9580 SSR/EU

OPERATION MANUAL

TRILITHIC
INNOVATIVE ENGINEERING

TRILITHIC

Trilithic, Inc. was founded in 1986 as an engineering and assembly company providing customized communications and routing systems for business and government applications. As business expanded, Trilithic broadened its offerings by acquiring components manufacturer Cir-Q-tel and instruments manufacturer Texscan, adding broadband solutions to the product line.

Today, Trilithic is comprised of three major divisions, Broadband/CATV Instruments & Systems, RF Microwave Components, and Emergency Alert Systems. The Instruments Division offers Test, analysis and quality management solutions for the major cable television systems worldwide. The Division specializes in the design and manufacturing of portable RF test equipment and integrated test systems performing in a wide range of HFC and LAN applications. The Wireless division provides components and custom solutions for companies specializing in cellular, military and other wireless applications. The EAS Division is a leading supplier of government-mandated Emergency Alert Systems used by HFC service providers.

An industry leader providing telecommunications solutions for major broadband and wireless markets around the world, Trilithic is dedicated to providing quality products, services and communications solutions meeting or exceeding our customers' expectations. Today, from our worldwide headquarters in Indianapolis Indiana, we provide over 1500 measurement products and communications components to thousands of customers around the world.

TRILITHIC

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.

Except for the warranty and exclusions set forth above, and the warranties, if any, available to the Buyer from those who supply Trilithic, Inc., there are no warranties, expressed or implied (including without limitation, any implied warranties of merchantability of fitness), with respect to the condition of the product or its suitability for any use intended for it by the Buyer or by the purchaser from the Buyer.

TRILITHIC
9710 Park Davis Drive
Indianapolis, IN 46235

Phone: (317) 895-3600
Toll Free in North America: (800)344-2412
Fax: (317) 895-3613
www.trilithic.com

INDEX

1 GENERAL INFORMATION

Introduction

Any CATV operator who maintains a two-way CATV distribution system knows that many factors can affect the performance of that system. Cumulative noise, signal ingress, incorrect gain or bad flatness all conspire to harm the return path which can lead to loss of service and customer complaints.

You have taken an excellent step toward alleviating the problems of your return path with your purchase of the **Guardian Return Path Maintenance System**. It is designed to monitor all of the troublesome parameters in a single, simple to use system. This 9580 SSR/EU is part of Trilithic's **Guardian Return Alignment System** which includes the 9581 SST, 9580 SSR, RSVP Installer Return Test Units and Isometer.

The SSR Field Unit generates test signals and displays the measurement data which is transmitted by the SST Headend Unit. The SSR Field Unit is addressable so that up to twelve (six on each TPM-8) may operate in conjunction with a single SST Headend Unit at any one time (for more information see the *9580 OPERATION MANUAL* or the *9581 SST OPERATION MANUAL*).

At the push of a button, the SSR Field Unit's high resolution, backlit LCD panel displays the ingress spectrum, sweep patterns or calculated values for gain and tilt. Operation is designed to be menu-driven and is so simple, you only need to do one keystroke to select any of the analytical displays.

The Unit's data logging feature allows you to store 24 sweep displays which can then be reviewed or uploaded to a PC.

The SSR Field Unit is designed to be handled in the field since it is small, light and inside a water-resistant case. It can operate for up to six full hours using its internal NiCad batteries or it can be operated from AC power while the battery charges.

Equipment

The 9580 SSR comes with the following standard items:

- SSR Field Unit (1)
- Carrying Bag for SSR Field Unit (1)
- SSR NiCad Battery Pack
- Power Cube
- Operation Manual (1)
- Field Operation Guide (1)

In addition to the standard equipment, you can also purchase the following:

- Replacement NiCad battery pack
- Replacement Power Cube

SET UP 2
9580 SSR/EU

Introduction

Before you can begin to use your 9580 SSR/EU Field Unit, you need to make decisions regarding carrier frequencies, which options you are using...you get the picture. The information in this chapter will assist you in making those pre-installation determinations for the 9580 SSR. For information regarding the 9580 SST or 9581 SST Headend Unit, refer to the *OPERATION MANUAL* which came with the unit.

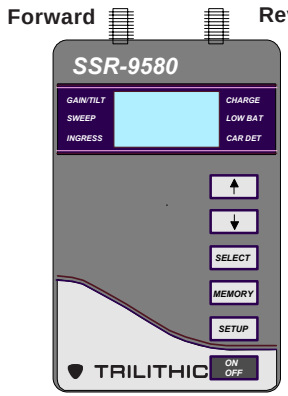
9580 SSR/EU Field Unit Preparation

Before using your SSR Field Unit, you need to gather data and make several decisions since the way you use your SSR will depend upon your system architecture.

> **NOTE:** The following procedures apply to both the fiber nodes and the line amplifiers.

TEST POINT CONNECTION

You need to determine the proper test point connection for each type of active device in the return system. The SSR Field Unit can accommodate separate forward and reverse test connections (dual test lines). It can also communicate through a single forward/reverse test point if one is available. Refer to Figure 1 on page 6.



NOTE: If you are using the single test point method, use the **REVERSE/BOTH** connector only.

If you are using the dual test point method, use both the **FORWARD** and the **REVERSE/BOTH** connectors.

Figure 1. SSR Field Unit Front Panel View.

- Dual test lines (See Figure 2 below):
  For the SSR Field Unit's data carrier input, connect it to the forward amplifier output test point, even if it is before the output diplexer.

