

TUNE-UP PROCEDURE

There is no field tune-up procedure. All adjustments are software controlled and are pre-set at the factory. Certain station operating parameters can be changed via Man Machine Interface (MMI) through the BRC RS232 port within predetermined limits. Examples include transmit / receiver operating frequencies and power level.

Tune Up Procedure

This exhibit contains the tune-up procedure as it will appear in the Astro® 25 system release 6.2 Simulcast Configuration Manual.

The following adjustments comprise the transmitter setups.

1. Reference oscillator installation
2. Setting transmitter frequency and power level.
3. Measuring channel interference
4. Measuring the transmitter metering points
5. Measuring the transmitter frequency error

Test Equipment

| <u>Description</u> | <u>Recommended Model</u> |
|---|-------------------------------|
| Service Monitor PC with CSS Software | Motorola R-2001 or equivalent |

Procedure

CSS Port: 9-pin serial cable with D connector is provided on the station control module front panel to allow service personnel to connect a PC loaded with the Configuration Service Software (CSS) and perform programming and maintenance tasks via the RS232 port. The following pages of this exhibit show the important alignment screens.

| <u>Exhibit</u> | <u>Description</u> |
|----------------|---|
| 9A | Installing reference oscillator |
| 9B | Configuring channel frequency and power level |
| 9C | Measuring channel interference |
| 9D | Measuring the transmitter metering points |
| 9E | Measuring the transmitter frequency error |

RF SITE EQUIPMENT CONFIGURATION

The following sections provide information about programming the devices that provide the RF interface (simulcast base radio) to the subscriber radios in your system and the devices that support the RF interface.

TRAK 9100 SIMULCAST SITE REFERENCE

See “TRAK 9100 Simulcast Site Reference Configuration” on page 2-20 for a full description of the configuration procedures that cover the general configuration points. This section provides only the specific settings required for the remote site device.

At the digital simulcast subsystem remote sites, the TRAK 9100 provides 1 pps + 5 Mpps composite signals to the simulcast base radio. For a total of 30 channels, a TRAK 9100 SSR with two Digital Distribution Modules (DDM) configured for composite signals is required. Each composite signal can drive up to six STR 3000 Base Radios. A 50 ohm impedance must terminate the end of a daisy chain. The 50 ohm load is installed at the STR 3000 Base Radio's composite input terminal.

STR 3000 SIMULCAST BASE RADIO

The information provided in this section is for all simulcast base radios installed in the digital simulcast subsystem at remote and co-located remote sites.

Using the TTY port, connect to the simulcast base radios, and program the IP address required for this particular station on this channel number at this subsite. IP address information should be obtained from your Motorola Field Representative. Using Configuration/Service Software (CSS), program the proper operating frequency for the station and verify proper RF alignment. Do this for all channels at all subsites. Table 3-1 gives an overview of information that is configured.

Using the CSS Station Configuration tab, set Simulcast Operation to **Enabled**.



NOTE

Some fields in the CSS dialog boxes are marked with an asterisk (*). This indicates a field that can be overwritten from the User Configuration Manager (UCM).

TABLE 3-1 SIMULCAST BASE RADIO CONFIGURATION SCREENS IN CSS (CONTINUED)

| Screen | Description |
|--------|-------------|
|--------|-------------|

FIGURE 3-7 BASE RADIO HARDWARE CONFIGURATION SCREEN

Station Configuration Screen

Provides for the simulcast base radio's specific station configuration. See the online documentation provided with the CSS for specific procedures.

FIGURE 3-8 BASE RADIO STATION CONFIGURATION SCREEN

MEASURING CHANNEL INTERFERENCE

The STR 3000 Simulcast Base Radios log interfering carrier levels that surpass the RF threshold value to the station error log. These logs can be used to determine periodic interfering carriers that are not present long enough to trigger the Carrier Malfunction Timer.

These logs should also be checked after any changes are made to the site that affect the site noise floor. An example of this type of change would be seen when a new customer in the immediate area is using the same frequency band.

SETTING THE STR 3000 SIMULCAST BASE RADIO RF THRESHOLD VALUE FIELD

The RF Threshold Value field appears on the Station Configuration tab of the STR 3000 Simulcast Base Radio window.

This field defines the level (in dBm) above which the received signal is considered to be an illegal carrier, if this STR 3000 Simulcast Base Radio is not assigned to a call.

