BASE STATION ANTENNA INSTALLATION.

NOTE *THE FOLLOWING SUGGESTIONS ARE FOR PERSONNEL RESPONSIBLE FOR ANNTENA INSTALLATIONS TO AVOID ERRORS IN ASSEMBLY AND ADJUSTMENT. MARTI ELECTRONICS, INC. ASSUMES NO RESPONSIBILITY FOR THE INSTALLATION AND PERFORMANCE OF ANTENNA SYSTEMS USED WITH MARTI EQUIPMENT. THE FOLLOWING TEXT IS NOT A COMPLETE STEP-BY-STEP PROCEDURE. HOWEVER, THE TEXT PRESENTS THE MOST FREQUENTLY REPORTED ERRORS IN ANTENNA SYSTEM INSTALLATION.*

NOTE

NOTE

NOTE

WARNING *DEATH CAN OCCUR IF AN ANTENNA COMES IN CONTACT WITH ELECTRIC POWER LINES OR EXPOSED ELECTRICAL WIRING. USE EXTREME CAUTION WHEN INSTALLING ANTENNAS. KEEP ANTENNAS AWAY FROM POWER LINES.*

WARNING

CAUTION
HIGH LEVEL RF RADIATION

PERSONNEL MUST NOT BE NEAR A RADIATING ANTENNA. LOCATE THE ANTENNA AS FAR AS POSSIBLE FROM PEOPLE AND EQUIPMENT SUSCEPTIBLE TO RF RADIATION. DO NOT MOUNT ANTENNA DIRECTLY ON THE TRANSMITTER. REFER TO ANSI C95.1 "LIMITS ON NON-IONIZING RADIATION".

Antenna Assembly.

Follow the manufacturer's instructions carefully. If no instructions were included with the antenna, call or write the antenna manufacturer for instructions. Antennas which have phasing or stacking cables must be assembled carefully to avoid phase reversal or signal cancellation.

Transmission Line Connector Assembly.

Do not use RG-58 U or RG-8 U cable with antennas. The cable has too much loss at VHF and UHF frequencies. Follow the instructions furnished by the manufacturer when cutting coaxial cable. Inspect the cable ends for small metal fragments which can short-circuit the line inside the connector assembly. Check the line for a short-circuit condition using an ohmmeter after each connector is installed. Pressurized line should be checked for several days under pressure before installation on a tower to ensure that there are no leaks in the line or fittings.

Moisture Proofing Coax Connectors.

Extreme care must be exercised with coaxial cable before and after connectors have been installed to ensure that moisture does not enter the line. Foam dielectric line can absorb moisture and is difficult to detect and remedy. Therefore, keep the line dry while in storage with the ends tightly capped. Coaxial splices, connectors, and fittings to be located outside should be made mechanically tight, then coated with a weatherproofing material over at least two layers of vinyl plastic electrical tape. Moisture problems in antenna systems are usually traced back to connectors which have NOT been properly taped. The Marti K-1 Grounding and Weatherproofing Kit is recommended for use in each new antenna installation.

Location and Grounding of Coaxial Cable.

NOTE ***DO NOT STRAP RECEIVER CABLE TO THE MAIN ANTENNA CABLE AT ANY POINT. PLACE THE RECEIVER ANTENNA CO-***

NOTE ***AXIAL CABLE ON THE OPPOSITE SIDE OF THE TOWER FROM THE MAIN ANTENNA CABLE.***

Keep the RPU receiver coaxial cable as far from the broadcast transmitter RF output line as possible. Maintain maximum separation between these cables at all points including the distance from the tower base to transmitter building as well as inside the building.

System Grounding.

It is essential that the RPU antenna system be properly grounded for safety and proper operation. Ensure the antenna system is properly grounded.

Antenna Installation and Adjustment.

The polarization of the transmit and receive antennas of the RPU system must be the same. For example, if the transmitting antenna is vertical, the receiving antenna must also be vertical. Each antenna should be attached to the tower using the proper side mount or top mount hardware. If an RF watt meter is available, each antenna and transmission line can be checked for VSWR conditions when the transmitter is producing RF power. The VSWR should be less than 1.5 to 1 (1.5:1). If the antenna system fails to give the predicated signal strength, check the following items:

1. Ensure the antenna is correctly assembled.
2. Ensure the antennas have same polarity.
3. Check VSWR of both the transmit and receive antennas. The VSWR should be less that 1.5:1.
4. Check for obstructions in the path such as trees and man-made structures. The base antenna must be high enough to provide a line-of-sight path to the remote transmitting antenna.

OPERATION.

MICROPHONE INPUT CONNECTORS.