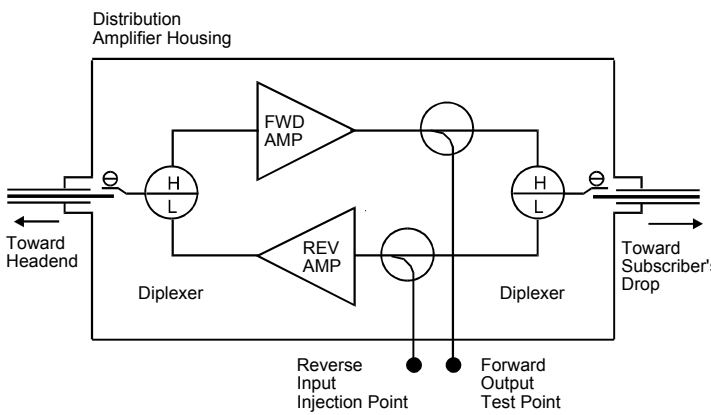


Figure 2. Dual Test Lines.

For the reverse test carrier injection, connect the SSR's **REVERSE/BOTH** connector to the reverse amplifier's input injection point if the injection point is upstream from the forward output diplexer.

- Single test connection (See Figure 3 below):
  To use this method, you need to connect the SSR's **REVERSE/BOTH** connector to the amplifier's (or node's) forward test point which is located after the down stream diplexer.

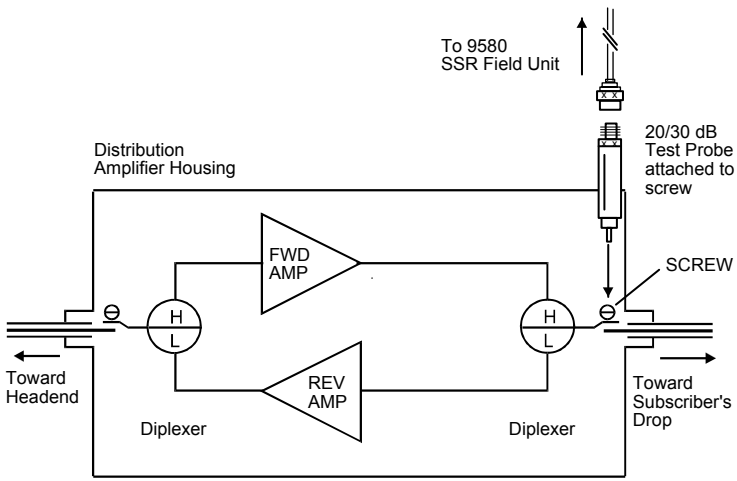


Figure 3. Single Test Connection.

INJECTION LEVEL

You need to identify the proper injection level for each device in the return path. First, consult the node's or amplifier's data sheet to determine the appropriate input level to the return amplifier for ordinary return path "traffic".

Add the coupler or test probe loss to this input level. Set your SSR Field Unit's test carrier level to the resulting value:

Input Level + Coupler Loss = SSR's Test Carrier Level

Set Up

Okay, you have "prepped" the 9580 SSR/EU Field Unit(s) of your return path system, and you're all ready to power up and start using everything. Well, almost. Before you can operate the system, you need to perform several basic set up steps.

POWER UP

The 9580 SSR/EU Field Unit is designed to run from an internal NiCad battery. The Unit also comes with an AC power cube which is used to charge the battery overnight or run the SSR Unit from an AC power source.

Connect the AC power cube to the connection on the left side of the SSR Field Unit and plug the power cube into an outlet.

Once the Unit is connected to a power source, turn it ON via the **ON/OFF** button on the front panel. See Figure 4 below.

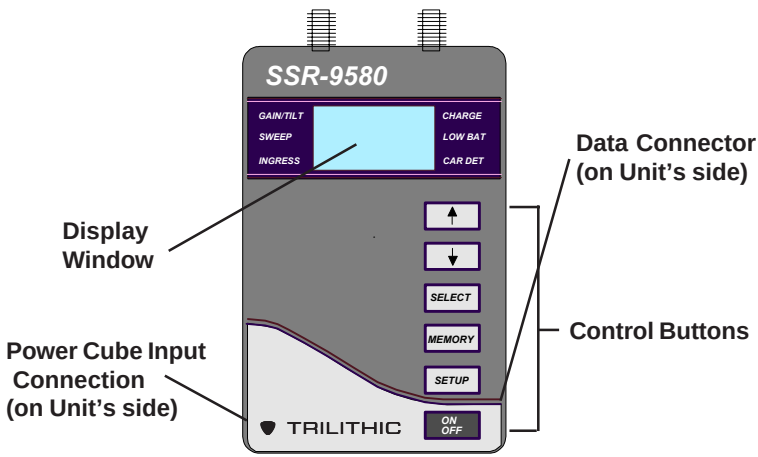
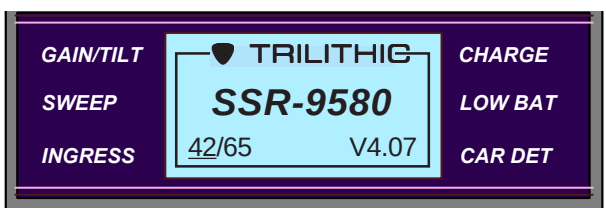


Figure 4. 9580 SSR/EU Field Unit Front Panel.

When you turn the Unit ON, the SSR will power up in the INTRO screen and then display the last test mode used.



NOTE: In the above figure, you will notice that the version number appears below the model number. Also, the maximum oeprating frequency appears in the lower left corner with the default frequency underlined.

The 9580 SSR/EU supports extended frequencies up to 65 MHz. It is designed to autoconfigure itself based on the data it receives from the SST headend unit. If it receives the same information three times in succession it will set that data as it's default. The default frequency appears in the lower left corner as **42/65** with the default frequency underlined.

In the example above, the unit's default is 65 MHz so the **65** is underlined.

