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SM-4450

UHF SYNTHESIZED MOBILE



SVC-4450

Nov. 94

MAXON SM-4450 VHF MOBILE

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MAXON SM-4450 UHF MOBILE SPECIFICATIONS

SPECIFICATIONS

GENERAL

Frequency Range	
A Band	400-440 MHz
C Band	450-470 MHz
E Band	470-512 MHz
Channels	16 maximum
Channel Spacing	25 kHz Programmable (In 6.25 kHz Steps)
Input Voltage	13.8 VDC Negative Ground
Current Drain	
Standby	0.15 Amp
Receive	0.5 Amp
Transmit	8 Amp
Temperature Range	-30° to + 60° C
Dimensions	2 x 6 x 8.25 inches (51 x 152 x 210 mm)
Weight	4 lbs., 3 oz. (1.9kg) With Mic.
FCC Compliance	Parts 15, 22, 74, 90, 95
FCC ID Designation	
400-440 MHz	F3JSM445A
450-470 MHz	F3JSM445C
470-512 MHz	F3JSM445E
DOC (Canada) Type Approval	
400-440 MHz	153194100I
450-470 MHz	153194100I
470-512 MHz	N / A

MAXON SM-4450 UHF MOBILE SPECIFICATIONS

RECEIVER (PER EIA RS-204-C)

RF Input Impedance	50 Ohms Nominal
Sensitivity:	
(EIA 12 dB SINAD)	0.35 uV
20 dB Quieting	0.50 uV
Squelch Sensitivity	0.20 uV Threshold
Selectivity	-80 dB
Intermodulation	-70 dB
Modulation Acceptance Bandwidth	±7.5 kHz
Spurious and Image	-70 dB
Audio Power Output	5 W (@10% Dist. into 40 W Load)
Frequency Stability	± 0.0005%
Channel Spread	10 mHz (13 mHz with 3dB degradation)

MAXON SM-4450 UHF MOBILE SPECIFICATIONS

TRANSMITTER (PER EIA RS-152-C)

RF Power Output	40 Watts (adjustable)
RF Output Impedance	50 Ohms
Spurious and Harmonics	-70 dBc
Modulation	16KOF3E
FM Hum and Noise	-45 dB Nominal
Audio Distortion	< 3 % @ 1000Hz
Frequency Stability	0.0005%
Channel Spread	20 MHz

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MAXON SM-4450 UHF MOBILE UNPACKING

UNPACKING

Check the carton and packing material carefully for the following items:

1. Transceiver Unit
2. Microphone
3. DC power cord
4. Mobile Mounting Bracket
5. Assembly Hardware
6. Operating Guide

Styrofoam not used

Inner Packing is now cardboard tray box.

