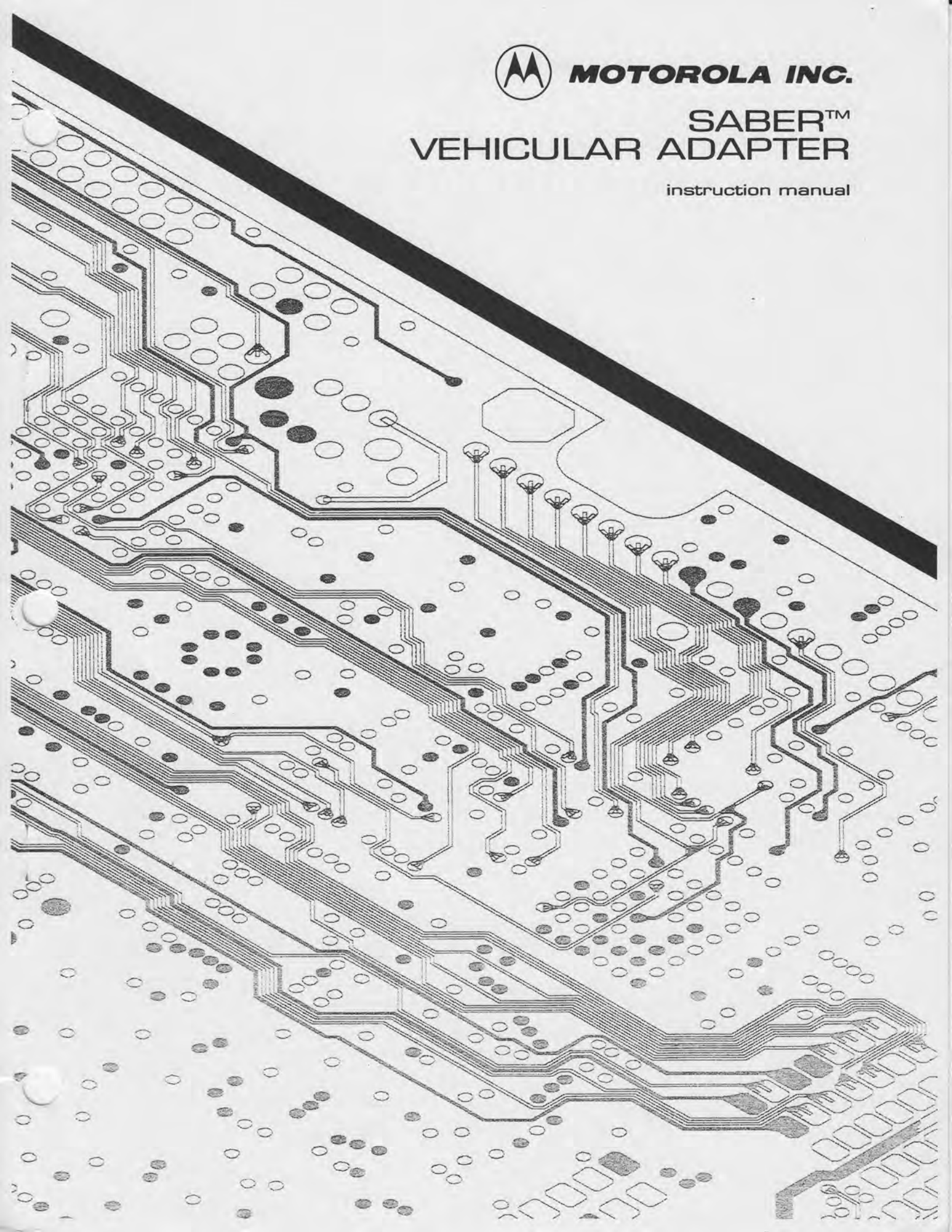




MOTOROLA INC.

SABER™ VEHICULAR ADAPTER

instruction manual



FOREWORD

SCOPE OF INSTRUCTION MANUAL

This manual offers descriptive data and service information for the equipment listed. Service diagrams, parts lists, and printed circuit board details are either a part of this instruction manual, or contained in a supplementary service manual.

NOMENCLATURE

Motorola equipment is specifically identified by the model number on the nameplate.

NOTE

Be sure to use the entire model number when making inquiries about your equipment.

Identifiers have been assigned to chassis and kits. Use these identifiers when requesting information or ordering replacements.

PRODUCTION CHANGES

When production and engineering changes are incorporated into the equipment, a revision number is assigned to the chassis or kit affected; -1, -2, -3, etc.

The chassis number complete with revision number, if any, is stamped on the chassis at the time of production. The revision number becomes an integral part of the chassis identifier. Revisions, if any, are listed on the schematic diagram.

INSTRUCTION MANUAL REVISIONS

Changes which occur after a manual is printed are described in the Manual Revision. These "FMRs" give the reader complete information on the change including pertinent parts listing data.

NATIONAL SERVICE ORGANIZATION

Motorola provides a nationwide service organization. Through its maintenance and installation program, Motorola

makes available the finest service to those desiring reliable continuous communications on a contract basis.

Motorola's National Service Organization is the largest service organization specializing in mobile communications. It includes over 900 authorized or company owned stations. In addition, our products are serviced throughout the world by a wide network of company or authorized independent distributor service organizations.



The area administrative staff, district service managers and district service representatives are in the direct employ of Motorola.

For your contract service requirements, please contact your local Motorola representative or write to:

National Service Manager
Motorola Communications & Electronics, Inc.
1301 E. Algonquin Road, Schaumburg, IL 60196

SAFETY INFORMATION

The Federal Communications Commission (FCC) with its action in General Docket 79-144, March 13, 1985 has adopted a safety standard for the human exposure to radio frequency (rf) electromagnetic energy emitted by FCC regulated equipment. Motorola subscribes to the same safety standard for use of its products. Proper operation of this radio will result in user exposure substantially below the FCC recommended limits.

DO NOT operate the transmitter of a mobile radio when someone outside the vehicle is within two feet (0.6 meters) of the antenna.

DO NOT hold the transmit (PTT) switch on when not actually desiring to transmit.

DO NOT allow children to play with any radio equipment containing a transmitter.

DO NOT operate a transmitter near unshielded electrical blasting caps or in an explosive atmosphere unless it is a type especially qualified for such use.

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MOTOROLA INC.

MANUAL REVISION

for
Manual No. 68P81058C70-O
SABER™ VEHICULAR ADAPTER

This revision outlines changes that have occurred since the printing of your manual. Use this information to supplement your manual.

REVISION DETAILS

NO.	CHANGE AFFECTS
1	Console Cabling
2	RECOMMENDED TEST EQUIPMENT Table
3	Schematic Diagram
4	Electrical Parts List
5	Nonreferenced Items

CHANGES

- NO.
- 1 For added protection, it is recommended that the following changes to the "CONSOLE CABLING" procedure, page 4, be incorporated:

Change step 6 c to read:

- c. Install the provided in-line fuse holder and fuse in the B+ (red) line, then connect the red lead to the positive (+) battery terminal. Ensure that the plug and jack in the wire are connected firmly together.
 - (1) On the engine side of the firewall, install the provided in-line fuse in the B+ (red) line approximately eight to ten inches from the vehicle's battery. To accomplish this:
 - (a) Cut the red lead eight to ten inches from its end. Using one of the pieces of heat-shrink tubing provided, solder one side of the fuse holder to the B+ (red) line.
 - (b) Using the other piece of heat-shrink tubing, solder the cut piece to the other side of the fuse holder.
 - (c) Insert the provided 5-amp fuse into the fuse holder.

Change step 6 d to read:

- d. Connect the yellow lead to the fused, switched side of the ignition circuit.

Change step 6 e to read:

- e. Connect the green lead to the fused, switched side of the headlight circuit.

The above modification uses the following parts:

0984239F01 Fuse Holder
6500052293 Fuse, 5-amp

NO.

- 2 In the "RECOMMENDED TEST EQUIPMENT" table, page 10, add the REX-4063A, Test Set for SVA.

NO.

- 3 On the Schematic Diagram, page 17:

Change the voltage input to resistor R97

From: ② (REGULATED +5V)

To: ① (A+)

Add the following capacitors:

C101 100pF From P7, Pin 1 To Ground
C102 100pF From P7, Pin 2 To Ground
C103 100pF From P7, Pin 3 To Ground
C104 100pF From P7, Pin 4 To Ground
C105 100pF From P7, Pin 8 To Ground
C106 100pF From P7, Pin 7 To Ground
C107 100pF From P7, Pin 6 To Ground

NO.

- 4 In the Electrical Parts List, page 18, change the following:

REF. SYM.	ACTION	PART NO.	DESCRIPTION
C101 thru 107	added	2113740A55	CAPICITOR; 100pF±5%; 50V
R161	changed to	0660076A01	RESISTOR; 10Ω±5%; 1/8W
VR34	changed to	4880140L15	DIODE, Zener; 10V

NO.

- 5 In the Nonreferenced Items, page 18, change Motorola part No. 0105955S29. Block, Charging contact (Console packet) to part No. 0905108U01.



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C106 100pF From P7, Pin 7 To Ground
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NO.

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SABER™ VEHICULAR ADAPTER

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RELATED PUBLICATIONS AVAILABLE SEPARATELY

SABER VHF (High-Band) Service Manual.....	68P81043C90
SABER SECURENET™ VHF (High-Band) Service Manual.....	68P81045C70
SABER UHF Service Manual.....	68P81043C95
SABER SECURENET UHF Service Manual.....	68P81045C75
Operating Instructions.....	68P81061C60
Reducing Noise Interference in Mobile Radios.....	68P81109E33

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SPECIFICATIONS

UNIT CAPACITY: DIMENSIONS (L x H x W): WEIGHT: (without portable radio) NOMINAL INPUT VOLTAGE: CURRENT DRAIN: Standby: Receive with 12W Audio: Transmit: CHARGE RATE: ANTENNA INPUT IMPEDANCE: AUDIO OUTPUT: (at less than 5% distortion)	One SABER I, II, or III Portable Radio 9.85" (over rf connector) x 3.03" x 6.64" (over knob) (250 x 76 x 168 mm) 9.59" (without rf connector) x 3.03" x 6.26" (without knob) (243 x 76 x 159 mm) 3.16 lbs. (1434 g) 13.8 Vdc (negative ground) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">CHARGED BATTERY</td> <td style="width: 50%;">DISCHARGED BATTERY</td> </tr> <tr> <td style="text-align: center;">.4A</td> <td style="text-align: center;">.8A</td> </tr> <tr> <td style="text-align: center;">2.3A</td> <td style="text-align: center;">2.7A</td> </tr> <tr> <td style="text-align: center;">1.8A</td> <td style="text-align: center;">1.8A</td> </tr> </table> Three hours (Medium- and Ultra-High-Capacity Batteries) 50 Ohms 12 Watt External	CHARGED BATTERY	DISCHARGED BATTERY	.4A	.8A	2.3A	2.7A	1.8A	1.8A
CHARGED BATTERY	DISCHARGED BATTERY								
.4A	.8A								
2.3A	2.7A								
1.8A	1.8A								

Specifications subject to change without notice

MODEL CHART

MODEL NUMBER					DESCRIPTION	
					NTN1043A	SVA PACKAGE 1
					NTN1044A	SVA PACKAGE 2
					NTN1045A	SVA PACKAGE 3
					ITEM NO.	DESCRIPTION
X	X	X			NTN5487A	CHARGING CONSOLE
X					HMN1035A	MOBILE (PALM) MICROPHONE
	X				HMN1056A	COMPACT (MINI-MOBILE) MICROPHONE
		X			NMN6150A	FULL-FEATURED SVA DISPLAY MICROPHONE
X	X	X			NSN6054A	12-WATT SPEAKER
A	A	A			HAD4006A	ANTENNA, 1/4 WAVE ROOFTOP (136-144MHz)
A	A	A			HAD4007A	ANTENNA, 1/4 WAVE ROOFTOP (144-150.8MHz)
A	A	A			HAD4008A	ANTENNA, 1/4 WAVE ROOFTOP (150.8-162MHz)
A	A	A			HAD4009A	ANTENNA, 1/4 WAVE ROOFTOP (162-174MHz)
A	A	A			RAE4012ARB	ANTENNA, 5dB GAIN ROOFTOP (406-420MHz)
A	A	A			RAE4014ARB	ANTENNA, 5dB GAIN ROOFTOP (445-470MHz)
A	A	A			RAE4015ARB	ANTENNA, 5dB GAIN ROOFTOP (470-494MHz)
A	A	A			RAE4016ARB	ANTENNA, 5dB GAIN ROOFTOP (494-512MHz)

KEY: X = INCLUDED A = ALTERNATE ITEM SUPPLIED; CHOICE DEPENDS ON CARRIER FREQUENCY

DESCRIPTION

1. GENERAL

The Motorola SABER Vehicular Adapter (SVA) adapts SABER Handie-Talkie portable radios for mobile operation. The vehicular adapter consists of a console, an external 12-watt speaker/amplifier, a hand-held mobile microphone, a rooftop antenna, mounting hardware, and cables.

When the radio is inserted into the console, the resulting combination acts as a mobile radio, with the following functions occurring automatically:

- The vehicular adapter's external antenna is connected to the radio, and the radio's internal antenna is disconnected.
- The vehicular adapter's mobile microphone is connected to the radio, and the radio's internal microphone is disconnected.
- The console's charging circuits are connected to the radio to charge the radio's battery.
- The radio's audio output is connected to the external 12-watt speaker/amplifier, and the radio's internal speaker is disconnected.

2. CONSOLE

The NTN5487A console is the vehicular adapter's central unit. The console includes an illuminated front control panel, a radio battery charger, a radio latching mechanism with lock, and circuitry for interconnecting the radio, microphone, 12-watt speaker, and external antenna.

When the radio is mounted in the console, the combined radio/console operates as a mobile two-way radio. The radio must have a battery attached when it is inserted into the console; this battery will be automatically charged when the radio is inserted. A key lock is provided on the console to minimize theft when the vehicle is left unattended. Appropriate mounting hardware is provided with the console to facilitate mounting at any suitable location.

3. EXTERNAL 12-WATT SPEAKER

The NSN6054A 12-watt speaker provides 12 watts of audio output power for use in high noise level environments. The audio level of the speaker can be adjusted from the console's control panel.

4. MOBILE MICROPHONE

Three different types of mobile microphones are available for the SABER Vehicular Adapter: the HMN1056A compact microphone, the HMN1035A palm microphone, and the full-featured NMN6150A display microphone.

All three mobile microphones are palm-type, weatherproof, cartridge microphones, with transistorized preamplifiers as an integral part of the cartridge. Each microphone is equipped with a push-to-talk (PTT) switch on the side, has a coiled cord, and an 8-pin connector which plugs into a jack on the left side of the console. Mounting hardware is provided as part of the console package.

In addition to the above, the NMN6150A display microphone has a keypad and display which duplicate the functions of the SABER radio's keypad and display.