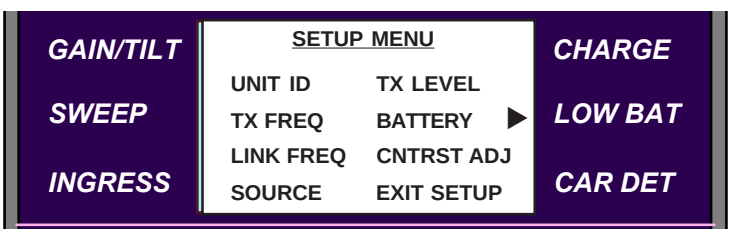
SET UP

Now that the SSR Field Unit is connected and turned ON, you need to configure its operational parameters via the SETUP Menu.

> **NOTE:** You may also use this SETUP Menu to change operational parameters later on.

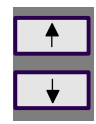
To enter the SETUP Mode, press the **SETUP** button on the front panel.

This will bring up the SET UP MENU.



NOTE: In the above figure, you will notice that there is an arrow at the LOW BAT indicator. This means that your Unit's NiCad battery needs charging. As battery power runs down, the SSR Field Unit is designed to shut off automatically. For this reason, it is a good idea to use the power cube for your initial set up preparations since the power cube is designed to charge the NiCad battery any time it is plugged into the SSR Field Unit.

Once you are in the SETUP MENU, use the **ARROW** buttons to move from one selection to another.



When the desired selection is highlighted, use the **SELECT** button to enter the SET UP SCREEN for that selection.

NOTE: If you wish to abort the set up selection, turn the Unit OFF.

TX Freq

The TX frequency setup is used to display the test carrier frequencies that the SSR Field Unit is using. It is also used to activate or deactivate any of the eight test carriers.

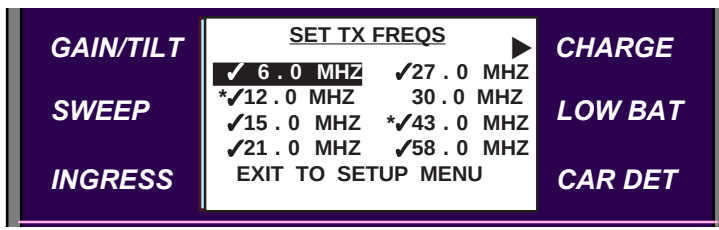
NOTE: Only disable a frequency when absolutely necessary. Usually the SST configuration will select frequencies which avoid interference problems.

HOT TIP

Frequencies are all* 0.0 *unless the SSR is connected to the system. If connected, the test frequencies shown are the ones downloaded from the SST data link so it is best to have the SSR active on the system before you inspect or modify the TX frequencies.

When you are ready to select the TX frequencies, use the **ARROW** buttons to highlight TX FREQ.

Then, press **SELECT** to enter the SET TX FREQS Menu. Press the **ARROW** buttons to highlight one of the eight frequencies.



Press **SELECT** to cycle through three options:

6 . 0 MHZ	Carrier Deactivated
✓27 . 0 MHZ	Carrier Activated
*✓43 . 0 MHZ	Carrier Activated and used to calculate Gain/Tilt

NOTE: You must program the 9580 or 9581SST's Gain/Tilt separately (see *9580* or *9581 OPERATING MANUAL*). It is a good idea to use the SAME frequencies for Gain/Tilt in both the 9580 or 9581 SST and the SSR.

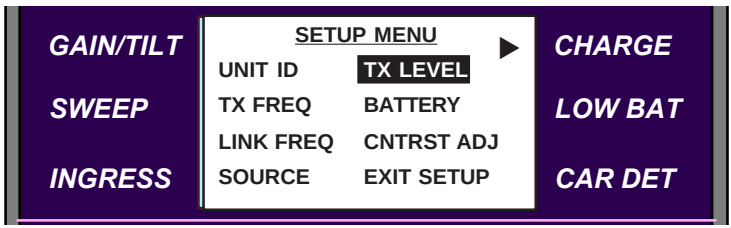
When you press **SELECT** so that you are satisfied with the state of the carrier, use the **ARROW** buttons to move you to a different frequency.

REMINDER: Only two frequencies may be marked with the "*".

When you have completed activating and deactivating the TX frequencies, highlight EXIT TO SETUP MENU and press **SELECT**. Your Unit will return to the SETUP Menu.

TX Level

To set the level at which test carriers are transmitted from the SSR, use the **ARROW** buttons to highlight TX LEVEL.



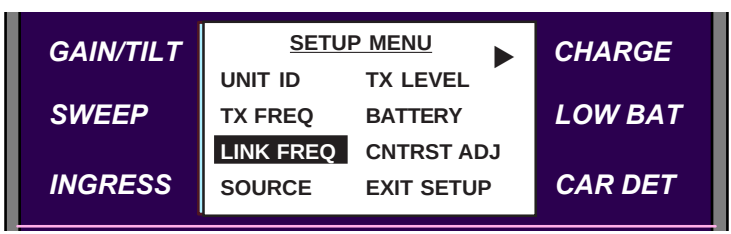
Press **SELECT** to enter the TX LEVEL Menu.

Press the **ARROW** buttons to *increase* or *decrease* the reverse test signal levels in 1 dB steps. When you are finished, press **SELECT** to return to the SETUP Menu. The available range is 20 – 55 dBmV.

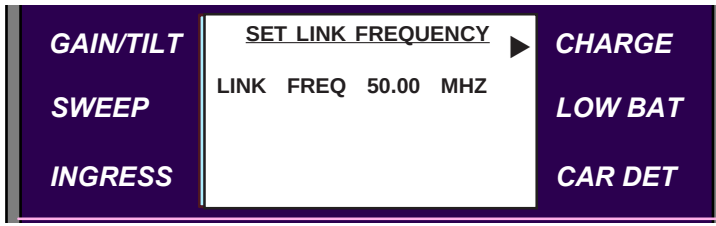
Set your unit to the proper level for injecting signal into your system (as computed on page 7).

Link Freq

To set the Link Frequency, use the **ARROW** buttons to highlight LINK FREQ.



Press **SELECT** to enter the SET LINK FREQUENCY Menu.

