



***TPX***  
***Test Point Expander***

**OPERATION  
MANUAL**



TRILITHIC, Inc., one of the fastest growing privately held companies in the U.S. (Inc. 500, #10), is a leading supplier of test equipment to the CATV industry. Through the years, we have introduced a range of products to make CATV maintenance simpler, faster and more precise. Our contributions include the first PRACTICAL CATV sweep system (1976), the first CATV return adjustment system (1981), the SEARCHER PLUS for leakage measurement (1989) and the SUPER PLUS for overbuilt leakage and ingress measurement (1994).

Among our most popular products is the TRICORDER series of CATV analyzers (led by the new TRICORDER III, the most versatile member of the popular TRICORDER family).

TRILITHIC is especially well known for its leakage products. More than 15,000 SEARCHER PLUSES are in daily use as well as the SUPER PLUS and SUPER CT measurement devices (which take leakage measurement into the new era of overbuilds and digital services).

In addition to developing instrumentation for the CATV industry, TRILITHIC produces RF and microwave components and equipment for aerospace and wireless communications, as well as computer controlled assemblies for automated test systems, headend automation and communications signal routing.

TRILITHIC products are designed and manufactured at our facility in Indianapolis, Indiana. These products are distributed by sales agents in over 40 countries.

Should you have any questions or need our service, please contact us at the address or telephone numbers below:

TRILITHIC, Inc.  
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Indianapolis, IN 46236  
(317) 895-3600  
(800) 344-2412



## **TWO YEAR WARRANTY**

Trilithic, Inc. warrants that each part of this product will be free from defects in materials and workmanship, under normal use, operating conditions and service for a period of two (2) years from date of delivery. Trilithic, Inc.'s obligation under this Warranty shall be limited, at Trilithic, Inc.'s sole option, to replacing the product, or to replacing or reporting any defective part, F.O.B. Indianapolis, Indiana; provided that the Buyer shall give Trilithic, Inc. written notice.

Batteries are not included or covered by this Warranty.

The remedy set forth herein shall be the only remedy available to the Buyer under this Warranty and in no event shall Trilithic, Inc. be liable for incidental or consequential damages for any alleged breach of this Warranty. This Warranty shall not apply to any part of the product which, without fault of Trilithic, Inc., has been subject to alteration, failure caused by a part not supplied by Trilithic, Inc., accident, fire or other casualty, negligence or misuse, or to any cause whatsoever other than as a result of a defect.

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## Introduction

Ingress is one of the banes of a good cable system. Ideally, you need to be able to monitor each node individually which is the best way to fine tune your ingress monitoring. The TPX, when used in conjunction with the 9580 SST Return Analyzer, enables you to do just that. Trilithic's **TPX (Test Point eXpander)** is a significant addition to the 9580 Return Path Maintenance system since it is tailor made for ingress monitoring. It also provides limited support for sweeping with the SSR and return path verification using the RSVP.

This addition to the 9580 system is a rack-mounted RF switch assembly which connects to a specially equipped 9580 SST. The TPX enables you to monitor ingress from a large number of return test points for a relatively low cost. This is possible since it enables a single 9580 SST unit and a TPX which is equipped with one or more **TPM-8** cards to monitor up to sixty four nodes in increments of eight.

If you wish the TPX to scan all of the test points automatically, you can control the unit from your PC by using Trilithic's **Ingress ManagerR** software. Configuration of the TPX is simple and cost-effective. You install the number of TPM-8s needed for your current application (you can add up to eight cards as your requirements change). For the purpose of ingress monitoring, the TPX creates "virtual" SSTs by making a single SST mimic the performance of eight units. For example, Bank 1 serves as SST #1, Bank 2 as SST #2 and so on.

For trouble-shooting or to use the SSR and RSVP field units, turn the TPX **SELECTION SWITCH** to a specific bank of eight test points to which the field units are connected. You may also lock the TPX to a bank via LIVE MONITOR Mode in Ingress ManagerR. When you lock the TPX to a manual bank, its performance is identical to an SST equipped with a TPM-8. The TPX architecture supports six field units which can be used for sweeping one bank at a time. For example, you can use five SSR Field units (designated A - E) and multiple RSVP units or six SSR Field units (designated A - F).