The **INPUT1, INPUT 2, INPUT 3,** and **INPUT 4** microphone inputs are for a balanced 150 ohm dynamic microphone such as the Shure BG 1.0 equipped with a standard XLR-3 or A3M connector. **INPUT 4** can operate at **MIC LEVEL** or **HIGH LEVEL** by means of a selector switch inside the transmitter (located just behind the INPUT 4 level control). The unit is factory configured for a **HIGH LEVEL** balanced input for use with tape cartridge machines, etc. To convert **INPUT 4** to a microphone level, remove top cover and operate the switch to **MIC.**

ACCESSORY INPUT CONNECTOR.

CAUTION

TOTAL CONTROL CIRCUIT RESISTANCE MUST NOT EXCEED 0.3 OHMS.

CAUTION

When INPUT 4 is operated to **HI**, audio can be routed to pins 2 and 3 on the **ACCESSORY** connector on the transmitter rear panel. The input level should be between 0.2 volts to 2.0 volts rms. The output impedance of the device connected to INPUT 4 should be 8 – 600 ohms. For unbalanced operation, ground pin 2 to pin 5 and connect the audio to pin 3. Use a standard 9–pin D–type female connector with a cover. The **TRANSMIT** control can be controlled remotely by using a low resistance switch circuit connected to pins 7 and 9.

GAIN CONTROLS.

The gain control located above each input connector provides independent channel level adjustment. Each gain potentiometer is adjusted as follows:

1. Connect an input source and operate at a normal audio level.
2. Turn gain control to the maximum counter–clockwise ("OFF") position.
3. Operate the **CONTROL** switch to **STDBY** and allow METER to indicate 0 VU. Slowly increase gain (clockwise) until the meter begins deflecting to the left on audio peaks. Maximum deflection should be –3 to –5 VU on the meter scale. This indicates 100% modulation of the transmitter. Excessive gain cause high compression values which result in an annoying increase in background noise. A 600 ohm headset may be connected to the MONITOR jack to aid in arriving at the proper gain adjustment. In high noise environments, close–talk the microphone and reduce the microphone gain until a maximum of –2 VU is indicated.
4. Once the proper gain level is determined, do not change the level for that particular microphone or tape player. The broadcast quality compressor/limiter built into the unit will maintain modulation at the maximum level while preventing over–modulation.

CONTROL SWITCH.

When the transmitter is not in use, operate the **CONTROL** switch to **OFF**. Operate the switch to **STDBY** at least 2 minutes before transmission is anticipated. This activates all audio circuits, the **MONITOR** jack, and the meter. Current drain is minimal in **STDBY**. The **CONTROL** switch is operated to **TRANSMIT** when transmission is desired. Return the **CONTROL** switch to **STDBY** or **OFF** as soon as a transmission is completed.

ENCODE SWITCH.

The internal subaudible encoder can be switched to **ON** or **OFF** by the front panel **ENCODE** switch. Encoding is used to activate a repeater station or tape recorder etc.

MONITOR JACK.

The **MONITOR** jack is active in the **STDBY** and **TRANSMIT** modes. A high–quality headset with a 300 ohm or higher impedance can be inserted into the **MONITOR** jack to perform adjustments or to monitor the transmitted audio quality. A miniature, single circuit, 1/8 inch phone plug should be used with the **MONITOR** jack.

ANTENNA CONNECTOR.

CAUTION

ENSURE THE ANTENNA IS CONNECTED TO THE UNIT BEFORE OPERATING THE CONTROL SWITCH TO TRANSMIT.

CAUTION

To connect various antenna systems to the unit, refer to INSTALLATION and ANTENNAS in the preceding text. Ensure the antenna connector is secure and the antenna is clear of objects which may affect the radiation efficiency. Ensure the antenna is connected to the unit before operating the **CONTROL** switch to **TRANSMIT**.

RECVR CONNECTOR.

If the SRPT–40E is equipped with the optional antenna relay, the transmit antenna can be used for receiving by connecting a coaxial cable (No. 585–026) between the **RECVR** jack on the SRPT–40E and the **ANTENNA** connector of the SR–10E receiver. To silence the receiver while transmitting, connect mute cable 585–038–2 to the **ACCESSORY** connector on each unit.

ANTENNA INDICATOR.

The red ANTENNA indicator flashes to indicate a problem with the antenna when transmitting. The indicator will flash if the CONTROL switch is switched to "TRANSMIT" without an antenna connected. The indicator can also indicate a: 1) defective antenna, coaxial cable, or connector or 2) improper antenna. Prolonged operation with these conditions can damage the transmitter.

TEMP INDICATOR.

The TEMP indicator flashes to indicate excessive operating temperatures within the transmitter. This can be caused by obstructed vent holes in the top or rear of the unit, a defective cooling fan, or antenna problems. If the TEMP indicator begins to flash, do not operate SRPT–40E until the cause of overheating is corrected.