5. ROOFTOP ANTENNA

To enable the vehicular adapter to function as a mobile vehicular radio, an external rooftop antenna must be ordered from C & E Parts. This antenna is cut to correspond to the frequency band of the radio used with the vehicular adapter. Refer to the MODEL CHART for specific antenna model numbers and frequencies.

INSTALLATION

1. INSTALLATION PLANNING

a. General

Before starting the installation, determine the location of the console, microphone, and 12-watt speaker. Also, check the mounting penetrations required. On most vehicles, it is necessary to penetrate the firewall to reach the battery. Check the opposite side of the firewall for cable clearance before drilling holes, and protect the cable where it passes through the firewall by using the supplied grommets or other similar protective measures. Because of the wide variations in vehicle design, these instructions may be modified to suit each particular installation requirement.

A properly installed SVA will minimize service calls and equipment downtime. Consider the following guidelines when planning the installation:

- **DO** use all mounting holes provided.
- **DO** use lockwashers where provided
- **DO** ensure that unit cables are not placed under stress, are not weathered, and are not subjected to damage due to engine heat.
- **DO** follow proper A+ and A- connections.
- **DO** tape all splices securely.
- **DON'T** attach the units to any part of the vehicle that is not rigid or is subject to excessive vibration.
- **DON'T** install units in areas where rain or snow can easily get into them, such as next to a vehicle window which may be left open.
- **DON'T** dress cables over sharp edges that could cause wear or tearing of cable insulation.
- **DON'T** install the units in locations where they might interfere with the vehicle operator or operating controls.
- **DON'T** install the units where they will be difficult for the operator to reach.

WARNING

For vehicles with electronic anti-skid braking systems, refer to the "Anti-Skid Braking Precautions" section of this manual.

b. Console Location

NOTE

If possible, avoid mounting the console in a vertical position. This will minimize the danger of foreign substances being dropped or spilled into the console pocket.

The console should be mounted to provide 12-inches of clearance in front of the console for inserting and removing the radio. A 4-inch clearance at the rear and left side of the console is necessary for connection of power, microphone, antenna, and speaker cables; a 1-inch clearance is required above the vents on the top of the console. Consider accessibility to the controls by the operator. When possible, mount the console on the floor near the center of the vehicle.

c. Microphone Bracket Location

When possible, mount the microphone bracket on the dash near the left side of the console. The location should be within easy reach of the operator, and it should be convenient to remove and replace the microphone without interfering with any of the vehicle controls.

CAUTION

Do not attach the microphone mounting bracket to the housing of the console.

d. Speaker Location

Select a location for the speaker that will be neither dangerous to the operator nor damaging to the speaker. A trunion bracket is provided for mounting the speaker. The speaker is normally hung under the dash near the right side of the console; however, the trunion bracket permits mounting the speaker against a wall or other vertical surface, if desired.

e. Antenna Location

Complete antenna installation instructions are supplied with each antenna ordered. Refer to those instructions for all information pertaining to the antenna. Also, refer to the SAFETY INFORMATION paragraph in the **FOREWORD** of this manual for additional information.

f. Battery Connections

Determine the best cable route from the rear of the console to the vehicle battery through the engine firewall. The best route should include the shortest path to the battery terminals, yet provide the cable with protection from engine heat. Be sure the supplied grommet or similar protective measure is used wherever a cable must pass through a hole in a metal panel, such as a firewall. The power cables must be routed in a way that protects them from being pinched or crushed.

2. CONSOLE INSTALLATION

Referring to Figure 1, install the console using the following procedure, or modify the procedure as necessary to conform to the vehicle type:

- Using the trunnion bracket as a template, drill the mounting holes, and mount the bracket with the hardware supplied. If the trunnion bracket is to be mounted on the floor or vehicle console, bend the tabs on the bracket to conform to the shape of the floor or vehicle console (see Figure 1).
- Position the console onto the trunnion bracket so that the knurled fittings of the console and trunnion bracket mesh together.
- Place the lockwashers on the Allen-head screws, then insert the screws through the trunnion bracket and screw them into the console. Since the console will have to be removed later to connect the cables, do not tighten the screws at this time.

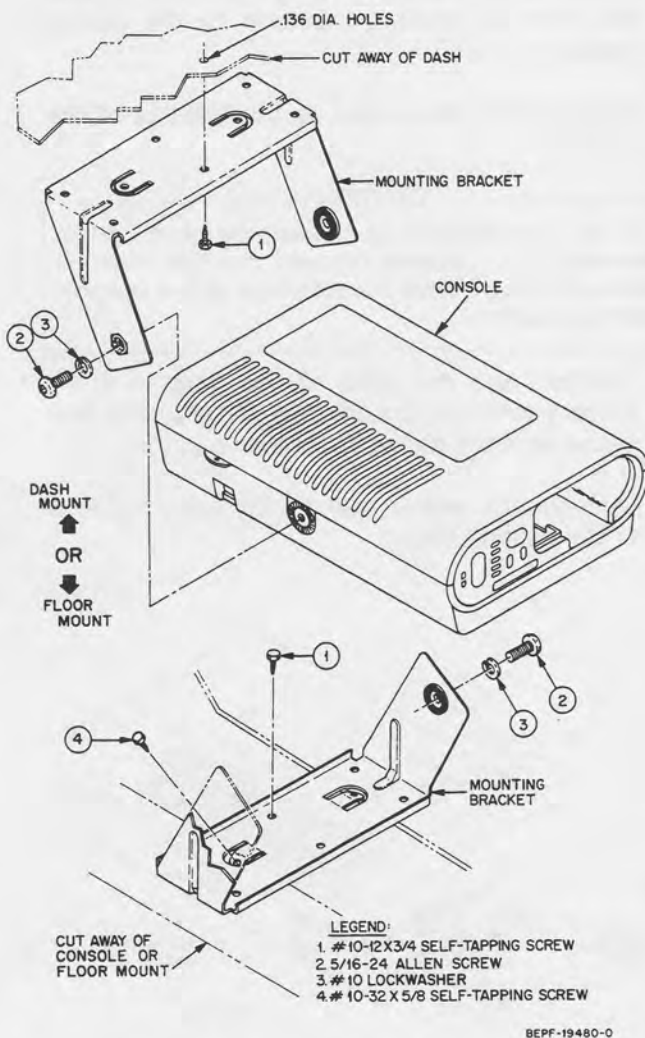


Figure 1. Console Installation Detail

3. MICROPHONE BRACKET INSTALLATION

Referring to Figure 2, use the microphone mounting bracket as a template and drill two 1/8-inch holes. Attach the microphone bracket to the mounting surface with the two self-tapping screws provided. Be sure to leave sufficient room above the bracket for insertion and removal of the microphone.

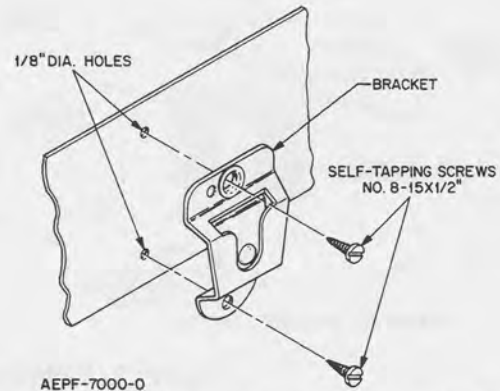


Figure 2. Microphone Bracket Installation Detail

4. 12-WATT SPEAKER INSTALLATION

The 12-watt speaker includes a trunnion bracket, a hanger bracket, and a wall-mount bracket, permitting the speaker to be mounted in a variety of ways.

- The trunnion bracket is used to permanently mount the speaker on the dashboard or accessible firewall areas, while permitting the speaker to be tilted to a desired angle.
- The hanger bracket permits temporary mounting, such as on an automobile window. The speaker must be removed from the trunnion bracket to use the hanger bracket.
- The wall-mount bracket can be used for permanent mounting if the trunnion bracket is too large to fit in the desired area. In this case, the trunnion bracket is removed, and the speaker is attached to the wall-mount bracket by the hanger bracket.

Referring to Figure 3 for installation information, perform the following procedure:

- Using the trunnion bracket as a template, drill the necessary mounting holes and secure the bracket with the self-tapping screws provided.
- Position the 12-watt speaker onto the trunnion bracket, and secure it using the wing screws provided.

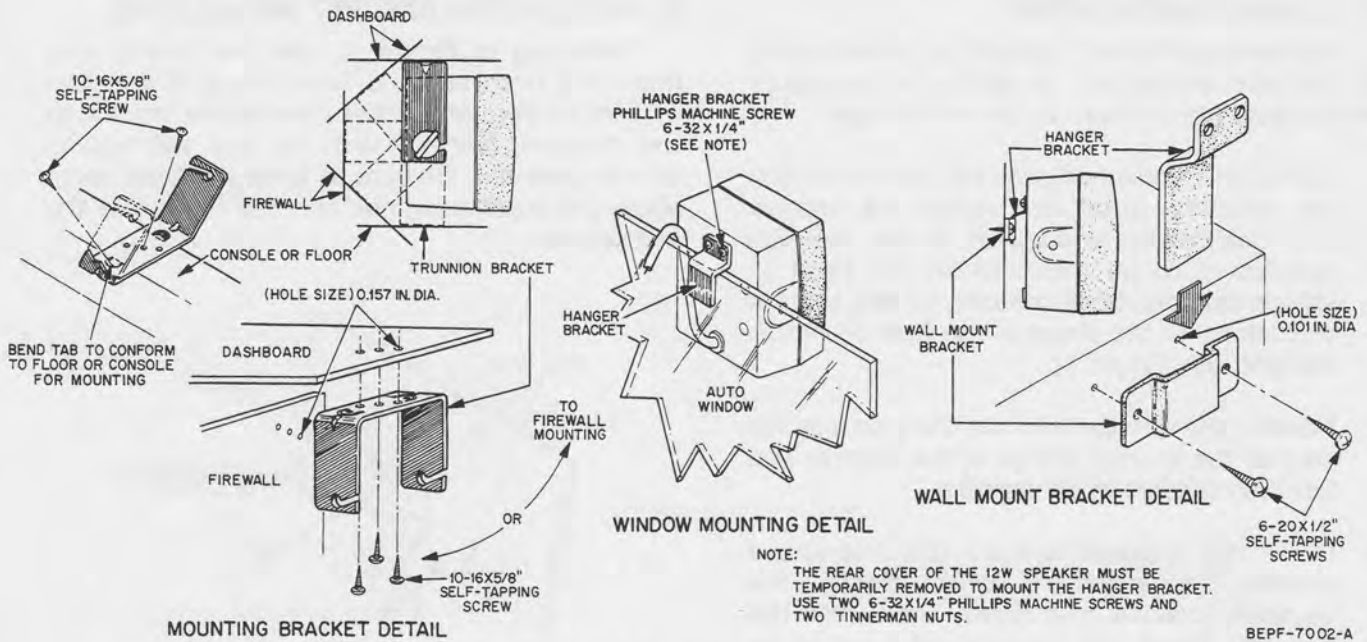


Figure 3. 12-Watt Speaker Installation Detail

5. ANTENNA INSTALLATION

Install the antenna and antenna cable as outlined in the installation instructions supplied with the antenna. Pertinent information on frequency matching, and mounting details are also provided with each antenna.

NOTE

The rf jack, J3, on the SVA console is a mini-UHF jack, and must be mated with either a mini-UHF plug (P3) or a UHF-to-mini-UHF adapter (Motorola part number 5880367B22).

6. CONSOLE CABLING

Refer to Figures 4 and 5 before routing or connecting any console cable. As shown in Figure 5, the console is used with a negative ground system only. The console should be cabled using the following procedure:

CAUTION

Remove the 5-ampere fuse from the power cable (red wire) before proceeding.

NOTE

Due to space restrictions, it may be necessary to remove the console before making connections to the connectors at the back of the console. If this is the case, make the connections and re-mount the console before replacing the 5-amp fuse.

- a. Route the main power cable through the firewall and into the battery compartment. Use an existing opening or, if necessary, drill a 3/4-inch hole through the firewall. Insert the

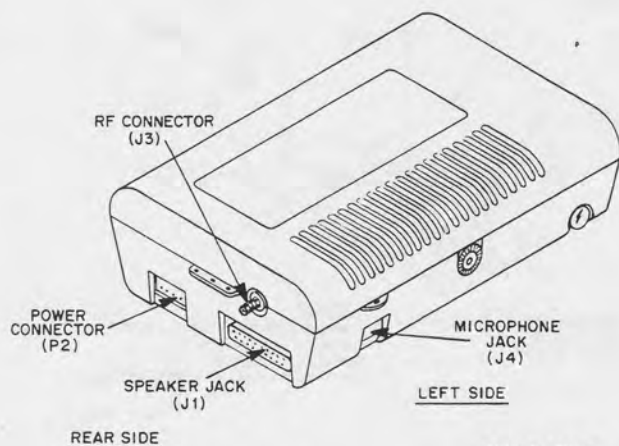
grommet provided with the mounting kit into the hole to prevent damage to the power cable.

- b. Connect the black lead to the chassis of the vehicle.

CAUTION

It is not good practice to connect the black lead to the negative (-) battery terminal; the SVA could be damaged if there were a malfunction in the vehicle's electrical system.

- c. Connect the red lead to the positive (+) battery terminal. Ensure that the plug and jack in the wire are connected firmly together.
- d. Connect the yellow lead to the switched side of the ignition circuit.



REAR SIDE

AEPF-19482-0

Figure 4. Console Connector Locations

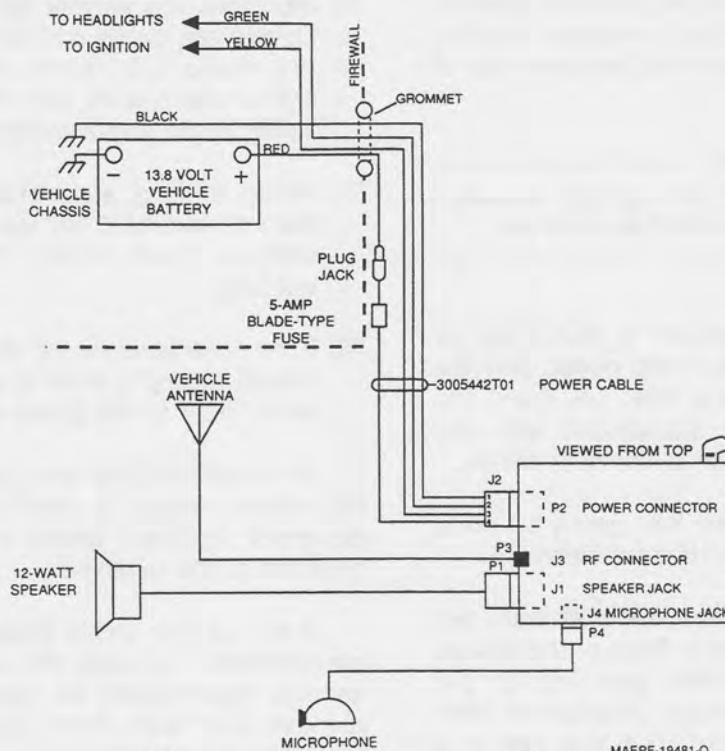


Figure 5. Console Intercabling Detail

- e. Connect the green lead to the switched side of the headlight circuit.
- f. Dress the cable so that it does not obstruct any vehicle controls or touch any hot or moving parts of the engine.
- g. Connect power cable jack J2 to console plug P2. Attach the strain-relief hook to the console.
- h. Connect speaker cable plug P1 to console jack J1, applying three in. lb. of torque to each screw. Attach the strain-relief hook to the console.
- i. Connect external antenna cable plug P3 to console jack J3.
- j. Connect microphone cable plug P4 to console jack J4. Attach the strain-relief hook to the console.
- k. Make certain that no radio is installed in the console, then replace the 5-amp fuse.