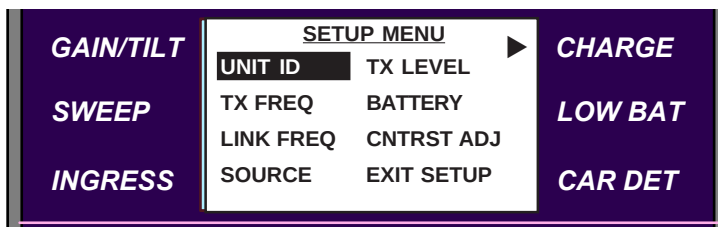


Press the **ARROW** buttons to *increment* or *decrement* the frequency in 50 kHz steps. The Unit will run through the possible first range of MHz frequencies then proceed to the second range of MHz frequencies (50 - 75 or 80 - 92). When the desired frequency is displayed, press **SELECT** to return to the SETUP Menu.

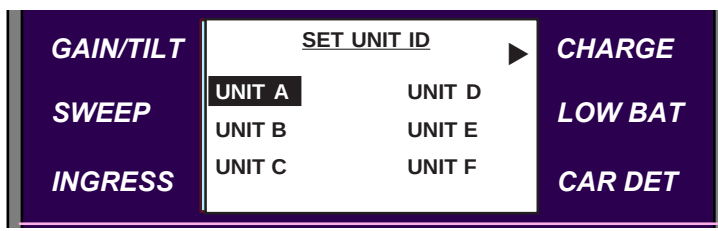
> **NOTE:** The frequency selected must match the setting on SST Unit with which the SSR Unit is interfacing.

Unit ID

To set the Unit Identification, use the **ARROW** buttons to highlight UNIT ID.



Press **SELECT** to enter the SET UNIT ID Menu.



Press the **ARROW** buttons to set the ID from A to F.

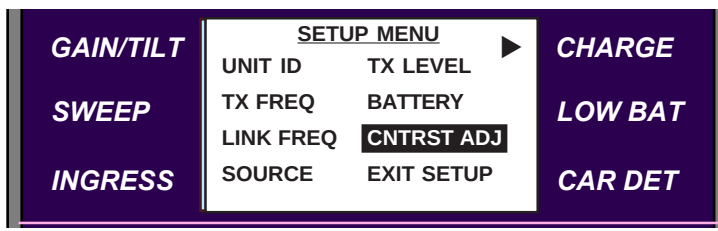
When the desired ID is highlighted, press **SELECT** to return to the SETUP Menu.

> **REMINDER:** Each SSR Field Unit must have a unique ID in order to operate with the same SST Headend Unit. SSR "A" will use the frequencies programmed into the SST while the other units (B - F) space up from that point by 90 kHz.
>
> For example, if SSR Field Unit "A" is set for 5.0 MHz, "B" will use 5.09 MHz, "C" will use 5.18 MHz and so on.

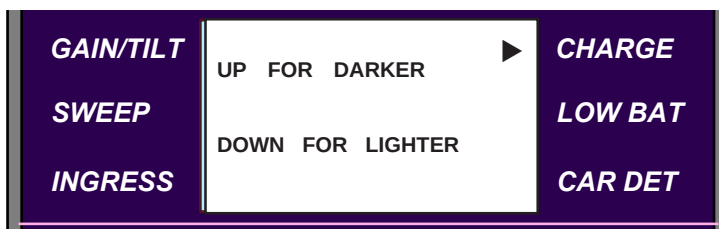
Adjust Contrast

The SSR Field Unit's display can be adjusted to your preference with regard to contrast.

Use the **ARROW** buttons to highlight CNTRST ADJ in the SETUP Menu.



Press **SELECT** to enter the CNTRST ADJ Menu.

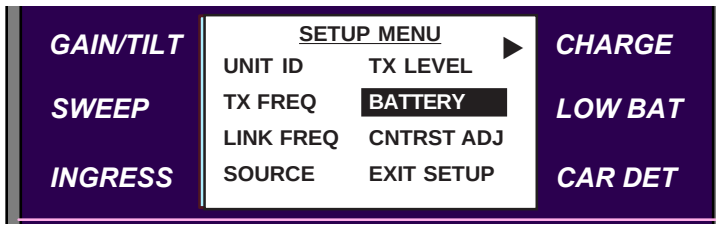


Use the **ARROW** buttons to *increase* or *decrease* the degree of contrast in your display.

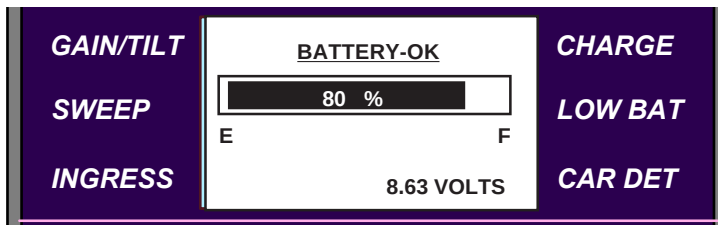
When you are finished, press **SELECT** to return to the SETUP Menu.

Battery

You can check the battery status in your SSR unit by using the **ARROW** buttons to highlight BATTERY in the SETUP Menu.



Press **SELECT** to enter the BATTERY display.



The display shows the voltage of the SSR's battery and the percentage of battery life remaining.

When you have finished checking the battery, press **SELECT** to return to the SETUP Menu.

Exit Setup Menu

When you have finished setting the operating parameters for the SSR Field Unit(s), highlight the EXIT SETUP option in the SETUP Menu. Press **SELECT** and the Unit will return to the screen it was in before entering SETUP.