CHANNEL UP/DOWN SWITCHES.

The channel UP/DOWN buttons allows the selection of up to 16 pre–selected channels. The channels are selected by depressing the UP or DOWN buttons as required to select the desired channel.

AFC LOCK LED.

The **AFC LOCK** indicator should be illuminated at all times when the transmitter is operating. This indicates the frequency synthesizer VCO is locked to the reference.

PWR LED.

The **PWR** indicator will illuminate to indicate ac power or an appropriate dc power source is applied to the unit.

VU METER.

The **METER** switch allows the monitoring of important transmitter parameters. The unit is equipped with a three position switch to display the following parameters.

AFC Level.

When the **METER** switch is operated to **AFC LEVEL**, the meter will indicate the AFC error correction voltage in the phase–locked loop. The operating range of the AFC error correction voltage is between –2 VU to +3 VU. Level errors greater than the normal range will require adjustment of the VCO center frequency (refer to MAINTENANCE in the following text).

RF Output.

When the **METER** switch is operated to **RF OUTPUT**, the meter will indicate the PA RF output power level. For a 40 watt output, the VU meter will indicate approximately 0 VU ±3 VU.

Audio Compression.

When the **METER** switch is operated to **AUDIO COMPRESSION**, the meter will indicate the audio limit level. A normal audio compression indication is from 0 to –4 VU. A meter value of –5 VU or greater indicates excessive compression. Reduce the amount of compression by reducing the audio input level.

PROGRAMMING THE CHANNELS.

The SRPT–40E is constructed for a specified center frequency when shipped from the factory. This center frequency selection is factory programmed into channel 1 and allows the unit to be programmed for operation within a ±2 MHz range of the frequency. Within this 4 MHz range, the unit can be programmed to operate on any frequency in 12.5 kHz increments. This results in approximately 320 available operating frequencies. These frequencies are recorded in the PROGRAMMING DATA SHEETS shipped with the unit.

Of the 320 available operating frequencies, up to 16 frequencies can be selected and assigned to operating channels in the unit. The unit can be programmed for 16 channels, 8 channels, 4 channels, or 2 channels. To program the unit for the desired number of channels and assign the frequencies to the channels, proceed as follows:

1. Remove the SRPT–40E top cover.
2. Connect the unit ac line cord to an appropriate power receptacle. Ensure the **CONTROL** switch is operated to **OFF**.
3. Refer to Figure 6 and locate the controller circuit board. This circuit board is the larger board directly behind the front panel channel display.
4. Refer to Figure 6 and select the number of operating channels using jumper P105.

