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# INSTRUCTION MANUAL

## RADIO SETS

## PRC-660T and VRC-240T

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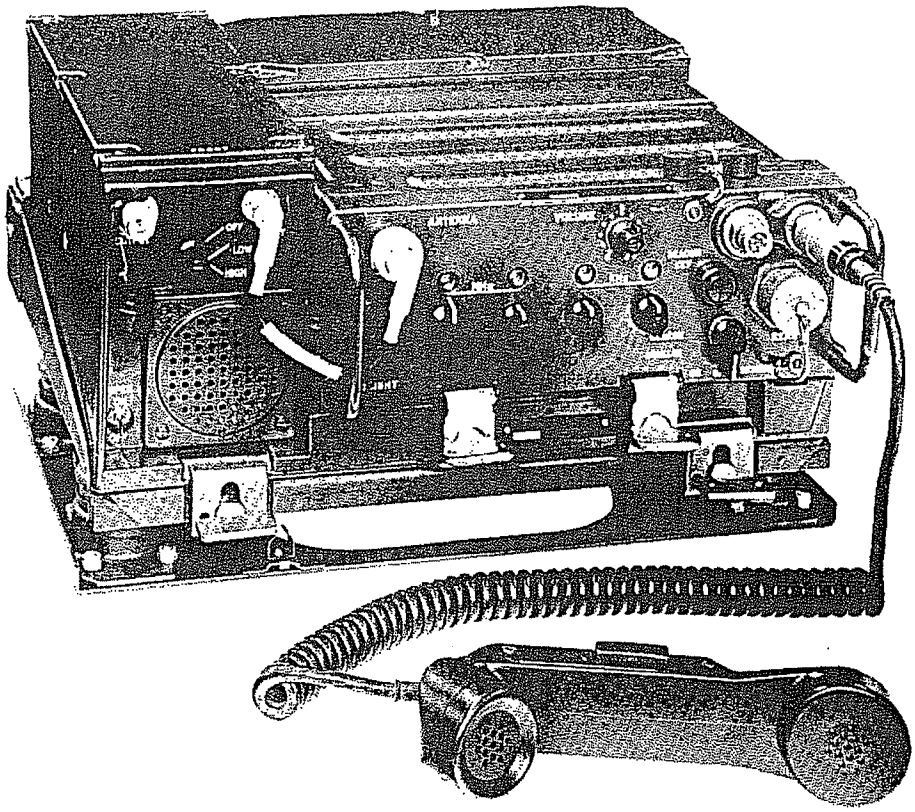


Figure 1-1. Radio Set VRC-240T

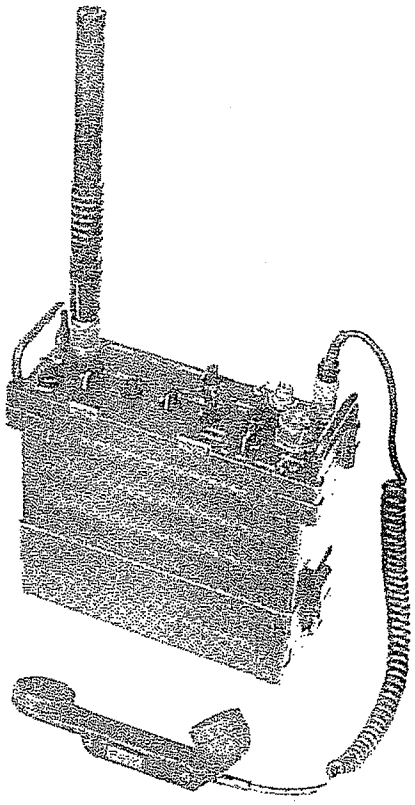


Figure 1-2. Radio Set PRC-660T

# Chapter 1

# GENERAL INFORMATION

## 1-1. SCOPE

This manual describes Radio Sets VRC-240T and PRC-660T, and covers their installation, operation, basic theory of operation, and maintenance. It includes instructions for cleaning, checking, and inspecting the equipment, as well as replacing components.

## 1-2. PURPOSE AND USE OF RADIO SETS (figs. 1-1 and 1-2)

Radio Sets VRC-240T (vehicular) and PRC-660T (portable) provide short-range, two-way, AM voice communication for ground-air and sea-air applications. They are compatible with, and replace, the AN/VRC-24, AN/TRC-68 and AN/PRC-41 radio sets. Receiver-transmitter RT-6241T is used in both radio sets, and can be removed from the VRC-240T and used in the PRC-660T with the addition of certain accessories (para. 1-4).

Amplifier-Power Supply AM-2411T is part of the VRC-240T. It provides operating voltage to the RT-6241T and amplifies the transmitted r-f output of the receiver-transmitter. It also acts as a mounting base for the RT-6241T in a vehicular installation. Battery BA-4660T (or BT-6600T) supplies operating voltage to the RT-6241T when the receiver-transmitter is used in the PRC-660T.

Control Box C-2410T provides remote operation of the VRC-240T at distances up to ten meters, and includes a preset, non-destructive core memory for selections of any one of 20 channels.

The radio sets also include provisions for retransmission (automatic relay operation between distant radio sets) as well as transmission of a tone beacon for direction finding.

## 1-3. SPECIFICATIONS

### a. Receiver-Transmitter RT-6241T

| | |
|---|---|
| Frequency range | 225-399.975 MHz |
| Channels | 3500 spaced at 50 kHz (optional - 7000 spaced at 25 kHz) |
| Frequency stability | better than ±2 kHz at room temperature; ± 4 kHz over operating temperature range. |
| Reset accuracy | 1 kHz |
| Channel changing time | 250 ms maximum |
| Transmit-receive interval | 250 ms maximum |
| Operating temperature range | $-40^{\circ}$ C to $+65^{\circ}$ C |
| Input voltage | 22-38Vdc |
| Power consumption | 6 W receive, 20W transmit |
| Size | 18 cm H x 28 cm W x 28 cm D |
| Weight | 6 kg |

#### Transmitter

| | |
|---|---|
| Power output | at least 1.7 W into 50 ohms |
| Modulation capability | 65 - 100% AM with 1 kHz |
| Audio response | 300 - 3000 Hz, +3/-6 dB |
| Microphone impedance | 150 ohms |
| Harmonic distortion | less than 10% |
| Sidetone | 0.5 - 1.2 mW into 1000 Ohms (earphone at maximum volume) or 10dB down from received signal (speaker of VRC-240T) |
| Noise and hum | 55 dB down |
| Spurious output | 60 dB down (harmonics 50 dB down) |

#### Receiver

| | |
|---|---|
| Sensitivity | 1.2$\mu$ V (modulated 30% at 1 kHz for 5 mW output at 10 dB S + N/N ratio ) |
| Squelch | S/N ratio type; actuated by 1$\mu$V input signal, 30% modulated. |
| Agc | output ±4 dB with 5$\mu$V to 0.1 V input |
| Selectivity(@ 50 kHz spacing) | 32 kHz at 3 dB; 100 kHz at 60 dB |
| I-f rejection | at least 100 dB down |
| Spurious and image rejection | 75 dB down except five frequencies |

| | |
|---|---|
| Cross-modulation rejection | 75 dB down minimum |
| Audio output | 5 mW into 1000 ohms |
| Harmonic distortion | less than 6% at 5 mW output |
| Audio response | 300 - 3000 Hz, +3 dB to -6 dB |

b. Amplifier-Power Supply AM-2411T

| | |
|---|---|
| Power output | 16 W minimum into 50 ohms |
| Input drive | 1.7 W into 50 ohms |
| Frequency range | 225 - 399.975 MHz |
| Audio distortion | less than 15% |
| Audio output | 1W min. into 8 Ohms |
| Operating temperature range | $-40^{o}$ C to $+65^{o}$ C |
| Input voltage | 22 - 35 Vdc; 26 Vdc nominal |
| Output voltage | 28 Vdc (for external equipment) |
| Power consumption | 60W receive, 250W transmit |
| Size | 16 cm H x 40 cm W x 35 cmD |
| Weight | 15 kg |

c. Control Box C-2410T

| | |
|---|---|
| Preset channels | up to 20, using non-destructive core memory |
| Manual frequency selection | up to 3500 channels over 225 - 339.950 MHz range (7000 channels @ 225 - 399.975 optional) |
| Maximum operating distance | 10 m |
| Audio amplifier output | 2W |
| Size | 13 cm H x 21 cm W x 12 cm D |
| Weight | 2 kg |

## 1-4. COMPONENTS OF RADIO SETS

a. Radio Set VRC-240T

Receiver-Transmitter RT-6241T
Amplifier-Power Supply AM-2411T
Control Box C-2410T
Mounting MT-1029/VRC
Antenna AT-803/VRC
Microphone M-80/GR
Bag CW-1
Cable Assembly CX-4720/VRC
Cable Assembly CG-2423T (optional)
Cable Assembly CX-2421T
Cable Assembly CG-1127/U
Cable Assembly CX-4723/VRC

b. Radio Set PRC-660T

Receiver-Transmitter RT-6241T
Battery Box CY-6600T
Antenna AT-2560T
Handset H-189/GR
Harness ST -138/PRC-25
Bag CW-503/PRC-25

## 1-5. DESCRIPTION OF MAJOR COMPONENTS

a. Radio Set VRC-240T (fig. 1-1) The RT-6241T is mounted on AM-2411T and connected to it by cable CG-1127 ; the AM-2411T in turn is secured to MT-1029/VRC, which is bolted to the vehicle. Primary power is supplied directly from the vehicle supply, through cable CX-4720/VRC. The C-2410T is also secured to the vehicle and connected to the RT-6241T through cable CX-2421T. Similarly, the AT-803/VR is secured to the vehicle, and connected to the AM-2411T through cable CG-2423T. All operating controls and indicators are located on the front panels of the RT-6241T , AM-2411T, and the C-2410T.

b. Radio Set PRC-660T (fig. 1-2) The RT-6241T is assembled on the ST-138 which in turn is secured to the back of the operator. The AT-6600T is mounted directly to the front panel of the RT-6241T. Power is supplied by BA-6600T which is housed in CY-6600T and connected directly to the RT-6241T.

c. Receiver-Transmitter RT-6241T (fig. 1-3) The RT-6241T is a rugged, lightweight, compact, modular-constructed, combination receiver and low-level transmitter that is housed in a watertight case. All operating controls and indicators are on the front panel. A power connector projects from the rear of the RT-6241T and mates with a connector on the AM-2411T (in the VRC-240T), or with a connector of the BA-4660T (in the PRC-660T). The CY-6600T is a lightweight metal case that houses and protects the BA-4660T and attaches to the RT-6241T with two clamps.

Twelve plug-in modules are securely mounted to a hinged chassis, and the

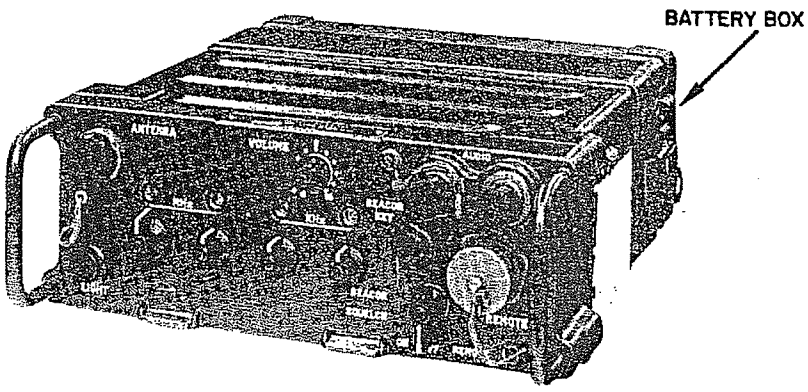



Figure 1-3. Receiver-Transmitter RT-6241T with Battery Box CY-6600T installed.

remaining components are on the front panel. All 3500 operating frequencies are automatically generated by a digital synthesizer system. An operating frequency is selected by rotating the MHz and KHz front panel controls until the selected frequency appears in the small windows above the controls.

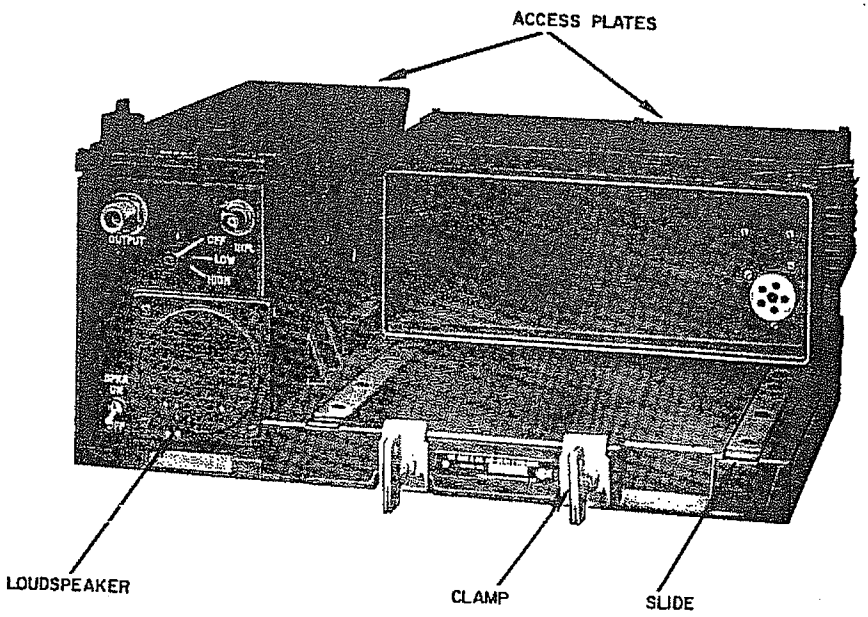
d. Amplifier-Power Supply AM-2411T (fig. 1-4) The AM-2411T consists of an r-f amplifier, an a-f amplifier and a converter-power supply. All components are located in a one-piece cast aluminium housing. A built-in loudspeaker, as well as all operating controls and indicators, are located on the front panel. An access plate, attached with six screws, can be removed for access to the modules and other components. Two mounting clamps on the front, and a mounting plate on the rear, attach the RT-6241T securely to the AM-2411T. Two slides allow the RT-6241T to be easily inserted, and at the rear of the base is a rubber bumper. On the rear of the AM-2411T are: a power-audio connector which distributes power and fixed level audio, and two guide pins to aid in holding the AM-2411T to the MT-1029/VRC.

e. Control Box C-2410T (fig. 1-5) The C-2410T is used with the VRC-240T for remote operation of the radio set, and also provides a selection of twenty preset channels. All operating controls and indicators are on the front panel. Two audio connectors are on the bottom of the unit, and a control connector is located on the left side. The rear cover has four lugs that are used to mount the C-2410T; the cover, in turn, is secured to the rear of the unit housing.

## 1-6. DESCRIPTION OF MINOR COMPONENTS

a. Mounting MT-1029/VRC (fig.1-6) The MT-1029/VRC is a mounting for the

AM-2411T. Five shock isolators, formed of a stainless-steel mesh act as shock absorbers. Five screws hold the top tray to the mounting plate (lower portion). Two copper bonding straps, connected between the top tray and mounting plate, insure a good ground connection. Two clamps lock the AM-2411T to the top tray, and two guide pins hold the AM-2411T to the MT-1029/VRC. A gasket-sealed junction box on the mounting distributes power, control and signal voltages between the AM-2411T and other equipment in a radio set system. The connector on the front of the junction box mates with the connector on the rear of the AM-2411T.



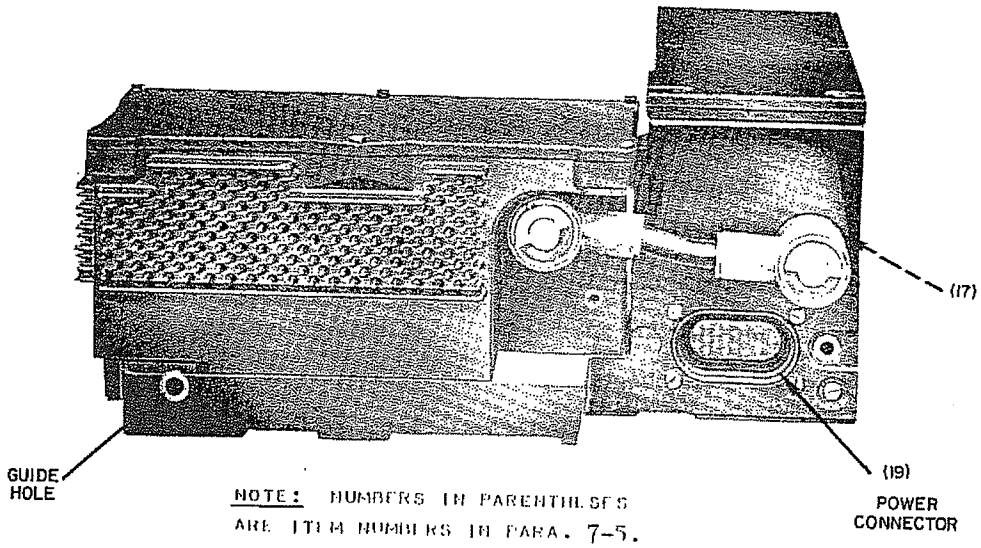




Figure 1-4. Amplifier-Power Supply AM-2411T

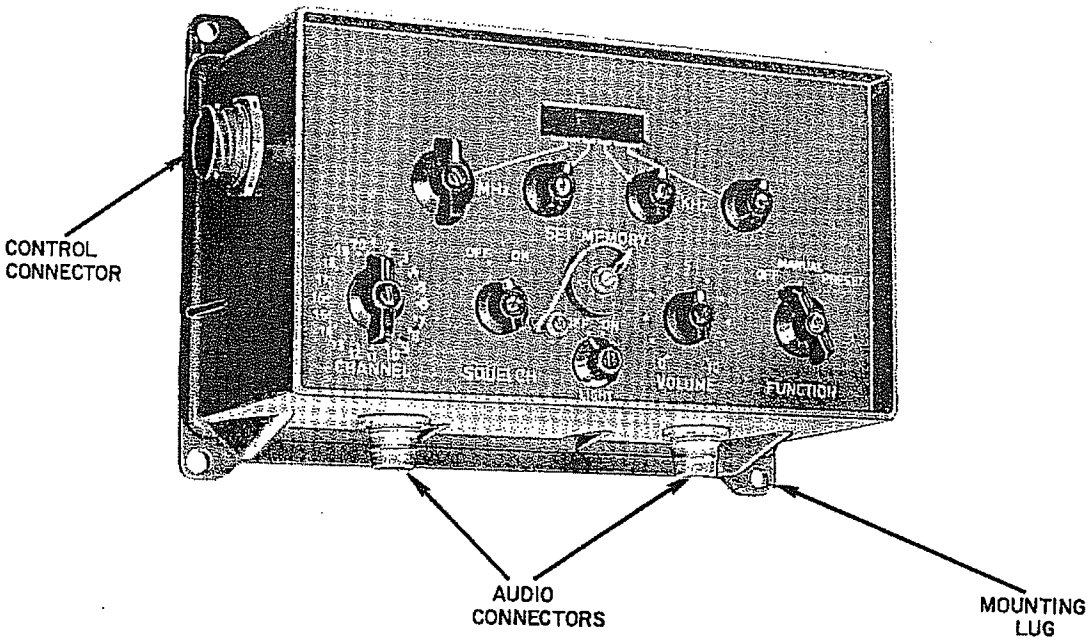



Figure 1-5. Control Box C-2410T

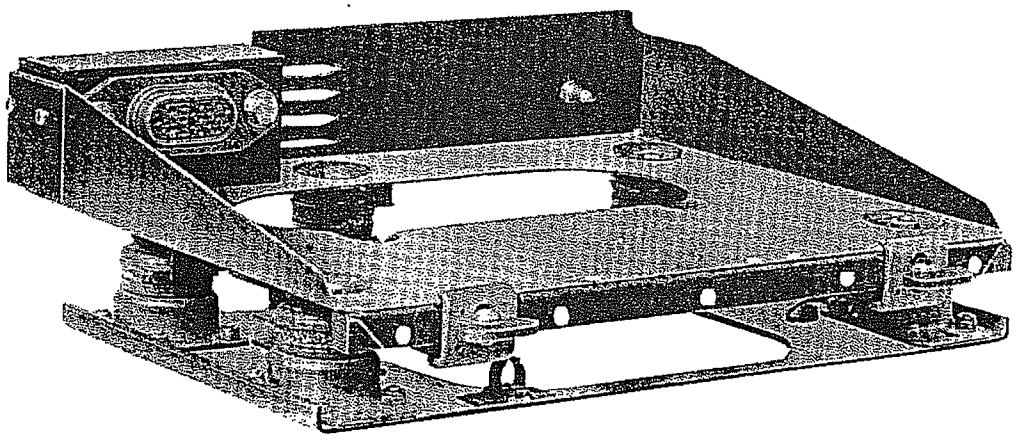


Figure 1-6. Mounting MT-1029/VRC

b. Handset H-189/GR (fig. 1-7)

The H-189/GR is used mainly with the PRC-660T, and consists of a microphone and earphone section for transmitting and receiving signals. The connecting cord is coiled and is terminated in a five-pin connector. A push-to-talk switch is mounted in the handle of this miniature audio accessory.

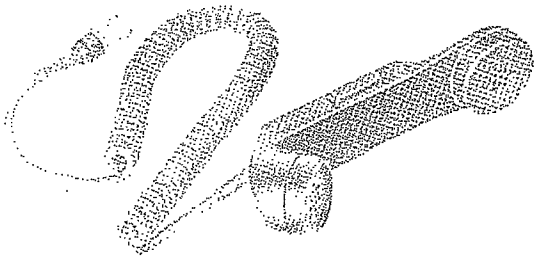


Figure 1-7. Handset H-189/GR

c. Microphone M-80/GR (fig. 1-8)

The M-80/GR is used with the VRC-240T for speaking on the radio system, or in certain installations on the intercom system. The microphone is noise-cancelling, and includes: a push-to-talk switch, a coiled cable that is terminated in a five-pin connector, and a clip to attach the microphone to the users clothing or to a radio set.

d. Antenna AT-803/VRC (fig. 1-9)

The AT-803/VRC is a dual-section, 28 cm long antenna. It consists of an upper and a lower element assembly separated by a dielectric-insulator. The AT-803 is designed for a 100-watt capacity and for vertical mounting on a vehicle, with a ground plane.