3 BASIC OPERATION

Introduction

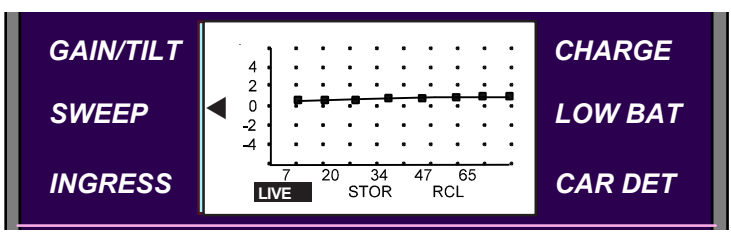
Okay, you have set up your 9580 SSR E/U Unit(s). For more information regarding SST Headend Unit operation, refer to the *9580* or *9581 OPERATION MANUAL.*

The 9580 SSR/EU is equipped with an auto configure feature. It will switch to the frequency that it is receiving from the SST. This frequency is indicated via an underline on the **42/65** display in the lower left corner of the Title screen when the unit is powered up. If the unit configures to the same frequency three times in a row, it will set itself to that frequency as its default.

> **NOTE:** In very dry, high static conditions, electro-static discharge (ESD) near the front panel may result in the SSR switching modes. If this occurs, simply reset to the desired mode.

Sweep Mode

To select SWEEP Mode, use the arrow keys to select **SWEEP**.

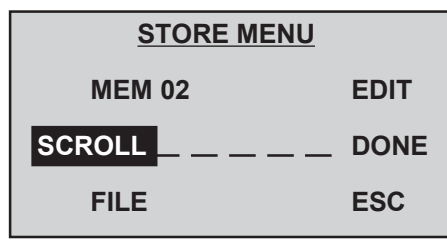


Use the **SELECT** button to cycle the display through LIVE, STOR and RCL.

STORING SWEEP DATA

When you are in LIVE Mode, press **SELECT** to cycle to STOR. Press the **MEMORY** button to put the current sweep display into a buffer. The Unit will switch to the STORE Menu.

When you first enter this menu, SCROLL will be highlighted. The MEMORY pointer will indicate the last used memory along with its user defined 7 digit ID. If the menu is empty or has no ID, dashes will show as in the example below.



While SCROLL is highlighted, use the arrow keys to cycle through the memories in the unit. For example, if you press the UP arrow key, MEM 02 changes to MEM 03 etc.

> **NOTE:** As you use the arrows to cycle, the memory pointer will stop at the maximum or minimum and will not roll over and enable you to cycle continuously. To return to a lower number, you must use the DOWN arrow.

The FILE icon appears when the memory which has been selected has the FILE bit set. This alerts you that this memory has been downloaded to the 9580 from a PC file. When you have scrolled to the desired memory, press **SELECT** to advance to the first digit of the ID.

The first digit will highlight but will remain unchanged. Press **SELECT** to have the Unit accept the current value and advance to the next ID digit. You can also use the arrow keys to cycle through the alphabet and numerals. A blank (underscore) is located between 0 and A. The arrangement of characters is 9,8,7,6,5,4,3,2,1,0,,A,B,C,.....Z with roll over.

When you have selected the desired digit, press **SELECT** to advance the Unit to the next digit of the ID which remains unchanged. You may change it by pressing the arrow keys or press **SELECT** to accept the current value. This process continues for all 7 digits. When you press **SELECT** to accept the last digit of the ID, the DONE icon is highlighted. To accept the entry and store the data, press **SELECT**.

If you wish to escape without accepting the data, use the arrow keys to highlight ESC and press **SELECT**. This will abort the function.

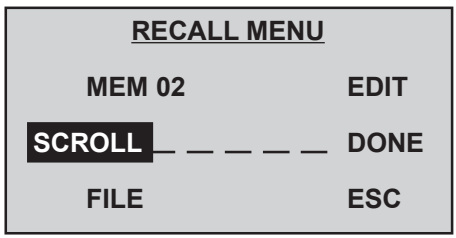
If you wish to return to the first digit of the ID, use the arrow keys to highlight EDIT and press **SELECT**. The Unit will return to SCROLL. This will enable you to scroll through the memories again.

> **NOTE:** Storing data in a memory location always resets the FILE flag for that memory.

When you exit the memory selection screen, the Unit returns to the normal sweep mode display with the STOR icon highlighted.

RECALLING SWEEP DATA

When you are in LIVE Mode, press **SELECT** twice to cycle to RCL to show the sweep display stored in the currently selected memory. To select a different memory, press the **MEMORY** button. The Unit will switch to the RECALL Menu. When you first enter this menu, SCROLL will be highlighted.



Use the arrow keys to scroll through the memories in order to select one to view or edit. Once the desired memory is selected, press **SELECT** which highlights the DONE icon.

NOTE: This process differs from the STORE procedure.

With the DONE icon highlighted, press **SELECT** to return to the sweep display and view the memory. You may also use the arrow key to highlight EDIT if modifications to the 7 digit ID are needed or ESC to abort the process. The FILE flag remains unchanged in this menu, even if the ID has been edited.

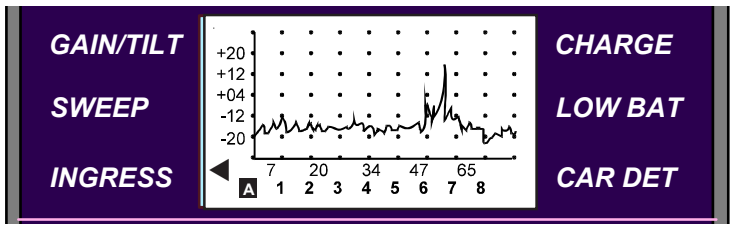
Exiting the RECALL Menu by any means returns the Unit to the sweep display with RCL highlighted and the currently selected memory is displayed. If the memory is empty, no sweep trace is shown.

Your SSR is capable of uploading and downloading the memory data via the RS-232 connection and **SweepSavR** data logging software running on a PC.