7. ANTI-SKID BRAKING PRECAUTIONS

a. General

The following transmitter installation suggestions and test procedures are recommended for vehicles with electronic anti-skid braking systems.

b. Installation Suggestions

Determine the location of the braking modulator box in the vehicle. This box is located in the trunk of Chrysler Corporation cars, and either in the trunk or under the dash in General Motors and Ford Corporation automobiles. A service manual may be helpful in finding the location of the braking modulator box.

Install the SABER Vehicular Adapter console in accordance with the following recommended guidelines:

- If the braking modulator box is mounted in the right side of the vehicle, mount the console on the left side to give as much space as possible between the box and the console. If the box is mounted on the left side of the vehicle, mount the console on the right side.
- Use the shortest practical length of Motorola coaxial cable.
- Mount the antenna on the side of the car trunk opposite from the braking modulator box.
- Route all cables along the side of the vehicle opposite from the braking modulator box.
- **DO NOT** operate the transmitter while the vehicle is in motion with the trunk lid open.

c. Test Procedure

This test is divided to cover several different types of interference. Disturbance of the electronic anti-skid device can usually be detected

in several different ways in the vehicle's braking system: by the lights, by any irregular audible sounds, or by any change in the performance of the braking system itself.

NOTE

During procedure steps (1) through (6), however, none of the above conditions should be observed.

- (1) With the car gear selector in NEUTRAL or PARK, your foot off the brake pedal, and the engine running at a fast idle, key (turn the carrier on and off) the transmitter with and without modulation. Refer to the note above.
- (2) Repeat step (1) with your foot gently pressing the brake pedal. Refer to the note above.)
- (3) When performing this step, allow at least two car lengths of clear area in front of the vehicle while it is stationary. Press your foot on the brake pedal with just enough pressure to keep the vehicle from moving. Put the car in a forward gear with the engine running at a fast idle, then key the transmitter with and without modulation.

WARNING

Disruption of the anti-skid braking system may cause the vehicle to move forward in addition to the lights and audible sounds mentioned above.

- (4) Drive at a moderate speed (15-25 mph) with your foot off the brake pedal, and have an assistant key the transmitter with and without modulation. Refer to the above warning.
- (5) Repeat step (4) with your foot lightly on the brake pedal to turn off the brake lights. Refer to the above warning.

WARNING

Severe disruption of the electronic anti-skid braking system may cause loss of control of the vehicle in steps (6), (7), and (8).

- (6) Increase the vehicle speed to 25-30 mph. Decelerate slowly and come to a stop. As you are doing this, have an assistant key the transmitter with and without modulation. Refer to the above warning.
- (7) While making abrupt stops from 20 mph, have an assistant key the transmitter with and without modulation. Refer to the above warning.
- (8) If no interference or disruption is noticed, repeat step (7), making abrupt stops from 30 mph. Refer to the above warning.

If no malfunctions are observed in performing the above steps, it can be assumed that no apparent problem exists and the car can be released to the customer.

If any of the above steps results in a brake malfunction, contact the car manufacturer's service department as soon as possible, and remove the radio from the vehicle. **DO NOT** complete the installation.

8. INSTALLATION CHECKOUT

a. General

After completing the installation of the vehicular adapter, check all electrical wiring for tight connections. Also, check all mechanical parts for tight and secure mounting.

Check for proper operation of the console, microphone, speaker, and radio as described in the operating instructions, Motorola publication 68P81061C60.

NOTE

If alternator or other vehicular noise is present in the received signal or in the transmission, refer to "Reducing Noise Interference in Mobile Two-Way Radios," Motorola publication 68P81109E33. This publication may be ordered separately from Motorola Communications Sector National Parts Department.

THEORY OF OPERATION

1. GENERAL

The Motorola SABER Vehicular Adapter (SVA) is designed to work in conjunction with SABER portable FM two-way radios.

Connection between the radio battery and the SVA console is made through the charger contacts at the rear of the console pocket. Through these contacts, the console's charger circuitry automatically charges the radio battery.

Other connections between the SVA console and the radio are made via the universal and rf connectors on the back of the radio.

When the radio is inserted into the console pocket and the radio is latched in place by rotating the knob on the side of the console 90° clockwise, the contacts of the console's universal connector assembly are automatically mated with the radio's universal and rf connectors. This makes control of all the basic radio functions available to the SVA. The hand-held microphone

and rooftop antenna are also automatically connected to the radio when it is latched into the console.

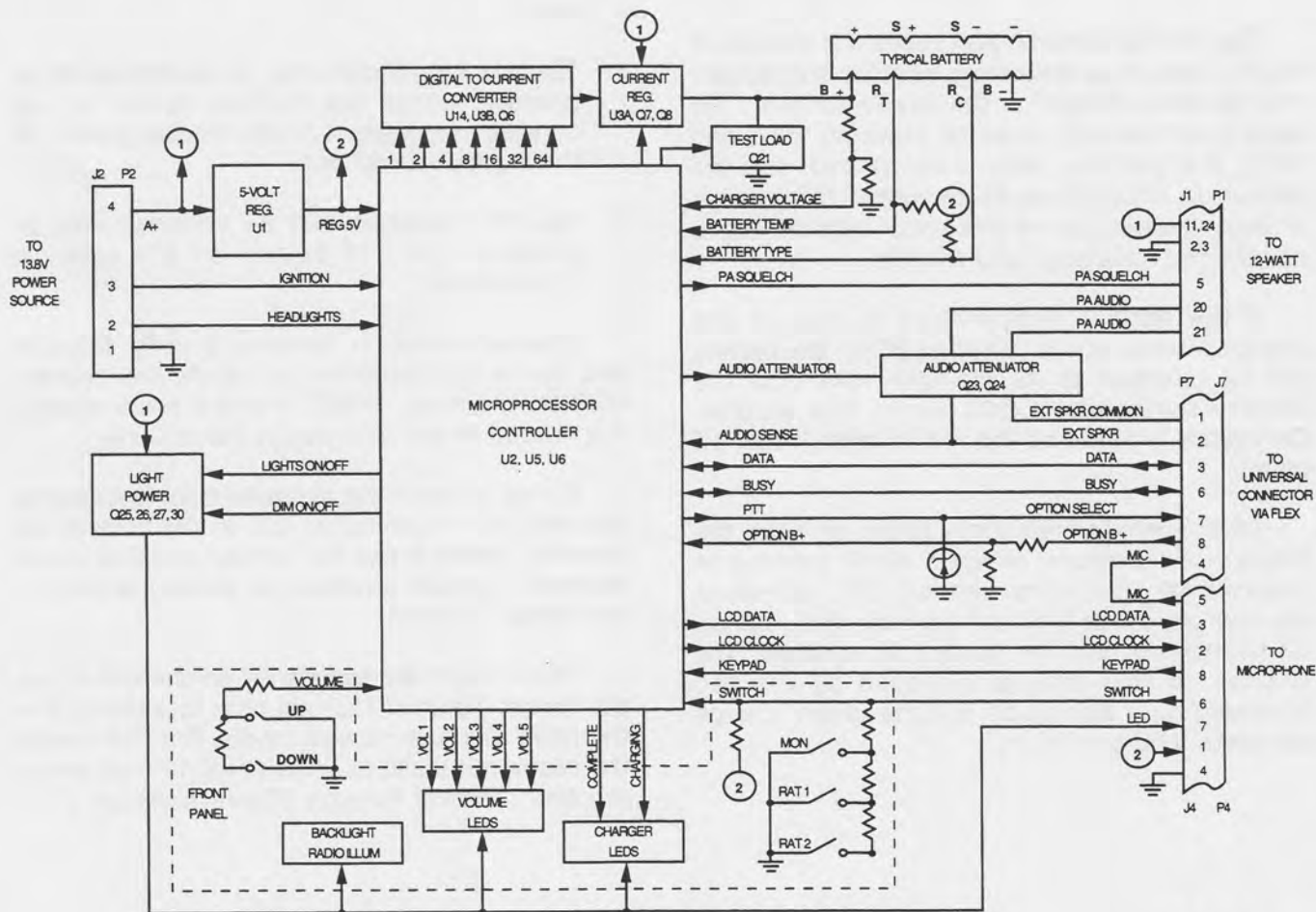
With the exception of the volume control, all controls on the top of the radio can be used on the radio. The radio's volume control is disabled by the SVA, and the volume control buttons on the front of the SVA console must be used instead.

2. CIRCUIT DESCRIPTION

When reading the following circuit descriptions, refer to the console block diagram, Figure 6, and the schematic diagram at the back of this manual.

a. Battery Charger Circuitry

Operating A+ for the console is obtained from a 13.8-volt source, such as a car battery. The A+ is applied to a 5-volt regulator (U1) which provides regulated +5Vdc power to the microprocessor.



MAEPF-19483-O

Figure 6. Console Functional Block Diagram

Four radio/battery combinations will be accepted by the SVA:

- SABER clear radio with 900mAh battery,
- SABER SECURENET radio with 900mAh battery,
- SABER clear radio with 1500mAh battery, and
- SABER SECURENET radio with 1500mAh battery.

Once the radio/battery combination is latched into place in the console pocket, the battery sensing, battery charging, and radio sensing begin.

b. Battery Sensing and Charging

The microprocessor (U6) scans for the insertion of a radio/battery combination by monitoring the voltage at the R_C and R_T battery contacts. The valid R_C values identifying the designated battery type are as follows:

R_C RESISTANCE	BATTERY TYPE
5.1k Ω	900 mAh
18k Ω	1500 mAh

The microprocessor also reads the voltage at the R_T contact to determine whether the battery may be safely charged at the three-hour rate. The battery temperature must be between 10°C and 40°C. If a valid R_C value is recognized, and the battery is determined to be within the charge window, charging at the three-hour rate will begin, and the red "charging" LED will light.

If the battery temperature is outside the charge window, but is less than 60°C, the battery will be charged at its ten-hour rate until the battery temperature falls within the window. During this time period the red "charging" LED will be on.

After approximately three hours or when the battery temperature reaches 45°C (whichever occurs first), the microprocessor (U6) will reduce the charge rate to the ten-hour rate; this rate will be maintained until the battery is removed. The change to this rate is signalled by the red "charging" LED turning off and the green "charge complete" LED turning on.

The microprocessor compensates for current consumed by the radio while the radio is in standby or receive modes. When the microprocessor senses the presence of a radio in the console pocket, it increases the battery charge current by the appropriate amount. When the radio transmits, the charge current is increased to 1.5 amps for the transmit duration.

c. Radio Sensing

The microprocessor (U6) determines whether the radio is turned on by measuring the voltage from the radio at pin 8 of the universal connector (P7). When the radio is turned on, the microprocessor will sense approximately 7.5V on the pin. The SVA's microprocessor (U6) will then attempt to establish communication with the radio's microprocessor via the serial bus (U6, pin 20).

Once communication has been established, control of radio volume control, monitor, and PTT functions are transferred to the SVA:

- The volume level can be changed via the up/down volume buttons on the console's front panel; five red LEDs indicate the volume level.
- The monitor function can be accomplished by pressing either the monitor button on the console's front panel or the monitor button on the display microphone.
- The PTT function can be accomplished by pressing the PTT button on the external microphone.

Channel selection remains a radio function and can be accomplished via the channel selector knob on the radio. SABER II and III radio displays are echoed on the SVA display microphone.

During transmit the rf power from is routed to the mini-UHF rf connector, J3, at the back of the console, where it can be further amplified by an external rf power amplifier, or hooked directly to the rooftop antenna.

When the radio detects an on-channel signal, the lowest "volume" LED will blink to indicate that the radio is in the receive mode. The SVA routes the recovered audio to an external 12-watt power amplifier/speaker through 25-pin connector J1.

MAINTENANCE

1. PREVENTIVE MAINTENANCE

a. Periodic Inspections

Slow degradation of equipment performance, if left uncorrected, can lead to costly equipment downtime and repair. Preventive maintenance (PM) differs from corrective maintenance in that minor equipment operating deficiencies can be corrected before breakdown occurs. Periodic and systematic PM inspection schedules should be set up to keep the equipment operational and failure free. The frequency of PM schedules will be determined by the environment in which the equipment is being used.

The periodic inspections should include:

- Visual inspection of cables for frayed or oxidized leads.
- Ensuring that battery connections are free from oxidation or corrosion.
- Checking the external rooftop antenna for clean and rust-free mounting.
- Checking for tight connection of the console-to-antenna cable connectors.
- Checking the system ground lead (black) for clean and proper electrical contact.
- Checking all jack and plug connections for tightness and good electrical pin contact. Pins should be visually checked for wear.
- Checking for loose components. Checking component assemblies and mechanical assemblies for tight and secure installation. The majority of SVA failures is directly related to poor installation.
- Inspecting all mounting brackets and associated mounting screws for secure and tight mounting.
- Checking for overheated or discolored components.
- Checking for proper (13.8Vdc) vehicular alternator charging. Vehicular voltage can vary from as low as 12.9Vdc to as high as 18Vdc without being evident to the operator; however, it can affect SVA operation.

b. Cleaning Procedures

In areas of high dust or salt conditions, periodically check the mechanical operation of the console's battery contacts. If contact movement requires excessive effort, clean any dust or salt deposits from the moving parts as described below. Cleaning may be accomplished by performing the following procedure:

- (1) Remove the console from the vehicle and place it rightside-up on a flat working surface.

The working surface should offer protection from scratching to the console's surfaces.

- (2) Referring to the "Disassembly/Reassembly Procedures" (paragraph d) in the "CORRECTIVE MAINTENANCE" section of this manual, disassemble the unit for cleaning.
- (3) Clean the external surfaces of the console using the recommended cleaning agent. These surfaces should be cleaned whenever a periodic visual inspection reveals the presence of excessive dust, grease, and/or grime.

The only recommended agent for cleaning the internal and external plastic SVA surfaces is a 0.5% solution of a mild dishwashing detergent in water (one teaspoon of detergent per gallon of water).