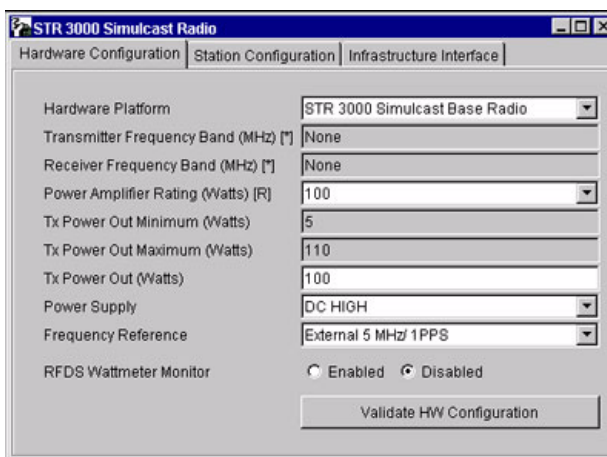
Procedure 3-1 describes the steps to set the RF Threshold Value field.

PROCEDURE 3-1 HOW TO SET THE STR 3000 SIMULCAST BASE RADIO RF THRESHOLD VALUE FIELD

- 1 In the CSS application, select **STR 3000 Simulcast Base Radio**.

Result: The STR 3000 Simulcast Base Radio window appears (Figure 3-10).

FIGURE 3-10 STR 3000 SIMULCAST BASE RADIO WINDOW SCREEN



MONITORING THE TRANSMITTER METERING POINTS

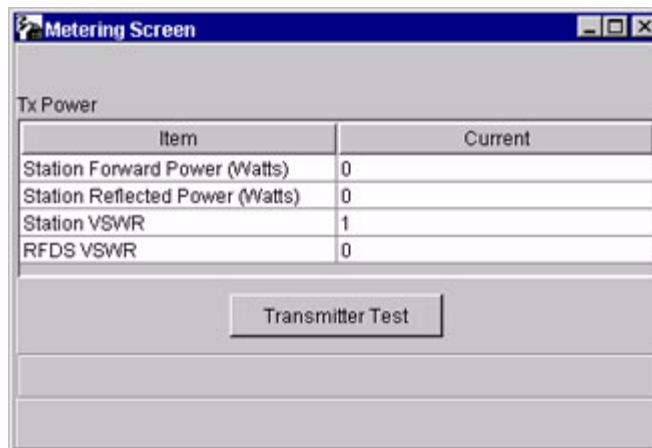
Perform Procedure 3-4 to monitor the transmitter metering points.

PROCEDURE 3-4 HOW TO MONITOR THE TRANSMITTER METERING POINTS

- 1 From the Service menu, select **Metering Screen**.

Results: The Metering Screen dialog box appears (Figure 3-17).

FIGURE 3-17 METERING SCREEN DIALOG BOX



NOTE

To obtain a reading for the RFDS VSWR metering point, you must be connected inside the STR 3000 Simulcast Base Radio rack at the bottom position, which accepts the output from the FRDS output power meter. Otherwise, the value will be either 0 or N/A.

- 2 Click **Transmitter Test**, which briefly keys up the transmitter.

Result: The status bar on the window confirms if the transmitter is operating properly or if it has failed.

See Table 3-4 “Source for the Transmitter Metering Points” on page 3-21 for a list of the source for each transmitter metering point.

SOURCE OF THE TRANSMITTER METERING POINTS

Table 3-4 lists each of the transmitter metering points and where the measurement is taken.

TABLE 3-4 SOURCE FOR THE TRANSMITTER METERING POINTS

| Current Column | Read From |
|---------------------------------|---------------------------|
| Station Forward Power (Watts) | Individual base radio |
| Station Reflected Power (Watts) | Individual base radio |
| Station VSWR | Individual base radio |
| RFDS VSWR | Power monitor in the RFDS |

CHECKING THE TRANSMITTER FREQUENCY

Perform Procedure 3-5 to measure the transmitter frequency of a base radio.

PROCEDURE 3-5 HOW TO CHECK THE TRANSMITTER FREQUENCY

- 1 Turn off the STR 3000 Simulcast Base Radio using the On and Off switch on the front of the power supply module.



CAUTION

Make sure power to the base radio is OFF. Connecting or disconnecting RF cables while the transmitter is keyed could cause personal injury or equipment damage from RF arcing.



NOTE

If two STR 3000 Simulcast Base Radio rack transmitters are combined together, turn off all of the base radios in both racks.