NOTE: Your Unit monitors the presence of the RS-232 connector plug. If the plug is in, the Unit will communicate via RS-232 and NOT via the RF link. Consequently, the Unit cannot be used in normal mode if the RS-232 plug is in. ALWAYS remove the RS-232 plug unless you are uploading or downloading data from the SSR to the PC.

Spectrum Mode

Your SSR Field Unit is capable of displaying a wide spectrum display for the return path to which it is connected. This can be useful for diagnosing problems in the field; particularly when you need to verify that a source of ingress has been fixed. If the 9580 SST is equipped with the Test Point Manager option, it automatically determines the node on which each SSR Unit is located. To enter SPECTRUM Mode, press the **ARROW** buttons until the cursor is beside **INGRESS**.



The SSR Field Unit automatically displays the spectrum data for the return path to which it is connected, as determined by the SST ("A" is highlighted under the graph).

In certain cases when ingress noise on one or more nodes connected to the SST 's Test Point Manager is extremely bad, the SST may mistakenly determine that the SSR is connected to the noisy node. In this instance, you can manually examine the ingress on each of the 8 nodes served by the Test Point Manager to which the SSR is connected. To examine the ingress manually, press **SELECT** to advance from "A" to each of the 8 return paths.

> **NOTE:** If the SST does not have the Test Point Manager option, the ingress displayed for each of the 8 nodes will be identical to that which is displayed automatically ("A").

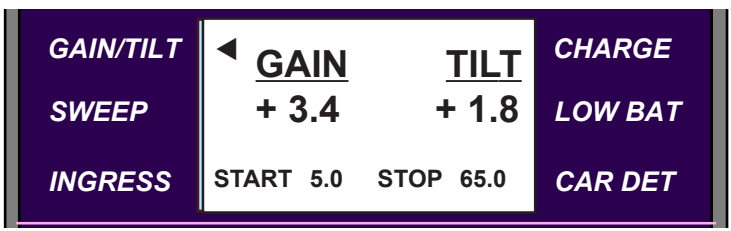
Use the **ARROW** buttons to go to the other modes.

NOTE: When the SST is put into FAST Mode, the SSR will operate only in the SPECTRUM Mode since no sweep data is available from the SST. If you push the **ARROW** buttons to move out of the SPECTRUM Mode, the unit will display a warning message.

Since sweep data is used by the SSR to automatically determine on which node to observe ingress data, this feature is disabled when the SST is in the FAST Mode. Consequently, you will not be permitted to cycle the **SELECT** button to the "A" selection.

Gain/Tilt Mode

The gain and tilt are displayed in numeric format along with the two test frequencies used to acquire the gain/tilt data. Press the **ARROW** buttons to move the cursor to **GAIN/TILT**.

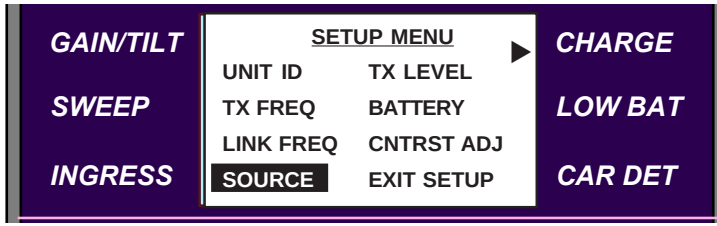


Gain represents the difference between the desired level which has been programmed into the SST Headend Unit and the actual return level at the STOP frequency.
Tilt represents the START minus the STOP level.

REMINDER: The START and STOP frequencies are determined by the frequencies marked with an "*" in the SET TX FREQ SETUP Menu.

Source

The SSR Field Unit may be used as a calibrated continuous wave (CW) source for troubleshooting. Use the **ARROW** buttons to highlight SOURCE.



Then, press **SELECT** to enter the SET SOURCE FREQUENCY Menu. A CW Carrier at the indicated frequency and level will be present at the **REVERSE/BOTH** connection.

Press **SELECT** to jump from SOURCE LEVEL to SOURCE FREQ.

To *increase* or *decrease* the source level or frequency values, press the **ARROW** buttons.

> **NOTE:** The source level and the TX level settings are independent. If the source level is set to a HIGH value for troubleshooting purposes, it does not need to be reset to the same value as the TX level.

The SSR Field Unit puts out the CW signal for as long as it remains in the SOURCE Menu. When you are ready to turn OFF the CW signal, press **SELECT**. The CW signal will go OFF and the Unit will return to the SETUP Menu.

4 ADVANCED OPERATIONS

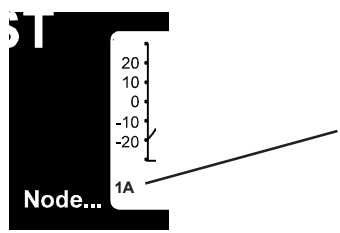
Introduction

The first step in developing a successful alignment and maintenance strategy for the return path depends on understanding what constitutes a properly operating system. If you have not already done so, review Chapter 2 for the data regarding your system parameters and set up so that you will have the following information handy:

- Proper levels at the headend
- Proper injection points for the node and each type of amplifier in the system
- Proper injection level for each device in the return system including coupling and test probe losses

You should also review the *9580* or *9581 SST OPERATING MANUAL*.

Alignment of the reverse should begin at the headend. Use the SST to monitor the ingress for each return path that you will be aligning (refer to *SPECTRUM MODE* in the SST operating manual).



Indicates Node on the 9580 and the Node and SST on the 9581 (i.e. Node 1 of SST A)

REMINDER: When you are reading the ingress, the 9581 displays the node and the SST (A or B) it is reading. In the example above, NODE 1 of SST A is being read so **1A** appears next to the word "Node" on the front panel. To cycle through SST A nodes 1 - 8 and then proceed to SST B and its 8 nodes, press the **Node** button.