CAUTION

The effects of certain chemicals and their vapors can be harmful to some types of plastics. Aerosol sprays, tuner cleaners, and other such chemicals should be avoided.

- (4) The internal circuit boards and components should ordinarily be cleaned when the console must be disassembled for servicing or repair. The only factory recommended liquid for cleaning the circuit boards and their components is *isopropyl alcohol* (70% by volume).

NOTE

When the SVA is used under adverse marine conditions, the circuit board must be cleaned of salt deposits at least twice a year.

Isopropyl alcohol may be applied with a stiff, non-metallic, short-bristled brush to dislodge embedded or caked-on materials located in hard-to-reach areas. The brush stroke should direct the dislodged material out and away from the inside of the console.

Alcohol is a high-wetting liquid and can carry contamination into unwanted places if an excessive quantity is used. Make sure that the controls are not soaked with the liquid. Upon completion of the cleaning process, use a soft, absorbent, lintless cloth to dry the area.

NOTE

Always use a fresh supply of alcohol and a clean container to prevent contamination by dissolved material from previous usage.

(5) Reassemble the console, reversing the disassembly procedure.

2. CORRECTIVE MAINTENANCE

a. Introduction

Efficient corrective maintenance requires an orderly and logical troubleshooting procedure for localizing malfunctions in the SVA's internal or external circuits. Troubleshooting and repair will be greatly simplified by becoming familiar with the overall SVA and radio operation.

This section provides detailed information required to isolate malfunctions to the SVA's internal or external circuits. The troubleshooting chart at the end of this section provides information on possible circuit failures, related symptoms, and suspected malfunctioning stages.

Generally it may be assumed that, if the SVA is totally inoperative, the vehicle's battery is completely discharged, the fuse is blown, or the power lead is opened. However, if the SVA is partially operative, it may be assumed that the batteries are serviceable and that one or more internal or external functional SVA circuits are defective or marginal. Using diagrams, the troubleshooting chart, the voltage table, and deductive reasoning, the defective circuit may readily be found.

To further aid in analyzing the symptoms and possible causes of the malfunction, check: rf power output using an in-line wattmeter, audio deviation, and current drain. Once the general problem area of the SVA is identified, careful use of a dc voltmeter, ohmmeter, and/or oscilloscope should help isolate the problem to a defective component.

b. Test Equipment and Service Aids

The "RECOMMENDED TEST EQUIPMENT" chart lists the test equipment recommended to properly service the SVA. Refer to the service manual for the associated radio for the recommended radio test equipment. For field servicing, the vehicle's battery is an adequate power source. Battery-operated test equipment is recommended when available.

See your Motorola sales representative for aid in ordering test equipment. The sales representative will analyze your requirements and help you select the latest available equipment and service aids to suit your individual needs.

(1) MAV-PACK 3 (VID-952)

The VID-952 Motorola Video Visual Package (MAV-PACK) is a video tape training program on

RECOMMENDED TEST EQUIPMENT

MODEL NO.	NAME	CHARACTERISTICS	APPLICATION
R-2001, R-2002, or R-2200	Service Monitor	-----	Audio circuit, testing, frequency/ deviation, power output.
S-1347	DC Power Supply	0-20Vdc, 0-5 Amps; current limited	Power supply for bench testing.
S-1053	AC Voltmeter	1mV to 300mV RMS, -72dB to +52dB; 10MΩ input impedance	Audio voltage measurements
R-1028	Solid-state Oscilloscope	-----	Waveform measurements
R-1001	Digital Multimeter	High input impedance	DC voltage, resistance measurements

leadless component repair techniques. This VHS format video cassette and supplemental literature describe the removal and replacement of leadless components using the following specialized equipment:

- RRX-4033 Laurier Hot Gas Bonder
- RPX-4234A Regulator and Hardware Kit
- O180386A62 Heated Tweezers
- RSX-1002 Desoldering Station
- RSX-1008 Weller Soldering Station

This MAV-PACK is strongly recommended for technicians who intend to service this and other Motorola products using leadless components. This VHS videotape is in standard half-inch format. This MAV-PACK, as well as others, is available from:

Motorola C&E, Inc.
National Service Training Center
1300 N. Plum Grove Road
Schaumburg, Illinois 60195

c. Troubleshooting

Refer to the troubleshooting and voltage charts at the back of this section to isolate a malfunction to a defective circuit. Follow the flow through the chart, check each observation, and answer each question. As an aid in understanding the operation and functioning of a particular circuit, refer to the appropriate paragraphs in the "THEORY OF OPERATION" section of this manual.

If a circuit board must be tested, it may be necessary to remove it from the chassis and test it outside of the enclosure. In this case, leave all wires connected to the board, and use care to protect the board from being accidentally shorted out. Use heat sinks with insulators on transistors Q7 and Q25 while the board is removed from the chassis.

d. Disassembly/Reassembly Procedures

(1) Disassembly Procedure

Disassemble the console by performing the following procedure:

Refer to the exploded view, exploded view parts list, and Figure 7 for steps a through e.

- (a) Turn off and unlock the SVA, remove the radio from the console, and disconnect all cables (including the microphone). Remove the key from the SVA lock. Place the console on a flat working surface with the rear of the console facing you.
- (b) Locate the first of three screwdriver positions; the two outside positions have features for the screwdriver. Insert a small flat-bladed screwdriver into the left-most slot, then lift up on the handle to allow the snap to release and the top housing to move toward the front of the console.
- (c) Repeat step (b) for the remaining screwdriver positions, working from left to right, until all three snaps are released and the top housing slides forward approximately 1/2 inch. If the top fails to slide forward, make certain that the coaxial connector (J3) is not restricting the top housing's movement.
- (d) Lift off the top housing and put it aside.
- (e) Remove the knob on the side of the console by grasping the extended portion of the blade and pulling it away from the console. The knob is made of a urethane material that can be deformed to allow the knob to be removed.

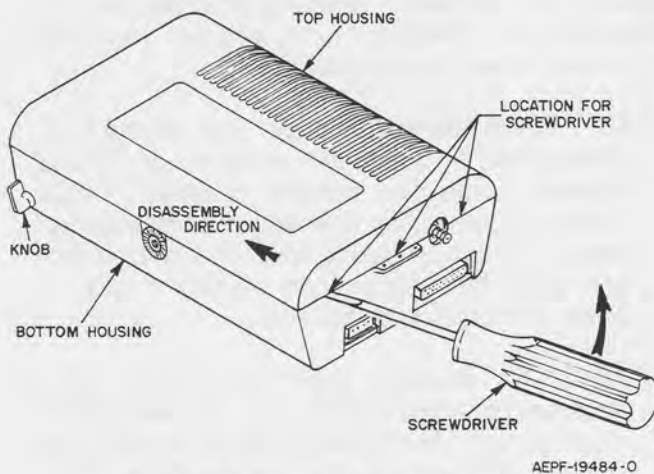


Figure 7. Removing the Top Housing

Refer to the exploded view, exploded view parts list, and Figure 8 for steps f through j.

- (f) Locate the two ribbon cables (one originates at the front housing assembly, and the other originates at the universal connector assembly), and follow them to their circuit board connection points (J5/P5 and J7/P7). Unsnap the hold-down clips at the sides of P5 and P7 by pulling them sideward. Then, disconnect the jacks from the plugs by grasping the jacks (J5 and J7) and pulling them directly away from the plugs.
- (g) Remove the hood by locating the four hold-down snaps which extend through the chassis. Place your thumb and index finger around the hood (Figure 8, locations A) and squeeze the hood. This will enable you to pivot the front portion of the hood away from the chassis, clearing the snaps in the middle of the part.
- (h) Insert the small flat-bladed screwdriver through the rear-most opening in the hood (Figure 8, location B), wedge the blade between the hood and the chassis, and twist the screwdriver slightly while pulling upward on the hood in that area. Repeat this step for the remaining snap.

NOTE

Do not attempt to remove the transistor clip at this time.

- (i) While gently squeezing the transistor clip against the heat sink fins on the chassis, loosen the clip (Figure 8, location C) by prying and lifting the clip away from the heat sink fins' retaining tab.
- (j) Separate the remaining assembly from the bottom housing and shield by locating the six hold-down snaps (Figure 8, locations D) which

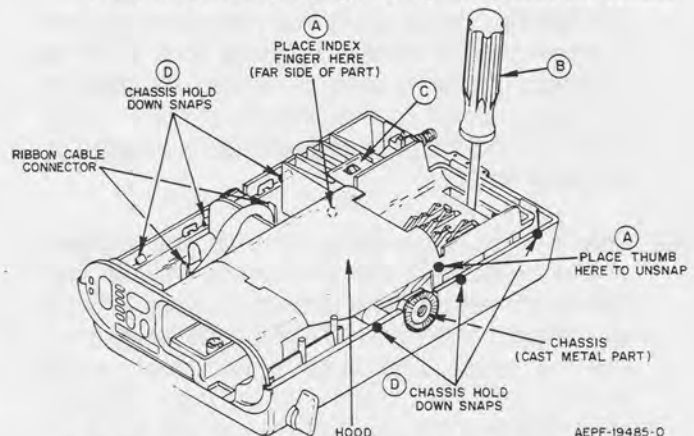


Figure 8. Removing the Insides of the Console

Refer to the exploded view and exploded view parts list for the remaining disassembly steps.

are molded into the bottom housing and hang over the sides of the chassis walls. Pull the bottom housing away from the chassis in the areas where the snaps are located, and pull the chassis upward and away from the bottom housing.

- (k) Remove the transistor clip by sliding the bottom of the clip toward the heat fins and lifting upward on the clip.
- (l) While lifting gently on the lightpipe, slide the front housing assembly forward away from the chassis. When reassembling the console the front housing assembly can be snapped in place vertically after the chassis is positioned in the bottom housing.
- (m) Remove the lightpipe by lifting it up and away from the chassis.
- (n) Remove the universal connector assembly by pivoting its end upward 90° to vertical and lifting the assembly out.
- (o) Unsnap and remove the actuator arm from the chassis
- (p) Remove the actuator arm spring from the chassis.
- (q) Remove the camshaft from the chassis.
- (r) Remove the printed circuit board assembly by lifting it up and away from the bottom housing. This assembly is not held in place by any clips, but is oriented to the bottom housing by four pins which line up with four holes in the board.
- (s) Remove the lock by lifting it up and away from the bottom housing. When reassembling the console, make certain that the lock is in its unlocked position, then place the flat side of the lock parallel to the bottom of the housing with the bottom housing standoffs cradled in the lock slots.
- (t) Only if it is necessary, remove the bottom shield by locating the four snaps molded into the inside walls of the bottom housing, deflect the sheet metal tabs of the shield away from the four snaps, and lift the shield up and away from the bottom housing. When reassembling the console, the shield must be aligned with the four housing snaps.

(2) Reassembly Procedure

Reassemble the console by reversing the disassembly procedure. Pay particular attention to the reassembly information in steps (l), (s), and (t).

When the console is completely reassembled, snap the top housing closed by placing the rear side of the bottom housing against the edge of a desk or table and tapping the top housing with a rubber mallet as shown in Figure 9.

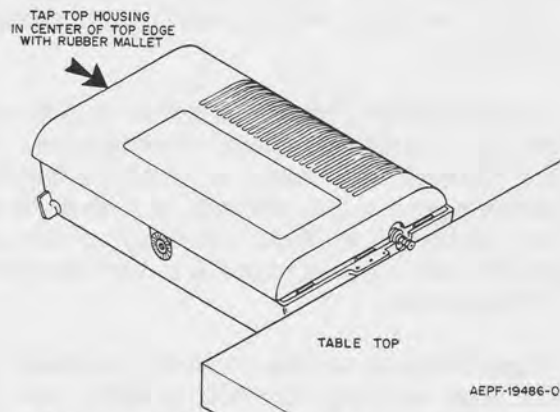


Figure 9. Snapping the Console Closed

e. Safe Handling of CMOS Devices

Complementary metal-oxide semiconductor (CMOS) devices are used in the SVA. While the attributes of CMOS are many, their characteristics make them susceptible to damage by electrostatic or high voltage charges. Damage can be latent, resulting in failures occurring weeks or months later. Therefore, special precautions must be taken to prevent device damage during disassembly, troubleshooting, and repair. The following handling precautions are mandatory for CMOS circuits, and are especially important in low humidity conditions.

- (1) All CMOS devices must be stored or transported in conductive material so that all exposed leads are shorted together. CMOS devices must not be inserted into conventional plastic "snow" or plastic trays of the type that are used for storage or transportation of other semiconductor devices.
- (2) All CMOS devices must be placed on a grounded bench surface and the technicians must ground themselves prior to handling the devices. This is done most effectively by having the technician wear a conductive wrist strap in series with a 100k-ohm resistor to ground.

- (3) Do not wear nylon clothing while handling CMOS circuits.
- (4) Do not insert or remove CMOS devices with power applied. Check all power supplies to be used for testing CMOS devices, and be certain that there are no voltage transients present.
- (5) When straightening CMOS device leads, provide ground straps for the apparatus used.
- (6) Use a grounded soldering iron.
- (7) All power must be turned off in a system before printed circuit boards containing CMOS devices are inserted, removed, or soldered.

f. Parts Replacement and Substitution

When defective parts or components must be replaced, identical parts should be used. If the identical replacement part is not locally available, check the electrical and exploded view parts lists for the correct Motorola part number. Order the part from the nearest Motorola Communications Parts office as listed under "Replacement Parts Ordering" on the inside back cover of this manual.

If, for any reason, substitutions must be made, reinstall the exact replacement part as soon as possible to ensure optimum performance. The substituted part must have identical electrical characteristics and must have equal or higher voltage and current ratings.

If it is necessary to replace any of the transistors that mate against the heat sink fins on the chassis, be sure to form the new transistor's leads like those of the original part so that the transistor lies flat against the insulator when clamped by the transistor clip against the heat sink fins.

g. Soldering

CAUTION

Leadless component technology requires the use of specialized equipment and procedures for repair and servicing of the SVA. If you are not totally familiar with leadless component repair techniques, it is strongly recommended that you either defer maintenance to qualified service personnel and service shops, or take the recommended videotaped component repair training program, MAV-PACK 3 (VID-952). This is of paramount importance as irreparable damage to the SVA can result from service by unauthorized persons. Unauthorized attempts to remove or repair parts may void any existing warranties or extended performance agreements with the manufacturer.

Special care must be taken to be as certain as possible that a suspected component is actually at fault. This special care will eliminate unnecessary unsoldering and removal of parts, which could damage or weaken other components or the printed circuit board itself.

(1) Rigid Circuit Boards

The SVA uses bonded multi-layer printed circuit boards. Since the inner layers are not accessible, some special considerations are required when soldering and unsoldering components. The printed through holes may interconnect multiple layers of the printed circuit. Therefore, care should be exercised to avoid pulling the plated circuit out of the hole. Closely examine your work for shorts due to solder bridges.