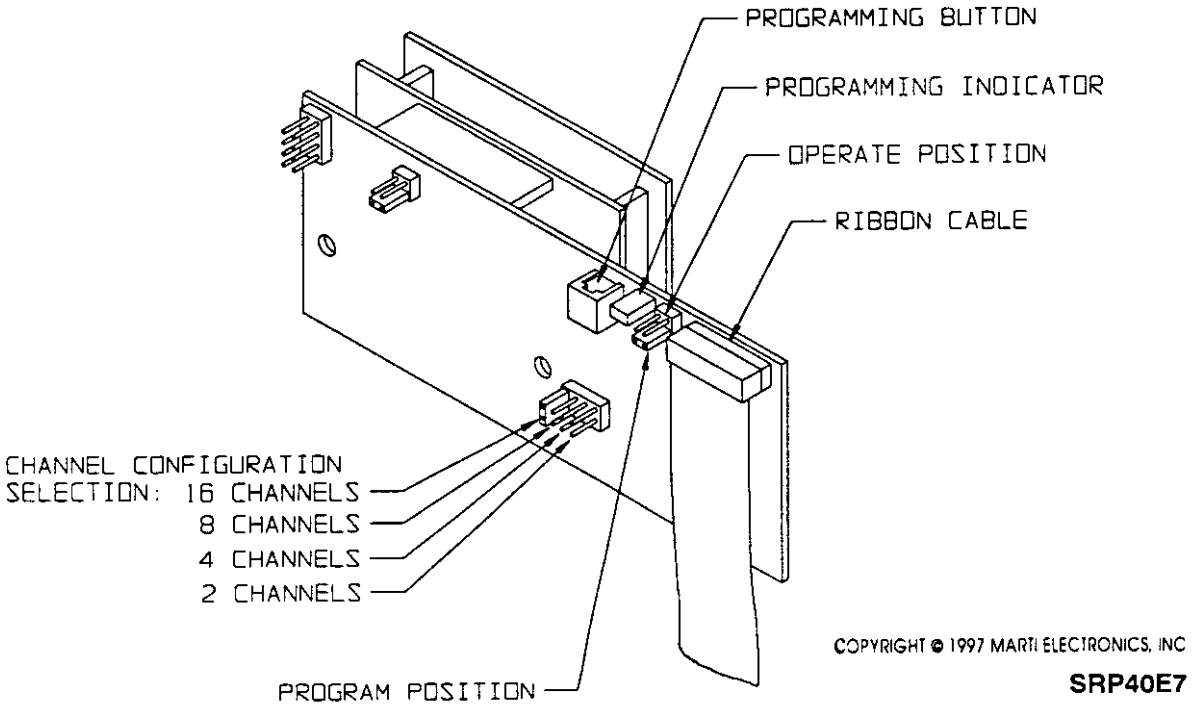


FIGURE 6. CONTROLLER CIRCUIT BOARD (VIEW FROM REAR OF UNIT)

5. Refer to Figure 6 and place the OPERATE/PROGRAM jumper P104 on the controller circuit board in the PROGRAM position as shown.

6. Assign a frequency to a channel as follows:

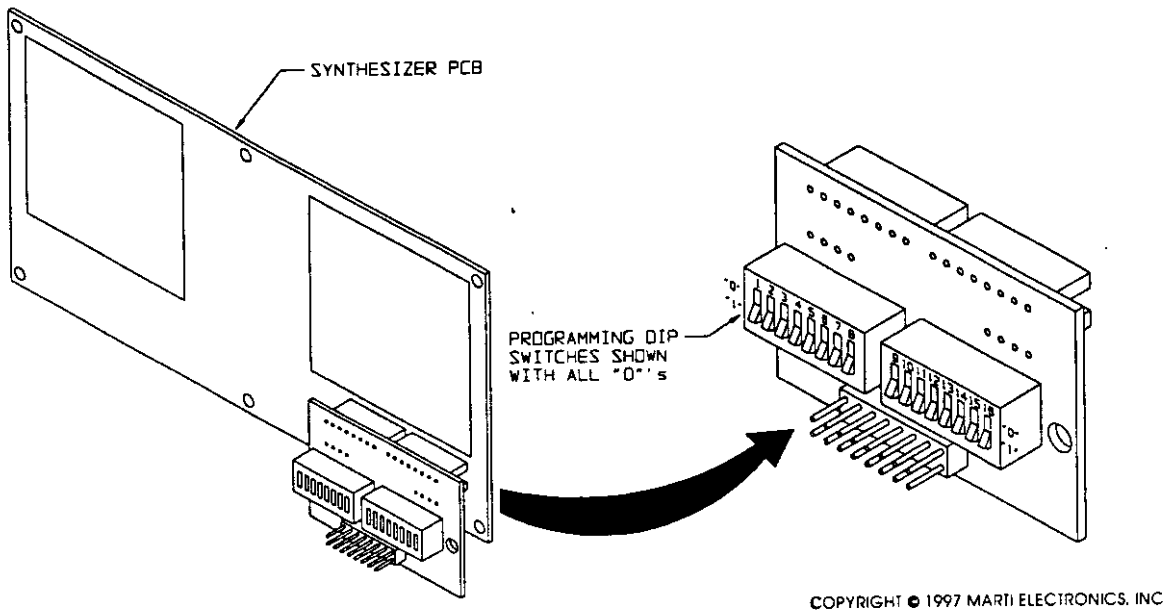
   A. Operate the **CONTROL** switch to **STDBY.**

   B. Use the front panel **UP** and **DOWN** buttons to select the channel to be programmed.

   C. Refer to the PROGRAMMING DATA SHEETS shipped with the unit and locate the operating frequency to be assigned to the channel. Highlight the 16 DIP switch programming positions for the frequency.

   D. Refer to Figure 7 and locate the synthesizer circuit board.

   E. Refer to Figure 7 and program the 16 DIP switch programming positions for the desired frequency. The DIP switch can be operated to the 1 or 0 position. To program a 1, the switch must be operated towards the ribbon cable. To program a 0, the switch must be operated towards the synthesizer circuit board.



SR10E 3

FIGURE 7. FREQUENCY SYNTHESIZER CIRCUIT BOARD

   F. Refer to Figure 6 and depress the PROGRAMMING button. The programming LED will illuminate when the switch settings are programmed into the controller circuit board.

   G. Repeat the procedure for each channel to be programmed into the unit.

NOTE ***IF ALL THE CHANNELS ARE NOT USED IN A CONFIGURATION, THE UNUSED CHANNELS SHOULD BE PROGRAMMED WITH THE FREQUENCY FROM THE LAST USED CHANNEL.***

NOTE

   H. If all the channels in a configuration are not used, program the unused channels using the frequency from the last used channel. For example, a unit is configured for 8 channels and only channels 1 through 6 are to be used. Therefore, program channels 7 and 8 with the frequency assigned to channel 6.