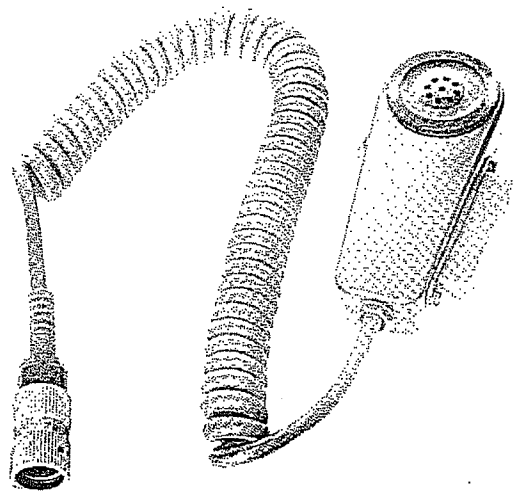


Figure 1-8. Microphone M-80/GR

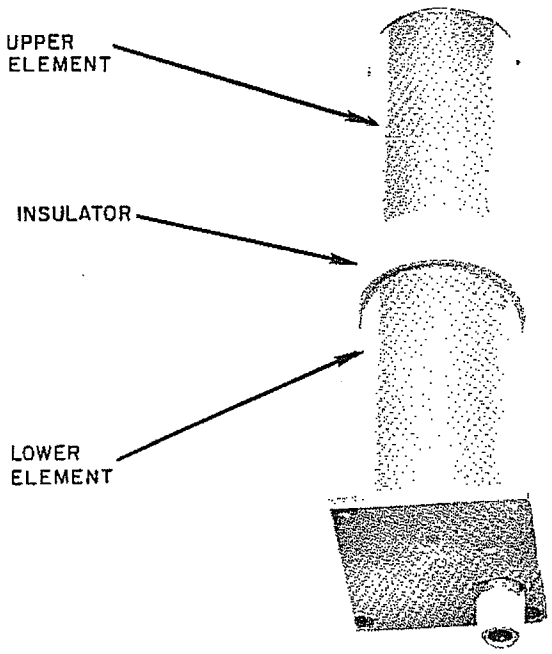



Figure 1-9. Antenna AT-803/VR

e. Antenna AT-6600T (fig. 1-10)

The AT-6600T is a single-section, 30 cm long, rubber-covered, whip antenna. It is designed for broadband operation with the PRC-660T. The spring base permits the AT-6600T to bend without breaking when it strikes an obstacle.

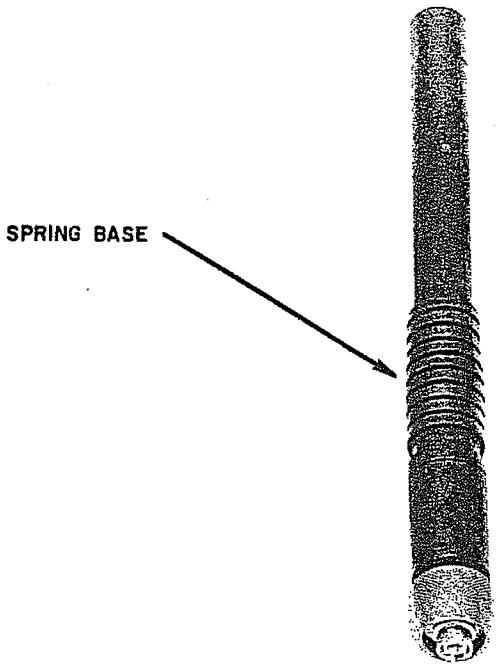



Figure 1-10. Antenna AT-6600T

f. Harness ST-138 (fig. 1-11) The ST-138 is made of cotton duck. It is used to secure the PRC-660T so that the radio set can be carried on the operator's back.

g. Bag CW-503 (fig. 1-11) The CW-503 is partitioned into several pockets which are used to store the antenna, the handset (H-189/GR) and other accessories.

h. Bag CW-1 (fig. 1-12) The CW-1 is a canvas bag used for storing the audio accessories, such as the M-80, the H-161 as well as other components of the VRC-240T.

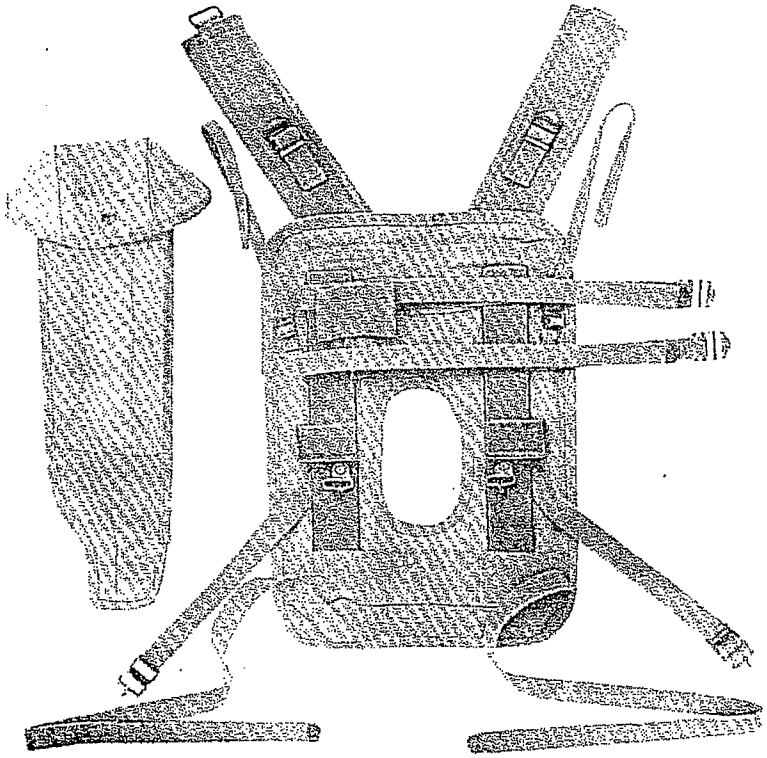
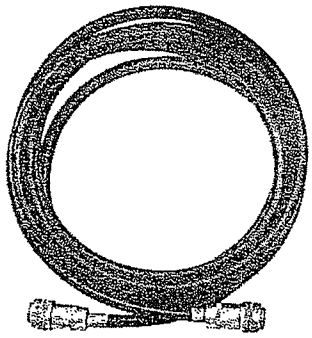
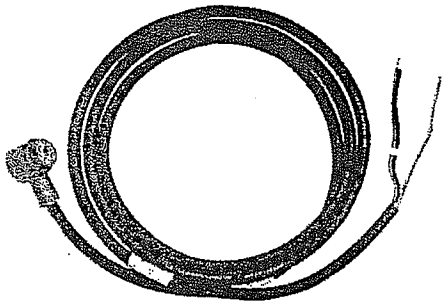


Figure 1-11. Harness ST-138 and Bag CW-503

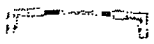
BAG CW-1



CX-2421T

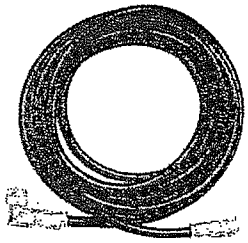


CX-4720/VRC



CG-1127/U

CX-4723/VRC



CG-2423T

Figure 1-12. Cable Assemblies and Bag CW-1

i. Cable Assemblies (fig. 1-12)

(1) Cable CX-4720/VRC connects the MT-1029 mounting to the vehicular electrical system. It is three meters long and has a four-terminal female connector at one end and two leads at the other end.

(2) Cable CG-2423T connects the AM-2411T to the antenna (AT-803/VR or AT-197/GR). It is five meters long and has a type UG-1185B/U coaxial connector at one end and a UG-574C/U coaxial connector at the other end.

(3) Cable CX-2421T connects the RT-6241T to the C-2410T control box. It is 10 meters long and has a 26-terminal connector at each end.

(4) Cable CG-1127/U connects the RT-6241T to the AM-2411T. It is 16 cm long and has a UG-913/U coaxial connector at each end.

(5) Cable CX-4723/VRC connects the power supply and amplifier sections of the AM-2411T. It is 17 cm long and has an 18-terminal connector at each end.

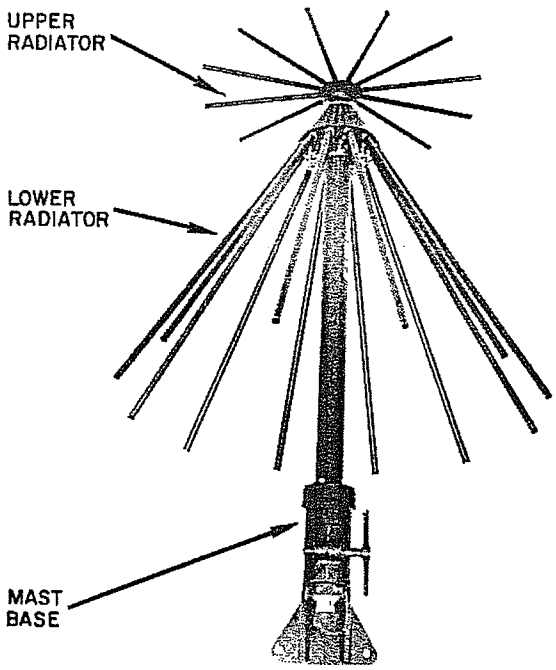



Figure 1-13. Antenna AT-197/GR

## 1-7. DESCRIPTION OF OPTIONAL ACCESSORIES

a. Antenna AT-197/GR (fig. 1-13)

The AT-197 is designed for installation at a fixed location. It is a discone type antenna, 67 cm high, with two major sections: an upper radiator and a lower radiator, each of which has twelve extending rods.

b. Headset H-161A/U (fig. 1-14)

The H-161A/U is used for listening and speaking on the radio or on an intercom system. It has a pair of earphones on a flexible headband, a boom-mounted microphone and a coiled cable assembly with two five-terminal connectors. In

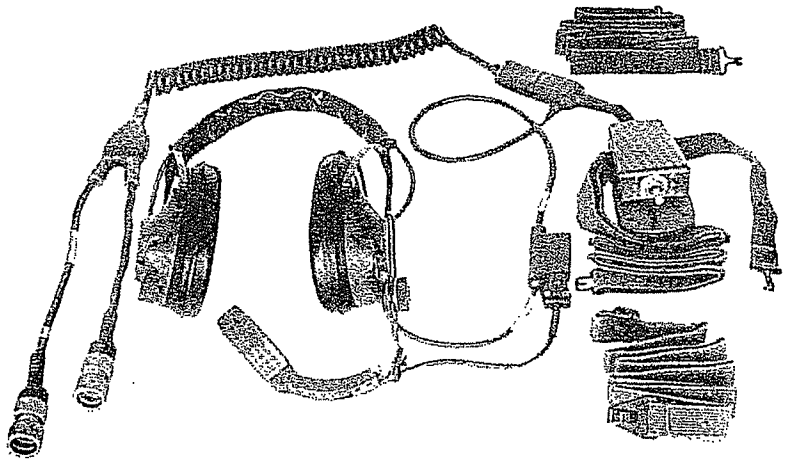


Figure 1-14. Headset H-161A/U

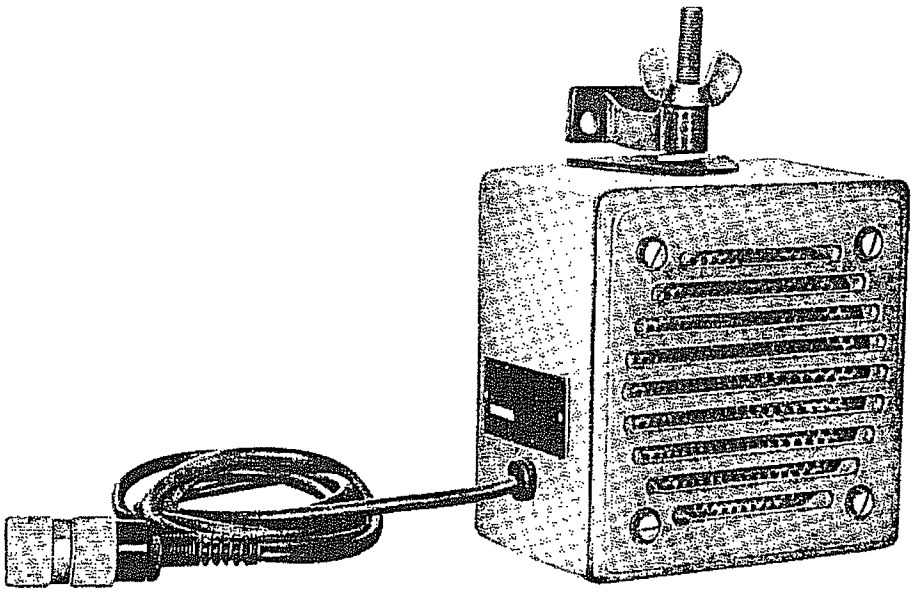


Figure 1-15. Loudspeaker LS-454/U

addition, a chestset switch assembly provides three operating conditions. A quick-disconnect (bailout) connector mates the earphones, microphone and chestset to the coiled cable.

c. Loudspeaker LS-454/U (fig. 1-15) The LS-454 is used for monitoring radio signals. It has a four-inch loudspeaker and a cable with a five-terminal connector. An adjustable bracket permits the unit to be wall or panel mounted.

d. Battery BA-4660T (fig. 1-16) The BA-4660T is not supplied as part of Radio Set PRC-660T, but is required for its use. The battery weighs about 1300 grams and has a minimum life of 12 hrs, at a 9:1 receive-transmit interval. The BA-4660T is supported and housed in the CY-6600T. A female connector on the battery mates with the RT-6241T battery plug. The BA-4660T is a magnesium type and supplies 34 volts.

e. Batteries BT-6600T and BT-6601T (fig. 1-16) The BT-6600T is not supplied as part of Radio Set PRC-660T, and may be used instead of the BA-4660T. It weighs about 3800 grams and has an average life of 12 hours at a 9:1 receive-transmit interval. A smaller capacity battery, the BT-6601T, weighs about 2250 grams and has an average life of 6 hours at a 9:1 receive-transmit interval.

The BT-6600T and BT-6601T have an integral case, and a female connector on the battery mates with the RT-6241T battery plug as well as the plug on the battery charger. The batteries are a nickel-cadmium types and each supplies 28 volts.

f. Retransmission Cable Kit MK-4560T (fig. 1-17). The PRC-660T or the VRC-240T may be used to relay the signals of two radio sets that are too far apart to communicate directly with each other. Automatic retransmission of the radio signals can be accomplished by establishing a relay station, with the MK-4560T connected between the PRC-660T or the VRC-240T and a second local radio set (PRC-660T, VRC-240T, or another compatible set). The kit consists of a canvas carrying bag and a 50-foot cable assembly. The cable assembly includes a network box, a choke box, an interconnecting cable, and two output cable assemblies terminated with five-pin connectors. The network box contains an audio connector that mates with an H-189/GR, used by the relay station operator for monitoring during retransmission.

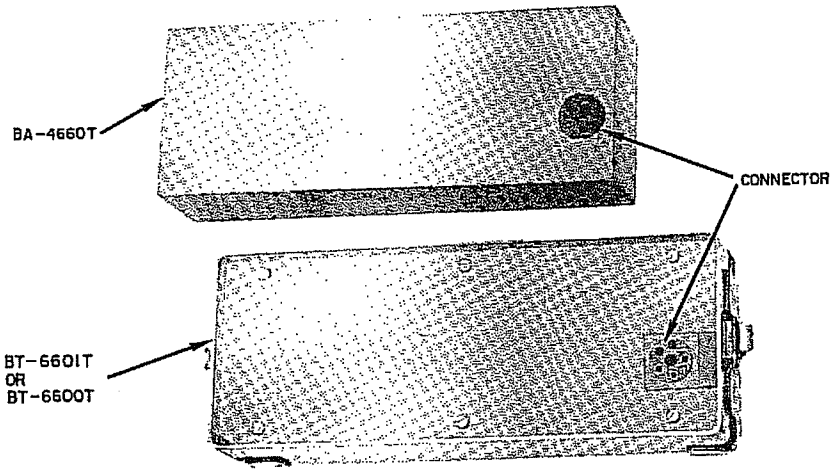



**Figure 1-16. Batteries BA-4660T and BT-6600T**

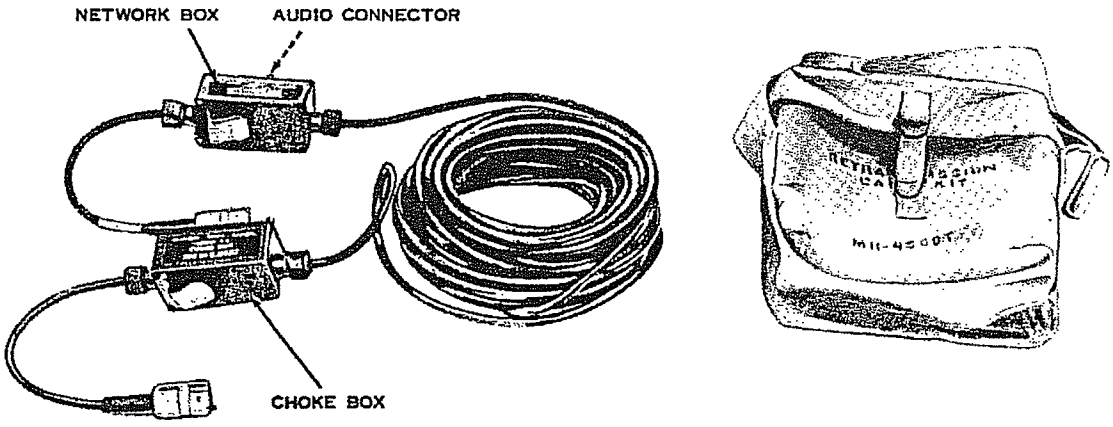



**Figure 1-17. Retransmission Kit MK-4560T**

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# Chapter 2
# INSTALLATION

## 2-1. CHECKING UNPACKED EQUIPMENT

Inspect the equipment thoroughly for possible damage incurred during shipment. Make sure that all components are furnished as listed on the packing slip or as listed in paragraph 1-4.

## 2-2. RADIO SET VRC-240T

a. Installation of Mounting MT-1029/VRC (fig. 2-1)

(1) Mount the MT-1029 to the vehicle according to the particular requirements of the vehicle and the radio set configuration.

(2) Loosen the six captive screws on top of the junction box and remove the cover.

(3) If power to the MT-1029 is to be turned on and off at another location, position the link between the center terminal and terminal E22.

(4) If power to the MT-1029 is to be turned on and off at the VRC-240, position the link between the center terminal and terminal E23.

(5) Replace the cover and secure it to the junction box; make sure not to bend the extended terminals of fuse F11 - they plug into terminals E21 and E24 of the junction box.

(6) Connect the plug of cable assembly CX-4720 to jack J21 at the rear of the mounting, below the junction box. Connect the free end of the CX-4720 to the vehicle battery.

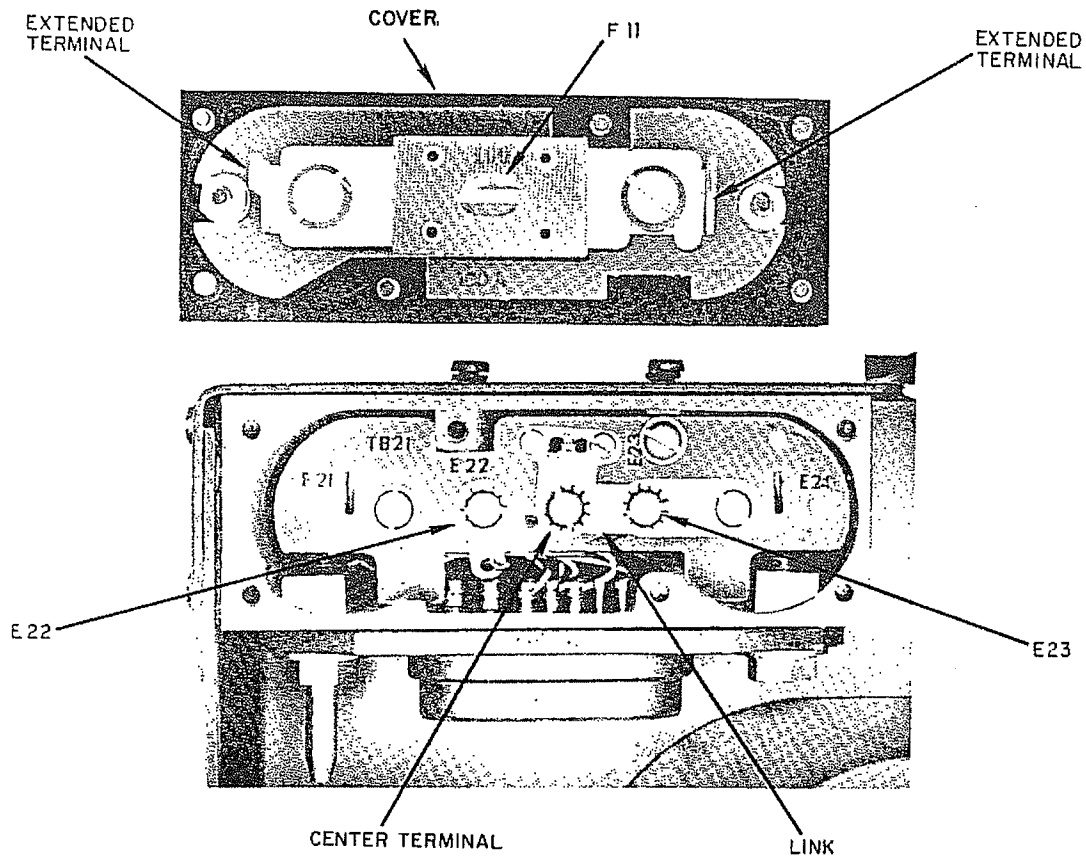



Figure 2-1. Inside View of Junction Box on Mounting MT-1029/VRC

b. Assembly of Amplifier - Power Supply AM-2411T to Mounting

(1) Loosen the two mounting clamps on the front of the MT-1029 until they drop down.

(2) Set the AM-2411T on the MT-1029.

(3) Check that the guide pins on the MT-1029 are aligned with the guide holes on the AM-2411T.

(4) Push the AM-2411T back on the MT-1029. The plug on the AM-2411T will mate automatically with the jack on the MT-1029 junction box.

(5) Engage the mounting clamps of the MT-1029 with the mounting feet of the AM-2411T. Tighten the clamps by turning the thumbscrews.

(6) Make sure the two power connectors on the rear of the AM-2411T are interconnected with 17-cm cable CX-4723.

c. Installation of Receiver- Transmitter RT-6241T

(1) Loosen the two mounting clamps on the front of the AM-2411T.

(2) Set the RT-6241T on the AM-2411T.

(3) Mate the connector at the rear of the RT-6241T with the connector on the AM-2411T; be sure the outside contour of the RT-6241T is aligned with the contour of the AM-2411T.

(4) Push the RT-6241T back on the AM-2411T until the bottom of the RT-6241T is flush with the power supply at the rear of the AM-2411T.

(5) Engage the mounting clamps of the AM-2411T with the mounting feet of the RT-6241T. Tighten the clamps by turning the thumbscrews.

(6) Connect cable assembly CG-1127/U between the ANTENNA jack on the RT-6241T and the INPUT jack on the AM-2411T.