For the 9580 or 9581 system to achieve sweep accuracies better than ± 1 dB (and your return data system to function properly), ingress must be at least 20 dB below the expected return levels. If the SST is set properly, this will be 30 dB down from full scale on the ingress display. Carefully inspect the spectrum around each test carrier frequency. If ingress is excessive, take one of the following steps to reduce it:

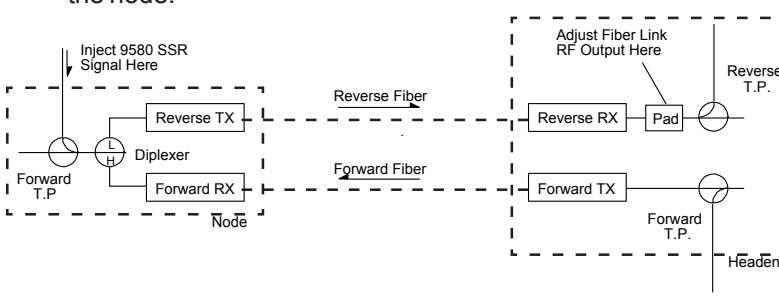
- If you are combining several return paths, try disconnecting some to reduce total ingress.
- If your system has no active carriers, turn down the gain or remove the pads in the reverse amplifiers.
- Temporarily pick a higher operating level for the SST and SSR.
- Find and fix the major ingress problems. Remember, you can use your 9580 system to help you troubleshoot the ingress while in the field. See *INGRESS* on page 30.

If ingress exceeds – 20 dB relative to the desired return level, the 9580 sweep display will show an "X" rather than the usual frequency marker (bar). This is another indication that there is an ingress problem which needs to be tracked down.

Adjusting the Fiber Link

Adjustment of the fiber link will require two technicians since the fiber receiver output must be adjusted with the SSR connected to the node (see below).

> **NOTE:** This could be achieved with one technician but it would involve a lot of back and forth runs to the headend and the node.



To adjust the fiber path properly, consult the manufacturer's data sheets to determine how to set gain in the fiber receiver. You may also want to measure the optical power at the receiver input to make sure that it meets recommended levels prior to starting alignment. Inject the 9580 test signals at the system design level into the node test point.

If your fiber receiver uses pads to set the gain, use the **GAIN/TILT** display on the SST to determine the correct pad to use in the fiber receiver. The SST will show a maximum gain error of ±9.9 dB. If the initial gain is off by more than ±9.9 dB, it may be necessary to zero in on the correct pad by changing the pad value until the reading is on scale. Then you can select a pad accordingly to set the gain as close as possible to 0.0 dB. When finished, switch to the **SWEEP** display to observe the sweep response.

If your fiber receiver has a screw driver adjustment, use the **SWEEP** display and adjust the receiver's gain so that the sweep response is positioned on the center graticule of the **SWEEP** display.

HOT TIP

Be sure to select the proper Unit ID on the SST SWEEP display. Remember, this also effects which SSR's data is displayed in the GAIN/TILT display.

NOTE: Some fiber nodes have a gain adjustment in the node which must be set first (i.e. Texscan's FLAME-THROWER™). Consult the manufacturer for the proper procedure for making this adjustment prior to setting the fiber receiver's gain.

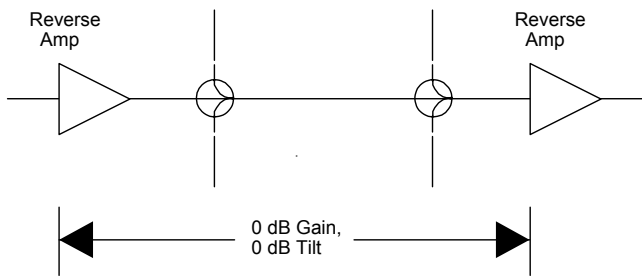
If you cannot get a display, try the following:

- Be sure that the SSR is receiving the data carrier as evidenced by the cursor pointing to **CAR DET** (carrier detect) on the SSR's display.
- Make sure that the injection test point you are using is pointing the correct way (i.e. TOWARD the headend).

- Make sure that the fiber transmitter and receiver are functioning properly and that the proper light level is reaching the headend.
- Increase or decrease the SSR's TX level in 5 dB increments until the response is on screen. Note the difference which is necessary for the output setting and adjust the gain accordingly. Now you can return your SSR to the proper output level and fine tune the gain setting.

Adjusting Amplifiers

When an amplifier is balanced properly, its gain and tilt will virtually cancel the loss and tilt of everything in the upstream path between the amplifier and the next amplifier upstream.



With the node adjusted properly, proceed to the first amplifier from the node. Set your SSR's TX level to the proper injection level for the amplifier. Connect it to the amplifier's input test point(s).

> **REMINDER:** Don't forget to allow for test point or coupling losses.

For amplifiers with fixed pads and equalizers, use the **GAIN/TILT** display. The 9580 or 9581 will show a maximum gain error of ±9.9 dB. If the initial gain is off by more than ±9.9 dB, it may be necessary to zero in on the correct pad by changing the pad value until the reading is on scale. Then you can install the equalizer to compensate for tilt. Once the tilt is corrected, fine tune the pad value to give an overall gain of 0.0 dB. Now, you can switch to the **SWEEP** display to observe the sweep response.

If your amplifier has screw driver gain and tilt adjustments, you need to use the **SWEEP** display and adjust the amplifier's gain controls so that the sweep response is positioned in the display. Adjust the amplifier's tilt for a flat response. Then you can fine tune the gain adjustment to position the sweep response on the center graticule of the display. You can switch to the **GAIN/TILT** display to confirm your settings numerically.

If you do not get a display, try the following:

- Be sure that the SSR is receiving the data carrier as evidenced by the cursor pointing to **CAR DET** (carrier detect) on the SSR's display.

- Make sure that the injection test point you are using is pointing the correct way (i.e. TOWARD the headend).

- Increase or decrease the SSR's TX level in 5 dB increments until the response is on screen. Note the difference which is necessary for the output setting and adjust the gain accordingly. Now you can return your SSR to the proper output level and fine tune the gain setting.