7. When all the channel programming has been completed, refer to Figure 6 and return the OPERATE/PROGRAM jumper on the controller circuit board to the OPERATE position.

AUDIO CIRCUIT BOARD 800-166AE.

The audio circuit board performs several functions. Integrated circuit IC-1 functions as a: 1) pre-emphasis amplifier, 2) voltage-controlled attenuator, and 3) regulator/ripple rejector. Pre-emphasized audio from IC-1B is also routed to D2 - D3 which form an adjustable series peak-limiting circuit. This circuit is adjusted to limit only audio peaks from the compressor. The limiter circuit output is applied to a low-pass filter (L1, C23, R46) which reduces the audio bandwidth specified for the operating channel of the transmitter. The low-pass filter output is mixed with the output of tone encoder IC-2A. IC-2A is a low-distortion Wien bridge oscillator. This composite signal is then routed to the controller circuit board for application to control R4. The signal from R4 is applied to the modulation port of the VCO on the frequency synthesizer circuit board. This audio signal is also routed to amplifier IC-2B to increase the level required for a 600 ohm headphone monitor. IC-2C is a dc amplifier designed to amplify the AGC voltage. The output of IC-2C drives the audio compression meter.

RF POWER AMPLIFIER CIRCUIT BOARD 800-170A2E/170A4E/170A1E.

The RF output from the RF pre-driver circuit board is connected to the input of the power amplifier circuit board at a 50 ohm impedance. Transformation of the 50 ohm input to the base impedance of Q1 is accomplished by C1, C2, L1, L2, and L3. L4 and L5 provide a path for Q1 base current and the L5 - R1 parallel circuit reduces low frequency gain and instability. The RF output power of Q1 is approximately 10 watts and is routed to the base of Q2 by the L-C impedance matching network shown on the schematic. L13 and R2 reduce low-frequency gain and instability. RF power at the collector of Q2 is matched to 50 ohms by the L-C network shown. The collector supply to Q1 and Q2 is decoupled by L8 and C5 - C10.

OUTPUT LOW-PASS FILTER CIRCUIT BOARD 800-250A4/306A2.

RF output from the RF power amplifier circuit board is routed through a four-section low-pass filter and directional-coupler before reaching the output connector. The directional-coupler is of stripline construction. The forward power sample of this coupler is routed to the RF output meter and the reflected power sample is routed to comparator IC-1A on the meter circuit board. IC-1A will flash the ANTENNA LED to indicate a high VSWR condition. R5 and R6 calibrate the forward and reflected power samples. Circuitry for an optional antenna relay is provided on the circuit board. When installed, this relay switches the antenna from receive to transmit for two-way operation.

POWER SUPPLY ASSEMBLIES 800-324A.

The transmitters are equipped with 800-324A power supplies. The power supply accepts ac input potentials from 90 to 264 volts and supplies 15 VDC at 8 Amperes to power the SRPT-40E circuitry. The supplies are not manufactured by Marti Electronics; therefore, no additional circuitry description can be provided.

ACCESSORY CONNECTOR CIRCUIT BOARD 800-253A.

All input/output circuits connect to the ACCESSORY receptacle on the accessory connector circuit board. The input/output signals and the ac line input are equipped with RF filters. In addition to the L and C filter components, the circuit board is also equipped with reverse polarity protector diode D2.

METER CIRCUIT BOARD 800-252A.

The meter circuit board is equipped with the VU meter, meter illumination lamp, ANTENNA and TEMP LEDs. The circuit board also contains comparator drivers IC-1A and IC-1B.

THERMISTOR CIRCUIT BOARD 800-255A.

The thermistor circuit board is equipped with thermistor R1 and transistor Q1. R1 is used to detect the transmitter operating temperature. The thermistor is connected to the temperature comparator on the meter circuit board. The TEMP indicator will flash to indicate an over-temperature condition. Q1 is used to control the fan.

NOTE *ENSURE ALL THE DIP SWITCHES ON THE SYNTHESIZER CIRCUIT BOARD ARE OPERATED TO THE 1 POSITION. THE*

NOTE *UNIT WILL NOT RECALL THE STORED FREQUENCIES CORRECTLY IF THIS IS NOT PERFORMED.*

8. Refer to Figure 7 and operate all the DIP switches to the 1 position. The unit will not recall the stored frequencies correctly if this is not performed.
9. Operate the **CONTROL** switch to **OFF** and replace the top cover.

OPERATING PROCEDURE.