(7) Connect cable assembly CG-2423T between the OUTPUT jack on the AM-2411T and the antenna.

d. Installation of Control Box C-2410T

(1) Mount the C-2410T to the vehicle according to the particular requirements of the vehicle and the radio set configuration.

(2) Connect cable assembly CX-2421T between the C-2410T and the REMOTE jack on the RT-6241T.

e. Installation of Antenna AT-803/VR Make sure the antenna is installed as high as possible on the vehicle.

f. Assembly and Installation of Antenna AT-197/GR

(1) Connect the upper radiator to the mast by removing the nut from the end of the mast, slipping the radiator over the threaded post and securing it with the nut.

(2) Insert the notched end of each rod of the lower radiator into its respective hole in the antenna and then turn the rod 1/4 revolution, while pushing it in, until it locks in place.

(3) Mount the antenna as high as possible, making sure that the radiators do not touch anything; the base of the mast may be removed for installation of the antenna, by loosening the locking handle on the base.

g. Typical Interconnection of VRC-240T (fig. 2-2). Make sure the VRC-240T is interconnected with all the necessary cables for proper operation. If the radio set is to be operated with an intercom system, connect cable assembly CX-4723/VRC between jack J22 on the MT-1029 and jack J501 or J503 on the AM-1780/ VRC.

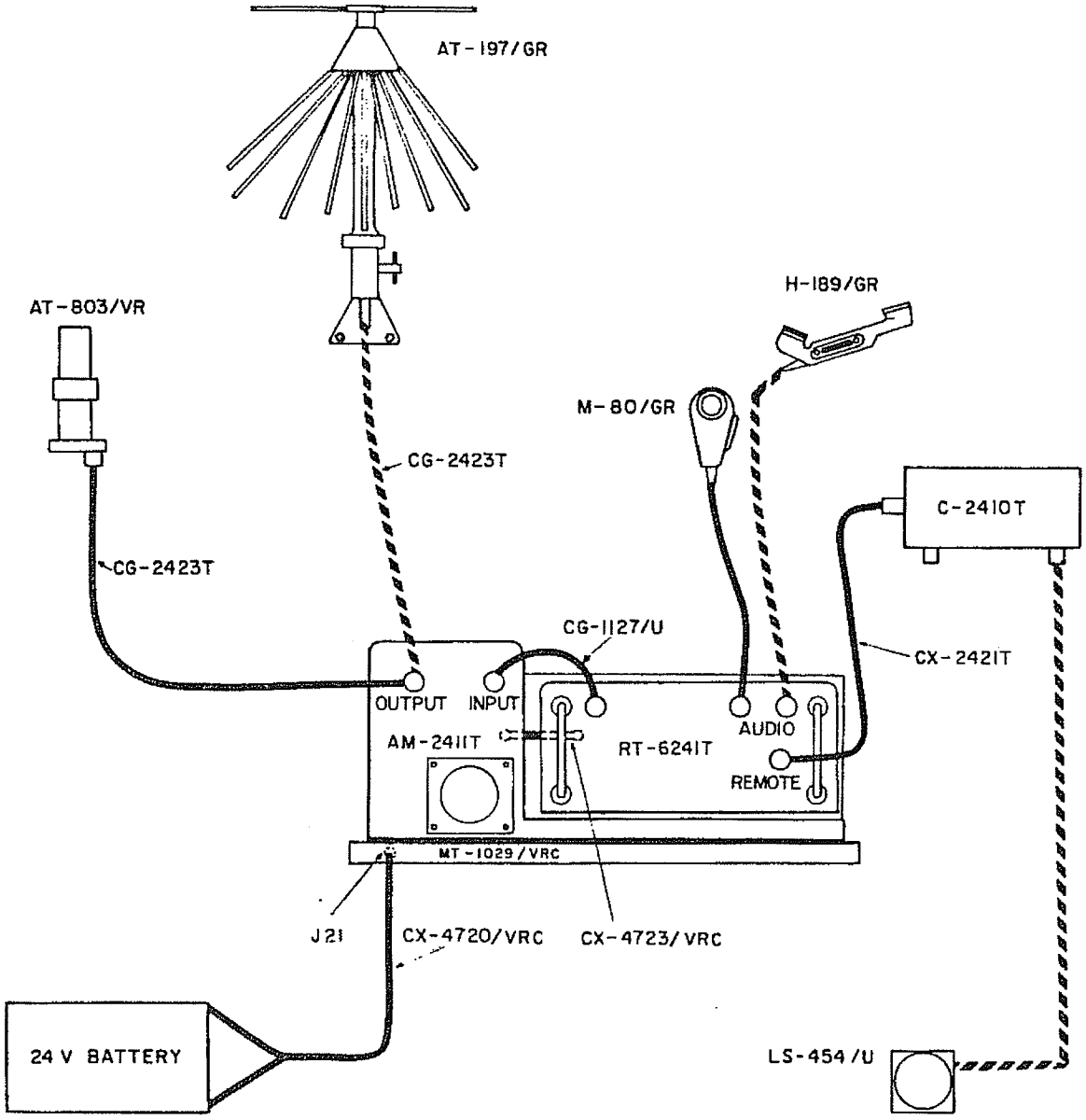
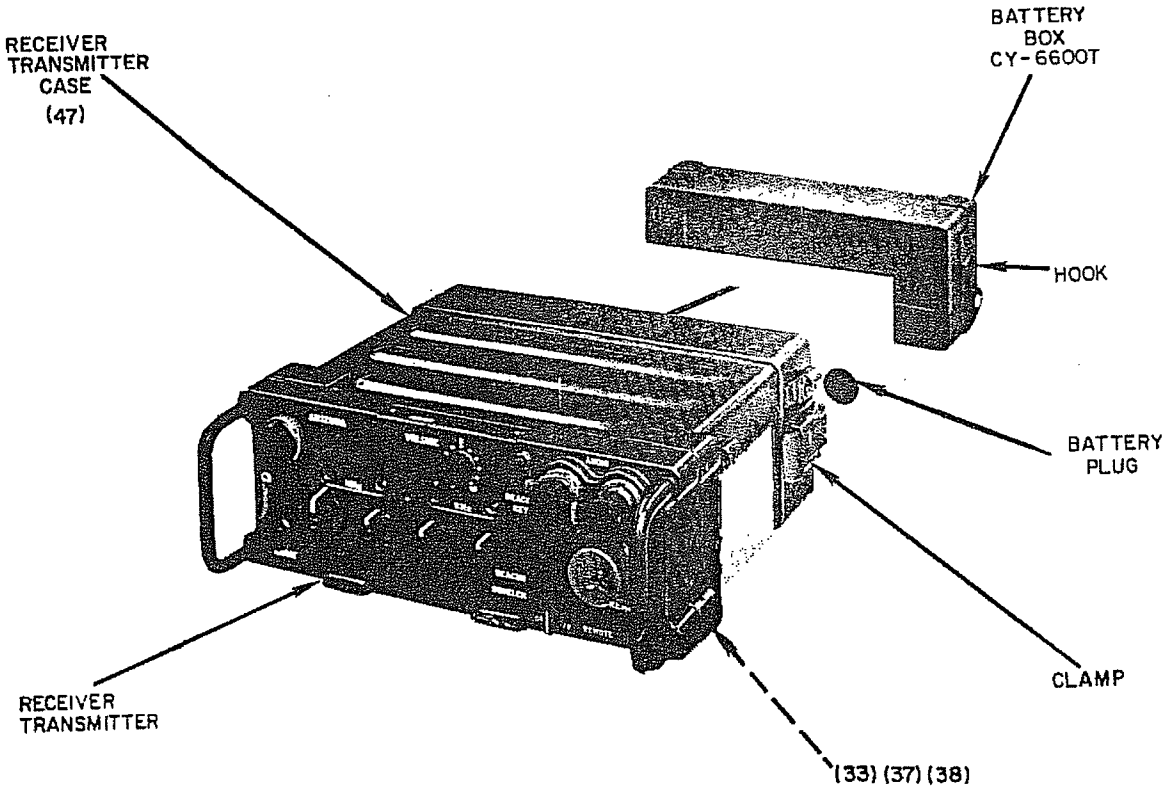



Figure 2-2. Interconnection of VRC-240T




NOTE: NUMBERS IN PARENTHESES ARE ITEM NUMBERS IN PARA. 7-4.

Figure 2-3. Installation of Battery BA-4660T

2-3. RADIO SET PRC-660T

a. Installation of Battery BA-4660T (fig. 2-3)

(1) Stand the RT-6241T on a level surface with its front panel facing down.

(2) Release the two clamps on the sides of the RT-6241T by pushing each clamp up and away from the RT-6241T case.

(3) Separate the CY-6600T from the RT-6241T case.

(4) Slide the battery into the RT-6241T case so that its connector mates with the battery plug on the rear of the RT-6241T case.

(5) Slide the CY-6600T over the battery and refasten the two clamps.

b. Installation of Battery BT-6600T

The procedure is the same as that for the BA-4660T above, except that the battery and its case are inseparable and are installed as a unit.

c. Assembly of Receiver-Transmitter RT-6241T to Harness ST-138 (fig. 2-4)

(1) Spread the ST-138 out on a flat surface, with the metal braces facing up.

(2) Place the RT-6241T on the ST-138 with its front panel toward the top and the CY-6600T (battery box) resting on the metal braces of the ST-138.

(3) Fasten the RT-6241T to the ST-138 using the two retaining straps; feed the metal-tipped end of each strap under its retaining buckle, through the center slot, and then down through the end slot in the retaining buckle.

(4) Secure the RT-6241T with the two security straps; feed the metal-tipped end of each strap under the front-panel handle of the RT-6241T, under its retaining buckle, through the center slot, and then down through the end slot in the retaining buckle.

d. Mounting Harness on Operator

(1) Install the antenna

(2) Make sure that the H-189/U

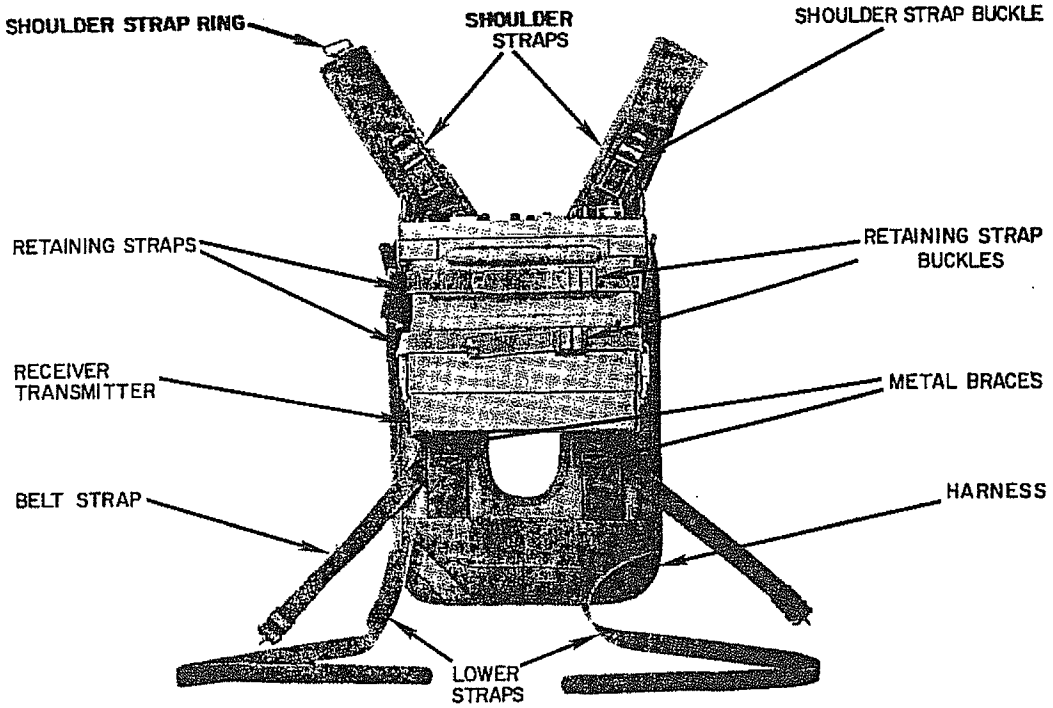



Figure 2-4. Assembly of Receiver-Transmitter to Harness

is connected to one of the audio connectors on the RT-6241T.

(3) Place the ST-138, with the RT-6241T attached, on the operator's back with the shoulder straps over his shoulders.

(4) Pull the lower right strap across the front of the operator and through the right shoulder strap ring. Then feed the metal-tipped end of the strap under the shoulder strap buckle, through the center slot, and then down through the end slot of the buckle.

(5) Pull the lower left strap across the front of the operator and through the left shoulder strap ring. Then feed the metal-tipped end of the strap under the shoulder strap buckle, through the center slot, and then down through the end slot of the buckle.

(6) Hook the two belt straps to the combat belt.

e. Installation of Antenna AT-6600T

(1) Remove the cover from the ANTENNA jack.

(2) Insert the antenna into the jack and tighten the knurled body of the jack.

# Chapter 3

# OPERATION

3-1. RECEIVER-TRANSMITTER RT-6241T, CONTROLS AND INDICATORS(fig. 3-1)

| Control, Indicator or Connector | Position | Function |
|---|---|---|
| ① Function switch | OFF | Turns off power. |
| | ON | Applies power for reception with squelch inoperative. * |
| | SQUELCH | Applies power for reception and eliminates noise in earphone when no signal is being received. * |
| | BEACON | Applies power for carrier transmission and permits 1kHz tone modulation (MCW) when BEACON KEY is depressed. |
| | REMOTE | Allows the RT-6241T to be operated through Control Box C-2410T. |
| ② MHz tuning controls | | Tunes the RT-6241T in 1-MHz steps as indicated in the window above each control. |
| ③KHz tuning controls | | Tunes the RT-6241T in 50-kHz steps as indicated in the window above each control(25kHz steps if RT-6241T has 7000 channels). |
| ④VOLUME control | | Varies the receiver volume. |
| ⑤ANTENNA connector | | Connection for a fixed whip antenna when the RT-6241T is part of radio set PRC-660T. |
| ⑥AUDIO connectors | | Connections for audio accessories. |
| ⑦LIGHT switch | | When pressed, lights the frequency windows above the MHz and KHz controls. |
| ⑧REMOTE connector | | Used for connecting control functions from the C-2410T to the RT-6241T. |
| ⑨BEACON key | | Modulates the CW with a 1 kHz tone when function switch is set to BEACON. |

* Transmission is actuated by PTT switch on handset or microphone.

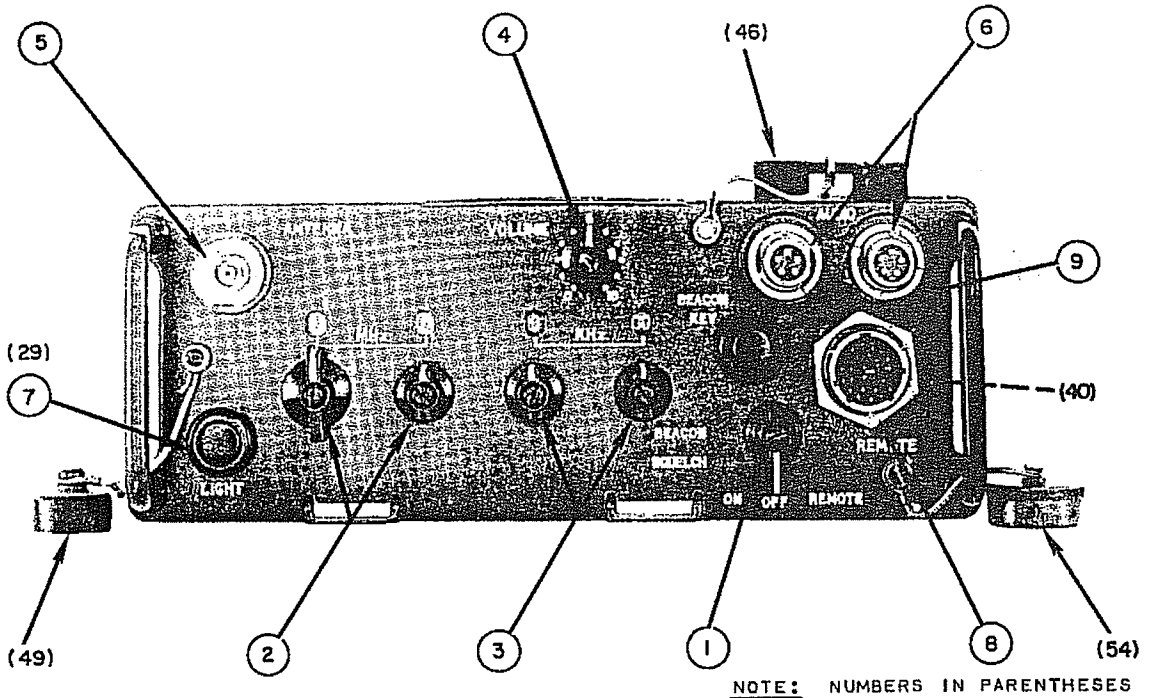



Figure 3-1. Receiver-Transmitter RT-6241T, Front Panel

3-2. AMPLIFIER - POWER SUPPLY AM-2411T, CONTROLS AND INDICATORS (fig. 3-2)

| Control, Indicator or Connector | Position | Function |
|---|---|---|
| ① Function switch | OFF | Turns off power. |
| | LOW | Connects the RT-6241T output directly to the antenna, bypassing the power amplifier of the AM-2411T. |
| | HIGH | Applies power; the RT-6241T output is amplified by the AM-2411T. |
| ② SPKR switch | | Turns the speaker on and off. |
| ③ INPUT connector | | Provides connection for cable assembly CG-1127T to the ANTENNA connector on the RT-6241T. |
| ④ OUTPUT connector | | Provides connection for cable assembly CG-2423T to the antenna (AT-803/VR or AT-197/GR). |

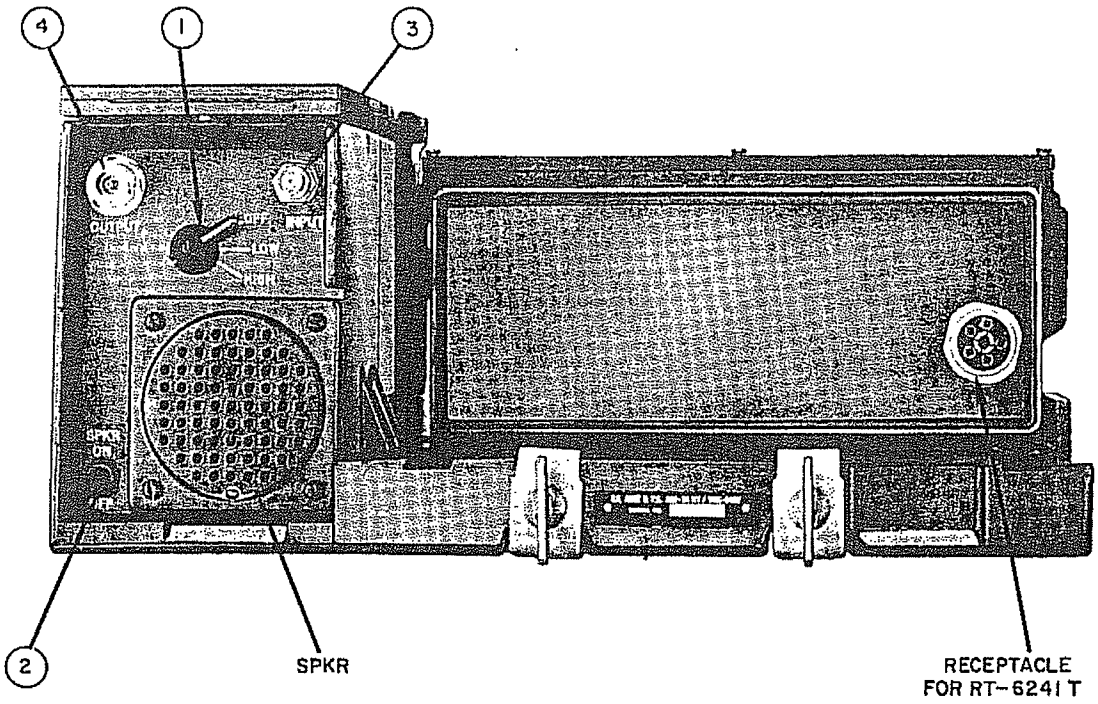



Figure 3-2. Amplifier - Power Supply AM-2411T, Front Panel

3-3. CONTROL BOX C-2410T, CONTROLS AND INDICATORS (fig. 3-3)

| Control, Indicator or Connector | Position | Function* |
|---|---|---|
| ① FUNCTION switch | OFF | Turns off power of RT-6241T. |
| | MANUAL | Turns on power of RT-6241T, and allows frequency to be selected with MHz and KHz tuning controls, for manual operation or for selecting preset channels. |
| | PRESET | Turns on power of RT-6241T and allows any one of the 20 preset channels to be selected. |
| ② MHz tuning controls | | Tunes the RT-6241T in 1-MHz steps as indicated in the window above the controls. |
| ③ KHz tuning controls | | Tunes the RT-6241T in 50-kHz steps as indicated in the window above the controls. |
| ④ CHANNEL selector | | Selects any one of the 20 channels preset on the C-2410T. |
| ⑤ VOLUME control | | Varies the audio volume in the audio accessories connected to the control box. |

| Control, Indicator or Connector | Position | Function* |
|---|---|---|
| ⑥ SQUELCH switch | | Turns the squelch circuit of the RT-6241T on and off; when on,it reduces the rushing noise in the audio output when no r-f signal is being received. |
| ⑦ Audio connectors (bottom) | | Connections for audio accessories. |
| ⑧ Remote connector (left side) | | Provides connection for cable assembly CX-2421T to REMOTE connector on RT-6241T. |
| ⑨ SET MEMORY switch | | When pressed, registers the preset frequency selected by the MHz and KHz controls in the channel selected by the CHANNEL selector. |
| ⑩ LIGHT switch | | Connects or disconnects power to frequency indicator. |

* Provided the RT-6241T function switch is set to REMOTE.