(2) Flexible Circuits

The flexible circuits are made from a different material than the rigid boards, and different techniques must be used when soldering. Excessive prolonged heat on the flexible circuit can damage the material. Avoid excessive heat and excessive bending. For parts replacement, use the ST-1087 Temperature-Controlled Solder Station with a 600 or 700 degree tip, and use small diameter solder such as ST-633. The smaller size solder will melt faster and require less heat being applied to the circuit.

CHARGER SECTION VOLTAGE MEASUREMENTS

	U3								Q5			Q7			Q8			Q29			Console Pocket			
	1	2	3	4	5	6	7	8	B	E	C	B	E	C	B	E	C	B	E	C	1	2	3	4
RAPID	1.7	10	10	0	2	2	2.6	13.8	2.6	2	10	13.1	13.8	10.2	1.09	0.46	12.7	0	0	1.09	10	2.4	1.4	0
TRICKLE	1.05	9.14	9.14	0	0.69	0.69	1.3	13.8	1.3	0.7	9.14	13.3	13.8	9.15	0.7	0.11	13.2	0	0	0.7	9.14	2.4	1.4	0

NOTES:

1. Measurements taken with a fully charged NTN4595A Battery.

LED CIRCUITRY SECTION (CR33,34,49, and 50) VOLTAGE MEASUREMENTS

	U2		Q25			Q26			Q27			Q30		
	Pin 20	Pin 22	B	E	C	B	E	C	B	E	C	B	E	C
ON	0	0	8.2	7.6	13.8	0	0	3.2	0	0	8.4	8.4	8.2	13.8
DIM	0	5	6.0	5.5	13.8	1.2	0	0.6	0	0	6.2	6.2	6.0	13.8

NOTES:

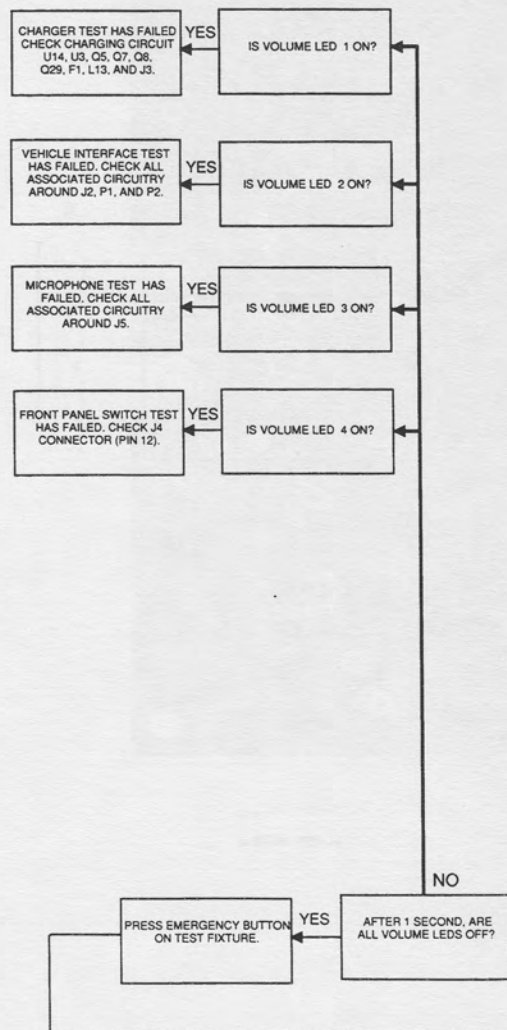
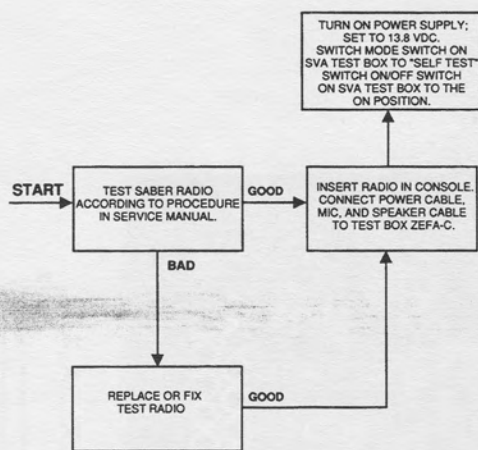
1. Measurements taken with a fully charged NTN4595A Battery.
2. To dim LEDs, tie headlights high.

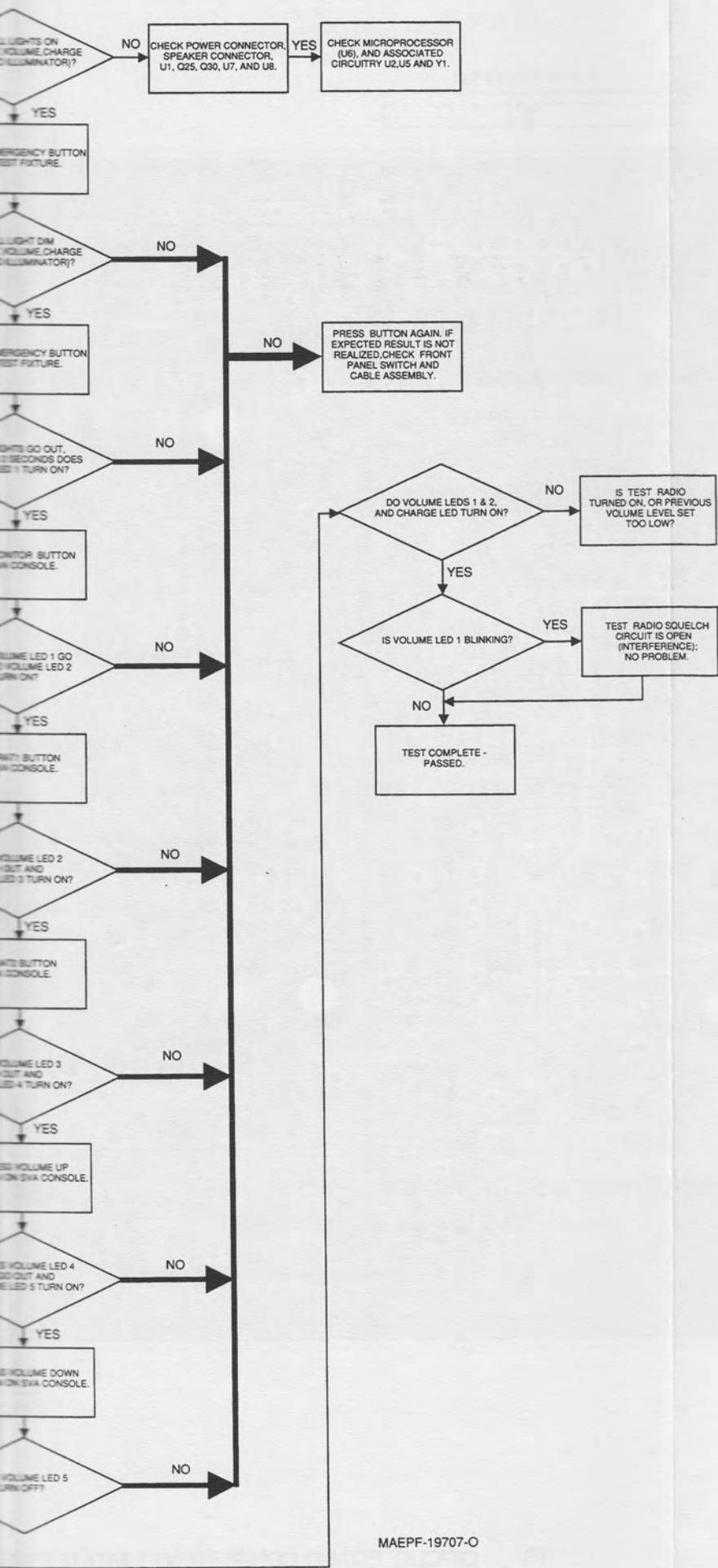
POWER SUPPLY VOLTAGE MEASUREMENTS

VDC				5V REGULATOR		
P2				U1		
1	2	3	4	1	4	8
0	-	13.8	13.8	5	0	13.8

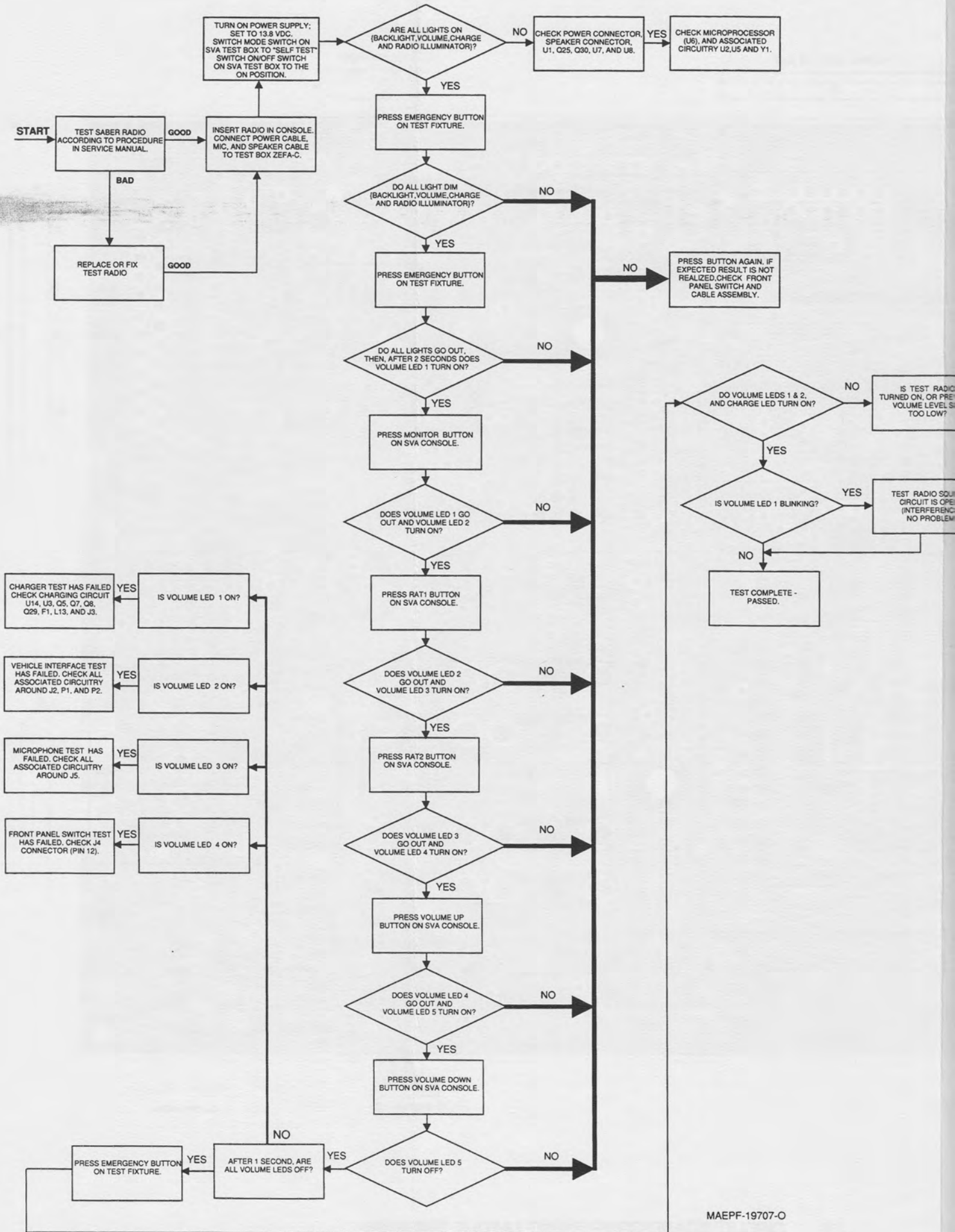
NOTES:

1. Measurements taken with a fully charged NTN4595A Battery.





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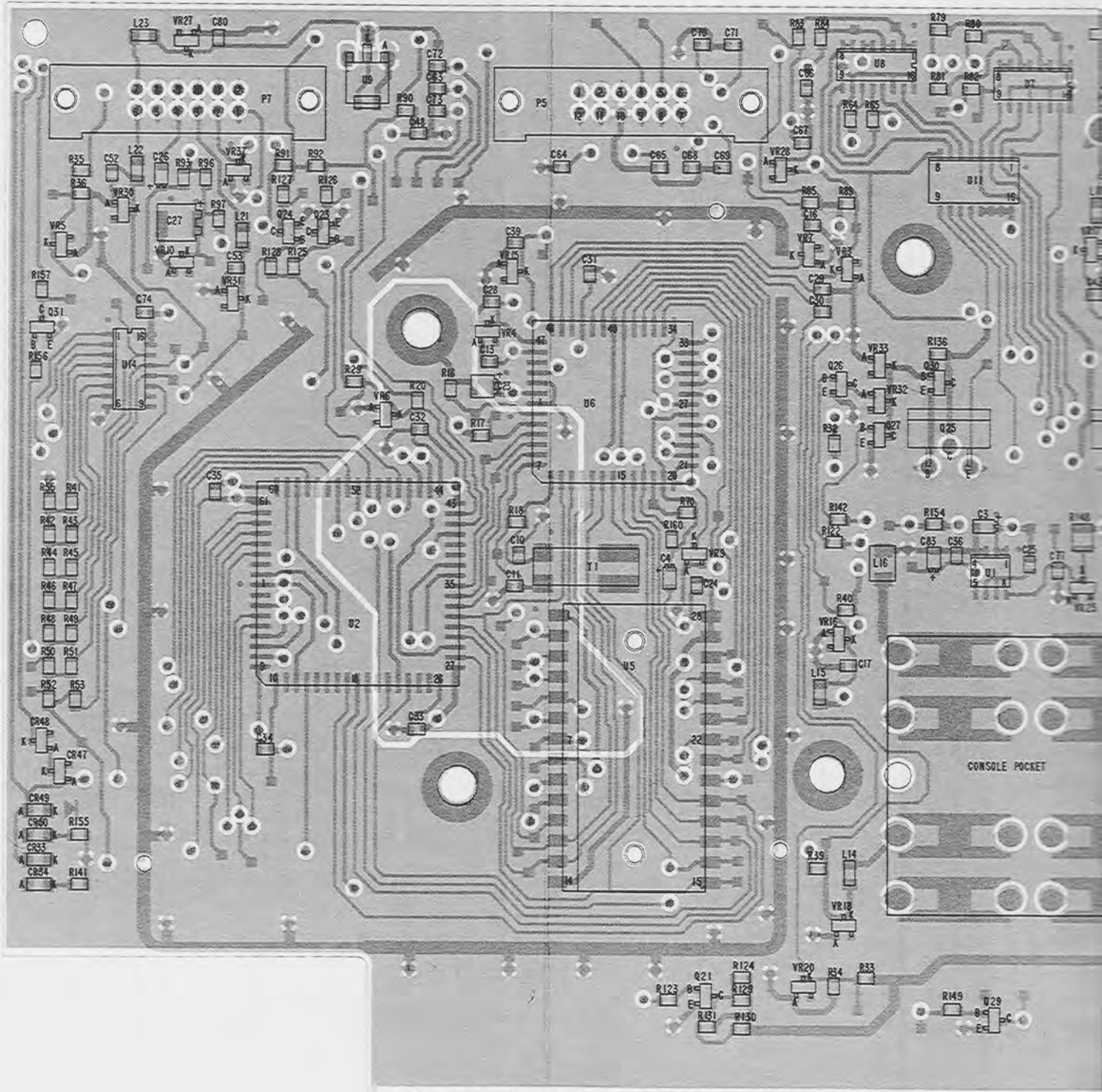


