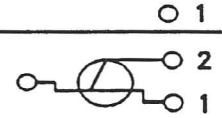
CAUTION: The ambient temperature in the field may differ significantly from the ambient temperature during factory alignment (70° F). Reference Section 3.4 for a determination of the compensation factor required.

2. Verify that the proper Pad and Equalizer values are installed.

3. Verify that the correct Output Plug-in is installed. Reference Figure 3.3.1 for Output Plug-in selection. One of these Output Plug-ins must be installed for proper operation.

4. Verify that the Power Selector Plug is set for the desired mode of operation: IN, OUT, OFF, or THRU. Reference Figure 3.3.2. for an illustration of station powering.

5. Verify that both the Input and Output Jumper Plugs are properly installed. (If the system is set up for reverse operation, the Jumper Plugs must be removed and replaced with either a T4RE Reverse Amplifier Module or a T4RP Reverse Passive Module.)

Model	Connections	Output Port #1 Loss (dB)*	Output Port #2 Loss (dB)*
T4SPL		4	4
T4BCM-1		0	NC**
T4BCM-2		NC**	0
T4BDC(8) (12) (16)		2.4 1.8 1.6	8 12 16

* These figures are measured at 450 MHz.
** NC = No connection

Figure 3.3.1 Output Plug-in Selection Guide

6. Connect a volt ohm meter between Test Point A (TP "A") and ground. Set the Voltage Selector Plug to provide between 28-32 VDC.

7. Measure the regulated voltage at the 24 VDC Test Point. The voltage should be +24 VDC $\pm$1 VDC. If the voltage is not correct, reference the troubleshooting procedures in Section 6.

8. Verify that the input level is correct (according to your system specifications) by connecting the field strength meter to the Input Test Point using the test probe. Reference Figure 3.3.3. for Input Test Point location. If the input level is not correct, system troubleshooting will be required. Reference the Texscan *CATV Systems Application Handbook, T300-T400 Equipment* for system troubleshooting procedures.