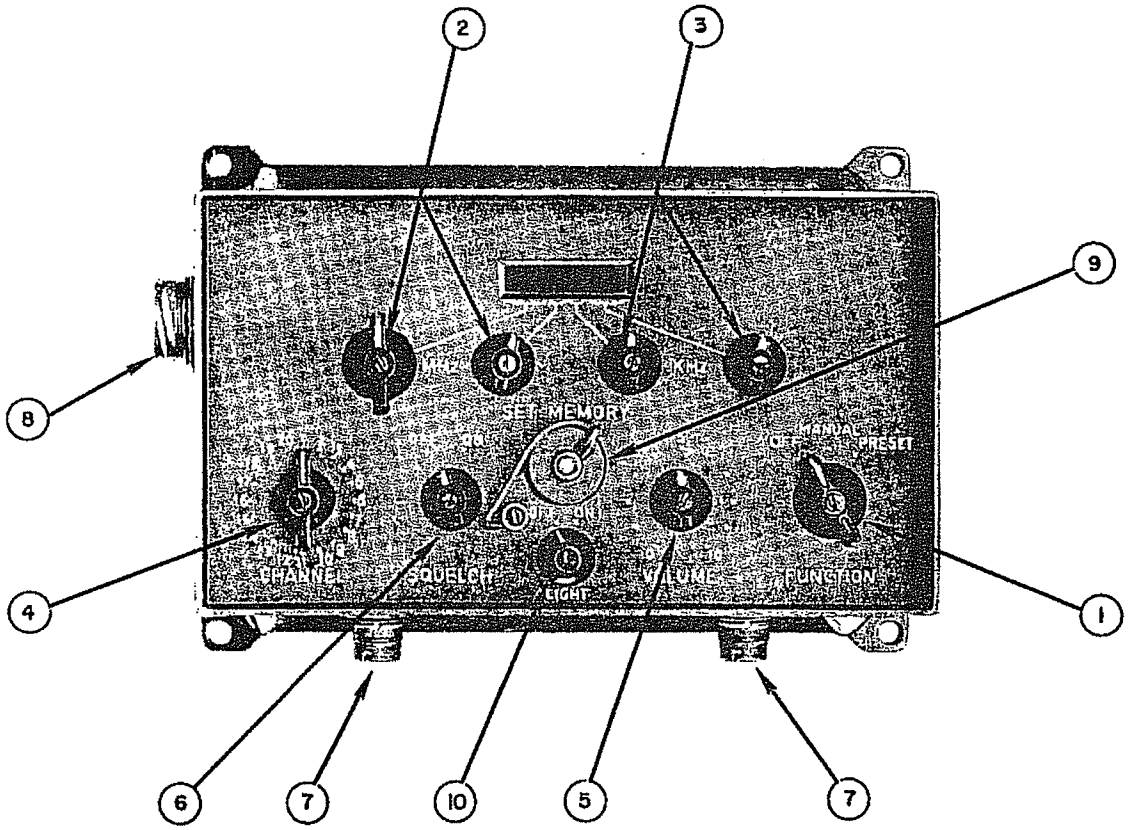



Figure 3-3. Control Box C-2410T, Front Panel

3-4. CONNECTION OF AUDIO ACCESSORIES

a. PRC-660T. Connect Handset H-189/U to one of the AUDIO connectors on the RT-6241T.

b. VRC-240T

(1) Connect Microphone M-80/GR to one of the AUDIO connectors on the RT-6241T, or on the C-2410T if the radio set will be operated remotely.

(2) When used, the H-161A/U may be connected to one of the AUDIO connectors on the RT-6241T or the C-2410T. The LS-454/U may be used in conjunction with the C-2410T only.

3-5. OPERATION UNDER USUAL CONDITIONS

a. Siting. Because of the relatively low power and the ultra-high frequency of the equipment, location of the radio set greatly affects its operating range. If the other stations can be seen (line-of-sight range), satisfactory operation is probable. An intervening hill or a tall building may prevent contact with other stations. Valleys, densely wooded areas, and low places are poor sites. Location on a hilltop will increase the operating range. If possible, avoid locations near sources of electrical interference such as power or telephone lines, radar sets and field hospitals.

b. Operation of PRC-660T

(1) Set the function switch to ON.

(2) Turn the MHz and KHz controls until the desired channel frequency appears in the windows above the controls.

(3) Set the VOLUME control to 5 and readjust for the desired sound level in the H-189/U.

(4) Set the function switch to SQUELCH to reduce the rushing noise heard in the H-189/U when no signal is being received.

(5) To transmit, press the push-to-talk switch on the H-189/U and speak into the H-189/U. A sidetone will be heard in the handset.

(6) To receive, release the push-to-talk switch on the H-189/U.

(7) To transmit an MCW beacon signal, set the function switch to BEACON; the beacon is keyed by alternately pressing and releasing the BEACON KEY switch to produce the desired coded signal.

(8) To shut down the equipment, set the function switch to OFF. Then disconnect the H-189/U and the AT-6600T and store them in the CW-503/PRC-25 bag.

c. Operation of VRC-240T

(1) Set the function switch of the RT-6241T to ON.

(2) Set the function switch of the AM-2411T to LOW.

(3) Connect Microphone M-80/GR to one of the AUDIO connectors on the RT-6241T, and make sure the SPKR switch on the AM-2411T is ON.

(4) Adjust the VOLUME control on the RT-6241T until a background noise is heard in the loudspeaker of the AM-2411T.

(5) Set the function switch of the RT-6241T to SQUELCH to reduce the rushing noise in the loudspeaker when no signal is being received.

(6) Turn the MHz and KHz tuning controls of the RT-6241T until the desired channel frequency appears in the windows above the controls.

(7) To transmit, press the push-to-talk switch on the M-80/GR and speak into the M-80/GR. A sidetone will be heard in the loudspeaker.

(8) To transmit at a high power level (16 W), set the function switch of the AM-2411T to HIGH.

(9) To transmit an MCW beacon signal, set the function switch of the RT-6241T to BEACON; the beacon is keyed by alternately pressing and releasing the BEACON KEY switch to produce the desired coded signal.

(10) To receive, release the push-to-talk switch on the M-80/GR.

(11) To shut down the equipment, set the function switches of the RT-6241T and the AM-2411T to OFF.

d. Operation of Control Box C-2410T

NOTE : Before operating the C-2410T, check if the function selector on the RT-6241T has been set to REMOTE.

(1) Set the FUNCTION switch to MANUAL.

(2) Select the desired operating frequency by turning the MHz and KHz tuning controls until the frequency appears in the window above the controls. [For automatic selection of a preset channel, see step (5) below].

(3) When receiving, adjust the VOLUME control to the desired audio level; to reduce the rushing noise in the audio output when no signal is being received, turn on the SQUELCH switch.

(4) To transmit, key the M-80 or the H-189 connected to one of the AUDIO jacks and speak into the microphone.

(5) To select a preset channel, set the FUNCTION switch to PRESET and turn the CHANNEL selector to the desired channel.

e. Channel Presetting on Control Box C-2410T

(1) Set the FUNCTION switch to MANUAL.

(2) Set the CHANNEL switch to the channel number whose frequency is to be preset.

(3) Turn the MHz and KHz tuning controls until the desired frequency appears in the window above the controls.

(4) Press SET MEMORY switch.

(5) To check that the desired frequency has been recorded, set the FUNCTION switch to PRESET; the frequency in the window should not change.

(6) Repeat steps (1) through (5) for each channel whose frequency is to be preset.

## 3-6. OPERATION UNDER UNUSUAL CONDITIONS

a. Retransmission (fig. 3-4) The following procedure describes the use of two identical radio sets (PRC-660T) as a relay station for retransmission purposes. However, the station can also consist of two VRC-240T's, a PRC-660T and a VRC-240T, and a PRC-660T or VRC-240T with any one of the series VRC-12 radio sets, the PRC-25 or the PRC-77. Thus, an operator equipped with a PRC-660T can establish contact with a second operator on a PRC-77, even though their frequencies and modulation methods are different, by using a retransmission relay station.

(1) Place the two PRC-660's on a level surface, and space them as far apart as practical; this is the relay station.

(2) Connect the MK-4560T between the AUDIO connectors of the two PRC-660's.

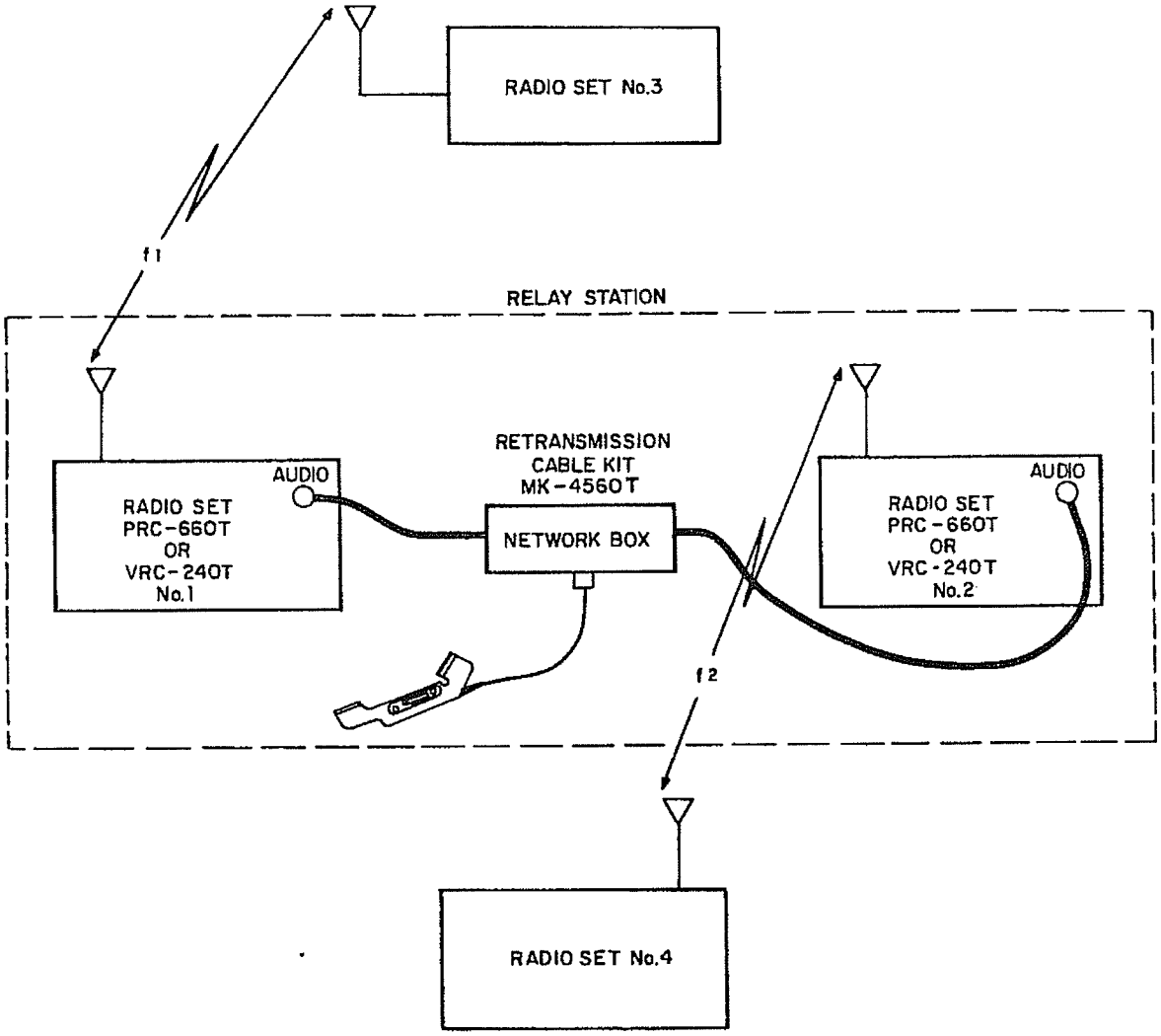



Figure 3-4. Retransmission Interconnection

(3) Install an AT-6600T into the ANT connector of each PRC-660T.

(4) Set the function switch of each PRC-660T to SQUELCH.

(5) Adjust PRC-660T No.1 to frequency f1.

(6) Connect an H-189/GR to the free AUDIO connector of PRC-660T No. 1

(7) Establish communication with the operator of radio set No. 3 (PRC-660T or VRC-240T); adjust the VOLUME control for a comfortable level of sound in the H-189/GR.

(8) Disconnect the H-189/GR from PRC-660T No. 1 and connect it to PRC-660T No. 2.

(9) Establish communication with operator of radio set No. 4; adjust the VOLUME control for a comfortable level of sound in the H-189/GR.

(10) Instruct the operator of radio set No. 4 to stand by for one minute, then transmit a signal, through the relay station, to radio set No. 3.

(11) Connect the H-189/GR to the audio connector of the network box. The relay station operator can now monitor the transmission from radio set Nos. 3 and 4 but cannot transmit to them.

(12) To communicate with radio set No. 3 or 4, connect the H-189/GR to the free AUDIO connector on PRC-660T No. 1 or 2, respectively.

b. Jamming and Antijamming Under real or simulated tactical conditions, the receiver may be jammed by the enemy. Jamming is easily done by transmission of a strong signal on the frequency being used, which makes it difficult or impossible to hear the desired signal. Unusual noises or strong interference heard on the receiver may be enemy jamming, or signals from a friendly station, or a defective receiver. To determine whether the interference is originating in the receiver, disconnect the antenna; if the interference continues, the receiver is defective.

When jamming of a channel is first noticed, notify the commanding officer immediately and continue to operate the radio set. To achieve maximum intelligibility of jammed signals, try the following:

(1) The effects of enemy jamming may be reduced by relocating the equipment so that nearby obstructions act as a screen or a barrier in the direction of probable sites of enemy jamming transmitters. This screen action may also reduce the strength of the transmitted signal toward the enemy and thereby make it more difficult for him to intercept your signals. If possible, try several different locations within the designated area and stay at the one where jamming is minimum.

(2) Vary the VOLUME control. The level of the desired signal may be raised enough to be distinguished from the jamming signal.

(3) Request a change to an alternate frequency and call sign.

c. Low Temperature

(1) Keep the front panel free of ice so that the control shafts can be turned.

(2) Keep the antenna free of ice, or communications may be impaired.

(3) Make sure a coating of silicone grease has been applied to the neoprene rubber O-rings of the AUDIO connectors.

(4) Be careful not to break interconnecting cables and cords; they lose some of their flexibility at low temperatures.

d. Desert and Dusty Climates. Keep the equipment as clean as possible and free from accumulation of sand and dust. The dust absorbs moisture and can impair proper operation of the radio set.

e. Emergency

(1) If the RT-6241T of the radio set cannot be operated due to a failure in the battery, the MT-1029/VRC or the AM-2411T, it may be connected directly to a 24-Vdc line through pin N of the REMOTE connector.

(2) If the AM-2411T fails to operate in the LOW position of the function switch, connect the antenna directly to the ANTENNA connector of the RT-6241T.

# Chapter 4
# THEORY OF OPERATION

## 4-1. RECEIVER-TRANSMITTER RT-6241T (fig. 4-1)

The RT-6241T consists of 12 major modules, and can function as a receiver or as a transmitter over the 225-400MHz range - but not both simultaneously.

A signal received at the antenna passes through a directional coupler, a bandpass filter and a deenergized R/T relay in module M5 and is fed to r-f amplifier M1 which amplifies the signal by at least 16 dB. After three stages of amplification, with d-c controlled helical filters, the signal is then fed through to a mixer in module M2. The second input to the mixer is the 195-370 MHz output from synthesizer modules M7 and M8. The resultant 30 MHz i-f signal is fed through a crystal filter and two i-f stages. The i-f stages include voltage-controlled capacitor ("varicap") coupling between stages; this achieves a stable 38 dB amplification and a high dynamic range, and ensures a low audio distortion. The output of M2 is amplified by a third i-f stage in detector module M3, and then passes through a driver to a detector. Part of the detected signal is amplified as an agc feedback that is applied to each of the three r-f stages in module M1 through agc amplifiers, and to each of the three i-f stages - two in module M2 and one in module M3. The main detected signal is fed through a noise limiter and through the front-panel VOLUME control to module M4, where it is amplified and supplied as a headphone output. Part of the output of M3 is fed directly to M4, amplified and supplied as a fixed-level signal, unaffected by the volume control. This "fixed-level" input to M4 is also fed through the squelch circuit: the audio signal is amplified, detected and applied with a detected noise signal to a Schmitt trigger which serves as a comparator. The output of the trigger is fed to a switching transistor which is enabled by the front panel SQUELCH setting of the function switch. The squelch control voltage is then applied to the audio amplifiers, and to the retransmit circuit which consists of a PTT grounding network.

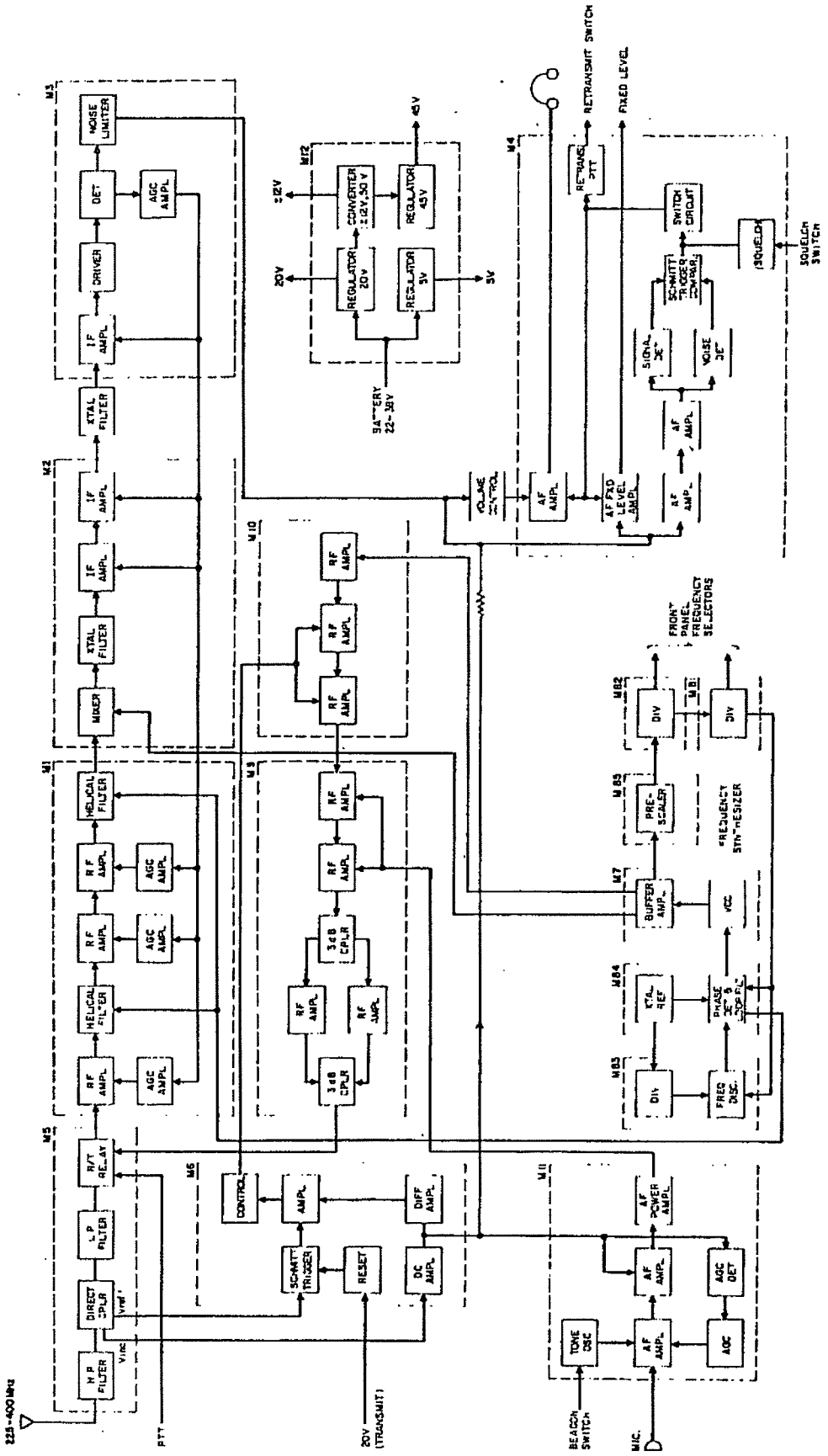



Figure 4-1. Receiver-Transmitter RT-6241T, Block Diagram

The 225-400 MHz carrier frequency for transmission is furnished by frequency synthesizer modules M7 and M8, and fed to a driver module M10. The r-f signal is amplified by a three-stage circuit whose amplification factor is controlled by power leveler module, M6. The r-f signal is then fed to power amplifier module M9. There, the carrier is amplified by two cascade amplifiers and the modulation is introduced. The modulated signal is then fed through a 3dB coupler (power divider) to a two-stage amplifier, and then through a 3dB coupler (power adder) to output module M5. The modulated r-f signal passes through an energized R/T relay, a low-pass filter, a directional coupler, and a high-pass filter to the antenna; the two filters form a band-pass network. Sampled outputs from the directional coupler - the incident and reflected voltages - are fed to leveler M6. When the reflected voltage is too high, it triggers the overload circuit, which in turn disables the driver amplifiers. A reset circuit restores the overload circuit to normal operation after the overload has been removed, and the PTT switch is pressed and released. The incident voltage is used to keep the output level constant; it is also supplied to modulator M11 as feedback to reduce distortions and to maintain a constant modulation percentage. The incident voltage is also fed to module M4 as sidetone. The microphone signal which enters modulator M11 is passed through two voltage amplification stages to a complementary symmetric amplifier. The amplified audio is used to modulate the r-f power amplifiers in M9. The modulator includes a network that maintains constant modulation level, and a feedback network to reduce distortion. These two networks are controlled by an input signal from M6. Also included in the modulator are a tone oscillator and the necessary switching to substitute the tone signal for the microphone signal when the receiver-transmitter is set to BEACON. The tone oscillator, enabled by the beacon switch, produces a 1 kHz signal that is fed to the first microphone amplifiers and used to modulate the r-f carrier.

The frequency synthesizer consists of modules M7 and M8, and covers 195 - 400 MHz in 7000 channels spaced 25 kHz apart. A crystal-controlled oscillator provides the reference frequency. This reference is compared in a phase detector with the output of a voltage-controlled oscillator (VCO) whose frequency has been divided by a factor corresponding to the frequency programmed in the synthesizer. The detected output tunes the VCO accordingly, and also tunes the front-end r-f amplifiers of the receiver. The crystal reference is also divided and fed to a frequency discriminator; an up-down network then coarse-tunes the VCO through the phase detector until the VCO is locked by the fine-frequency control of the phase detector.