1. Operate the **CONTROL** switch to **OFF** and connect the unit to a 90 – 264 volt grounded ac receptacle.
2. Connect the antenna to the **ANTENNA** connector on the rear panel.
3. Select the desired operating channel.
4. Operate the **CONTROL** switch to **STDBY**. Allow approximately 2 minutes for warm-up.
5. Connect microphones to **INPUT 1** through **INPUT 3** or a line level source such as a tape player to **INPUT 4**. **INPUT 4** can be configured for microphone or line inputs (refer to MICROPHONE INPUT CONNECTORS in the preceding text). Check the levels by observing the compression on the meter and by using a headphone connected to the **MONITOR** receptacle. Operate the **INPUT 1** through **INPUT 4** gain controls for a maximum of –3 VU audio compression on the VU meter.
6. To transmit, operate the **CONTROL** switch to **TRANSMIT**. Operate the **METER** switch to **RF OUTPUT**. The meter should read 0 VU ±3 VU.
7. If the **ANTENNA** indicator flashes during transmit operation, operate the **CONTROL** switch to **OFF** immediately. Check the antenna, connectors, and coaxial cable. Placing an antenna too near a wall or other object can cause **ANTENNA** indicator to flash.
8. If the **TEMP** indicator flashes during transmit operation, ensure: 1) the vent holes in top or rear of unit are not obstructed, 2) the fan is operating, 3) the transmitter is properly tuned, 4) an improper antenna load is not present, or 5) any other problems causing excessive heating are present. Do not operate SRPT-40 until cause of overheating is corrected.

THEORY OF OPERATION.

The SRPT-40E block diagram at the end of this manual presents an overall description of the SRPT-40E circuitry. Refer to the diagram as required for the following circuit description.

PRE-AMPLIFIER/MIXER CIRCUIT BOARD 800-251A.

Each of the four microphone inputs is applied to a low-noise differential operational amplifier. Critical resistors in the input circuits are low-noise, precision, and temperature stable to obtain maximum performance from the pre-amps. Monolithic chip capacitors are used to filter RF voltages that may be present at the microphone inputs. The four operational amplifier outputs are routed to gain controls, mixed using resistors, and routed to the audio circuit board.

FREQUENCY SYNTHESIZER 800-287A4ET/-305A2ET/-305A1ET.

The SRPT-40E is equipped with 3 different frequency synthesizer circuit boards as determined by the band of operation. The 800-287A4ET circuit board is used in the 450 MHz band units. The 800-305A1ET circuit board is used in the 150 MHz band units. The 800-305A2ET circuit board is used in the 215 MHz band units. The frequency synthesizer consists of Phase-Locked Loop IC5, voltage-controlled-oscillator Q2, pre-scaler IC4, reference oscillator Y1, and loop filter IC2A. The transmitter frequency is synthesized using a local oscillator. IC5 is a programmable device with a reference frequency generated by a crystal oscillator. The loop filter is an active type. The pre-scaler is used to pre-scale the VCO frequency to make it compatible to the PLL. The PLL performs three major functions:

1. Compares the phase of the pre-scaled VCO frequency with the frequency of resolution and produces outputs that are used by the loop filter to generate a dc voltage. This dc control voltage is used to control the VCO frequency.
2. Controls the pre-scaler by selecting the divisor.
3. Generates the frequency of resolution internally using the crystal oscillator.

The PLL has 16 programming pins that are used by controller circuit board 800-339A1 to select a VCO frequency and produce a lock. An extremely stable crystal oscillator and noiseless loop filter make the synthesizer ultra stable. The output of phase-locked VCO Q2 is buffered by IC3. The output of IC3 is low-pass filtered and connected to J1 (L.O. out).

CONTROLLER CIRCUIT BOARD 800-339A1.

The controller board consists of up/down counter U107 and EPROMs U109 and U110. Pulses from the channel selector switches on LCD display circuit board 800-340A1 are routed through a debouncing circuit constructed from timer U106. The output from U106 is applied to a logic circuit consisting of NOR gates U101 and U102. The logic circuit directs U107 to count up or down as determined by the up/down switches on the LCD display circuit board. The output of U107 functions as an address generator for U109 and U110. Both U109 and U110 respond to the address by selecting an 8 bit output with the information required to drive the PLL circuit on the frequency synthesizer circuit board.

Header J104 configures EPROMs U109/U110 for read or write operation. When P104A is installed in position 1-2 and S101 is depressed, data on the I/O bus will be stored in U109/U110 and LED DS101 will illuminate. When P104B is installed in position 3-4, U109/U110 will be configured to place the frequency synthesizer programming information on the I/O bus for application to IC5 on the frequency synthesizer circuit board.

LCD DISPLAY CIRCUIT BOARD 800-340A1.