Proceed to the next amplifier and repeat the process until ALL of your amplifiers are aligned. Make sure that you adjust the SSR's TX level if necessary when you are changing amplifier types.

Data Logging Feature

Your 9580 is equipped with a data logging feature which enables you to save up to 24 sweeps; each containing a 7 digit ID. By using **SweepSaveR** software to upload these sweep files, you can compare past performance to current field conditions via two different methods: Upload from SSR to PC and Download from PC to SSR.

Upload file from SSR to PC - this enables you to upload up to 24 sweep files from the SSR to your PC so that you can compare the new files to ones taken at an earlier time.

Download file from PC to SSR – this enables you to compare new sweeps to old ones while you are in the field. Before starting your rounds, you can download up to 12 older sweep files from your PC to your SSR. Then, it is a simple matter to call up these records at the actual field location so that you can compare current readings to these older files.

You can identify the older sweep files by the FILE flag which appears in the STORE or RECALL Menus of the SSR's sweep display. You may also over-write these older files with the new data. When you do, the FILE flag is turned OFF.

Ingress

Ingress along the return path can cause serious disruptions to a subscriber's cable service. This makes regular monitoring of ingress an essential part of a sound return maintenance strategy. The 9580 was designed to provide you with a simple solution to reverse monitoring.

When you are using the 9580 to monitor ingress, there are configuration trade-offs which you need to consider. The most important of these concerns the number of return paths connected to a single input on the SST. Combining your returns may economize on your hardware but it can make it far more difficult to localize on the source of ingress.

If you equip your 9581 with Test Point Managers, you will be able to monitor 8 or 16 independent return test points. This can reduce the need to combine returns.

If ingress control is a "must", as it is in the case of telephony or commercial data carrying, consider using more than one SST so that each return can be monitored separately.

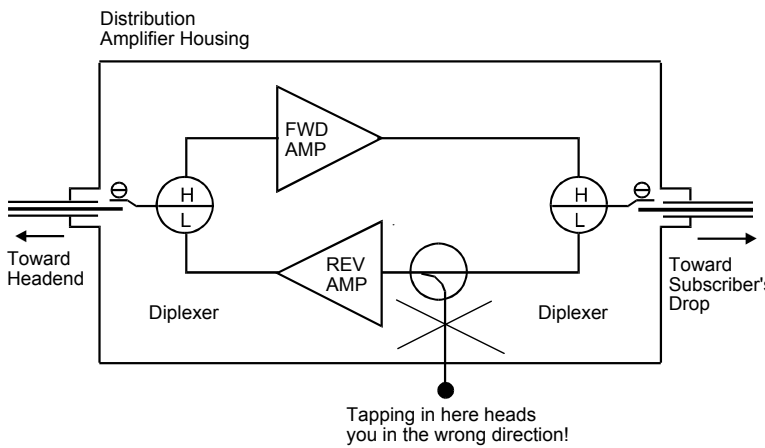
You can also automate your ingress monitoring task by using **Ingress ManageR**, the 9580's Remote Monitoring Software, with a PC.

When ingress problems do occur, you can:

- Determine along which return path the ingress is coming. If necessary, disconnect the combined returns one at a time until you locate the “bad” one.
- Read and record ingress levels at several frequencies.

- Go to the node (first amplifier in an all coax system) and read the ingress at the node’s return input using an SLM.

  CAUTION: Be careful to choose a test point that is looking downstream and NOT toward the headend.



Compare this ingress to the levels you saw at the headend. If the levels are still about the same, divide the number of amplifiers in each leg in half and test at that point. Continue to divide the amplifier spans in half until you locate the amplifier farthest from the node that still has the ingress problem.

Once you have localized the ingress, you can trouble-shoot the hardware and the drops of the target amplifier. When you think that you may have located the difficulty, connect the SSR to the system and verify that the problem is fixed by observing the ingress pattern.

Many ingress problems are transient in nature. For example, ingress from a CB radio will only be present when the radio is keyed on and the vehicle it is in is physically close to a leaky section of cable plant. These transient events will be on the order of 1 or 2 seconds.

Other events in the subscriber's house, such as electrical transients from turning on motors in appliances, can be much shorter in duration. The SST allows you to capture these transient events by combining the use of FAST Mode and PEAK HOLD Mode.

In FAST Mode, the SST analyzes each node at rates up to 80 Hz. This enables you to capture transients in the millisecond range.

When PEAK HOLD Mode is enabled, these transients stay in the screen until you reset the system.

> **REMINDER:** The sweeping procedure is not supported when the SST is in FAST Mode.
>
> An effective strategy for you may be to balance a node with the SST in NORMAL Mode. After you have obtained a balance, let the SST analyze the node in FAST Mode for a long duration (i.e. 24 hours) to verify that transient ingress is not a problem.

SPECIFICATIONS

9580 SSR/EU SPECIFICATIONS

Output Frequencies	8 user-selectable from 5 – 65 MHz (in 100 kHz steps)
Output Level	+ 20 to +55dBmV settable in 1dB steps
Output Level Accuracy	± 0.35dB after compensation
Output Spurious	– 25dBc
Data Carrier RX Frequency	Standard: 80 - 90 MHz Optional: 50 to 53.75 and 70.00 to 75.75 MHz
Data Carrier Sensitivity	– 15dBmV min., + 30dBmV max.
Display	64 x 128 pixel graphic LCD w/backlight
Display Update Rate	0.7 seconds (in all modes)
Battery Life	6 hours (in normal operating mode)
Data Logging	24 sweep records, uploadable via RS-232
Connectors	Combined TX/RX, or separate TX and RX field replaceable type “F”

TRILITHIC

9710 Park Davis Drive
Indianapolis, IN 46236
(317) 895-3600

P/N 0010203000 1/04 Made in U.S.A.