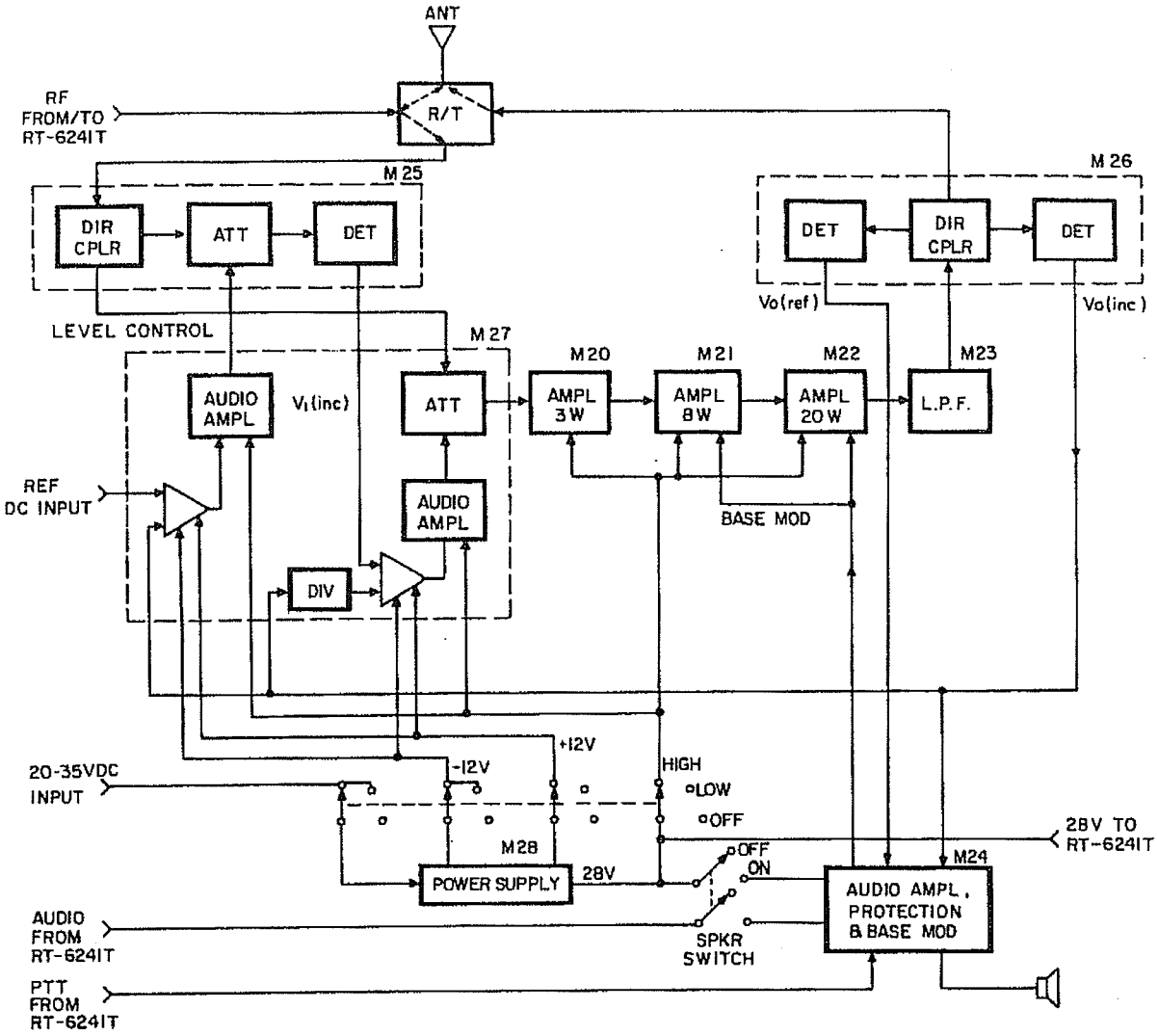



Figure 4-2. Amplifier-Power Supply AM-2411T, Block Diagram

## 4-2. AMPLIFIER-POWER SUPPLY AM-2411T

The amplifier boosts the r-f output of the receiver-transmitter from 1.7W to 16W. This is accomplished in three steps: module M20 is a 3W amplifier which drives module M21, an 8W amplifier. These modules consist of two parallel stages with a nominal peak-envelope-power (PEP) of 12W and 40W respectively. Module M21 drives M22, a 20W amplifier with 75W PEP, that consists of four pairs of parallel stages in a power adding circuit.

The linear amplifier must track with the rate of change in the input due to changes in the audio envelope. To assure a constant amplification of different input levels, the outputs of modules M25 and M26 (which represent the output of the RT-6241T and the AM-2411T, respectively)

are compared, and the resultant used to change the attenuation of a pin-diode attenuator in module M27. The detected output of M25 is fed to one of the differential amplifiers in M27 with the detected output of M26. If the two inputs are equal, there is no output from the differential amplifier; however, if the first is above or below the second, the output of the differential amplifier changes the attenuation in the pin-diode attenuator. To assure that the output of the amplifier does not exceed a predetermined level (16W), the detected output of M26 is fed to a second differential amplifier, with a reference that is set for the predetermined output level.

The power supply (M28) converts the 22-35 Vdc input from the vehicle supply to 28 Vdc for the RT-6241T and to +12 Vdc, -12 Vdc and 28 Vdc for the amplifier stages. In the HIGH position, the power switch connects the input voltage to the power supply and the output of the power supply to the amplifier stages and to the RT-6241T; in the LOW position, the input voltage is connected to the power supply and the output of the power supply is fed to the RT-6241T only; in the OFF position, no input is fed to the power supply.

An audio amplifier (M24) raises the audio output of the RT-6241T received signal to a sufficient level to drive the loudspeaker. A speaker switch connects the audio and 28 Vdc input to M24 in the ON position and disconnects them in the OFF position.

## 4-3. CONTROL BOX C-2410T

The control box operates the RT-6241T remotely and contains six sub-assemblies.

When the FUNCTION switch is set to MANUAL, the frequency of the RT-6241T may be selected manually. Rotating the tuning controls determines the frequency data that enters read-write sub-assembly M46, from which the data is fed through the REMOTE Connector to the RT-6241T. This frequency data can be recorded in memory M47 by pressing the SET MEMORY switch, which "writes" the data at the "address" selected by the CHANNEL selector. For example, to preset 300MHz at channel 6: the CHANNEL selector is set to 6 - the address for the memory; the FREQUENCY selectors are set to 300 MHz - the data to be registered at address 6; and the SET MEMORY switch is pressed - to "write" the data in the memory. When the FUNCTION switch is set to PRESET, the data (frequency) at the address (channel) is "read" and fed to the REMOTE Connector to tune the RT-6241T to the selected channel frequency.

The frequency selected mannually or from a preset channel is displayed on an

electronic readout (M44) which has its own power supply (M45).

The audio signal from the microphone input is fed to amplifier M42 and through the REMOTE connector to the RT-6241T as modulation. Conversely, the audio signal received at the RT-6241T is fed through the REMOTE connector and the volume control to amplifier M41 which raises the level sufficiently to drive a loudspeaker. The SQUELCH control parallels the one in the RT-6241T and replaces it functionally when the RT-6241T is set for remote operation.

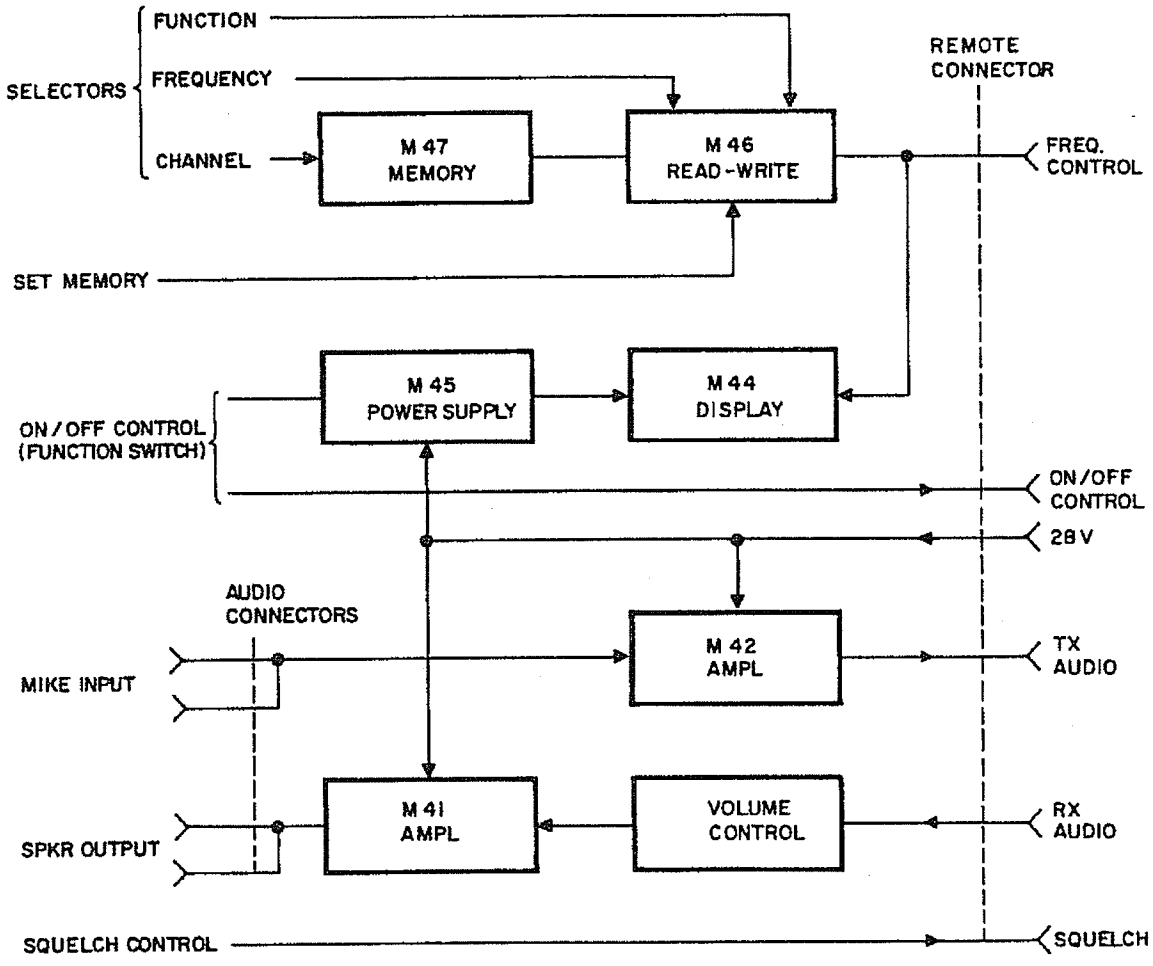



Figure 4-3. Control Box C-2410T, Block Diagram

# Chapter 5
# MAINTENANCE

## 5-1. SCOPE

Maintenance consists of the following:

a. Preventive maintenance, including checks and cleaning, to assure continued, uninterrupted and proper operation of the radio set.

b. Corrective maintenance, including troubleshooting in the form of inspection and checklists, as well as repairs (component and subassembly replacement) to return a defective radio set to proper operation.

## 5-2. PREVENTIVE MAINTENANCE

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to ensure equipment serviceability.

a. Systematic Care. The procedures in paragraphs b through e cover the systematic care and cleaning essential for proper upkeep and operation of the radio set. The equipment should be cleaned externally, each day; however, if the radio set is not used daily, it must be cleaned before operation, after any shutdown, or weekly while it is in standby.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts(c, d and e below) outline the periodic inspections to be made. These checks and services are made to maintain the equipment in a serviceable condition - physically and operatively. The chart indicates what to check, how to check and the normal conditions; the References column lists the paragraphs or illustrations that contain repair or replacement procedures. If there is no Reference entry, the defect must be repaired at a higher level of maintenance.

c. Daily Preventive Maintenance Checks and Services Chart

| No. | Item | Procedure | Reference |
|---|---|---|---|
| 1 | Completeness | Check that the equipment is complete | Para. 1-4 |
| 2 | Installation | Check that the equipment is properly installed. | Para. 2-2, 2-3 |
| 3 | Exterior surfaces | Remove dust, dirt and moisture from channel windows and equipment surfaces<br><br>WARNING: Do not clean equipment if power is ON. | Use water and soft cloth |
| 4 | Interconnection (VRC-240T) | Check all interconnecting cables and connectors for cracks and breaks and replace defective parts. | Para 2-2g |
| 5 | Plexiglass windows | Check to see they are not broken or loose. | None |
| 6 | Controls | a. Check all knobs and switches for looseness and other damage.<br><br>b. During the operational check (5-3 d or e below) make sure the mechanical action of each knob and switch is smooth and free of external or internal binding. | Para. 3-1, 3-2, 3-3 |
| 7 | Battery (PRC-660T) | Inspect for leakage, corrosion and swelling. Remove battery if radio set will not be used one or more days. | Para. 5-3g(1), 5-3g(2) |
| 8 | Operation | Operate the radio set on an authorized frequency to verify its capabilities. | Para. 3-5 |

d. Weekly Preventive Maintenance Checks and Services Chart

| No. | Item | Procedure | Reference |
|---|---|---|---|
| 1 | Audio accessories | Inspect cords for fraying, cuts, kinks, and broken insulation. | None |
| 2 | Canvas material | Inspect for mildew and tears. | None |
| 3 | Antenna | Inspect for damage, loose fit, and corrosion. | Para 2-2e,f |
| 4 | Gasket (PRC-660T) | Inspect gasket on battery box for damage. | Para 5-3g(1) or 5-3g(2) |

e. Quarterly Preventive Maintenance Checks and Services Chart

| No. | Item | Procedure | Reference |
|---|---|---|---|
| 1 | Gaskets | Check gaskets for moisture, oil saturation, and brittle, broken, cracked, loose, pinched, mismatched or missing sections. | None |
| 2 | Pluckout units | Check that relays are properly seated; check for loose module holddown screws. | Figures 5-2, 5-3 |
| 3 | Mounting (VRC-240T) | a. Check that fuse in mounting MT-1029/VRC is of correct value and properly installed. | Figure 2-1 |
| | | b. Check that bolts, nuts and washers are correctly positioned and properly tightened and that AM-2411T is properly installed on mounting. | Figures 1-1, 1-6 |
| 4 | Connections | Check that plugs and receptacles are clean, intact and not loose - fitting; check that audio accessories are properly connected. | Para. 2-2g, 2-3c. |

f. Cleaning. Inspect the exterior surfaces of the radio set - they must be free of dirt, dust, grease and fungus.

(1) Remove dust and loose dirt with a clean, soft cloth.

WARNING: Cleaning compound may be flamable and its fumes toxic. Provide adequate ventilation. Do not use near a flame. Avoid contact with the skin and wash off any that spills on your hands.

(2) Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with cleaning compound.

(3) Remove dust or dirt from plugs and jacks; use a brush.

(4) Clean the front panel and control knobs; use a clean, soft cloth. If dirt is difficult to remove, dampen the cloth with mild soap and water.

5-3. CORRECTIVE MAINTENANCE

a. General. The first step in servicing a defective radio set is to sectionalize the fault to a major component or area. The next step is to localize the fault to a defective module.

b. Sectionalization. The tests in d and e below are arranged to reduce unnecessary work and to aid in troubleshooting a defective radio set.

(1) Visual Inspection. When the equipment fails to operate properly, visually inspect for the following: faulty front panel indications, physical damage, incorrect setting of switches and controls, loose connection of audio accessory or antenna, weak battery in PRC-660T (check by substitutions), disconnected cables in VRC-240T.

(2) Operational Test. Operational tests frequently indicate the general location of a trouble and may often determine the exact nature of the fault. They are listed in paragraphs d and e.

c. Localization. The RT-6241T has test points which will enable rapid location of a faulty module. The troubleshooting checks listed in f below are designed to localize a fault, using the test points; once the defective module or part is located, correct the trouble by substituting a new module or part. Figures 5-1 and 5-2 illustrate the modules and test points. Since the radio set is transistorized, observe all cautions to prevent damage, and make only the measurements listed in g below, and at the indicated test point. For dc measurements, use a 20,000 Ω/V meter, for audio measurements use a millivoltmeter and an oscilloscope, and for i-f measurements use an oscilloscope with a VHF probe-divider, or an r-f probe. To localize and isolate a trouble in the AM-2411T, use the checks listed in h below; the modules are identified in figure 5-3. To isolate a fault in the C-2410T, use the checks lists in i below. Neither the AM-2411T nor the C-2410T have test points.

d. Operational Checklist for PRC-660T

| Step | Action | Normal Indication | Corrective Measure |
|---|---|---|---|
| 1 | Set function switch to ON, and set VOLUME control to 5. | Rushing noise is heard in H-189/GR when no signal is received. | a. Connect H-189/GR to other AUDIO connector<br>b. Replace H-189/GR<br>c. Replace battery (para. 5-2j) |
| 2 | Press LIGHT switch | Frequency dials light | a. Replace dial lamp<br>b. Replace battery (para. 5-2j) |

| Step | Action | Normal Indication | Corrective Measure |
|---|---|---|---|
| 3 | Set function switch to SQUELCH | Rushing noise ceases in H-189/GR. | - |
| 4 | Tune RT-6241 to receive test signals from nearby set at assorted frequencies over the operating band of the radio set | Signals are heard loud and clear | Check antenna. |
| 5 | Tune RT-6241 to transmit test signals, at assorted frequencies, to a nearby set | Test signals are heard loud and clear at near-by set, and sidetone is heard at local set. | Connect H-189/GR to other AUDIO connector. |
| 6 | Set function switch to BEACON and press BEACON KEY inter-mittently. | Keyed beacon tone is heard loud and clear at nearby set. | - |

e. Operational Checklist for VRC-240T

| Step | Action | Normal Indication | Corrective Measure |
|---|---|---|---|
| 1 | Set RT-6241T function switch to ON and AM-2411T function switch to LOW; press LIGHT switch on RT-6241T. | Frequency dials light | a. Check power cables<br>b. Replace dial lamps |
| 2 | Set VOLUME control of RT-6241T to 5 and set SPKR switch of AM-2411T to ON. | Rushing noise or a received signal is heard from loud-speaker. | Check antenna. |
| 3 | Rotate VOLUME control back and forth. | Loudness of speaker output increases and decreases smoothly. | |
| 4 | Connect H-189/GR or H-161A/U to AUDIO connector of RT-6241T and set SPKR switch to OFF. | Rushing noise or a received signal is heard in audio accessory. | a. Connect audio accessory to other AUDIO connector<br>b. Replace audio accessory. |
| 5 | Set RT-6241T function switch to SQUELCH | Rushing noise ceases in audio accessory | - |
| 6 | Tune RT-6241T to receive test signals from a nearby set at assorted frequencies over the operating band of the radio set. | Signals are heard loud and clear | Check antenna. |

| Step | Action | Normal Indication | Corrective Measure |
|---|---|---|---|
| 7 | Tune RT-6241T to transmit test signals, at assorted frequencies, to a nearby set; connect M-80/GR to AUDIO connector and press P.T.T. | Test signals are heard loud and clear at nearby set and a sidetone at local set. | a. Connect M-80/GR to other AUDIO connector.<br>b. Replace M-80/GR. |
| 8 | Set RT-6241T function switch to BEACON and press BEACON KEY intermittently. | Keyed beacon tone is heard loud and clear at nearby set | - |
| 9 | Set AM-2411T function switch to HIGH and press BEACON KEY of RT-6241T intermittently. | Keyed beacon tone is heard much louder and clear at nearby set | - |
| 10 | Set RT-6241T function switch to REMOTE, C-2410T FUNCTION switch to MANUAL and press LIGHT switch on RT-6241T. | Frequency dials of RT-6241T light | Check cable interconnection between RT-6241T and C-2410T |
| 11 | Connect H-189/GR or H-161A/U to AUDIO connector of C-2410T and rotate VOLUME control back and forth. | Loudness of audio output increases and decreases smoothly | a. Connect audio accessory to other AUDIO connector.<br>b. Replace audio accessory. |
| 12 | Set C-2410T FUNCTION switch to SQUELCH | Rushing noise ceases in audio accessory. | - |
| 13 | Tune RT-6241T (using controls on C-2410T) to receive test signals, at assorted frequencies, from nearby set. | Signals are heard loud and clear, and selected frequency appears in window above tuning controls | - |
| 14 | Set C-2410T FUNCTION switch to PRESET and rotate CHANNEL selector to various channels to receive test signals from nearby set. | Frequency of selected channel appears in window and signals are heard loud and clear. | - |
| 15 | Set C-2410T FUNCTION switch to MANUAL and preset various frequencies, using MEMORY switch, in various channels. Then rotate CHANNEL selector to those channels whose frequencies were preset. | Selected frequencies appear in window above tuning controls of C-2410T. | - |