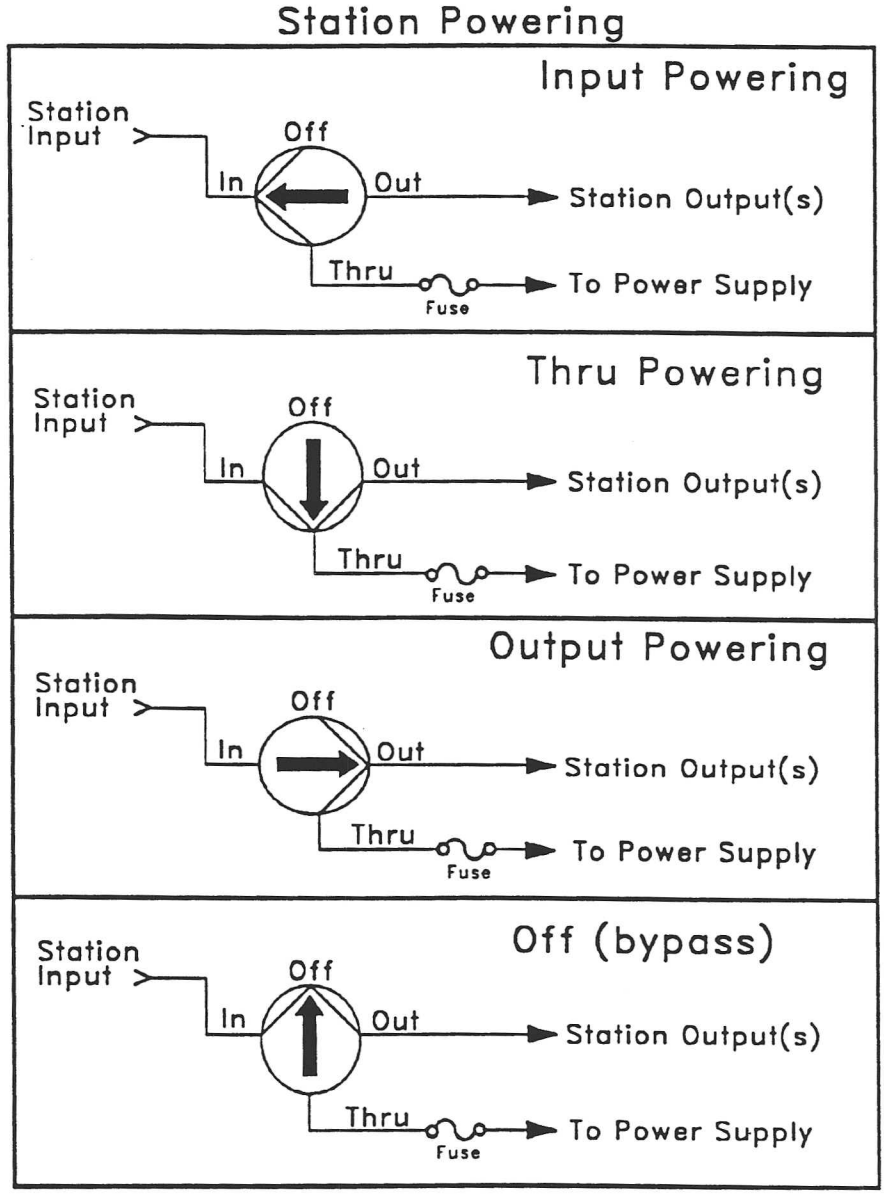


Figure 3.3.2 Station Powering

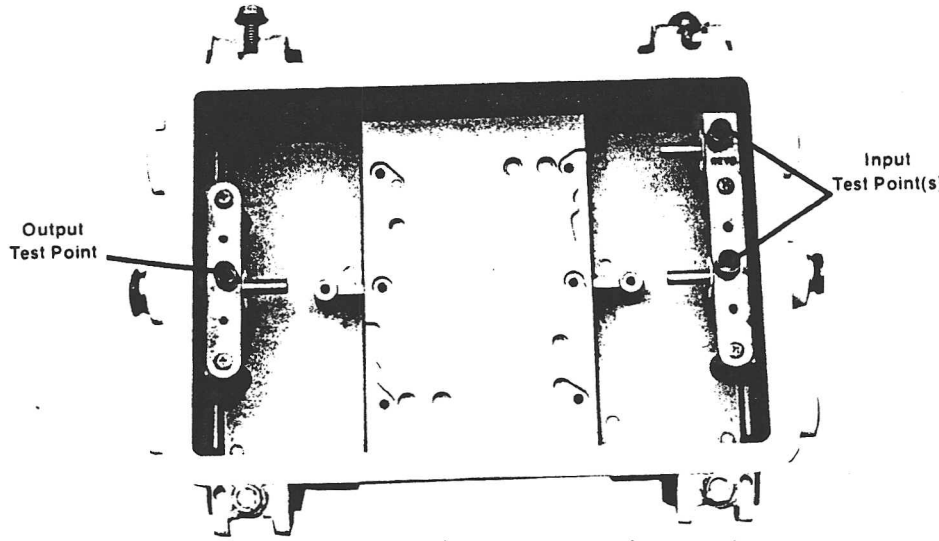


Figure 3.3.3 Input and Output Test Point Locations

9. Verify that the blue Auto/Manual Mode Selector Plug is in the Thermal (Auto) position. Reference Figure 3.3.4.

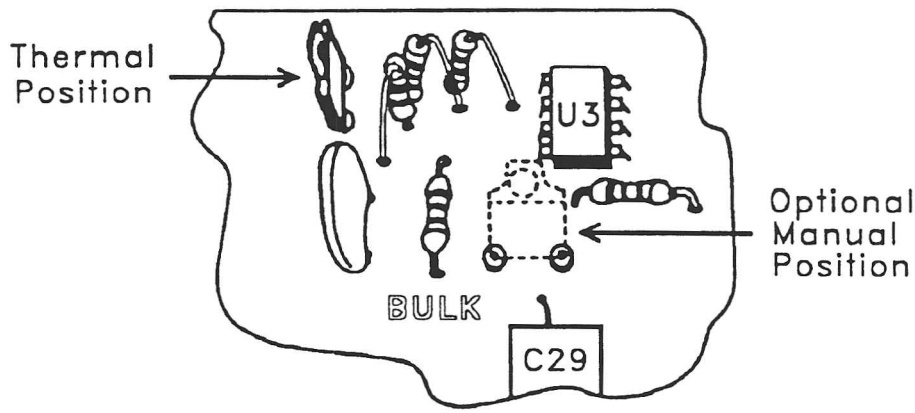


Figure 3.3.4 Auto/Manual Mode Selector (Auto position)

10. Connect the field strength meter to the Output Test Point using the test probe. Reference Figure 3.3.3 for Output Test Point location.

11. Measure the level at the high frequency end of the spectrum. Set the level at the high frequency end of the spectrum by selecting the proper Pad as required (if different from the one originally installed in the system). **DO NOT ADJUST THE GAIN CONTROL AT THIS TIME.**

12. Measure the level at the low frequency end of the spectrum. Set the level at the low frequency end of the spectrum by selecting the proper Equalizer as required (if different from the one originally installed in the system). **DO NOT ADJUST THE SLOPE CONTROL AT THIS TIME.**

13. Measure the level again at the high frequency end of the spectrum.

14. If necessary, the Gain Control may be adjusted NO MORE THAN ±0.5 dB. If a greater adjustment is required, select a new Pad and adjust the Gain Control, observing the ±0.5 dB limitation.