## TPX Overview

The TPX's card cage can accommodate up to eight TPM-8 Test Point Manager cards. Each card provides connections for eight reverse test points. When these test points are controlled by a PC via Ingress ManagerR, the TPX will scan at a rate of sixty four test points in less than thirty seconds. At each test point, the SST unit collects and analyzes the reverse spectrum once, twenty or eighty times per second depending on your programming specifications.

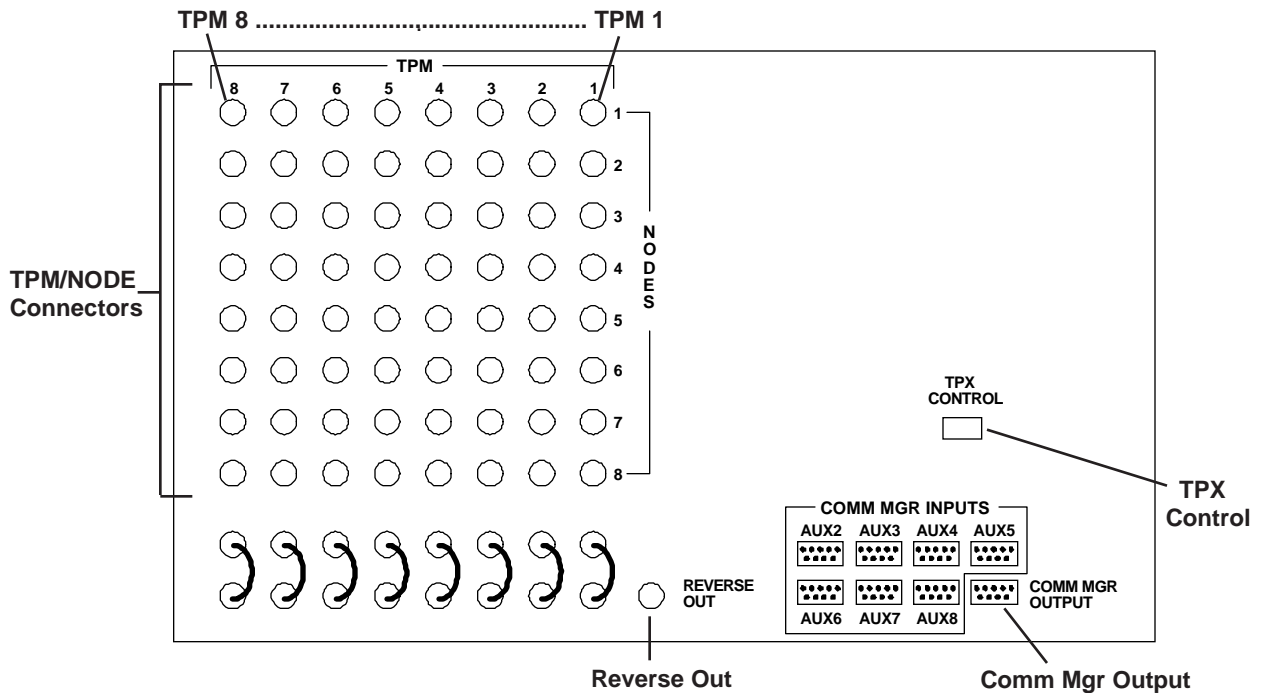
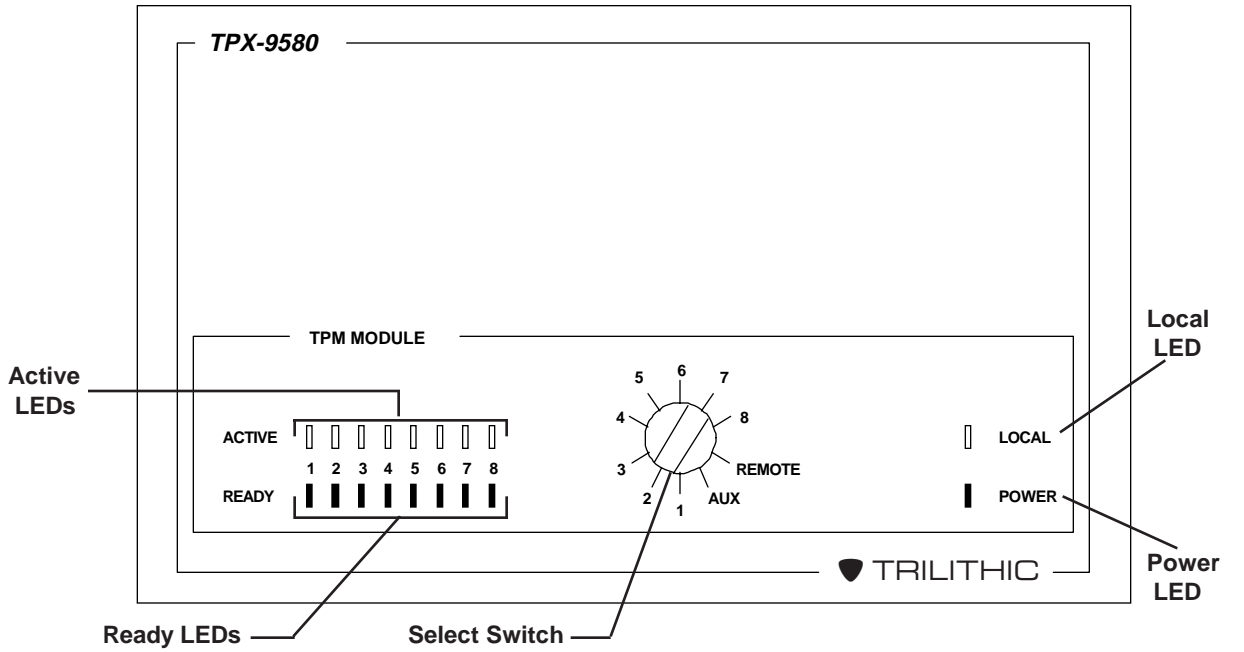
**NOTE:** When programmed for twenty and eighty times per second, the unit does not support the sweep function of the SSR unit or any functions of the RSVP unit even if the TPX is locked to a bank. This is referred to as FAST Mode in your SST manual.