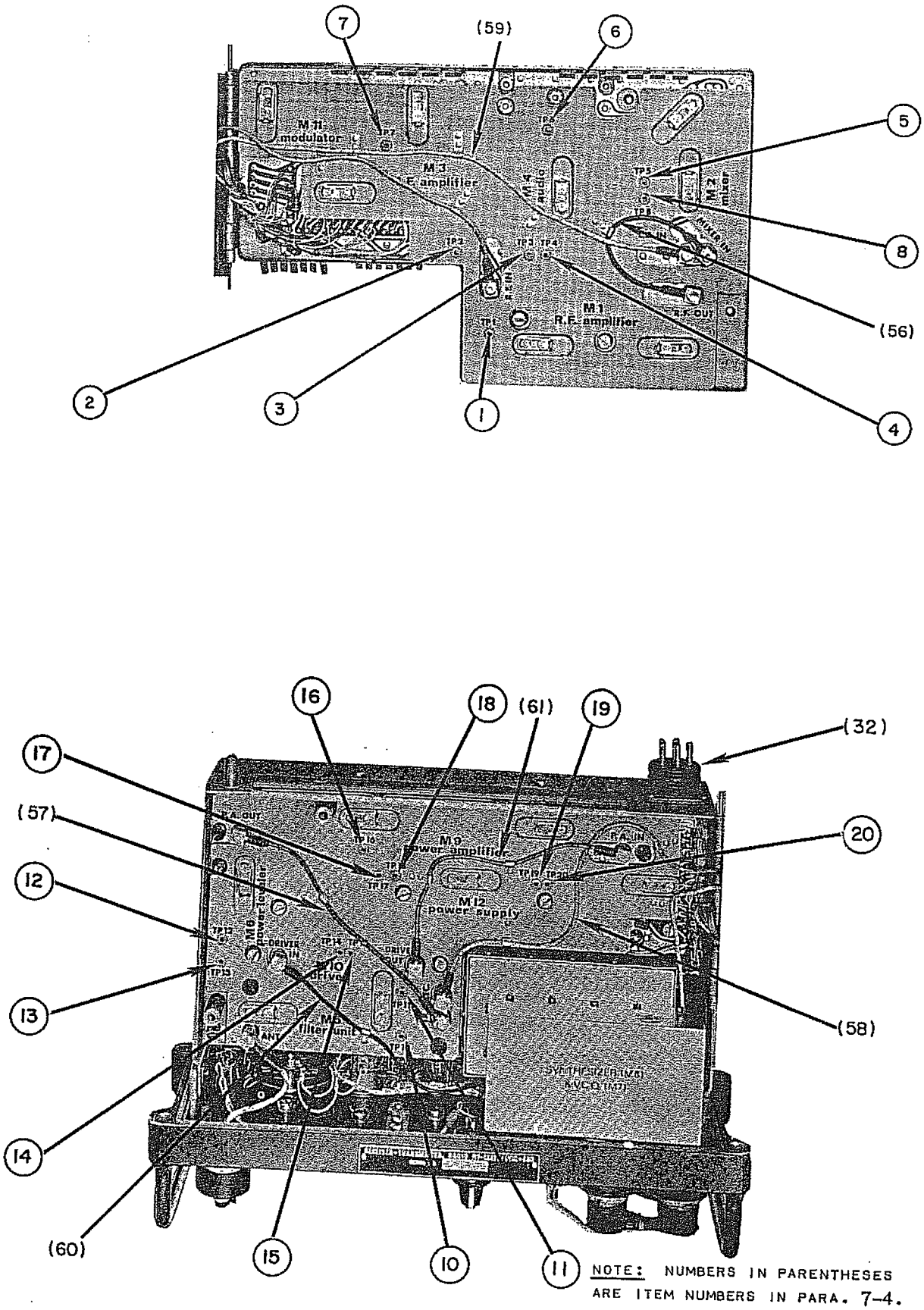
f. Test Points for Receiver-Transmitter RT-6241T

| TP No. | Measurement |
|---|---|
| 1 | 5 Vdc at receive; 0V at transmit (to receiver modules) |
| 2 | Agc: 0-1.5 Vdc at receive: 0V at transmit |
| 3 | Audio input into M4 : 25mV<br>with VOLUME CONTROL fully clockwise |
| 4 | -12Vdc for receiver modules |
| 5 | Fixed level output (from audio amplifier M4): 150 - 450 mV |
| 6 | +5 Vdc at transmit; 0V at receive: control input to audio amplifier M4. |
| 7 | +20 Vdc input to modulator M11 |
| 8 | +12 Vdc for receiver modules |
| 10 | +12 Vdc for transmitter modules |
| 11 | Incident voltage of transmitter: 1-2 Vdc and 2 V p-p audio at transmit; 0V at receive |
| 12 | -12Vdc for transmitter modules |
| 13 | Reflected voltage of transmitter:0-1 Vdc and 1 V p-p audio at transmit; 0V at receive |
| 14 | Driver control: 0-5 Vdc at transmit; 0V at receive |
| 15 | +20 Vdc at transmit; 0V at receive (to transmitter modules) |
| 16 | +5Vdc at transmit; 0V at receive : bias input to power amplifier M9 |
| 17 | +44-46 Vdc output of power supply M12 |
| 18 | +5Vdc output of power supply M12 |
| 19 | +20 Vdc output of power supply M12 |
| 20 | Switched dc: battery voltage (22-38 Vdc) to power supply M12 |
| M2/TP1 | IF (30 MHz): 2mV rms |
| M3/TP1 | IF (30 MHz): 100 mV rms |
| M4/TP1 | Squelch: +12 Vdc squelch off; 0V squelch on (+12 Vdc with input signal; 0V with no input signal) |
| M6/TP1 | Incident voltage (same as TP11 but multiplied by three) : 3-6 Vdc and 6V p-p audio |
| M6/TP2 | Overload protection: +1.5 Vdc, normal; -1.2 Vdc when overload operates at transmit |
| M11/TP1 | Modulation (audio): 0.1 - 0.8 Vac @ 100% modulation |

g. Troubleshooting Chart for Receiver-Transmitter RT-6241T

| Item | Indication | Probable Cause |
|---|---|---|
| 1 | Dial lamp does not light when LIGHT switch is pressed | Make checks 1A and 1B |
| 1A | Voltage at TP20 is normal | Defective lamp or LIGHT switch |
| 1B | Voltage at TP20 is abnormal | Improper battery voltage |
| 2 | With RT-6241T tuned to receive a known signal, weak signal is heard in the H-189/GR | Improper antenna connections.<br>Defective antenna. |
| 3 | With RT-6241T tuned to receive a known signal, distorted signal is heard in the H-189/GR. | Defective audio amplifier M4.<br>Defective agc amplifier in M3. |
| 4 | With RT-6241T tuned to receive a known signal, no signal is heard in the H-189/GR. | Make checks 4A through 4I. |
| 4A | Voltage at TP4 or at TP8 is abnormal. | Defective power supply M12, or TP4 is shorted. |
| 4B | Voltage at TP18 is abnormal | Defective power supply M12, or TP18 is shorted. |
| 4C | Voltage at TP18 is normal, but voltage at TP1 is abnormal. | Defective relay K1. |
| 4D | Voltage at TP2 is normal but voltage at TP3 (25 mV with VOLUME control fully clockwise) is abnormal | Defective VOLUME control<br>Defective audio amplifier M4. |
| 4E | Voltage at TP2 is normal but voltage at TP5 is abnormal | Defective audio amplifier M4. |
| 4F | Voltage at M3TP1 is normal but voltage at TP2 is abnormal. | Defective i-f amplifier M3. |
| 4G | Voltage at M2TP1 is normal but voltage at M3TP1 is abnormal | Defective i-f amplifier M3.<br>Defective crystal filter FL1. |
| 4H | Voltage at TP17 is normal but voltage at M2TP1 is abnormal. | Defective synthesizer M7 and M8.<br>Defective r-f amplifier M1.<br>Defective mixer M2.<br>Defective directional coupler M5.<br>Loose or defective cables: W12, W51, W72. |
| 4I | Voltage at TP17 is abnormal | Defective power supply M12, or TP17 is shorted. |

| Item | Indication | Probable Cause |
|---|---|---|
| 5 | Received signals are heard but rushing noise in H-189/GR cannot be reduced when function switch is set to SQUELCH; voltage at M4 TP1 is abnormal. | Defective power supply M12, or TP17 is shorted.<br>Defective audio amplifier M4. |
| 6 | Signals are received on wrong frequency channel. | Defective synthesizer M7 and M8. |
| 7 | No r-f output from transmitter. | Make checks 7A through 7G. |
| 7A | Voltage at TP10 or at TP12 is abnormal | Defective power supply M12, or TP10/TP12 shorted. |
| 7B | Voltage at TP18 is abnormal | Defective power supply M12, or TP18 shorted. |
| 7C | Voltage at TP18 is normal but voltage at TP16 is abnormal. | Defective relay K1 (transmit only) |
| 7D | Voltage at TP7 is normal but voltage at TP15 is abnormal | Defective relay K1 (transmit only) |
| 7E | Voltage at TP7 or TP19 is abnormal. | Defective power supply M12, or TP7/TP19 shorted. |
| 7F | Voltage at TP11 is normal but voltage at M6TP1 is abnormal. | Defective power leveler M6. |
| 7G | Voltages at TP11 are abnormal | Defective filter M5.<br>Defective synthesizer M7 and M8<br>Defective power amplifier M9<br>Defective driver M10<br>Defective power leveler M6<br>Loose or defective coaxial cables between modules. |
| 8 | No modulation of r-f signal from transmitter | Make checks 8A and 8B |
| 8A | Voltage at M11TP1 is abnormal | Defective modulator M11. |
| 8B | Voltage at M11TP1 is normal | Defective power amplifier M9 |
| 9 | Signals are transmitted on frequencies which do not correspond to front-panel settings. | Defective synthesizer M7 and M8.<br>Defective front-panel switches. |
| 10 | Modulated signals are transmitted but no sidetone is heard in H-189/GR; received audio signals are heard in the H-189/GR | Make checks 10A and 10B |
| 10A | Voltage at TP6 is abnormal | Defective audio amplifier M4. |
| 10B | Voltage at TP6 is normal | Defective power leveler M6. |




NOTE: NUMBERS IN PARENTHESES ARE ITEM NUMBERS IN PARA. 7-4.

Figure 5-1. Location of Test Points in Receiver-Transmitter RT-6241T

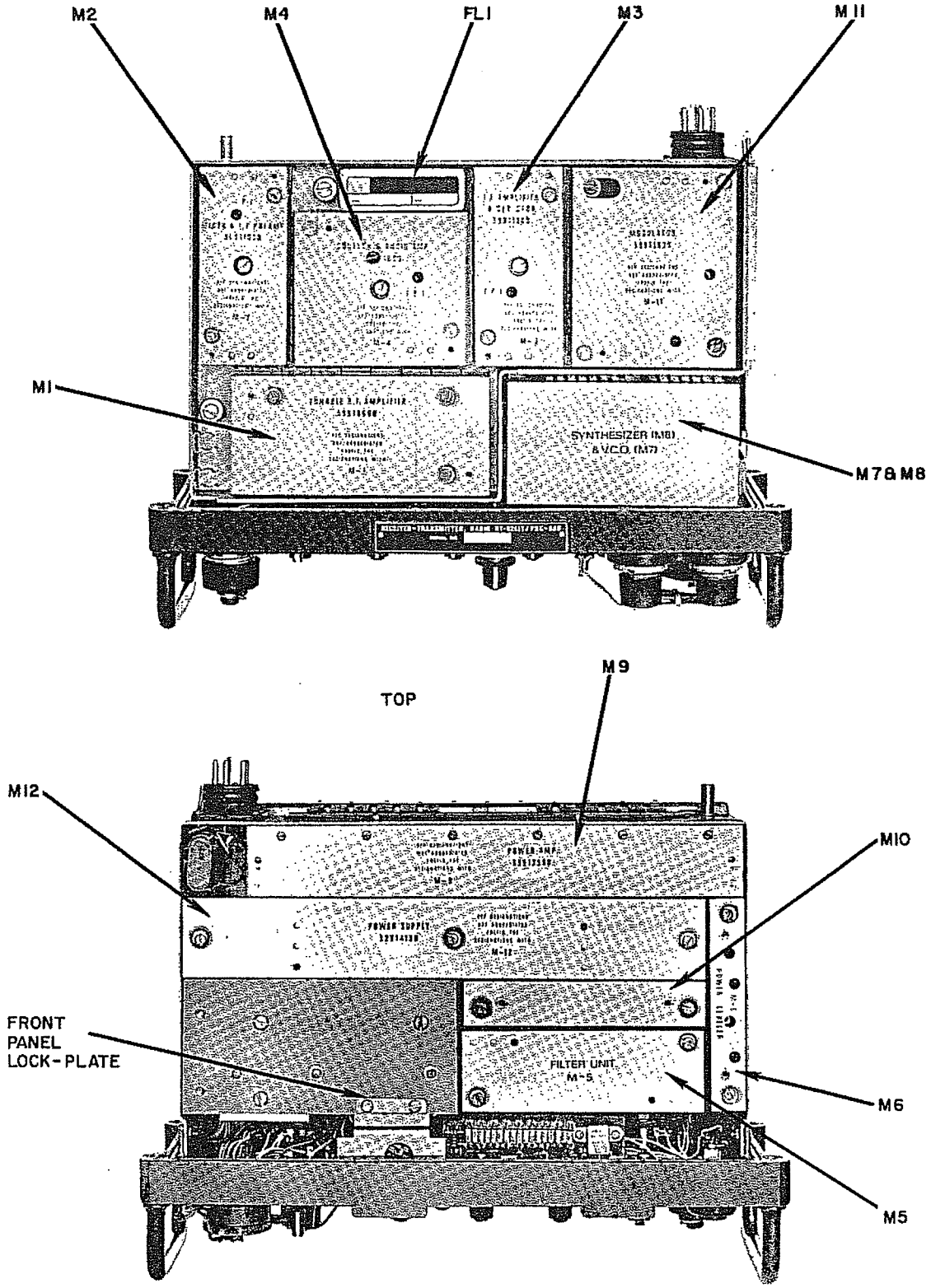



Figure 5-2. Location of Modules in Receiver-Transmitter RT-6241T

h. Troubleshooting Chart for Amplifier-Power Supply AM-2411T

| Item | Indication | Probable Cause |
|---|---|---|
| 1 | No power is applied to RT-6241T when function switch of AM-2411T is set to LOW or HIGH | Short or open in CX-4723/VRC.<br>Defective power supply module M28.<br>Broken pin in power input connector or other defect. |
| 2 | Received signals not heard at loudspeaker, but can be heard at RT-6241T through hand-set or headphones. | Short or open in loudspeaker.<br>Defective SPKR switch.<br>Defective amplifier module M24. |
| 3 | No received signals heard in loudspeaker or through audio accessory connected to RT-6241T. | Short or open in CG-1127/U<br>Short or open in CG-2423T.<br>Defective directional coupler module M25.<br>Defective attenuator module M27.<br>Defective R/T relay. |
| 4 | Received signals heard are very weak. | Defective power supply module M28.<br>Defective amplifier module M24. |
| 5 | No r-f output with function switch in LOW position. | Defective directional coupler module M25.<br>Defective attenuator module M27.<br>Defective R/T relay. |
| 6 | No r-f output or low r-f output with function switch in HIGH POSITION. | Defective modules: M20, M21, M22, M23, M25, M26, M27, M28. |

i. Troubleshooting Chart for Control Box C-2410T

| Item | Indication | Probable Cause |
|---|---|---|
| 1 | Receiver-transmitter RT-6241T cannot be energized remotely from control box | Defective connection at REMOTE connector or defective cable. |
| 2 | No power applied to frequency indicator when LIGHT switch is ON. | Defective power supply assembly M45; defective display assembly M44; check connection and cable at REMOTE connector. |
| 3 | Frequency cannot be selected manually with MHz and KHz tunning controls | Defective read-write assembly M47; check connection and cable at REMOTE connector. |
| 4 | Frequency cannot be set into memory. | Defective read-write assembly M47. |
| 5 | Preset frequency cannot be selected with CHANNEL selector | Defective memory assembly M46. |

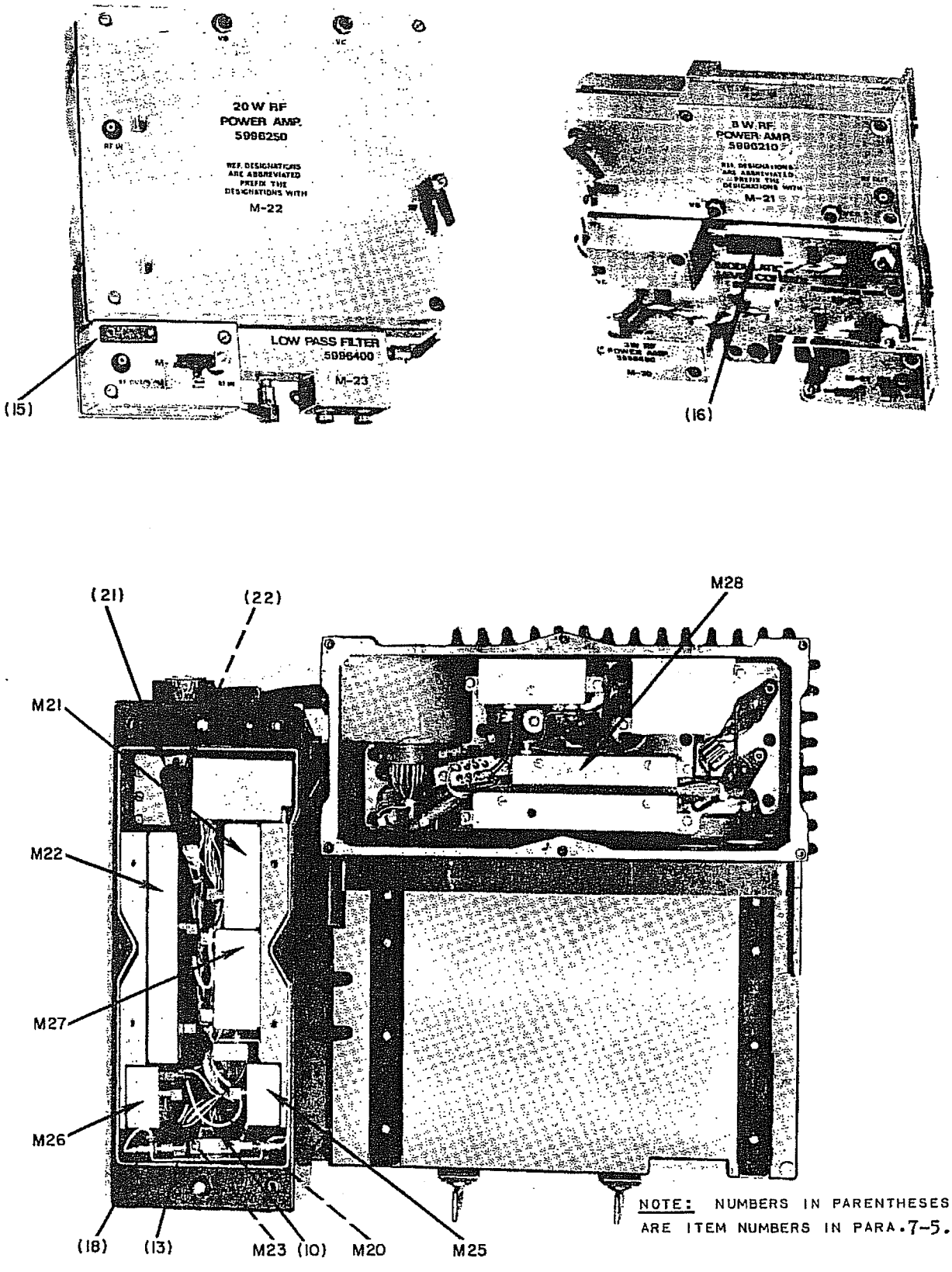
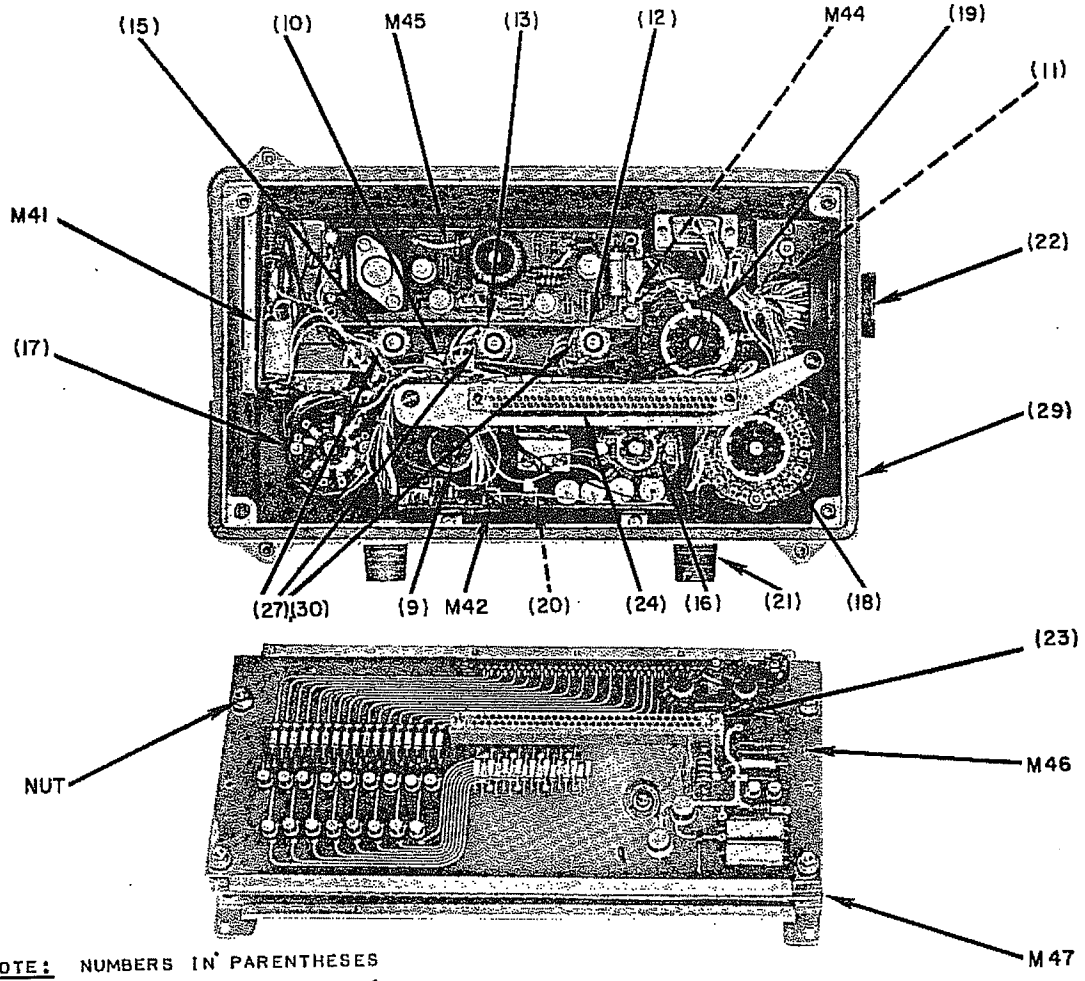



Figure 5-3. Location of Modules in Amplifier - Power Supply AM-2411T.

| Item | Indication | Probable Cause |
|---|---|---|
| 6 | No audio is heard in headphones or in loudspeaker | Defective audio amplifier assembly M41; check connection and cable at REMOTE connector; check audio accessory and its connection. |
| 7 | Squelch inoperative | Defective connection at REMOTE connector or defective cable |
| 8 | Volume in audio accessory (headphones or loudspeaker) not adjustable with VOLUME control | Defective audio amplifier assembly M41; check connection and cable at REMOTE connector |
| 9 | Transmitted signal cannot be modulated with voice from microphone. | Defective microphone amplifier module M42; check connection and cable at REMOTE connector; check microphone and its connection. |




NOTE: NUMBERS IN PARENTHESES ARE ITEM NUMBERS IN PARA. 7-6.

Figure 5-4. Location of Modules in Control Box C-2410T.

j. Repairs

(1) Replacement of Battery BA-4660T

(a) Stand the RT-6241T on a level surface with its front panel facing down.

(b) Release the two clamps on the sides of the RT-6241T by pushing each clamp up and away from the RT-6241T case.

(c) Separate the CY-6600T from the RT-6241T case. Remove the old battery.

(d) Slide a new battery into the RT-6241T case so that its connector mates with the battery plug on the rear of the RT-6241T case.

(e) Slide the CY-6600T over the battery and refasten the two clamps.

(2) Replacement of Battery BT-6600T. The procedure is the same as for the BA-4660T above, except that the battery and its case are inseparable and must be replaced as a unit.

(3) Removal and Replacement of RT-6241T Case

NOTE: Remove CY-6600T and battery from PRC-660T before removing RT-6241T case.

CAUTION: The gaskets and joints between the case and panel of the RT-6241T, and the seals of the battery terminals, insure that an assembled RT-6241T will be watertight. Avoid deforming or destroying metal surfaces and edges which together with good gaskets made a continuous seal. Never repair a case with chipped or burred edges - replace it with a new one.

(a) Loosen the four captive screws that secure the RT-6241T case and pull the RT-6241T straight out of the case.

(b) Visually inspect the inside of the RT-6241T front panel, particularly the condition of the gasket and its recess. The gasket must not be broken, cut, or twisted, and must lie with its flat surface evenly within

the groove. The recess for the gasket must be free of dirt and burrs.

(c) Clean the inside front panel surface with a clean, lint-free cloth. If necessary, remove the gasket and clean it as well as the recess. Place a thin coat of Dow Corning No. 4 silicone grease on the gasket. Make sure that the replaced gasket is properly seated in the recess.