CAUTION: The Gain and Slope Controls MUST NOT be varied by more than ±0.5 dB from bench alignment positions. Failure to observe this precaution will cause the TxLET Module to operate outside the control range of its thermal compensation circuitry.

3.4 Forward Setup Procedure (Manual Mode)

To set up the TxLET Module for forward operation in the Manual mode, first set up the module as described in Steps 1 through 8, Section 3.3 above, then proceed with the following:

1. The TxLET Module is factory-supplied with the blue Auto/Manual Mode Selector Plug in the Thermal (Auto) position. Move the Auto/Manual Mode Selector Plug to the Manual position. Reference Figure 3.3.4.

2. Connect the field strength meter to the TxLET Output Test Point using the test probe. Reference Figure 3.3.3. Set the Gain and Slope Controls to the output levels required by your system map and/or your system design requirements.

NOTE: The Gain and Slope Controls should be set to operate as near to the center of their range as possible. This provides optimum module performance by allowing maximum compensation in response to seasonal temperature variations. It may be necessary to change Equalizer and Pad values to allow the Gain and Slope Controls to be set to operate as near to the center of their range as possible.

3.5 Reverse Set Up Procedure

To set up the TxLET Module for reverse operation, first set up the TxLET Module for forward operation with the reverse module (either a T4RE Reverse Amplifier Module or a T4RP Reverse Passive Module) plugged in. Reference Section 3.3 to set up the TxLET Module for forward operation in the Thermal (Auto) mode, or reference section 3.4 to set up the TxLET Module for forward operation in the Manual mode. After forward setup is complete, proceed with the following:

1. Align the reverse system using the Texscan Two Way Test Set, model 9557/9558. Reference the 9557/9558 manual for complete set-up and testing procedures.

NOTE: Thermal compensation is not required for operation at 30 MHz due to the lower cable losses at this frequency.

2. Reference the table in Section 1.4 to select the proper Equalizer value. Install the Equalizer in the reverse module.

3. Close the housing cover and tighten the retaining bolts as illustrated in Figure 3.5.1. The torque limit is 5 foot pounds.

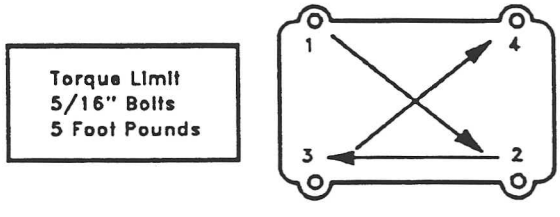


Figure 3.5.1 Bolt Tightening Pattern

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4. FIELD SERVICE

4.1 General

This section describes field service procedures for the TxLET Module only. For information concerning complete system field service, reference the Texscan *CATV Systems Application Handbook, T300-T400 Equipment.*

The TxLET Module has been carefully designed to provide efficient and reliable performance. Since all modules are easily replaced in the field, modular replacement is the most economical means of field service. A supply of spare TxLET Modules, T4RE Reverse Amplifier Modules, and T4RP Reverse Passive Modules should be carried in stock for field replacement. Spare pads, equalizers, output plug-ins, fuses, and hybrid amplifiers should also be stocked.

4.2 Test Equipment Required (or equivalent)*

1. Signal Level Meter	Texscan Spectrum 700
2. Volt Ohm Meter	Triplett 630-na
3. Test Probe	Texscan XR2TP or T6TP-20A (-20 dB, Power Blocked)

*All Test Equipment must be properly calibrated.

4.3 Voltage Verification

1. Verify that the Voltage Selector Plug is in the correct position.

2. Reference the chart in Figure 4.3.1 to check the AC input voltage. If the voltage is not correct after setup as performed in Section 3.3, Step 6, troubleshoot your downline powering system.

3. Check the voltage at the wire leading to the capacitor located directly under the lettering "BULK" on the TxLET Module printed circuit board. The correct voltage should be between 28-32 VDC.

4. Check the voltage at the point labeled "+24" on the TxLET Module printed circuit board. The voltage should be +24 VDC $\pm$1 VDC.

System Voltage	Selector Plug Setting	Input VAC RMS	VTVM Reading	VOM Reading
60	High	52-60	43-50	55-65
	Medium	44-52	37-43	47-55
	Low	36-44	30-37	38-46
30	High	26-30	21.5-25	27.5-32
	Medium	22-26	21.5-18.5	23.5-27.5
	Low	18-22	15.0-18.5	19-23

Figure 4.3.1 AC Input Voltages

CAUTION: The TxLET Module is designed to operate on square wave power. All voltage values for square waves must be correlated to the type of meter used for measurement.