The LCD display circuit board consists of two switches, two indicators, and an LCD display. Switch S201 operates the channel display in the up direction when depressed. Switch S203 operates the channel display in the down direction when depressed. AFC lock indicator DS202 will illuminate to indicate when the PLL circuit on the synthesizer circuit board is locked. PWR indicator DS201 illuminates when ac or dc power is applied to the unit. DS203 is a 2-digit LCD display. The display is controlled by the circuitry on the LCD display driver circuit board.

LCD DISPLAY DRIVER CIRCUIT BOARD 800-341A.

The channel display is controlled by circuitry on the LCD display driver circuit board. The output of U107 on the controller circuit board also functions as an address generator for EEPROM U302. U302 is programmed with the data used to generate the numerals on the LCD display. The output of U302 is pulsed by timer U301 and applied to transistor array U303 which is used to drive the LCD display on the LCD display circuit board. DS301 is used to back-light the LCD display.

POWER SUPPLY REGULATOR CIRCUIT BOARD 800-168-1AE.

The power supply regulator circuit board is equipped with three-terminal adjustable regulator IC-1. IC-1 is designed for a +13 volt dc output. Capacitors C7 and C8 provide filtering for the dc supply.

RF PRE-DRIVER CIRCUIT BOARD 800-338A1/A2/A4.

The RF pre-driver circuit board is equipped with RF amplifier transistors Q1 and Q2. Q1 functions as a pre-driver stage. Q2 is designed as an RF amplifier stage. Resistors R1 through R3 attenuate the RF input signal. Matching of the 50 Ohm input impedance to the input impedance of Q1 is accomplished by L1, L2, and C1. The amplified RF signal from Q1 is applied to amplifier Q2. Impedance matching between Q1 and Q2 is provided by C2, C3, L3, L4, and R5. The output impedance of Q2 is matched to the RF output impedance by C4 and C5. Thermistor T1 monitors the RF amplifier heat sink temperature.

MAINTENANCE.

The SRPT-40E transmitter is tested and inspected at the factory prior to shipment. The unit performance was recorded on the factory test report shipped with the unit. Adjustments should rarely be required in the field and should be attempted only by highly trained technicians familiar with this type equipment. Refer to the SRPT-40E ADJUSTMENT LOCATIONS illustration in the following text for the location of the adjustments and test points.

TEST EQUIPMENT.

The following text presents the equipment required to perform the SRPT-40E adjustments.

1. Marconi RF Signal Generator, Model 2022C or TF2013.
2. Insulated Adjustment Tool.
3. Kron-Hite Distortion Analyzer, Model 6801.
4. Spectrum Analyzer, Hewlett Packard Model 8558B.

PRE-AMPLIFIER CIRCUIT BOARD REMOVAL.

To remove remove pre-amplifier circuit board 800-251A from the chassis, proceed as follows:

1. Remove the knobs and hardware from the four level controls on front panel.
2. Unlock the microphone connectors as follows:
   A. In addition to the three pin receptacles, the microphone connector is equipped with a small hole near the center of the connector. This hole contains a tiny locking mechanism. Using a small (0.75" wide) flat blade screwdriver, insert the tool into hole and turn slowly until screwdriver engages the connector lock.
   B. Turn screwdriver counter-clockwise (1/8 turn) until the microphone insert releases.
   C. Repeat the procedure for each microphone input.
   D. Gently push the black plastic inserts out of the metal shells while simultaneously pushing the gain adjust controls inward until the circuit board releases from the front panel.
3. Remove the circuit board from the chassis. To re-install the circuit board, reverse the above procedure.

POWER SUPPLY ASSEMBLY 800-324A.

The transmitters are equipped with power supply assembly 800-324A. The modules are self-contained with no user adjustments.

RF PRE-DRIVER CIRCUIT BOARD 800-338A1/A2/A4.

To adjust the pre-driver circuit board assembly, proceed as follows:

1. Connect a 50 ohm load with a sampling port and a wattmeter with a 50 watt element for the correct frequency range to the SRPT-40E ANTENNA connector.

2. Connect a 13.5 volt DC regulated bench power supply with an accurate 0–10 Ampere meter to the transmitter using power cable 586–074 (refer to Figure 3).
3. Connect the spectrum analyzer to the wattmeter sample port.
4. Operate the **CONTROL** switch to **TRANSMIT** and adjust capacitors C1 through C5 for: 1) minimum current on the power supply ampere meter, 2) maximum output power on the wattmeter, and 3) minimum spurs on the spectrum analyzer. Adjust the capacitors in the following order: C1, C2, C3, C4, and C5.
5. Once the pre–driver circuit board is adjusted, refer to the following text and perform the RF POWER AMPLIFIER CIRCUIT BOARD 800–170A1E/A2E/A4E procedures.