CAUTION: Replace the gasket if there is any doubt as to its condition. To avoid harming the gasket or recess, use a tweezer or a small, unpointed tool to pry up the gasket. Be sure the gasket is not twisted; otherwise, the seal will be improper.

(d) Make sure the terminals of the battery plug at the rear of the RT-6241T are not bent or distorted, and that their surfaces are not sheared.

(e) Make sure the two O-rings on the battery plug are clean and are not cut, broken or twisted. Make sure the recesses of the O-rings are also clean. If necessary, remove the rings and clean them as well as the recesses. Place a thin coat of Dow Corning No. 4 silicone grease on the gasket.

CAUTION: Replace O-rings if there is any doubt as to their condition. When removing the rings, be careful not to burr or chip edges of the recesses on the connector.

(f) Wipe the inside of the case with a clean, lint-free cloth.

(g) Coat the threads of the four case-securing screws with anti-seize compound. Carefully move the case over the chassis, making sure the terminals clear the holes in the rear. Also, be sure the case seats evenly on all surfaces of the gasket be-

fore tightening the screws. Never tighten one screw completely: tighten all screws a few turns at a time, while checking the condition of the seal.

(4) Removal and Replacement of Modules from RT-6241T

(a) Loosen the four captive screws that secure the RT-6241T case and pull the RT-6241T straight out of the case.

CAUTION: Be extremely careful when removing and replacing a module. Rough handling may deform the connectors and pins and cause subsequent malfunction.

(b) Remove the two module pullers from their holders. (see figure 5-2).

(c) Screw the pullers into the respective threaded holes on the module; be careful not to cross thread them into the holes.

(d) Loose the screws which fasten the module to the chassis; it may be necessary to lift the hinged chassis for access to these screws.

(e) Using the module pullers, pull out the module. The pullers may be removed from the module and replaced in their holders.

(f) When replacing a module, make sure the jack mates with the respective plug on the chassis, and then seat the module in place by applying equal pressure to both ends of the module. Then tighten the fastening screws.

(g) Replace the case as described in para. (3) (g) above.

(5) Removal and Replacement of Synthesizer

(a) Loosen the four captive screws that secure the RT-6241T case and pull the RT-6241T straight out of the case.

(b) Loosen the two screws and lift the hinged chassis.

(c) Loosen the three screws at the bottom of the dual-module synthesizer.

(d) Pull out the synthesizer and disconnect the coaxial cables (fig. 5-5).

(e) To replace, reconnect coaxial cables (black cable from M10 to left connector and violet cable from M2 to right connector), insert synthesizer, and tighten the three screws.

(f) Replace the case as described in para. (3) (g).

(6) Removal and Replacement of RT-6241T Front Panel

(a) Loosen the four captive screws that secure the RT-6241T case and pull the RT-6241T straight out of the case.

(b) Remove the synthesizer modules as in (5) above.

(c) Remove the two screws from the multipin plug, and separate the plug from the receptacle which is secured to the chassis.

(d) Remove three screws on each side which secure the front panel to the RT-6241T chassis.

(e) Remove two screws and lock plate on underside of receiver-transmitter which secure front panel bracket to chassis. (fig. 5-2).

(f) Pull front panel away from RT-6241T chassis.

(g) To replace front panel, reverse the order of removal, making sure to reconnect the multipin plug; replace the case as described in para. (3) (g).

(7) Removal and Replacement of Modules from AM-2411T

(a) Remove cover over left housing of AM-2411T by loosening the six screws.

(b) Lift AM-2411T and remove the two module pullers from the underside of the mounting surface.

(c) Attach the module pullers to the top of the module assembly in the AM-2411T housing.

(d) Disconnect the two coaxial cable connectors from the inside of the front panel: one from the INPUT connector at the right and one from the OUTPUT connector at the left.

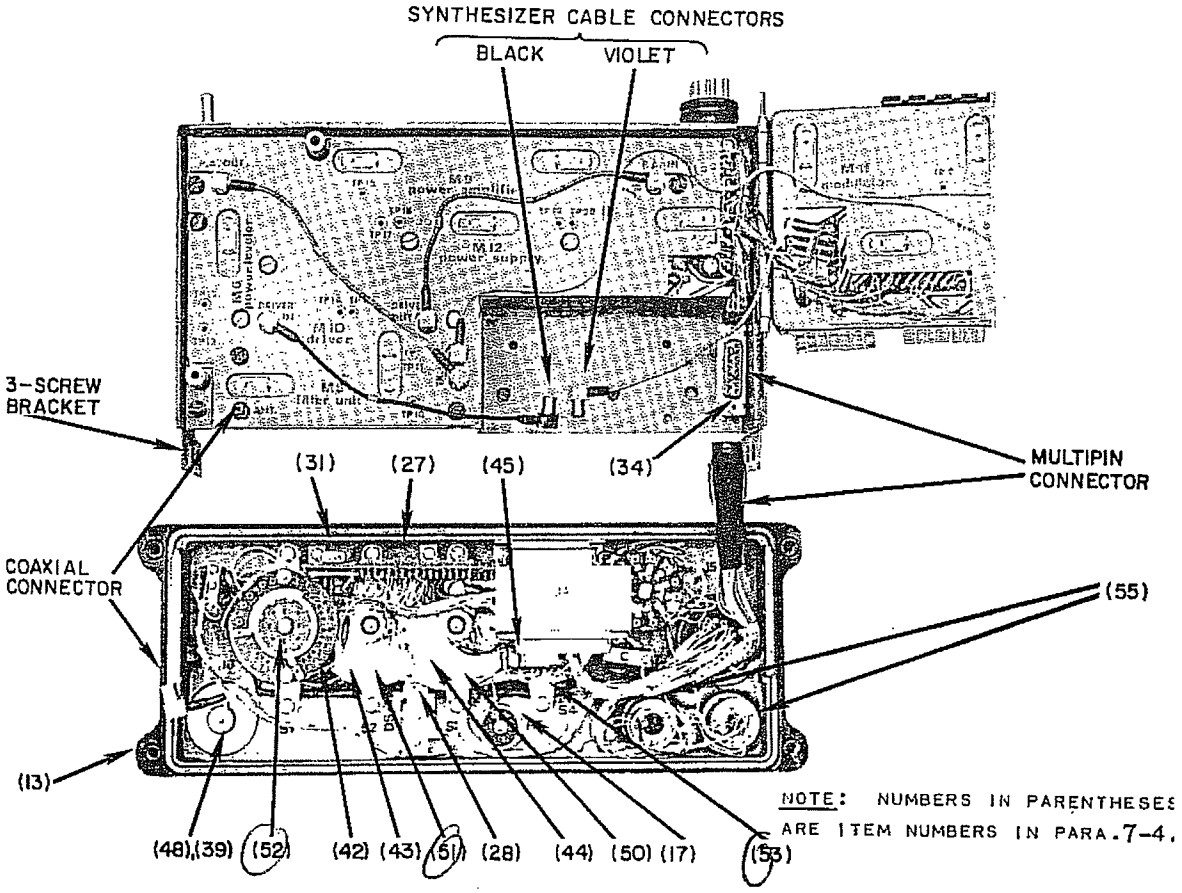



Figure 5-5. Front Panel Removed from Receiver-Transmitter RT-6241T

(e) Disconnect multi-pin plug of module assembly from plug of harness.

(f) Remove six screws from each side of housing, which secure module assembly in place.

(g) Using module pullers, pull out the module assembly.

(h) To replace, reverse the order of removal.

(8) Disassembly of AM-2411T Module Assembly

(a) Disconnect the coaxial cables which connect the two sections of the module assembly and separate the two parts.

(b) To remove the low-pass filter M23, disconnect the two r-f cables and remove the two screws which secure the filter to the mounting plate.

(c) To remove the input or output directional coupler (M25 or M26), disconnect the two r-f cables and the harness, and remove the two screws which secure the coupler to the mounting plate.

(d) To remove the audio amplifier (M24), disconnect the harness and remove the eight screws which secure the amplifier to the mounting plate.

(e) To remove the attenuator (M27), disconnect the two r-f cables and the harness, and remove the four screws which secure the attenuator to the mounting plate.

(9) Removal and Replacement of Power Supply from AM-2411T

(a) Disconnect the short cable assembly at the rear between the AM-2411T and the RT-62411T.

(b) Remove the nine screws from the bottom of the AM-2411T mounting surface and separate the power supply from the AM-2411T.

(c) To remove the power supply chassis from the housing, take off the cover by loosening the six screws, remove the 11 black screws which secure the power supply chassis to the housing, and pull out the chassis.

(d) To replace the power supply, reverse the order of removal.

(10) Removal and Replacement of Modules from C-2410T (fig. 5-4).

(a) Remove rear cover of C-2410T by loosening four screws.

(b) Loosen four screws on metal plate and pull out memory and read-write assemblies M46 and M47.

NOTE: Audio assemblies M41 and M42 may now be removed.

(c) To separate M46 and M47, loosen the nut at each corner.

CAUTION: Be especially careful when handling assemblies M46 and M47 - they are very delicate.

(d) For access to display assembly M44, loosen the securing screws and remove power supply assembly M45.

(e) To reassemble, reverse the order of removal.

(11) Cable Assemblies. If any of the multiconductor cables (CX-4720/VRC, CX-4723/VRC or CX-2421T) is suspected to be defective, check the continuity using a multimeter. Figures 5-6, 5-7 and 5-8 are schematic diagrams for the cable assemblies.

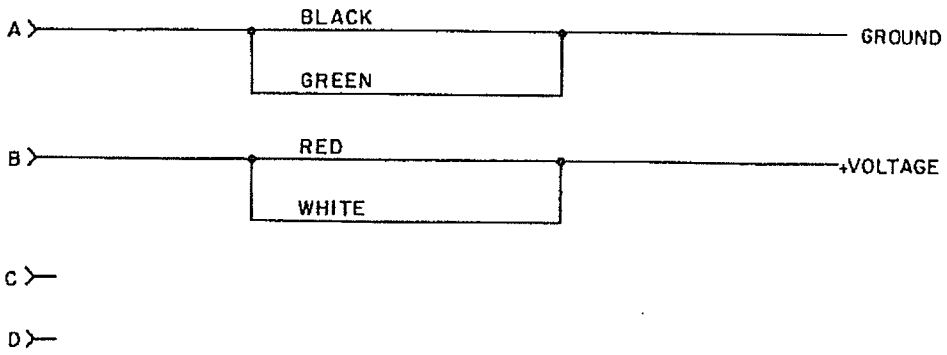



Figure 5-6. Cable Assembly CX-4720/VRC, Schematic Diagram

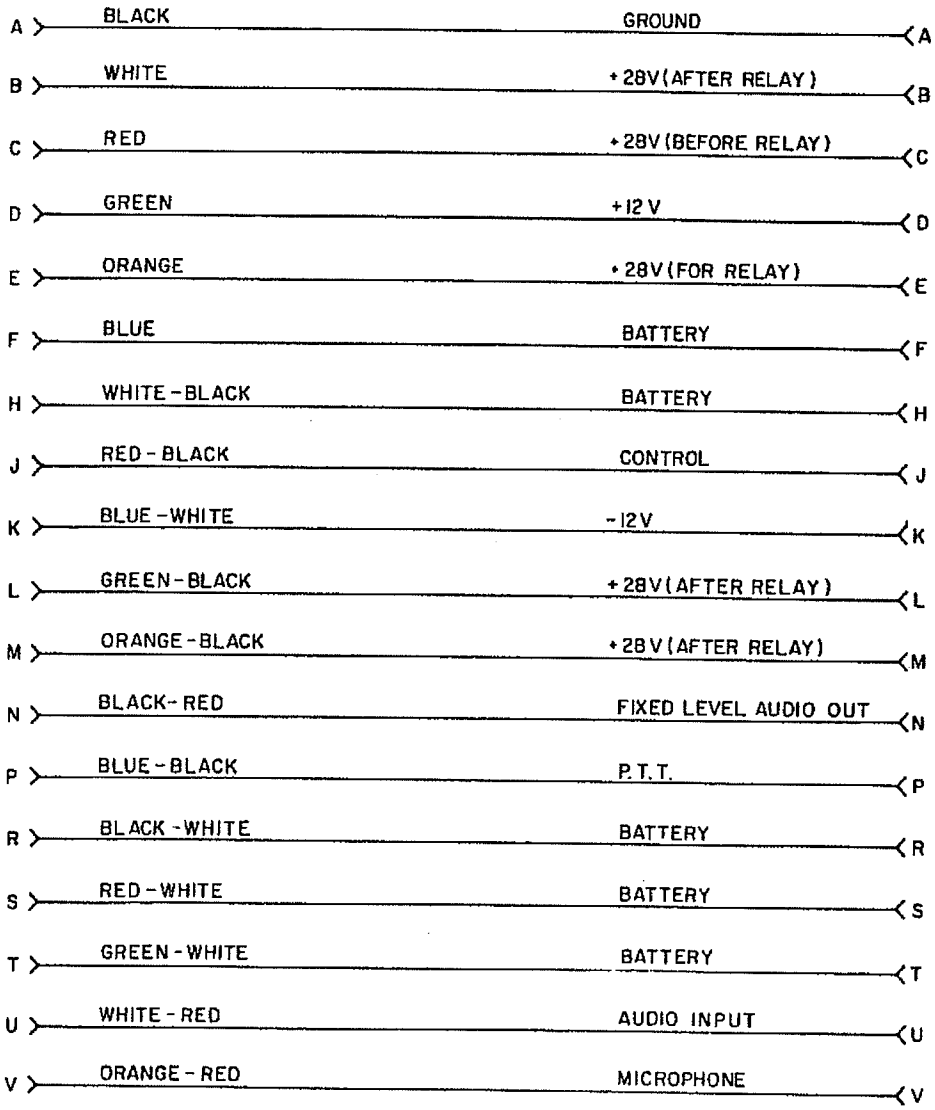



Figure 5-7. Cable Assembly CX-4723/VRC, Schematic Diagram

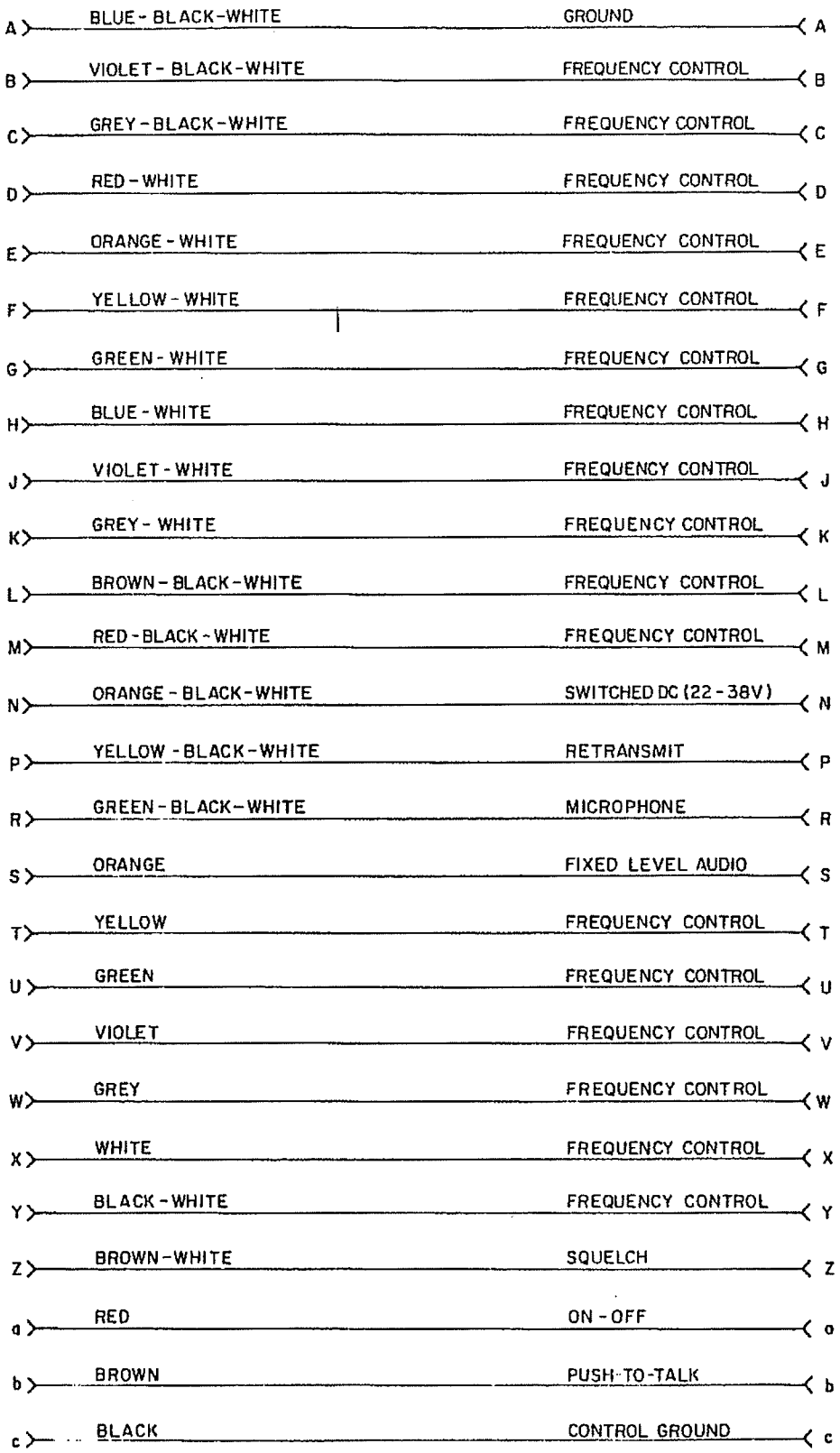



Figure 5-8. Cable Assembly CX-2421T, Schematic Diagram

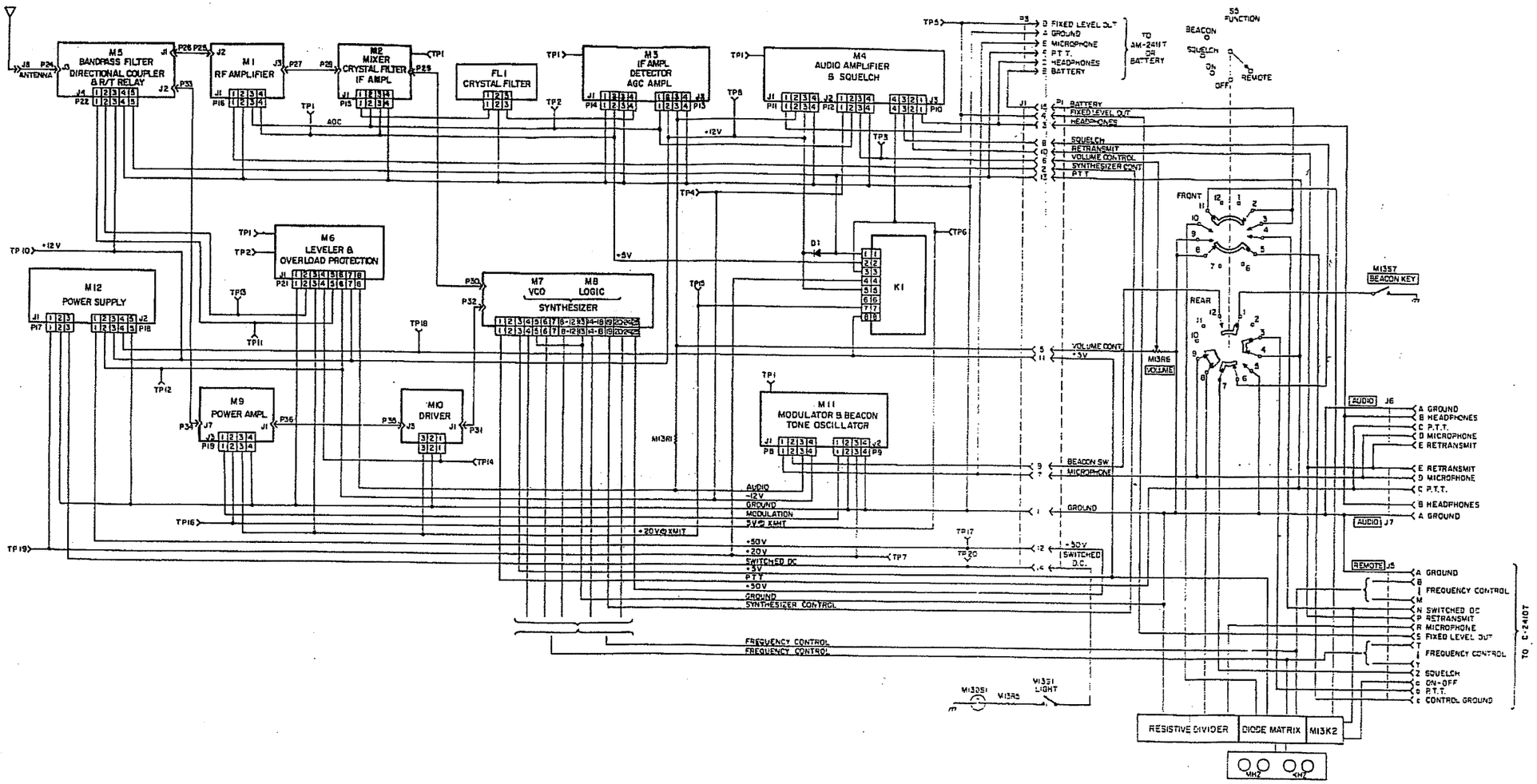



Figure 5-9. Receiver-Transmitter RT-6241T, Interconnection Diagram

# Chapter 6
# REFERENCES

The following instruction manuals will be useful when the VRC-240T is used with Audio Frequency Amplifier AM-1780/VRC in an intercom set; all are U.S. Army publications.

| | |
|---|---|
| TM11-5820-401-10 | Operator's Manual: Radio Sets AN/VRC-12 and AN/VRC-43, -44, -45, -46, -47, -48 and -49. |
| TM11-5820-401-20 | Organizational Maintenance Manual: Radio Sets AN/VRC-12 and AN/VRC-43, -44, -45, -46, -47, -48 and -49. |
| TM-11-5820-401-35 | Field and Depot Maintenance Manual: Radio Sets AN/VRC-12 and AN/VRC-43, -44, -45, -46, -47, -48 and -49. |

# Chapter 7

# REPAIR PARTS

## 7-1. INTRODUCTION

This chapter lists the repair parts for maintenance of Radio Sets PRC-660T and VRC-240T. It is a basis for requisitioning parts and is also a guide for establishing stock levels of spare parts.

## 7-2. EXPLANATION OF COLUMNS IN CHARTS

a. "Item" Column. This is a running number assigned to each part as it appears in the chart.

b. "Model" Column. Parts used only in PRC-660T are identified by P, parts used only in VRC-240T are identified by V, and parts common to both radio sets have no letter (only in chart in paragraph 7-3).

c. "Name" Column. Nomenclature of the part.

d. "Identification" Column. The manufacturers part number or the standard number of the part is listed in this column.

e. "Manufacturers" Column. The manufacturer. The manufacturer's code number represents the following:

0001: Sealectro Corp., Mamaroneck, N. Y.