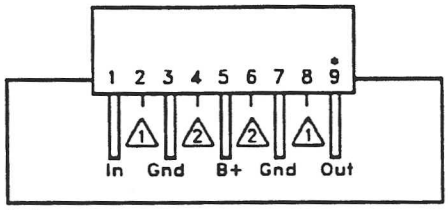
5. If you are set up for reverse operation and the voltage in Step 4 is low, remove the cover on the reverse module and check the DC voltage at P5, then remove the reverse module and check the voltage at P5 on the TxLET Module printed circuit board. If the voltage returns to normal, replace the reverse module with a known good module and recheck the voltage with this module in place. If the voltage is still low, continue with Step 6 of this procedure.

CAUTION: When measuring the voltage within the reverse module, be careful not to cause a short between the pins and ground.

6. Check the voltage at P5 of both hybrid amplifiers. Reference Figure 4.3.2 for hybrid amplifier pin out locations. The voltage should be +24 VDC ±1 VDC. If the voltage is low or missing, remove the hybrid amplifier and recheck the voltage.

7. If the voltage returns to normal, replace the hybrid amplifier and recheck the voltage. The voltage should be +24 VDC ±1 VDC.

8. If the power supply voltage cannot be corrected by following the above steps, the TxLET Module should be replaced with a known good module and the voltages should be rechecked.



Notes:
1. * Pin numbering not dependent on pin actually being present.
2. ⚠1 Pin clipped off during assembly process.
3. ⚠2 No pin at this location.

Figure 4.3.2 Hybrid Amplifier Pin Out Locations

9. Module replacement will require field setup. Reference Section 3 for a description of proper field setup procedures.

4.3 Field Test Procedure

1. Using the field strength meter and the test probe, verify that the input signal level at the high and low band edges meets your system design specifications.

2. Check the output signal level(s) at the high and low band edges.

3. If the signal levels in the preceeding step are not within the ranges as specified in Section 3, check the Pad, Equalizer, and Output Plug-ins by substituting them with known good ones. Check the Gain and Slope Controls for proper settings--the gain should be 2 dB below its maximum setting, and the slope should be 2 dB below the flat setting of 50 MHz.

4. If the signals cannot be returned to their proper levels by following the above steps, the TxLET Module should be replaced with a known good module and the signal levels should be rechecked.

5. Module replacement will require field setup. Reference Section 3 for a description of proper field setup procedures.

5. TROUBLESHOOTING AND REPAIR

5.1 General

This section provides the troubleshooting and repair instructions for defective or suspected defective TxLET and reverse modules. Troubleshooting and repair should be performed by a qualified CATV service technician only on out of warranty modules. Under no conditions should a module under warranty be repaired in the field, as such repair voids the warranty. If conditions permit, it is recommended that the defective module be returned to Texscan Communication Products Division Servicing Facility for troubleshooting and repair, since the procedures which follow and those in Section 6 require test equipment not common in all repair shops.

5.2 Test Equipment Required (or equivalent)*

1. Oscilloscope	Normal Oscilloscope
2. Sweep Generator	Texscan VS60CZ
3. Attenuators	Texscan RA70F, RA71F, RA73F
4. Detector Probe	Texscan CD75N
5. Digital Multimeter	Data Precision 2480
6. DC Power Supply	Power Design 5015T (Must be regulated)
7. Terminators	Texscan P/N 15493-1
8. Reflection Test Bridge	Texscan RCB3/75N
9. Calibrated Mismatch	Texscan MF75 (16 dB, 1.38:1)
10. Connectors	GN 625CHFT (75 Ohm)
11. Adapters	"N to F"
12. RF Cables	RG-6 (75 Ohm; Double shielded)
13. Test Probe	Texscan XR2TP or T6TP-20A

*All Test Equipment must be properly calibrated.

5.2.1 Optional Test Equipment (or equivalent)*

1. RF Comparator	WBE A49R (Wide Band Engineering)
2. Broadband RF Amplifier	WBE A52U (Wide Band Engineering)
3. Network Analyzer	HP 8754A (With Test Set 8502) Transmission/Reflection Storage Normalizer 8750A optional

*All Test Equipment must be properly calibrated.

5.3 Equipment Setup

1. Connect the equipment as illustrated in Figure 5.3.1 for DC powering, or as illustrated in Figure 5.3.2 for AC powering. Turn on all test equipment except the DC power supply. Allow the equipment to warm up for 1 hour.

2. Remove the input and output cables from the TxLET Module undergoing test and connect the cables with a barrel adapter.

3. Set the sweep generator attenuators to approximately 20 dB; this will provide approximately +40 dBmV to the variable attenuator set. Set the variable attenuators to 0-0-0.