It then reports the spectral data via front panel displays via a serial connection to the PC (or to a modem if the PC is at a remote location). For more information on using the 9580 SST and Ingress ManagerR, please refer to the products' operation manuals.

The TPX front panel contains:

- **ACTIVE LEDS** - row of amber LEDS (upper) indicate which bank is selected currently (only one should be lit at any given time).
- **READY LEDS** - row of green LEDS (lower) indicate the location of installed TPM-8 cards.
- **SELECTION SWITCH** - sets/selects the remote and manual positions for the TPX.

- **LOCAL LED** - indicates when the **SELECTION SWITCH** is turned to a specific bank rather than the REMOTE setting.
- **Power LED** - indicates when the TPX is turned ON.



The TPX rear panel contains:

- **TPM/NODE Connections** - used to connect the TPX to the system nodes.
- **Reverse Out Connector** - used to connect the TPX to the SST.
- **Comm Mgr Output Connector** - used to connect the TPX to the PC/Modem

- **TPX Control Connector** - used to connect the TPX to the 15-pin connector on the TPX Adaptor installed in the SST.

## TPX Connections

To connect and setup the TPX system you will need:

- 9580 SST Unit
- TPX Unit
- SST/TPX Adaptor Board installed in the SST (SSTi option)

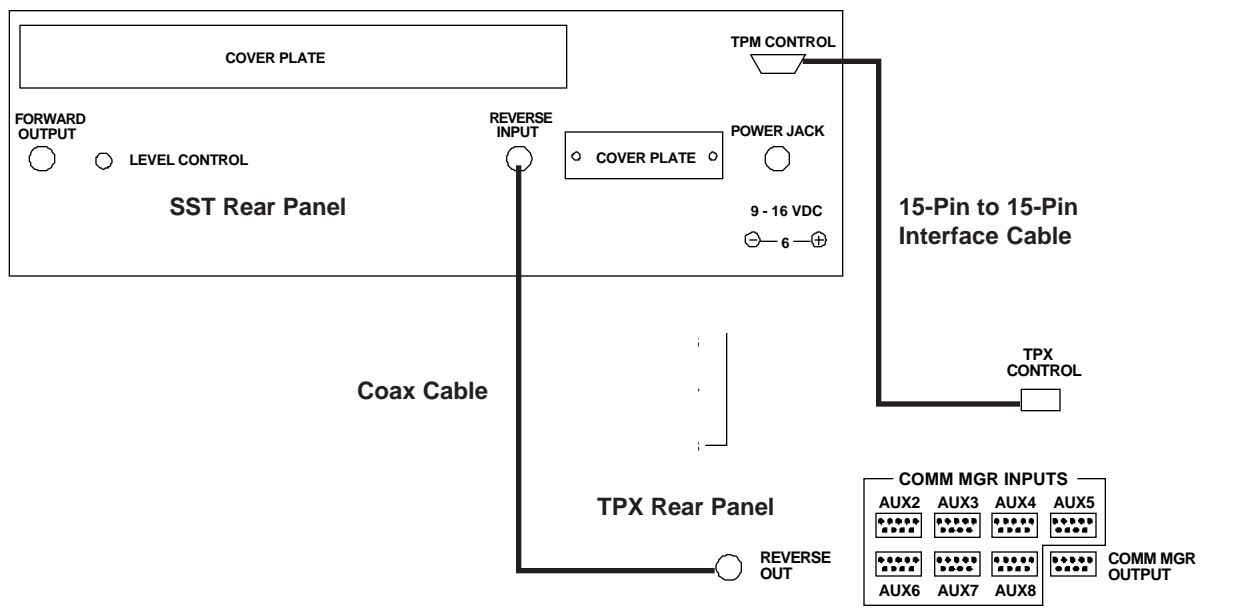
**NOTE:** If the adaptor board is installed in your SST, you will have a 15-pin connector on the back of the unit. If the connector is only a 9-pin, please contact Trilithic (800-344-2412) for the SSTi Kit (P/N 2071106000).

- SST/TPX 15-pin to 15-pin interface cable (P/N 2071112000)
- SST/TPX coax cable (P/N 2071108001)

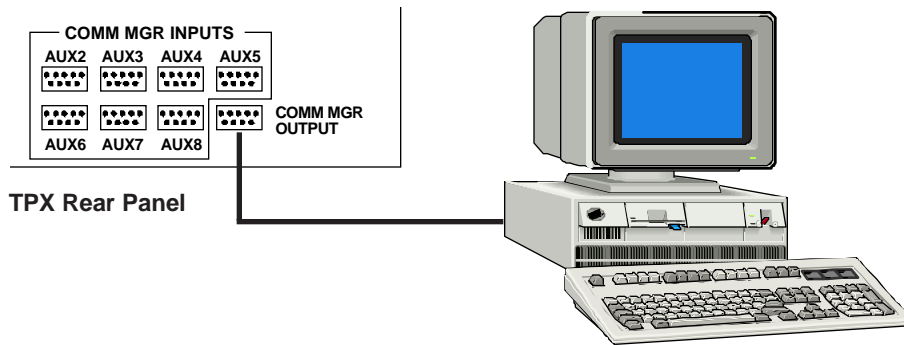
Before you start connecting the devices, keep in mind that it's a good idea to organize the TPM banks into logical groupings by area. This makes it easier to use the TPX in manual for either trouble shooting specific nodes or for occasional use with the SSR or RSVP field units.

Use the SST/TPX 15-pin to 15-pin interface cable to connect the **TPX CONTROL** connector to the SST's **PC** connector.