TO UNIVERSAL CONNECTOR VIA FLEX

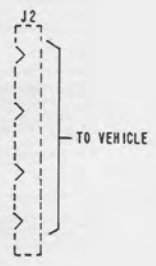
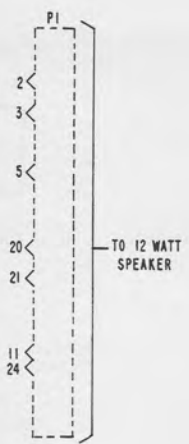
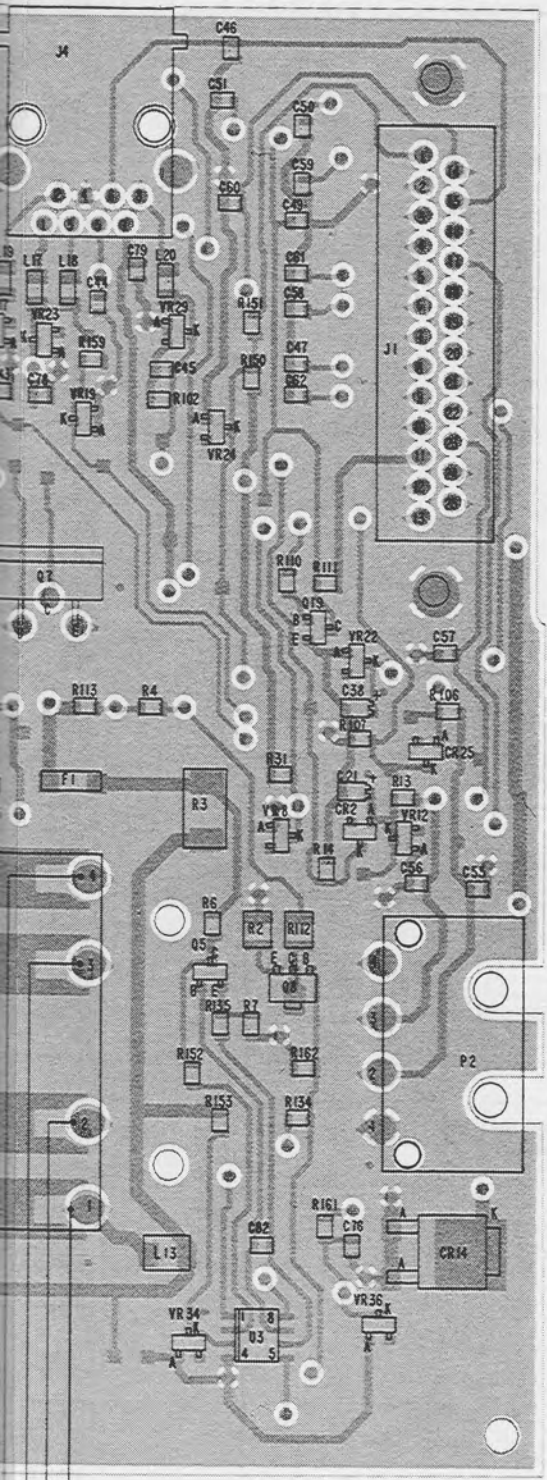
TO FRONT PANEL VIA FLEX

J7

J5



FROM MICROPHONE
P4



BATTERY

01-DEFF-19479-0
01-DEFF-19479-0

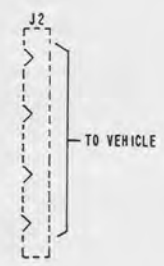
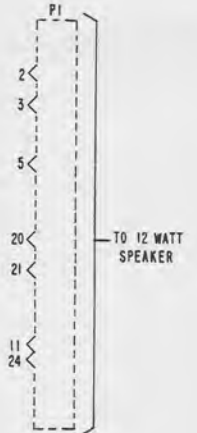
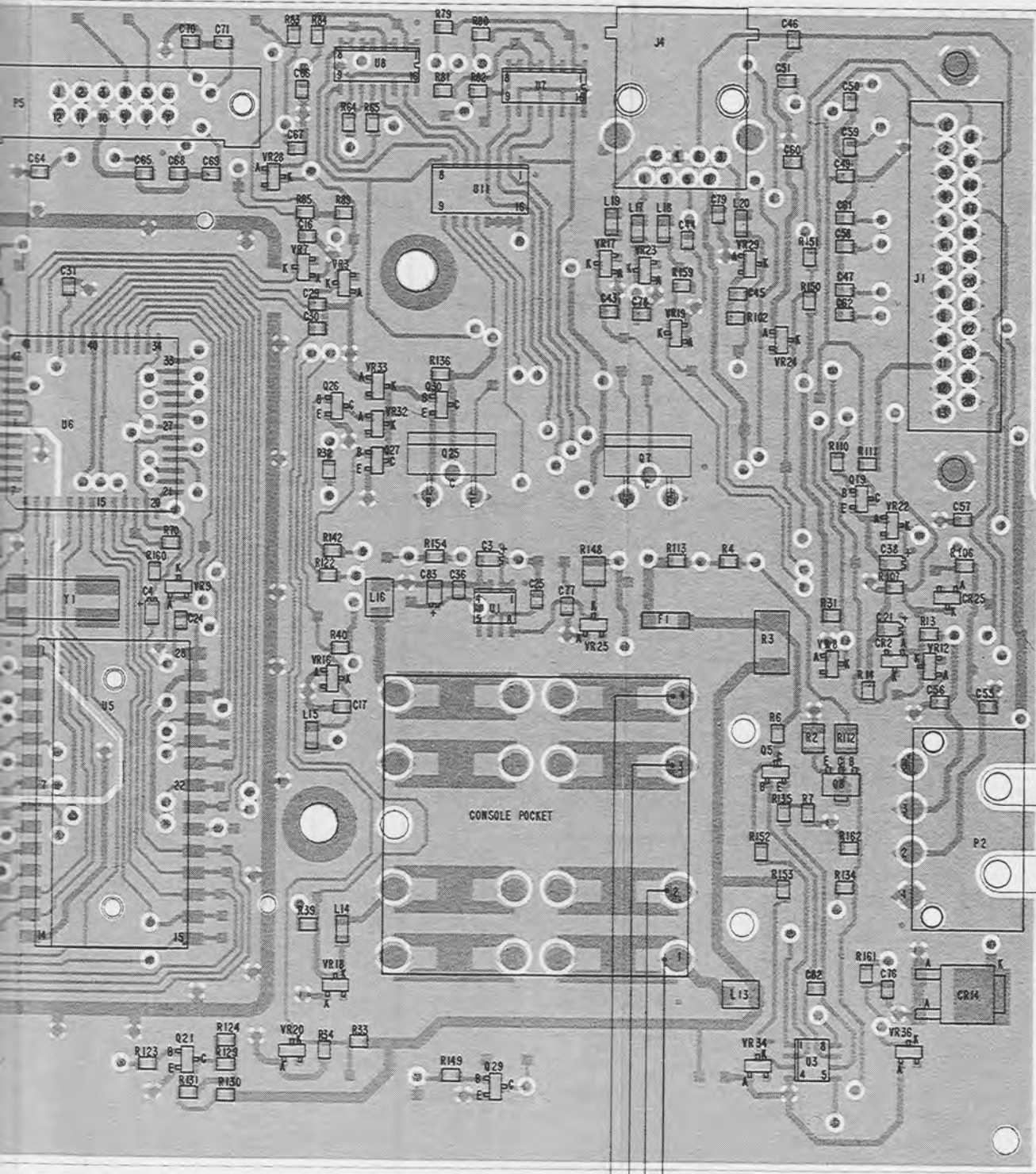
GRAM

TO FRONT PANEL VIA FLEX

J5

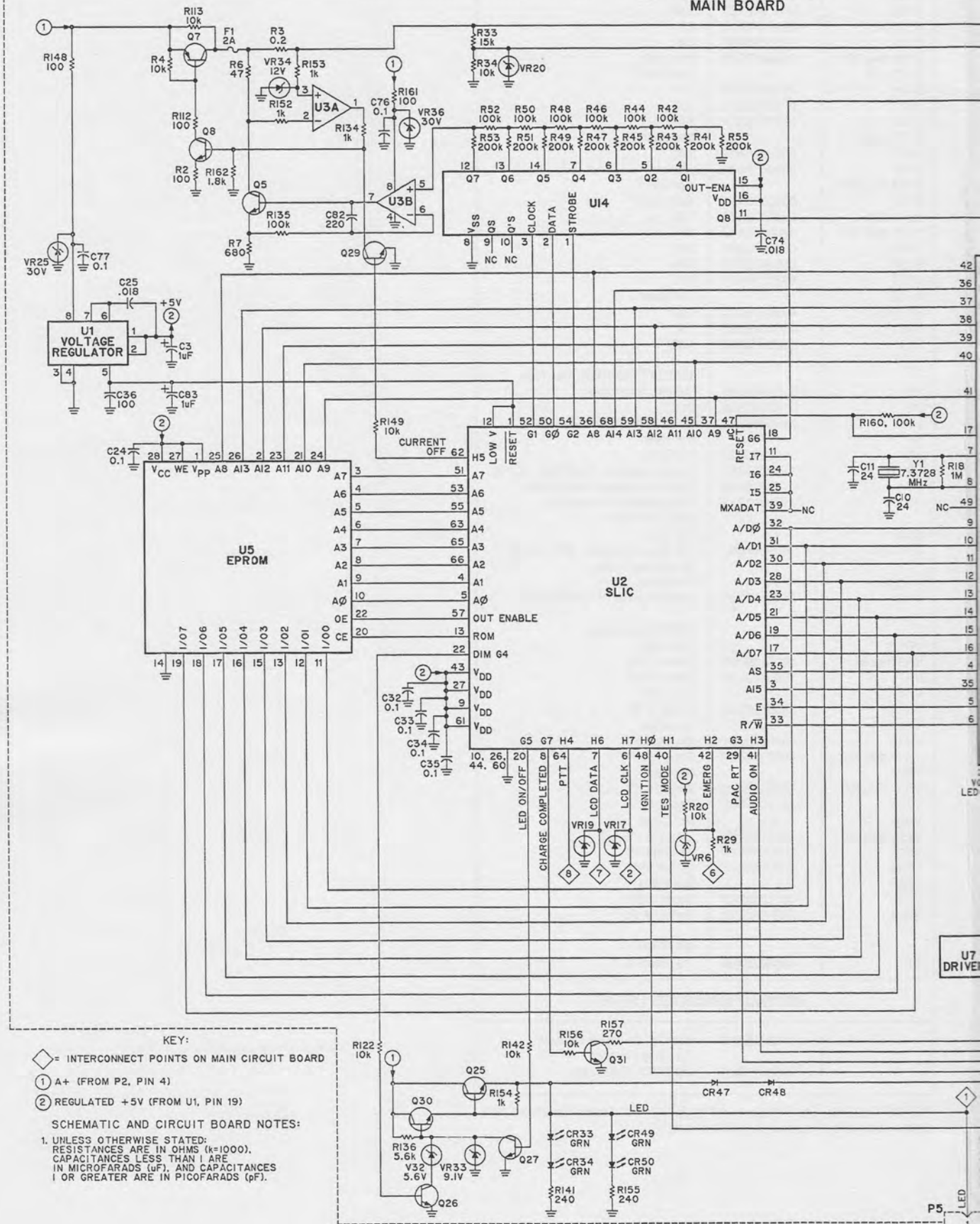
FROM MICROPHONE

P4



OL-DEPF-19478-0
 OL-DEPF-19479-0

MAIN BOARD

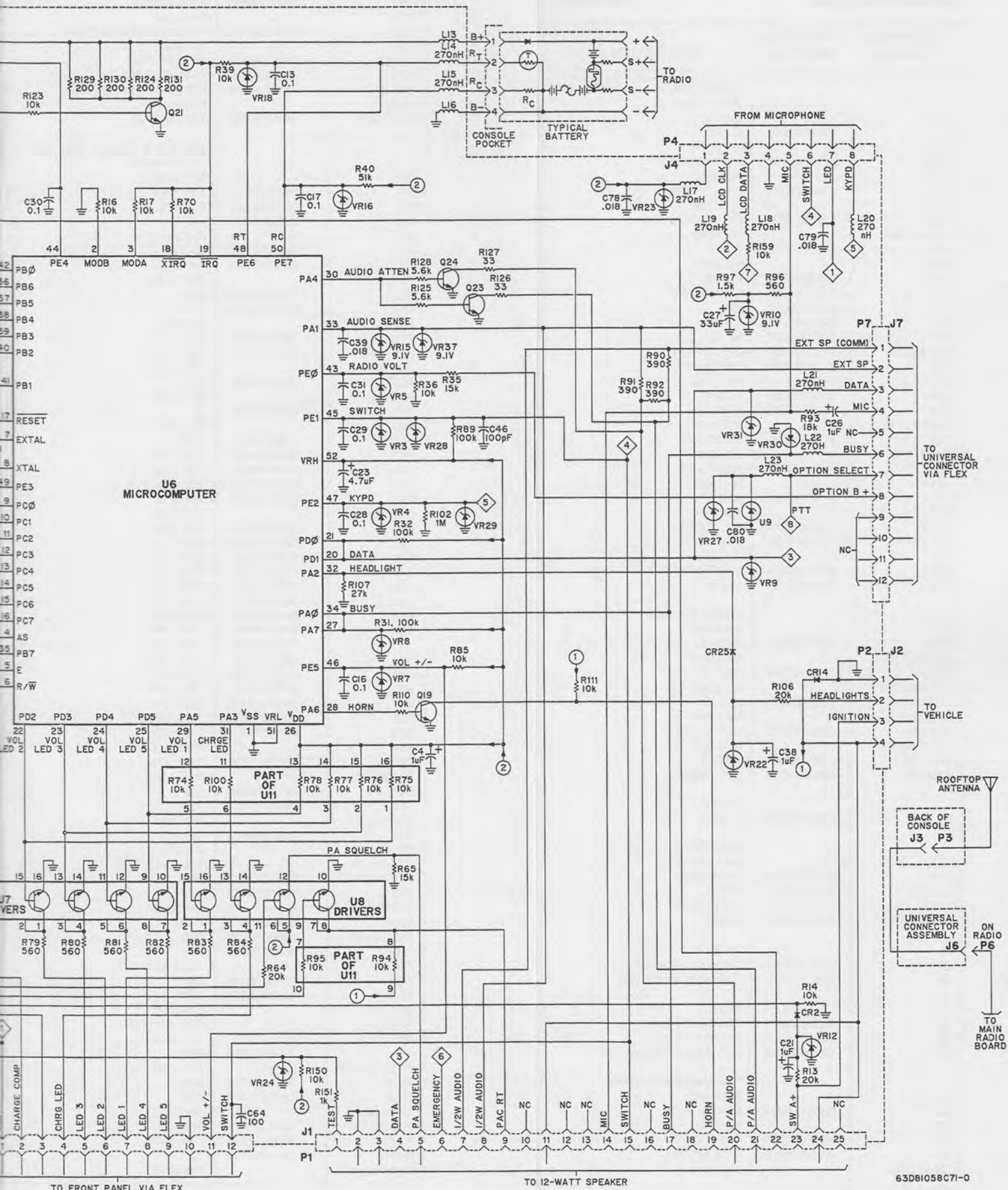


KEY:
 ◊ = INTERCONNECT POINTS ON MAIN CIRCUIT BOARD
 ① A+ (FROM P2, PIN 4)
 ② REGULATED +5V (FROM U1, PIN 3)