0002: Erie Technological Products, Inc. Erie, Pa.

0012: Amphenol-Borg Corp., Chicago, Ill.

0034: Cannon Electric Co., Los Angeles, Calif.

0048: Motorola Inc., Phoenix, Ariz.

0089: Honeywell Inc., Micro-switch Div., Freeport, Ill.

0267: U.S. Signal Corps.

0268: U.S. Military or Federal Specifications

0310: Elektronik Service Gesellschaft mbH 2000 Hamburg-Norderstedt 2, Robert-Koch-Str. 29, W. Germany

0424: Magnavox Co., Urbana, Ill.

0553: Hughes Aircraft Co., Fullerton, Calif.

0615: Hi-G, Italy

0650: Elco-Webster Co., Watertown, Mass.

0745: Arrow-Hart Co.,
Hartford, Conn.

f. "Quantity" Column. This column indicates the number of parts of this type found in the equipment and which can be replaced at this level of maintenance.

g. "Replacement Factor" Column. This decimal indicates the average rate at which a similar item will fail, wear out or otherwise require replacement (based on experience or probability) over two Mean-Time-Between-Failure (MTBF) periods: about 4000 hours of operation for RT-6241T; 6000 hours for AM-2411T; 6000 hours for C-2410T. For example, 0.030 indicates that 3 of every 100 items used in the radio can be expected to need replacement in the 2-MTBF period.

h. "Part Number" Column. This is the EL.S.G. catalog number.

i. "Location" Column. The first part lists the figure number in the manual, and the second part lists the reference number in the figure, in which the item is identified and located.

7-3. REPAIR PARTS LIST CHART: PRC-660T AND VRC-240T

| Item | Model | Name | Identification | Mfr. | Qty | E.L.S.G. Part No. |
|---|---|---|---|---|---|---|
| 1 | P | Radio Set PRC-660T | 59090010 | 0310 | 1 | 5909001 |
| 2 | V | Radio Set VRC-240T | 59090020 | 0310 | 1 | 5909002 |
| 3 | | Receiver-Transmitter RT-6241T | 59090100 | 0310 | 1 | 5909010 |
| 4 | V | Ampl-Power Supply AM-2411T | 59090110 | 0310 | 1 | 5909011 |
| 5 | V | Control Box C-2410T | 59090200 | 0310 | 1 | 5909020 |
| 6 | V | Mounting MT-1029/VRC | SM414975 | 0267 | 1 | 7009044 |
| 7 | P | Antenna AT-6600T | 59090600 | 0310 | 1 | 5909060 |
| 8 | V | Antenna AT-803/VR | SM345512 | 0267 | 1 | 5909061 |
| 9 | V | Antenna AT-197/GR | MIL-A-4946 | 0268 | 1 | 5909062 |
| 10 | P | Handset H-189/GR | 70090330 | 0310 | 1 | 7009033 |
| 11 | V | Microphone M-80/GR | MIL-E-55119 | 0268 | 1 | 5909031 |
| 12 | V | Headset H-161A/GR | MIL-E-55119 | 0268 | 1 | 7009032 |
| 13 | V | Loudspeaker LS-454/U | MIL-L-12632 | 0268 | 1 | 7009016 |
| 14 | P | Battery BA-4660T | 59090800 | 0310 | 1 | 5909080 |
| 15 | P | Battery Box CY-6600T | 59090850 | 0310 | 1 | 5909085 |
| 16 | P | Battery BT-6600T | 59090810 | 0310 | 1 | 5909081 |
| 17 | P | Battery BT-6601T | 59090820 | 0310 | 1 | 5909082 |
| 18 | P | Bag CW-503 | MIL-R-55137 | 0268 | 1 | 9009010 |
| 19 | P | Harness ST-138 | SM447168 | 0267 | 1 | 9009014 |
| 20 | V | Bag CW-1 | 70090180 | 0310 | 1 | 7009018 |
| 21 | | Retrans. Kit MK-4560T | 59090400 | 0310 | 1 | 5909040 |
| 22 | V | Cable Assy CG-1127 | 5909048-02 | 0310 | 1 | 5909048-02 |
| 23 | V | Cable Assy CG-2423T | 59090430 | 0310 | 1 | 5909043 |
| 24 | V | Cable Assy CX-2421T | 59090410 | 0310 | 1 | 5909041 |
| 25 | V | Cable Assy CX-4720/VRC | 59090460-01 | 0267 | 1 | 5909046-01 |
| 26 | V | Cable Assy CX-4723/VRC | 59090470-01 | 0267 | 1 | 5909047-01 |
| 27 | | Operator's Manual | 59091000 | 0310 | 1 | 5909100 |

7-4. REPAIR PARTS LIST CHART : RECEIVER-TRANSMITTER RT-624/T

| Item | Name | Identification | Mfr. | Qty. | Repl. Factor | EL.S.G. Part No. | Location |
|---|---|---|---|---|---|---|---|
| 1 | Ampl Assy (M1) | 59910600 | 0310 | 1 | 0.090 | 5991060 | 5-2 |
| 2 | Mixer Assy (M2) | 59911000 | 0310 | 1 | 0.090 | 5991100 | 5-2 |
| 3 | IF Ampl Assy (M3) | 59911300 | 0310 | 1 | 0.090 | 5991130 | 5-2 |
| 4 | AF Ampl Assy (M4) | 59911600 | 0310 | 1 | 0.150 | 5991160 | 5-2 |
| 5 | Filter Assy (M5) | 59914700 | 0310 | 1 | 0.090 | 5991470 | 5-2 |
| 6 | Pwr Leveler Assy (M6) | 59911900 | 0310 | 1 | 0.020 | 5991190 | 5-2 |
| 7 | VCO Assy (M7) | 59950700 | 0310 | 1 | 0.050 | 5995070 | 5-2 |
| 8 | Synthesizer Assy (M8) | 59920100 | 0310 | 1 | 0.200 | 5992010 | 5-2 |
| 9 | PA Assy (M9) | 59912500 | 0310 | 1 | 0.020 | 5991250 | 5-2 |
| 10 | Driver Assy (M10) | 59913200 | 0310 | 1 | 0.020 | 5991320 | 5-2 |
| 11 | Modulator Assy (M11) | 59913800 | 0310 | 1 | 0.020 | 5991380 | 5-2 |
| 12 | Pwr Supply Assy (M12) | 59914100 | 0310 | 1 | 0.070 | 5991410 | 5-2 |
| 13 | Front Panel Assy (M13) | 59910400 | 0310 | 1 | 0.005 | 5991040 | 5-5(13) |
| 14 | Resistor, Fxd. | RC07GF222K | 0268 | 1 | 0.020 | 5911014 | |
| 15 | Resistor, Fxd. | RC07GF224K | 0268 | 1 | 0.020 | 5911036 | |
| 16 | Resistor, Fxd. | RC07GF682K | 0268 | 1 | 0.020 | 5911038 | |
| 17 | Resistor, Var. | SM-447148B | 0267 | 1 | 0.050 | 5911053 | 5-5(17) |
| 18 | Resistor, Fxd. | RC20GF221K | 0268 | 1 | 0.020 | 5911074 | |
| 19 | Resistor, Fxd. | RC07GF274K | 0268 | 1 | 0.020 | 5911088 | |
| 20 | Resistor, Fxd. | RC05GF332K | 0268 | 1 | 0.020 | 5911184 | |
| 21 | Resistor, Fxd. | RC07GF151J | 0268 | 1 | 0.020 | 5911237 | |
| 22 | Resistor, Fxd. | RC07GF394J | 0268 | 1 | 0.020 | 5911241 | |
| 23 | Resistor, Fxd. | RC07GF474J | 0268 | 1 | 0.020 | 5911216 | |
| 24 | Capacitor, Fxd. | 8131-050-W5R-224M | 0002 | 1 | 0.020 | 5912166 | |
| 25 | Xtal Filter 50 kHz | 59140010A | 0310 | 1 | 0.010 | 5914001 | 5-2(FL1) |
| 26 | Si Controlled Rect. | MCR1906-3 | 0048 | 1 | 0.010 | 5921136 | |
| 27 | Diode | 1N270 | 0268 | 18 | 0.010 | 5921216 | 5-5 (27) |
| 28 | Lamp | MS25237-327 | 0268 | 1 | 0.200 | 5923010 | 5-5 (28) |
| 29 | Switch, Pushbutton | 1PB712 | 0089 | 2 | 0.050 | 5931009 | 3-1 (29) |
| 30 | Relay | SM-447085C | 0267 | 1 | 0.050 | 5931011 | |
| 31 | Relay | SM500889C | 0267 | 1 | 0.050 | 5931017 | 5-5 (31) |
| 32 | Connector | 59330160C | 0310 | 1 | 0.010 | 5933016 | 5-1 (32) |
| 33 | Screw | SM-447224B | 0267 | 4 | 0.020 | 5946380 | 2-3 (33) |
| 34 | Screw, Connect.* | 59466600A | 0310 | 2 | 0.020 | 5946660 | 5-5 (34) |
| 35 | Bushing | 59493500A | 0310 | 3 | 0.010 | 5949350 | |

*Left-turn thread.

| Item | Name | Identification | Mfr. | Qty. | Repl. Factor | E.L.S.G. Part No. | Location |
|---|---|---|---|---|---|---|---|
| 36 | Bushing | 59493600A | 0310 | 1 | 0.010 | 5949360 | |
| 37 | Washer | MS35337-41 | 0268 | 44 | 0.005 | 5953020 | 2-3 (37) |
| 38 | Washer, Flat | NAS620C10L | 0268 | 4 | 0.010 | 5953170 | 2-3 (38) |
| 39 | O-Ring | 10-00-1459-1224 | 0708 | 1 | 0.050 | 5955200 | 5-5 (39) |
| 40 | O-Ring | 10-00-2070-1224 | 0708 | 1 | 0.020 | 5955300 | 3-1 (40) |
| 41 | Chassis Assy | 59910500D | 0310 | 1 | 0.005 | 5991050 | |
| 42 | Shaft Assy, Sw 1 | 59916200B | 0310 | 1 | 0.010 | 5991620 | 5-5 (42) |
| 43 | Shaft Assy, Sw 2 | 59916300B | 0310 | 1 | 0.010 | 5991630 | 5-5 (43) |
| 44 | Shaft Assy, Sw 3 | 59916400B | 0310 | 1 | 0.010 | 5991640 | 5-5 (44) |
| 45 | Shaft Assy, Sw 4 | 59916600B | 0310 | 1 | 0.010 | 5991660 | 5-5 (45) |
| 46 | Cap Assy | SM447440B | 0267 | 1 | 0.050 | 5991700 | 3-1 (46) |
| 47 | Case Assy | 59918100D | 0310 | 1 | 0.005 | 5991810 | 2-3 (47) |
| 48 | Antenna Base Assy | 59918800B | 0310 | 1 | 0.010 | 5991880 | 5-5 (48) |
| 49 | Cap Assy, Conn., Ant. | 59919200B | 0310 | 1 | 0.020 | 5991920 | 3-1 (49) |
| 50 | Switch 3 Assy | 59919600B | 0310 | 1 | 0.010 | 5991960 | 5-5 (50) |
| 51 | Switch 2 Assy | 59919700B | 0310 | 1 | 0.010 | 5991970 | 5-5 (51) |
| 52 | Switch 1 Assy | 59919800B | 0310 | 1 | 0.010 | 5991980 | 5-5 (52) |
| 53 | Switch 4 Assy | 59919900B | 0310 | 1 | 0.010 | 5991990 | 5-5 (53) |
| 54 | Cap Assy | 59921500C | 0310 | 1 | 0.010 | 5992150 | 3-1 (54) |
| 55 | Connector Assy | 59923300 | 0310 | 2 | 0.020 | 5992330 | 5-5 (55) |
| 56 | Cable Assy | 59930100-1 | 0310 | 1 | 0.020 | 5993010 | 5-1(56) |
| 57 | Cable Assy | 59930100-2 | 0310 | 1 | 0.020 | 5993020 | 5-1(57) |
| 58 | Cable Assy | 59930100-3 | 0310 | 1 | 0.020 | 5993030 | 5-1(58) |
| 59 | Cable Assy | 59930100-4 | 0310 | 1 | 0.020 | 5993040 | 5-1(59) |
| 60 | Cable Assy | 59930100-5 | 0310 | 1 | 0.020 | 5993050 | 5-1(60) |
| 61 | Cable Assy | 59930100-6 | 0310 | 1 | 0.020 | 5993060 | 5-1(61) |
| 62 | Cable Assy | 59930700 | 0310 | 1 | 0.020 | 5993070 | |
| 63 | Cable Assy | 59931000 | 0310 | 1 | 0.020 | 5993100 | |
| 64 | Cable Assy | 59931100 | 0310 | 1 | 0.010 | 5993110 | |

960 5930-12-196-1881
970 5930-12-196-1880
980 5930-12-196-1879
-1882
990

U33 JOINC

7-5. REPAIR PARTS LIST CHART : AMPLIFIER - POWER SUPPLY AM-2411T

| Item | Name | Identification | Mfr. | Qty. | Repl. Factor | EL. S. G. Part No. | Location |
|---|---|---|---|---|---|---|---|
| 1 | Filter Assy (M23) | 59964000 | 0310 | 1 | 0.020 | 5996400 | 5-3 |
| 2 | Audio Assy (M24) | 59963200 | 0310 | 1 | 0.020 | 5996320 | 5-3 |
| 3 | Coupler Assy (M25) | 59963600 | 0310 | 1 | 0.040 | 5996360 | 5-3 |
| 4 | Coupler Assy (M26) | 59968500 | 0310 | 1 | 0.040 | 5996850 | 5-3 |
| 5 | Feedback Assy (M27) | 59962600 | 0310 | 1 | 0.020 | 5996260 | 5-3 |
| 6 | Power Supply Assy (M28) | 59960400 | 0310 | 1 | 0.070 | 5996040 | 5-3 |
| 7 | Capacitor, Fxd, Tant. | CL65CE5 41SP-T3 | 0268 | 1 | 0.070 | 5912023 | |
| 8 | Capacitor, Fxd, Tant. | CL44BH10 1TP3 | 0268 | 1 | 0.070 | 5912230 | |
| 9 | Loudspeaker | SM454812D | 0267 | 1 | 0.020 | 5931501 | 3-2 |
| 10 | Switch | 59315030B | 0310 | 1 | 0.040 | 5931503 | 5-3(10) |
| 11 | Relay (RF) | 2RFBC-1D-112 | 0615 | 1 | 0.040 | 5931512 | |
| 12 | Switch | MS75029-23 | 0268 | 1 | 0.040 | 5931610 | 3-2② |
| 13 | Connector, Rf | 51-328-3196 | 0001 | 16 | 0.020 | 5933005 | 5-3(13) |
| 14 | Connector | 58-010-3196 | 0001 | 1 | 0.020 | 5933027 | 3-2③ |
| 15 | Connector, Dc (7-pin) | S188812B-3 | 0424 | 2 | 0.020 | 5933503 | 5-3 |
| 16 | Connector, Dc (11-pin) | S188812B-7 | 0424 | 2 | 0.020 | 5933507 | 5-3(16) |
| 17 | Connector | SM414991C | 0267 | 1 | 0.020 | 5933520 | 1-4(17) |
| 18 | Connector, Rf | SM414044C | 0267 | 2 | 0.020 | 5933522 | 5-3(18) |
| 19 | Connector | SM414116C | 0267 | 1 | 0.020 | 5933530 | 1-4(19) |
| 20 | Feedthru Assy | SM454853B | 0267 | 2 | 0.020 | 5933553 | |
| 21 | Connector, Plug | SM500320C-4 | 0267 | 1 | 0.020 | 5933560 | 5-3(21) |
| 22 | Connector, Receptacle | SM500320C-11 | 0267 | 1 | 0.020 | 5933561 | 5-3(22) |
| 23 | Connector, Panel | 57-010-3196 | 0001 | 1 | 0.020 | 5933570 | 3-2④ |
| 24 | Boot, Rubber | 18578-2 | 0745 | 1 | 0.070 | 5935510 | 3-2② |
| 25 | Runner | 59420200A | 0310 | 2 | 0.020 | 5942020 | |
| 26 | Clamp | SM454866C | 0267 | 2 | 0.020 | 5942030 | |
| 27 | Screw | SM454875B-7 | 0267 | 4 | 0.020 | 5942150 | |
| 28 | Cover | SM454823B | 0267 | 1 | 0.020 | 5942160 | |
| 29 | Screw | SM454875B-1 | 0267 | 4 | 0.020 | 5942170 | |
| 30 | Bracket | 59427200B | 0310 | 1 | 0.010 | 5942720 | |
| 31 | Cover | SM454864D | 0267 | 1 | 0.020 | 5942020 | |
| 32 | Knob | 59462400C | 0310 | 1 | 0.020 | 5946240 | 3-2① |
| 33 | Screw | MS35223-13 | 0268 | 10 | 0.020 | 5952010 | |

230 5355-12-180-3768
240 12-180-3767
700 5355-1271-180-3769

| Item | Name | Identification | Mfr. | Qty. | Repl. Factor | EL.S.G. Part No. | Location |
|---|---|---|---|---|---|---|---|
| 34 | Screw | MS35223-14 | 0268 | 15 | 0.020 | 5952020 | |
| 35 | Screw | MS35223-1 | 0268 | 1 | 0.020 | 5952570 | |
| 36 | Screw | SM454878B-2 | 0267 | 6 | 0.020 | 5952590 | |
| 37 | Screw | MS35237-19 | 0268 | 18 | 0.020 | 5952420 | |
| 38 | Screw | MS35237-21 | 0268 | 4 | 0.020 | 5952620 | |
| 39 | Screw | 59527400A | 0310 | 11 | 0.020 | 5952740 | |
| 40 | Screw | MS35223-12 | 0268 | 7 | 0.020 | 5952840 | |
| 41 | Washer | MS35337-40 | 0268 | 45 | 0.010 | 5953040 | |
| 42 | Housing Assy | 59960500C | 0310 | 1 | 0.020 | 5996050 | |
| 43 | Relay Assy | 59960600A | 0310 | 1 | 0.010 | 5996060 | |
| 44 | Heatsink Left Assy | 59964710A | 0310 | 1 | 0.040 | 5996471* | 5-3 |
| 45 | Heatsink Right Assy | 59964810A | 0310 | 1 | 0.040 | 5996481** | 5-3 |
| 46 | Speaker Assy | 59966200 | 0310 | 1 | 0.005 | 5996620 | 3-2(SPKR) |
| 47 | Handle Assy | 59969400A | 0310 | 2 | 0.010 | 5996940 | |
| 48 | Bridge Assy | 59969500B | 0310 | 1 | 0.005 | 5996950 | |
| 49 | Cap conn. Assy | 59969700A | 0310 | 1 | 0.040 | 5996970 | |
| 50 | Cap conn. Assy | 59969900A | 0310 | 1 | 0.040 | 5996990 | |

* Includes Module M22

** Includes Modules M20 and M21.

7-6. REPAIR PARTS LIST CHART : CONTROL BOX C-2410T

| Item | Name | Identification | Mfr. | Qty | Repl. | E.I.S.G. Part No. | Location |
|---|---|---|---|---|---|---|---|
| 1 | Power Ampl Assy (M41) | 59974100 | 0310 | 1 | 0.120 | 5997410 | 5-4 |
| 2 | Mic Ampl Assy (M42) | 59954200 | 0310 | 1 | 0.090 | 5995420 | 5-4 |
| 3 | Display Assy (M44) | 59974400 | 0310 | 1 | 0.100 | 5997440 | 5-4 |
| 4 | Display PS Assy (M45) | 59954500 | 0310 | 1 | 0.100 | 5995450 | 5-4 |
| 5 | Read-Write Assy (M46) | 59954600 | 0310 | 1 | 0.180 | 5995460 | 5-4 |
| 6 | Memory Assy (M47) | 59974700 | 0310 | 1 | 0.100 | 5997470 | 5-4 |
| 7 | Knob | 59462200 | 0310 | 1 | 0.010 | 5946220 | 3-3 |
| 8 | Knob | 59462300 | 0310 | 5 | 0.010 | 5946230 | 3-3 |
| 9 | Res, Var, 10K | SM447148B | 0267 | 1 | 0.050 | 5911053 | 5-4(9) |
| 10 | Res, Fxd, 47Ω±3% | RH-10 | 0036 | 2 | 0.020 | 5911480 | 5-4(10) |
| 11 | Transistor | 2N3054 | 0598 | 1 | 0.010 | 5921154 | 5-4(11) |
| 12 | Switch | 59310020B | 0310 | 1 | 0.010 | 5931002 | 5-4(12) |
| 13 | Switch | 59310030B | 0310 | 1 | 0.010 | 5931003 | 5-4(13) |
| 14 | Switch | SM447053B | 0267 | 2 | 0.010 | 5931007 | |
| 15 | Switch | 59310080B | 0310 | 1 | 0.010 | 5931008 | 5-4(15) |
| 16 | Switch | 59314010B | 0310 | 1 | 0.010 | 5931401 | 5-4(16) |
| 17 | Switch | 59314020B | 0310 | 1 | 0.010 | 5931402 | 5-4(17) |
| 18 | Switch | 59314030B | 0310 | 1 | 0.010 | 5931403 | 5-4(18) |
| 19 | Switch | 59314040B | 0310 | 1 | 0.010 | 5931404 | 5-4(19) |
| 20 | Switch | S414392D | 0424 | 1 | 0.010 | 5931407 | |
| 21 | Connector | SM415681C | 0267 | 2 | 0.030 | 5933032 | 5-4(21) |
| 22 | Connector | MS3114 - 16-26S | 0268 | 1 | 0.030 | 5933033 | 5-4(22) |
| 23 | Connector | 8228-065-629001 | 0650 | 3 | 0.010 | 5933400 | 5-4(23) |
| 24 | Connector | 8228-065-631001 | 0650 | 1 | 0.010 | 5933401 | 5-4(24) |
| 25 | Knob | 59467000A | 0310 | 3 | 0.010 | 5946700 | 3-3 |
| 26 | Stop | SM447392B | 0267 | 2 | 0.020 | 5946900 | |
| 27 | Pin, Slotted, Steel | SAE-J496: 1/16x5/32 | 0268 | 3 | 0.010 | 5946860 | 5-4(27) |
| 28 | Cap | MS 3181-16 | 0268 | 1 | 0.010 | 5955100 | On Item 22 |
| 29 | Box Assy | 59971000D | 0310 | 1 | 0.010 | 5997100 | 5-4(29) |
| 30 | Switch Shaft Assy | 59973900 | 0310 | 3 | 0.010 | 5997390 | 5-4(30) |