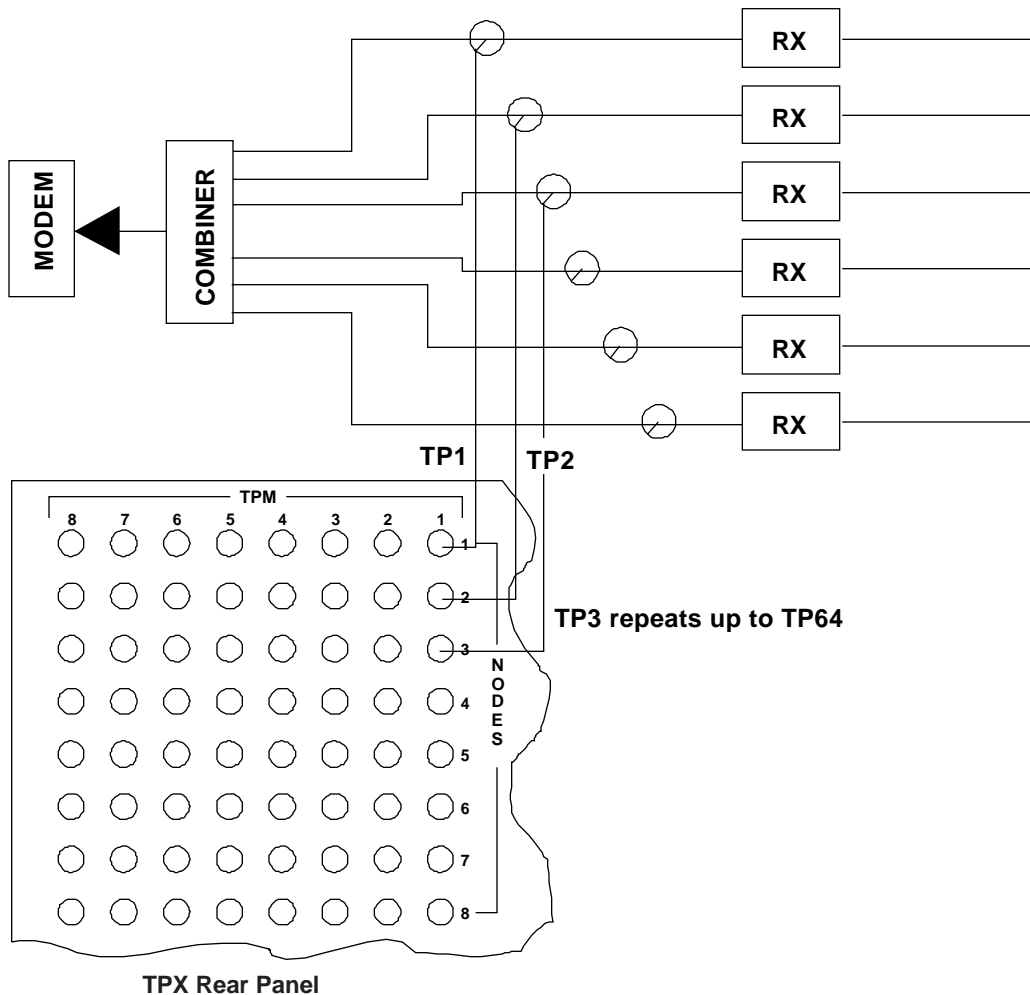
Connect the SST's **INPUT** connector to the TPX's **REVERSE OUT** connector via the coax cable.



To use Ingress ManagerR to control the TPX, connect the **COMM MGR OUTPUT** to the PC or PC modem.



Then connect the **TPM/NODES** on the back of the TPX to your system.



**NOTE:** The SST is programmed to expect the same level from each return test point. The unit has only one optimal level so you need to arrange the desired levels on each test point to have the same loss. This can be accomplished by setting the SST to the minimum nominal input and padding the other inputs appropriately.

## TPX Operation

Once everything is connected, you may use your TPX.

**NOTE:** For SST and Ingress ManagerR operation, refer to the products' operation manuals.

Operation is quite simple as all TPX functions are controlled automatically via Ingress ManagerR or manually via the TPX **SELECTION SWITCH**.

**NOTE:** When you move the knob from the **REMOTE** position to lock the TPX on a specific bank of eight test points, Ingress ManagerR cannot communicate with the TPX and therefore reports it as failure.