RF POWER AMPLIFIER CIRCUIT BOARD 800–170A1E/A2E/A4E.

To adjust the RF power amplifier circuitry, proceed as follows:

1. Ensure the RF pre–driver circuit board is adjusted before proceeding (refer to RF PRE–DRIVER CIRCUIT BOARD 800–338A1/A2/A4 adjustment procedures in the preceding text if required).
2. Connect a 50 ohm load with a sampling port and a wattmeter with a 50 watt element for the correct frequency range to the SRPT–40E **ANTENNA** connector.
3. Connect a 13.5 volt DC regulated bench power supply with an accurate 0–10 Ampere meter to the transmitter using power cable 586–074 (refer to Figure 3).
4. Connect the spectrum analyzer to the wattmeter sample port.
5. Operate the **CONTROL** switch to **TRANSMIT** and adjust capacitors C1, C2, C11, C12, and C13 for: 1) minimum current on the power supply ampere meter, 2) maximum output power on the wattmeter, and 3) minimum spurs on the spectrum analyzer. Adjust the capacitors in the following order: C1, C2, C11, C12, and C13.
6. Adjust collector output matching capacitors C16, C17, and C18 for maximum efficiency at the rated output by slightly retuning for a minimum current at the rated power output. Total current to the transmitter is approximately:

FREQUENCY	POWER OUTPUT	CURRENT
450 MHz	40 watts	7.5 to 8.0 A
300 MHz	40 watts	6.5 to 7.0 A
215 MHz	40 watts	6.0 to 6.5 A
150 MHz	40 watts	6.0 to 6.5 A

7. Remove the test equipment.

AUDIO CIRCUIT BOARD 800–166AE.

Encoder Calibration.

1. Connect a 50 watt test load with sampling port to the **ANTENNA** connector.
2. Connect an FM deviation meter and frequency counter to the sampling port.
3. Operate the **CONTROL** switch to **TRANSMIT**.
4. Operate the **ENCODE** switch to **ON** and adjust encode level control R33 for a 1.0 kHz deviation.
5. Remove the test equipment.

Meter Calibration.

1. Operate the **METER** switch to **AUDIO COMPRESSION**.
2. With no audio input, adjust control R22 for a 0 VU meter indication.

Distortion Adjustment.

1. Operate the **ENCODE** switch to **OFF**.
2. Connect a harmonic distortion analyzer to the audio output of the SR–10E receiver.
3. Connect a 50 watt test load with sampling port to the SRPT–40E **ANTENNA** connector.

CAUTION

CAUTION

DO NOT ROUTE THE SRPT–40E OUTPUT DIRECTLY INTO THE INPUT OF THE SR–10E. THIS WILL SEVERELY DAMAGE THE RECEIVER INPUT STAGE.

4. Route a 100 microvolt signal from the sample port to the receiver RF input.
5. Connect an audio signal generator to INPUT 4 on the transmitter.
6. Modulate the transmitter with a 2500 Hz tone at 3 dB compression.
7. Adjust limit level control R26 to the maximum counter–clockwise position and note the distortion. The distortion should be less than 2%. Slowly adjust R26 clockwise until an additional 0.1% distortion is indicated on the distortion meter.
8. Remove the test equipment.

Encode Frequency Adjustment.

1. Connect a 50 watt test load with sampling port to the SRPT–40E **ANTENNA** connector.

CAUTION

CAUTION

DO NOT ROUTE THE SRPT–40E OUTPUT DIRECTLY INTO THE INPUT OF THE SR–10E. THIS WILL SEVERELY DAMAGE THE RECEIVER INPUT STAGE.

2. Route a 100 microvolt signal from the sample port to the receiver RF input.
3. Operate the **ENCODE** switch to **ON**.
4. Operate the SR–10E **METER** switch to **DECODE LEVEL**.
5. Adjust encode frequency control R37 for a maximum indication on the SR–10E meter.
6. Remove the test equipment.

Frequency Response Adjustment.

1. Connect an audio voltmeter to the output terminals of the SR–10E receiver.
2. Connect a 50 watt test load with sampling port to the **ANTENNA** connector.
3. Connect an attenuator to the sample port and route a 100 microvolt signal into the SR–10E receiver.
4. Connect an audio signal generator to line level **INPUT 4** on the SRPT–40E. Adjust the signal generator for a 2.5 kHz signal at 20 dB below the compression level .
5. Adjust L1 for a maximum level on the audio meter.
6. Remove the test equipment.

FREQUENCY SYNTHESIZER CIRCUIT BOARD 800–287A4ET/305A1ET/305A2ET.

The VCO and frequency synthesizer circuitry is adjusted at the factory and will not require adjustment in the field. Do not adjust the circuitry in the field.