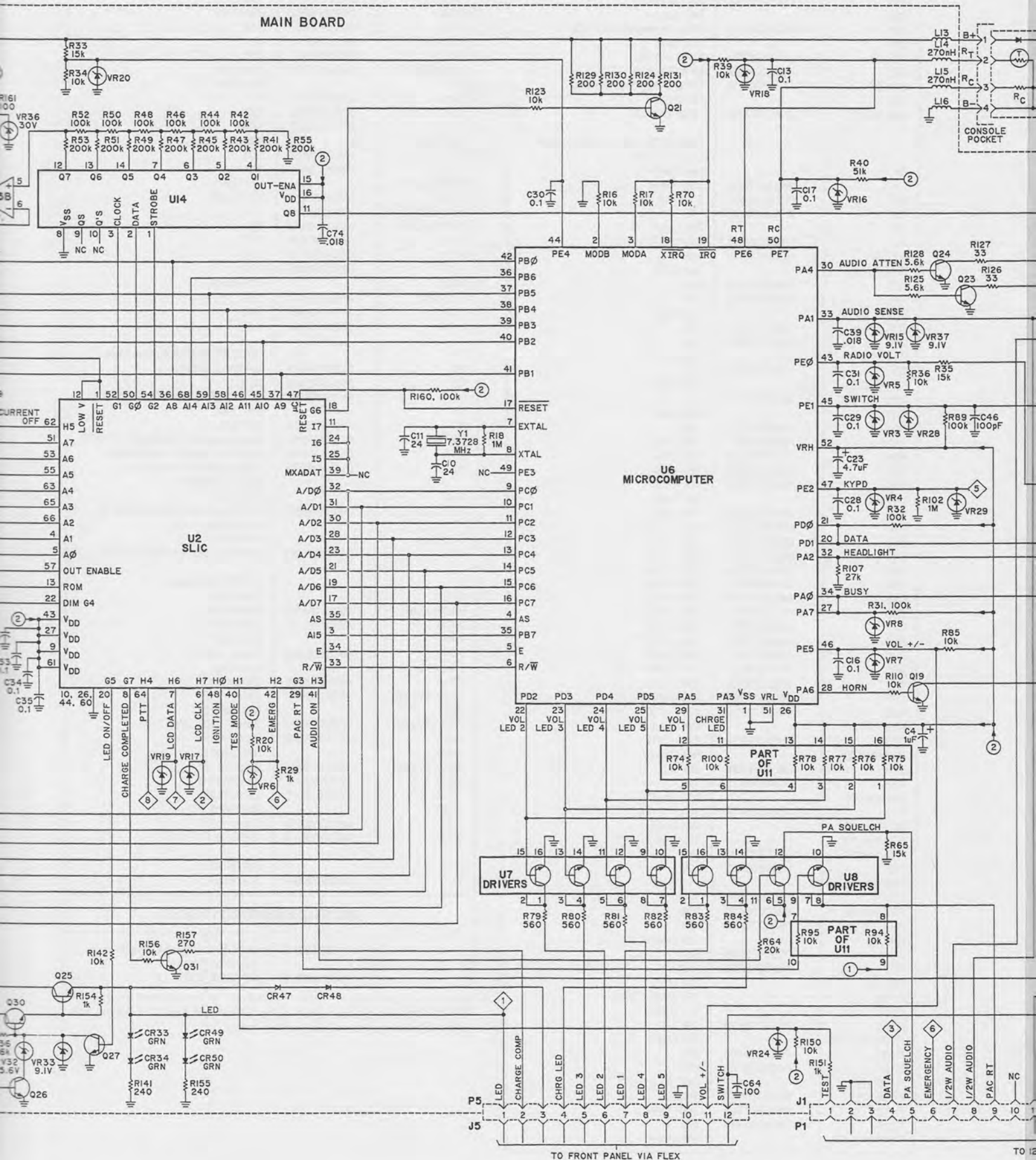
SCHEMATIC AND CIRCUIT BOARD NOTES:
 1. UNLESS OTHERWISE STATED:
 RESISTANCES ARE IN OHMS (k=1000),
 CAPACITANCES LESS THAN 1 ARE
 IN MICROFARADS (μF), AND CAPACITANCES
 1 OR GREATER ARE IN PICOFARADS (pF).

U7 DRIVER

P5
J5



MAIN BOARD



TO FRONT PANEL VIA FLEX

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		CAPACITOR, Fixed: $\mu\text{F}\pm 20\%$; 25V unless stated
C1,2	-----	Not Used
C3,4	2362998B59	1; 16V
C5 thru 9	-----	Not Used
C10,11	2113740A38	24pF; $\pm 5\%$; 50V
C12	-----	Not Used
C13	2160521G37	0.1; +80-20%
C14,15	-----	Not Used
C16,17	2160521G37	0.1; +80-20%
C18 thru 20	-----	Not Used
C21	2362998B59	1; 16V
C22	-----	Not Used
C23	2362998B68	4.7; 10V
C24	2160521G37	0.1; +80-20%
C25	2113741A51	.018
C26	2362998B59	1; 16V
C27	2362998D41	33; 16V
C28 thru 35	2160521G37	0.1; +80-20%
C36	2113740A55	100pF; $\pm 5\%$; 50V
C37	-----	Not Used
C38	2362998B59	1; 16V
C39	2113741A51	.018
C40 thru 45	-----	Not Used
C46	2113740A55	100pF; $\pm 5\%$
C47 thru 63	-----	Not Used
C64	2113740A55	100pF; $\pm 5\%$
C65 thru 73	-----	Not Used
C74	2113741A51	.018
C75	-----	Not Used
C76,77	2160521G37	0.1; +80-20%
C78 thru 80	2113741A51	.018
C81	-----	Not Used
C82	2113740A63	220pF; $\pm 5\%$; 50V
C83	2362998B59	1; 16V
		DIODE: See Note
CR1	-----	Not Used
CR2	4805129M04	SOT-23
CR3 thru 13	-----	Not Used
CR14	4805450S01	369A-02
CR15 thru 24	-----	Not Used
CR25	4805129M04	SOT-23
CR26 thru 32	-----	Not Used
CR33,34	4805729G38	LED, Yellow
CR35 thru 46	-----	Not Used
CR47,48	4805129M04	SOT-23
CR49,50	4805729G38	LED, Yellow
		FUSE:
F1	6505663R02	2 Amp
		INDUCTOR:
L1 thru 12	-----	Not Used
L13	2484657R01	Ferrite Bead
L14,15	2462575A14	270nH
L16	2484657R01	Ferrite Bead
L17 thru 23	2462575A14	270nH
		JACK:
J1	0960113D01	Connector, Speaker
J4	0960113B01	Connector, Microphone
		PLUG:
P2	2860626B01	Connector, Power
P5	2805928S02	Connector, Display
P7	2805928S02	Connector, Universal Flex
		TRANSISTOR: See Note
Q1 thru 4	-----	Not Used
Q5	4805128M44	NPN; SOT-23
Q6	-----	Not Used
Q7	4800869807	PNP; TO-220
Q8	4805128M09	NPN; SOT-89
Q9 thru 18	-----	Not Used

Q19	4805128M44	NPN; SOT-23
Q20	-----	Not Used
Q21	4805128M19	NPN, Darlington; SOT-23
Q22	-----	Not Used
Q23,24	4805128M44	NPN; SOT-23
Q25	4800869806	NPN; TO-220
Q26,27	4805128M19	NPN, Darlington; SOT-23
Q28	-----	Not Used
Q29 thru 31	4805128M44	NPN; SOT-23
		RESISTOR, Fixed: $\Omega\pm 5\%$; 1/8W unless stated
R1	-----	Not Used
R2	0660077A25	100; 1/4W
R3	0605846S01	0.2; $\pm 1\%$; 1W
R4	0660076A73	10k
R5	-----	Not Used
R6	0660076E17	47, $\pm 1\%$
R7	0660076E45	680 $\pm 1\%$
R8 thru 12	-----	Not Used
R13	0660076A80	20k
R14	0660076A73	10k
R15	-----	Not Used
R16,17	0660076A73	10k
R18	0660076B25	1M
R19	-----	Not Used
R20	0660076A73	10k
R21 thru 28	-----	Not Used
R29	0660076A49	1k
R30	-----	Not Used
R31,32	0660076B01	100k
R33	0660076E77	15k; $\pm 1\%$
R34	0660076E73	10k; $\pm 1\%$
R35	0660076E77	15k; $\pm 1\%$
R36	0660076E73	10k; $\pm 1\%$
R37,38	-----	Not Used
R39	0660076E73	10k; $\pm 1\%$
R40	0660076A90	51k
R41	0660076F08	200k; $\pm 1\%$
R42	0660076F01	100k; $\pm 1\%$
R43	0660076F08	200k; $\pm 1\%$
R44	0660076F01	100k; $\pm 1\%$
R45	0660076F08	200k; $\pm 1\%$
R46	0660076F01	100k; $\pm 1\%$
R47	0660076F08	200k; $\pm 1\%$
R48	0660076F01	100k; $\pm 1\%$
R49	0660076F08	200k; $\pm 1\%$
R50	0660076F01	100k; $\pm 1\%$
R51	0660076F08	200k; $\pm 1\%$
R52	0660076F01	100k; $\pm 1\%$
R53	0660076F08	200k; $\pm 1\%$
R54	-----	Not Used
R55	0660076F08	200k; $\pm 1\%$
R56 thru 63	-----	Not Used
R64	0660076A80	20k
R65	0660076A77	15k
R66 thru 69	-----	Not Used
R70	0660076A73	10k
R71 thru 73	-----	Not Used
R74 thru 78	-----	10k (part of U11)
R79 thru 84	0660076A43	560
R85	0660076A73	10k
R86 thru 88	-----	Not Used
R89	0660076B01	100k
R90 thru 92	0660076A39	390
R93	0660076A79	18k
R94,95	-----	10k (part of U11)
R96	0660076A43	560
R97	0660076A53	1.5k
R98,99	-----	Not Used
R100	-----	10k (part of U11)
R101	-----	Not Used
R102	0660076B25	1M
R103 thru 105	-----	Not Used
R106	0660076A80	20k
R107	0660076A83	27k
R108,109	-----	Not Used
R110,111	0660076A73	10k
R112	0660077A25	100; 1/4W
R113	0660076A73	10k
R114 thru 121	-----	Not Used

R122,123	0660076A73	10k
R124	0660076E32	200; ±1%
R125	0660076A67	5.6k
R126,127	0660076A13	33
R128	0660076A67	5.6k
R129 thru 131	0660076E32	200; ±1%
R132,133	-----	Not Used
R134	0660076A49	1k
R135	0660076B01	100k
R136	0660076A67	5.6k
R137 thru 140	-----	Not Used
R141	0660076A34	240
R142	0660076A73	10k
R143 thru 147	-----	Not Used
R148	0660077A25	100; 1/4W
R149,150	0660076A73	10k
R151 thru 154	0660076A49	1k
R155	0660076A34	240
R156	0660076A73	10k
R157	0660076A35	270
R158	-----	Not Used
R159,160	0660076A73	10k
R161	0660076A25	100
R162	0660076A55	1.8k
CIRCUIT MODULE: See Note		
U1	5105469E65	Voltage Regulator
U2	5182862N09	SLIC
U3	5105469E82	Dual Op Amp; MC3358DR1
U4	-----	Not Used
U5	0105955S30	EPROM
U6	5197024A01	Microprocessor, MC68HC11ACFN
U7,8	5105469E83	Transistor Array; MMPQ3904
U9	5105469E48	Volatge Reference Diode; LM285Z-2.5R1
U10	-----	Not Used
U11	0605847S01	10k Array (includes R74 thru 78, 94, 95, and 100)
U12,13	-----	Not Used
U14	5105461G53	Shift Register; MC14094BDR2
DIODE: See Note		
VR1,2	-----	Not Used
VR3 thru 9	4805129M35	Zener; 5.6V
VR10	4880140L14	Zener; 9.1V
VR11	-----	Not Used
VR12	4805129M35	Zener; 5.6V
VR13,14	-----	Not Used
VR15	4880140L14	Zener; 9.1V
VR16 thru 20	4805129M35	Zener; 5.6V
VR21	-----	Not Used
VR22 thru 24	4805129M35	Zener; 5.6V
VR25	4811058B05	Zener; 30V
VR26	-----	Not Used
VR27 thru 32	4805129M35	Zener; 5.6V
VR33	4880140L14	Zener; 9.1V
VR34	4880140L17	Zener; 12V
VR35	-----	Not Used
VR36	4811058B05	Zener; 30V
VR37	4880140L14	Zener; 9.1V
CRYSTAL:		
Y1	4860875A01	7.3728MHz
NONREFERENCED ITEMS		
	0105955S29	BLOCK, Charging Contact (Console Pocket)
	0960113C01	SOCKET, IC (for U5)

NOTE: For optimum performance, order replacement diodes, transistors, and circuit modules by Motorola part number only.