## AUTOMATIC OPERATION

For most TPX functions, you will control procedures via Ingress ManagerR. (For information on setting up and using Ingress ManagerR, refer to the software's operation manual.)

Turn the **SELECTION SWITCH** to the REMOTE setting.

As Ingress ManagerR scans the TPX banks for ingress, the SST will display the test points in sequence. For example, TP1 on bank 1 will appear, then TP2 on bank 1, etc.

**NOTE:** The NODE SELECT function in the SST display is somewhat different when the TPX is being used. The display still indicates the node being scanned, but you need to check the TPX to determine which bank is being checked.

## MANUAL OPERATION

By manually selecting any single TPM-8 card, you may use the TPX for trouble-shooting a specific bank or limited sweeping in conjunction with the SSR or RSVP field units. Turn the **SELECTION SWITCH** to the desired bank (one through eight).

**REMINDER:** Keep in mind the following limitations when using the TPX for manual operation:

1. Ingress ManagerR is off-line and will report any node scanned as failed.
2. The SST will not support either the SSR or RSVP field units in FAST or ZOOM Modes.
3. Only six field units can be supported in this setup:
  - Six SSRs (designated A - F) or
  - Five SSRs (designated A - E) and multiple RSVP units (up to 200 RSVPs can be used in this setup one at a time)

## General Reminders

There are several things to keep in mind while using your TPX.

First, Ingress ManagerR does not know the difference between a TPX and multiple SSTs. This enables your ingress monitoring to be transparent of hardware. If you select your TPX Hub and select Node 4 of SST #3, you are actually viewing "virtual" SST #3 (or TPM #3) and Node 4. Your TPX will show TPM module #3 as active and will remain on this TPM until manually changed or remotely changed by Ingress ManagerR.

Second, the Communications Manager board in your TPX is hardware identical to other Communications Managers but has a firmware option bit set. The Communications Manager is the only component that knows a TPX is installed rather than two to eight SSTs. Therefore, you should NOT install this board in other SSTs in your system.

Third, you may swap any of the vertical mounted TPMs to or from any SSTs in your system. However, the bottom (horizontal mounted) TPM must remain with the TPX chassis as it contains specific calibration data.

## Specifications

The TPX has the following Specifications.

Frequency Range	0.375 to 42.0 MHz, All modes
Input Level Range	+ 31 to – 4 BmB applied to any TPX input connector for full dynamic range
Return Inputs	Increments of 8 inputs per TPM-8 Test Point Manager cards employed. A maximum of 8 cards can be inserted into the unit providing a total of 64 inputs.
Input Level Accuracy	± 0.5 dB
Spectrum On-Screen Range	50 dB. Normally set to place 10 dB or range above and 40 dB below the reference line.
Spectral Level Resolution	1 dB
Spectral Frequency Resolution:	
NORMal MODE	375 kHz
FAST MODE	375 kHz @ 20 samples/sec
ZOOM MODE	525 kHz @ 80 samples/sec
	50 kHz
Spectrum Dispersion	Normal/Fast (0.375 to 42.00 MHz); Zoom (0.375 to 42.0 MHz) in 2.5 MHz increments
Displays and Indicators	64 x 128 pixel graphic LCD display on SST. Two rows of LEDs on TPX showing how many TPM-8 cards are installed and which TPM-8 is being accessed by the PC. One LED indicating local operation.
Remote Access/Control	Single serial port for direct connection to a PC or remote operation via modem
Data Carrier:	
Frequency	Settable 50 to 53.75 and 70 to 75.75 MHz in 50 kHz increments; optional 80 to 92 MHz
Output Level Range	+ 23 to + 55 dBmV continuously adjustable
Purity	All undesired emissions > – 60 dBc
Data Carrier Bandwidth	150 kHz @ – 20 dBc; 475 kHz @ – 60 dBc
Mechanical:	
Size	6U (10.5")X (TPX)
Weight	< 15 lb with 8 TPM-8 cards installed 2U (SST)
Power:	
SST	Standard 117 VAC, 50 - 60 Hz
TPX	Draws power via the SST



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