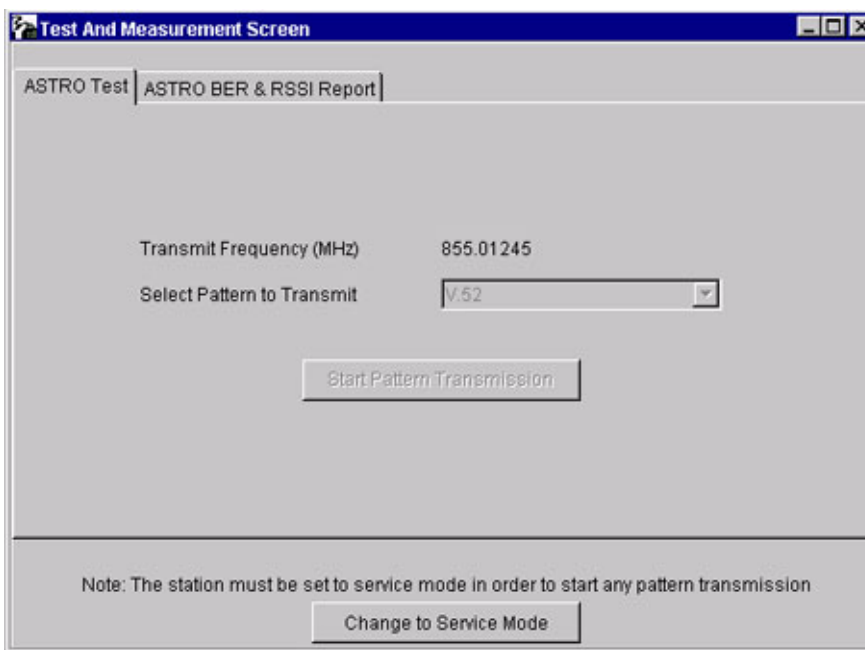
- 2 Disconnect the transmit cable from the base radio.
- 3 Connect the transmit port to the service monitor.
- 4 Set the service monitor to monitor the transmit frequency of the base radio being tested.
- 5 Turn on the base radio being checked using the On and Off switch on the front of the power supply module and allow the station to fully initialize.
- 6 Use the CSS application to read the configuration from the base radio.
See “Reading the Configuration File from a Device” in the STR 3000 Simulcast Base Radio online help.

PROCEDURE 3-5 HOW TO CHECK THE TRANSMITTER FREQUENCY (CONTINUED)

- 7 From the Service menu, select **Test and Measurement Screen**.

Result: The Test and Measurement Screen dialog box appears (Figure 3-18).

FIGURE 3-18 TEST AND MEASUREMENT SCREEN DIALOG BOX



- 8 If the station is not already in Service Mode, click **Change to Service Mode**.

Result: The STR 3000 Simulcast Base Radio begins a reset sequence to change modes, which takes a few seconds.

After resetting, read the configuration data again from the base radio and then open the Test and Measurement Screen dialog box, as described in step 7.

- 9 Select the **Standard Test** pattern.

- 10 Click **Start Pattern Transmission** to start transmitting the test pattern.

- 11 Record the transmitted frequency.

- 12 Calculate the parts per million (ppm) error using the following equation:

$$\text{ppm error} = (\text{Recorded frequency}/\text{assigned frequency} - 1) \times 10^6$$

The specification is 0.15 ppm.



NOTE

If all transmitter tests are complete proceed with next step, otherwise, go to the next transmitter test.

- 13 Turn off the STR 3000 Simulcast Base Radio using the On and Off switch on the front of the power supply module.

PROCEDURE 3-5 HOW TO CHECK THE TRANSMITTER FREQUENCY (CONTINUED)

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- 14** Disconnect the service monitor from the base radio and reconnect the transmit antenna to the transmit input connector.
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- 15** Turn on the base radio being checked using the On and Off switch on the front of the power supply module and allow the station to fully initialize.
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- 16** Click the **Change to Normal Mode** button to return the base radio to normal operations.
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CHECKING THE TRANSMITTER BIT ERROR RATE

Perform Procedure 3-6 to check the bit error rate (BER) on the transmitter.

**NOTE**

If the service monitor is already connected, go to step 6.

PROCEDURE 3-6 HOW TO CHECK THE TRANSMITTER BIT ERROR RATE

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- 1** Turn off the STR 3000 Simulcast Base Radio using the On and Off switch on the front of the power supply module.

**CAUTION**

Make sure power to the base radio is OFF. Connecting or disconnecting RF cables while the transmitter is keyed could cause personal injury or equipment damage from RF arcing.

**NOTE**

If two STR 3000 Simulcast Base Radio rack transmitters are combined together, turn off all of the base radios in both racks.

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- 2** Disconnect the transmit cable from the base radio.
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- 3** Connect the transmit port to the service monitor.
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- 4** Set the service monitor to monitor the transmit frequency of the base radio being tested.
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- 5** Turn on the base radio being checked using the On and Off switch on the front of the power supply module and allow the station to fully initialize.
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- 6** Use the CSS application to read the configuration from the base radio.
See “Reading the Configuration File from a Device” in the STR 3000 Simulcast Base Radio online help.
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