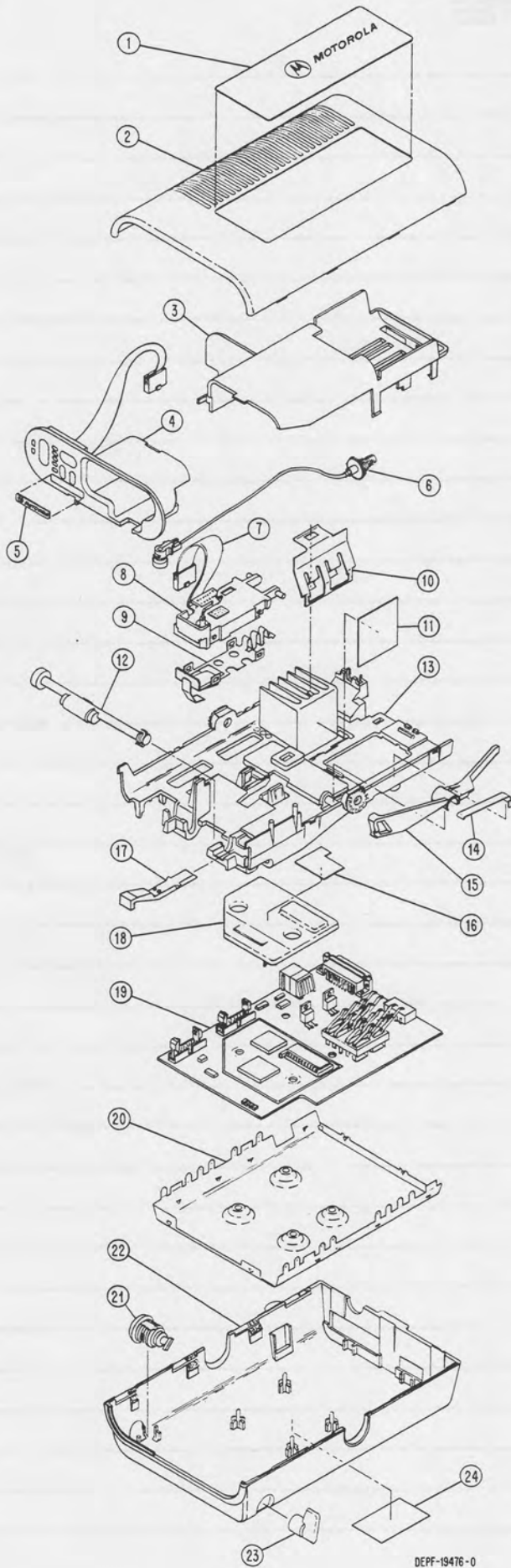
Q19	4805128M44	NPN; SOT-23
Q20	-----	Not Used
Q21	4805128M19	NPN, Darlington; SOT-23
Q22	-----	Not Used
Q23,24	4805128M44	NPN; SOT-23
Q25	4805869806	NPN; TO-220
Q26,27	4805128M19	NPN, Darlington; SOT-23
Q28	-----	Not Used
Q29 thru 31	4805128M44	NPN; SOT-23
RESISTOR, Fixed: $\Omega \pm 5\%$; 1/8W		
unless stated		
R1	-----	Not Used
R2	0660077A25	100; 1/4W
R3	0605846S01	0.2; $\pm 1\%$; 1W
R4	0660076A73	10k
R5	-----	Not Used
R6	0660076E17	47; $\pm 1\%$
R7	0660076E45	680 $\pm 1\%$
R8 thru 12	-----	Not Used
R13	0660076A80	20k
R14	0660076A73	10k
R15	-----	Not Used
R16,17	0660076A73	10k
R18	0660076B25	1M
R19	-----	Not Used
R20	0660076A73	10k
R21 thru 28	-----	Not Used
R29	0660076A49	1k
R30	-----	Not Used
R31,32	0660076B01	100k
R33	0660076E77	15k; $\pm 1\%$
R34	0660076E73	10k; $\pm 1\%$
R35	0660076E77	15k; $\pm 1\%$
R36	0660076E73	10k; $\pm 1\%$
R37,38	-----	Not Used
R39	0660076E73	10k; $\pm 1\%$
R40	0660076A90	51k
R41	0660076F08	200k; $\pm 1\%$
R42	0660076F01	100k; $\pm 1\%$
R43	0660076F08	200k; $\pm 1\%$
R44	0660076F01	100k; $\pm 1\%$
R45	0660076F08	200k; $\pm 1\%$
R46	0660076F01	100k; $\pm 1\%$
R47	0660076F08	200k; $\pm 1\%$
R48	0660076F01	100k; $\pm 1\%$
R49	0660076F08	200k; $\pm 1\%$
R50	0660076F01	100k; $\pm 1\%$
R51	0660076F08	200k; $\pm 1\%$
R52	0660076F01	100k; $\pm 1\%$
R53	0660076F08	200k; $\pm 1\%$
R54	-----	Not Used
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R56 thru 63	-----	Not Used
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R100	-----	10k (part of U11)
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R102	0660076B25	1M
R103 thru 105	-----	Not Used
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R107	0660076A83	27k
R108,109	-----	Not Used
R110,111	0660076A73	10k
R112	0660077A25	100; 1/4W
R113	0660076A73	10k
R114 thru 121	-----	Not Used

R122,123	0660076A73	10k
R124	0660076E32	200; $\pm 1\%$
R125	0660076A67	5.6k
R126,127	0660076A13	33
R128	0660076A67	5.6k
R129 thru 131	0660076E32	200; $\pm 1\%$
R132,133	-----	Not Used
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R135	0660076B01	100k
R136	0660076A67	5.6k
R137 thru 140	-----	Not Used
R141	0660076A34	240
R142	0660076A73	10k
R143 thru 147	-----	Not Used
R148	0660077A25	100; 1/4W
R149,150	0660076A73	10k
R151 thru 154	0660076A49	1k
R155	0660076A34	240
R156	0660076A73	10k
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VR22 thru 24	4805129M35	Zener; 5.6V
VR25	4811058B05	Zener; 30V
VR26	-----	Not Used
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	0960113C01	SOCKET, IC (for U5)

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Exploded View Parts List

TPLF-3789-0



ITEM NO.	MOTOROLA PART NO.	DESCRIPTION
1	3305183R19	LABEL
2	1505159T01	HOUSING, Top
3	1505157T01	HOOD, SVA
4	0105952Q23	ASSEMBLY, Front Housing
5	3305183R17	LABEL
6	0105952Q28	ASSEMBLY, RF Connector (part of item 8)
7	0905925S01	FLEX (part of item 8)
8	0105952Q26	ASSEMBLY, Universal Connector (includes items 6, 7, and 9)
9	4105169T01	SPRING, Connector (part of item 8)
10	4205294T01	CLIP, Transistor
11	1405329Q03	INSULATOR
12	4505165T01	CAMSHAFT
13	2705172T01	CHASSIS
14	4105170T01	SPRING, Actuator Arm
15	4505164T01	ARM, Actuator
16	7505934Q02	PAD, RF Shield
17	6105357T01	LIGHT PIPE
18	2605471T01	SHIELD, RF Cover
19	0105952Q25	ASSEMBLY, Printed Circuit Board
20	2605167T01	SHIELD, Bottom
21	5505173T01	LOCK
22	1505158T01	HOUSING, Bottom
23	3605163T01	KNOB, Snap-On
24	3305183R18	LABEL

DEPF-19476-0

INSTRUCTION MANUAL QUESTIONNAIRE

We believe that reports from users provide valuable information for producing quality manuals. By taking a few moments to answer the following questions as they relate to this specific manual, **you** can take an active role in the continuing effort to ensure that our manuals contain the most accurate and complete information of benefit to you. Thank you for your cooperation.

In reference to Manual Number: **68P81058C70-0**

SABER Handie-Talkie Portable Radios Vehicular Adapter

1. Please check all the appropriate boxes:

	Complete	Incomplete	Correct	Incorrect	Clear	Confusing	Size Adequate	Size Too Small	Not Covered in This Manual
Model/Option Charts									
General Description (Features/Options)									
Detailed Circuit Description									
Test Equipment & Service Aids									
Troubleshooting Procedures/Charts									
Repair Procedures									
Illustrations/Photos/Tables									
Disassembly Procedures									
Alignment Procedures									
Exploded Views									
Schematic Diagrams									
Circuit Board Details									
Electrical Parts List									
Exploded View Parts List									

2. How would you rate the overall organization of this manual?

- excellent very good good fair poor

3. Is the information in this manual **essential** to servicing and maintaining the specific equipment?

- very much so generally yes to some extent no

4. How do you rate this particular manual?

- excellent very good good fair poor

5. We would appreciate any corrections or recommendations for improving this manual. Please include the specific page number(s) of the diagram, illustration, photo, chart, parts list, or procedure in question.

a. Model/Option Charts: (Page No. _____)

b. General Descriptions (Features/Options): (Page No. _____)

c. Detailed Circuit Descriptions: (Page No. _____)

d. Test Equipment & Service Aids: (Page No. _____)

CUT ALONG DOTTED LINE

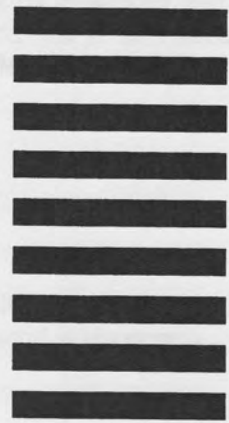
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Please specify the page number along with any corrections or recommendations for improvement.

- e. Troubleshooting Procedures Charts: (Page No. _____)
- f. Repair Procedures: (Page No. _____)
- g. Illustrations/Photos/Tables: (Page No. _____)
- h. Disassembly Procedures: (Page No. _____)
- i. Alignment Procedures: (Page No. _____)
- j. Exploded Views: (Page No. _____)
- k. Schematic Diagrams: (Page No. _____)
- l. Circuit Board Details: (Page No. _____)
- m. Electrical Parts Lists: (Page No. _____)
- n. Exploded View Parts Lists: (Page No. _____)

6. General comments/suggestions:

Name: _____

Company: _____

Customer COSC MSS FTR Other

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City/State/Zip: _____

Phone Number (Please include Area Code): _____

REPLACEMENT PARTS ORDERING

ORDERING INFORMATION

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Crystal and channel element orders should specify the crystal or channel element type number,

crystal and carrier frequency, and the model number in which the part is used.

Orders for active filters, Vibrasender and Vibrasponder resonant reeds should specify type number and frequency, should identify the owner/operator of the communications system in which these items are to be used; and should include any serial numbers stamped on the components being replaced.

MAIL ORDERS

Send written orders to the following addresses:

Replacement Parts/
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Motorola Inc.
Communications Parts Division
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1313 E. Algonquin Road
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Federal Government Orders:

Motorola Inc.
Communications Parts Division
Attention: Order Processing
1701 McCormick Drive
Landover, MD 20785

International Orders:

Motorola Inc.
Communications Parts Division
Attention: International Order
Processing
1313 E. Algonquin Road
Schaumburg, IL 60196

TELEPHONE ORDERS

Replacement Parts/Test Equipment:

Call: 1-800-422-4210
1-800-826-1913 (For Federal Government Orders)

Crystal Service Items:

Call: 1-800-323-1570
1-800-445-4564 (For Illinois Residents)

TELEX/FAX ORDERS

Replacement Parts/Test Equipment/
Crystal Service Items:

Telex: 280127
FAX: 312-576-6285

Federal Government Orders:

FAX: 301-925-2473 or 301-925-2474

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Call: 1-800-537-7007

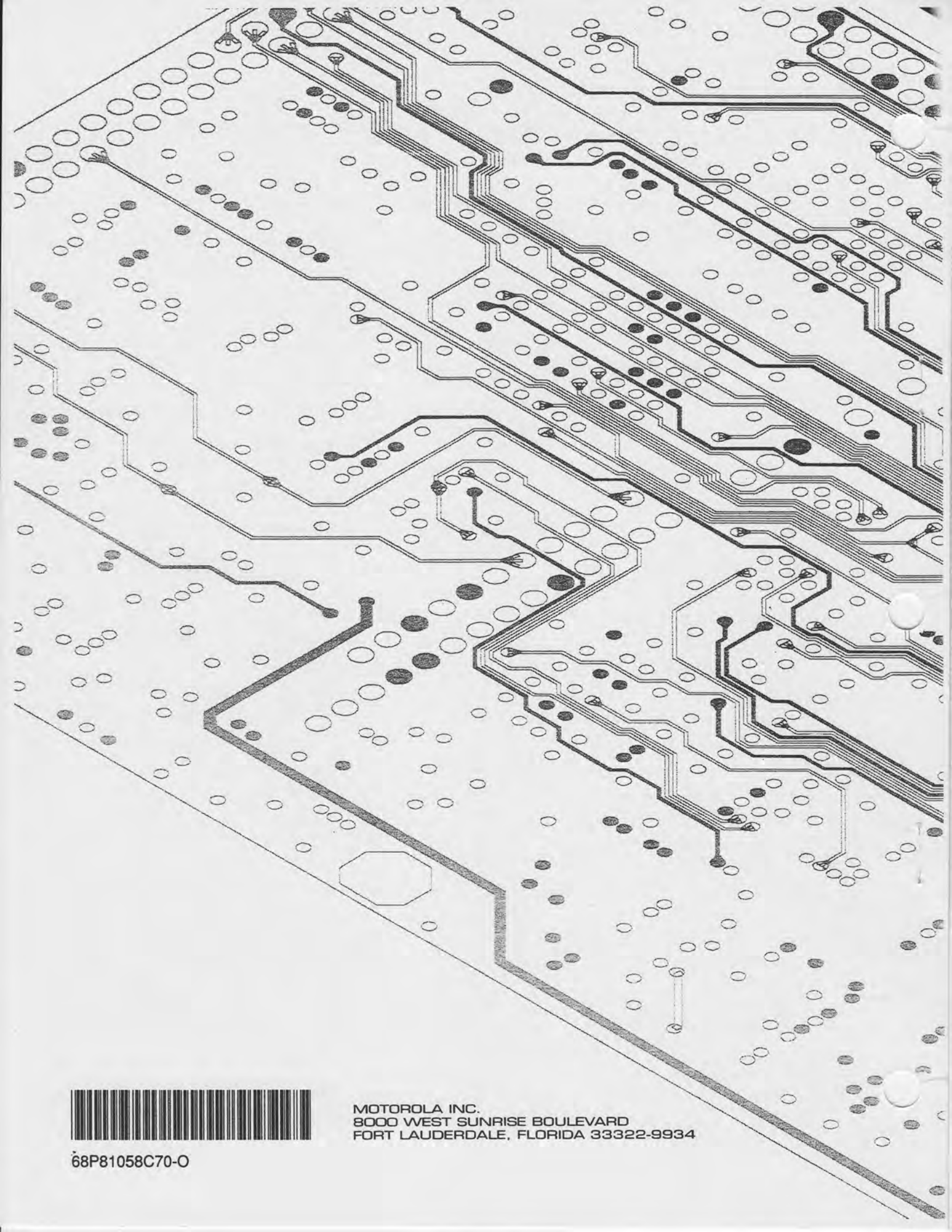
Crystals:
Call: 1-800-323-0234

Parts Identification:
Call: 312-576-7418

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