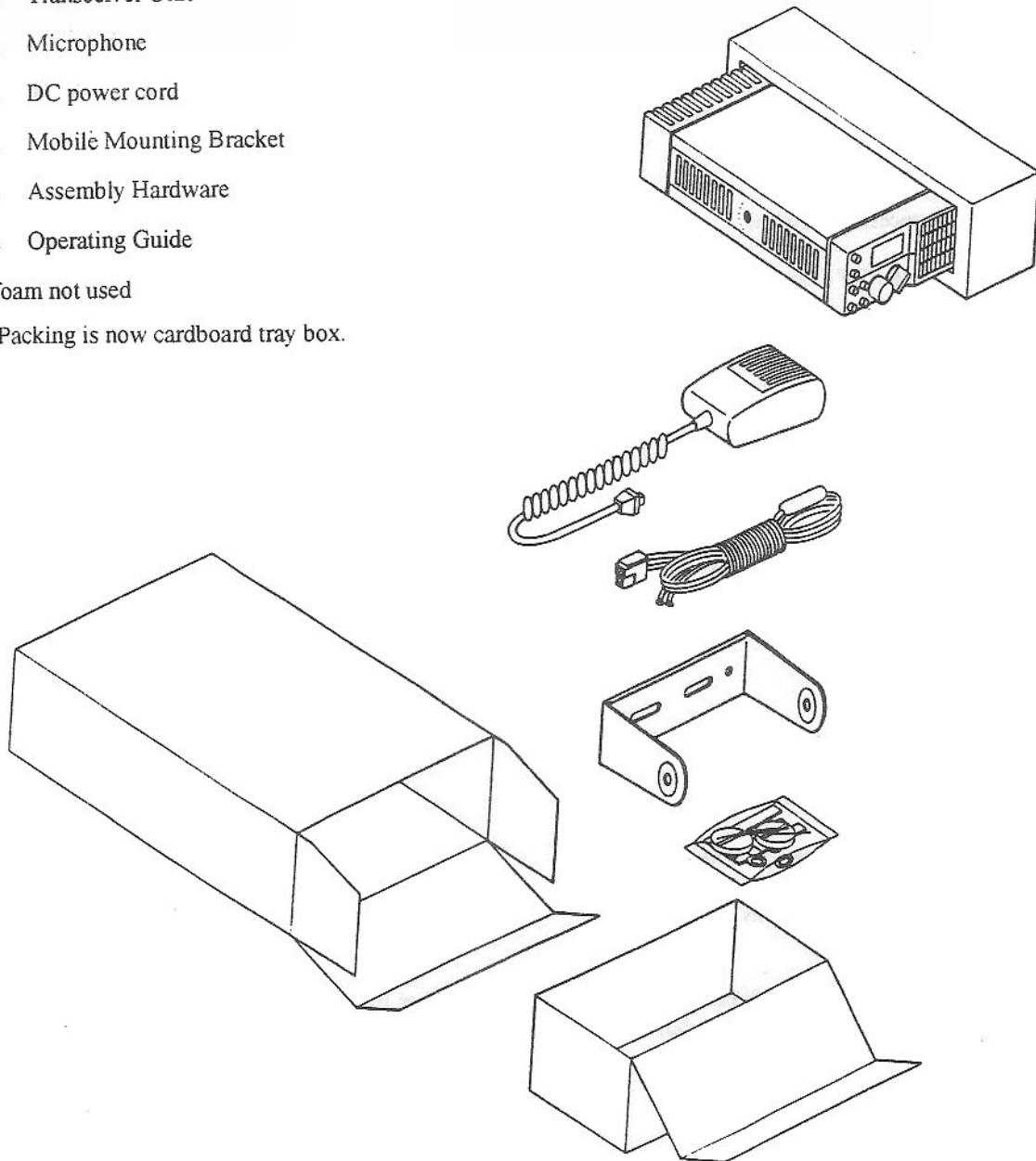


Figure 1 - Unpacking Diagram

MAXON SM-4450 VHF MOBILE

GENERAL DESCRIPTION

GENERAL DESCRIPTION

INTRODUCTION

The Maxon SM-4450 series radio is a rugged two-way FM mobile radio which operates in the 400-440 MHz, 450-470 MHz or the 470-512 MHz band split. The SM-4450 is a synthesized radio utilizing microcomputer technology to provide reliable high quality simplex two-way mobile communications. Its transmitter output power level is 40 watts over the wide bandwidth, with an allowable 10 MHz maximum receive channel separation. The basic radio package includes the following features:

Features

- * **Microprocessor Control**
- * **Synthesized RF Channel Selection (Frequency Control)**
- * **Vacuum Fluorescent Channel Selection Display**
- * **Channel Guard (CTCSS) Encode-Decode**
- * **Digital Channel Guard (DCS Encode / Decode)**
- * **Priority Scan**
- * **± 5 PPM Frequency Stability**
- * **Field Programmable with PC**
- * **Variable Squelch**
- * **Internal 5-watt Speaker, with Volume Control**
- * **Side Mounted Microphone Connector**
- * **Rear Mounted Antenna Connector**
- * **Rear Power Connections**

The small size of the SM-4450 radio makes it ideal for front mounting in conventional vehicles. The radio is operated with a simple hand held microphone in combination with the operating controls described in the following section.

MAXON SM-4450 UHF MOBILE

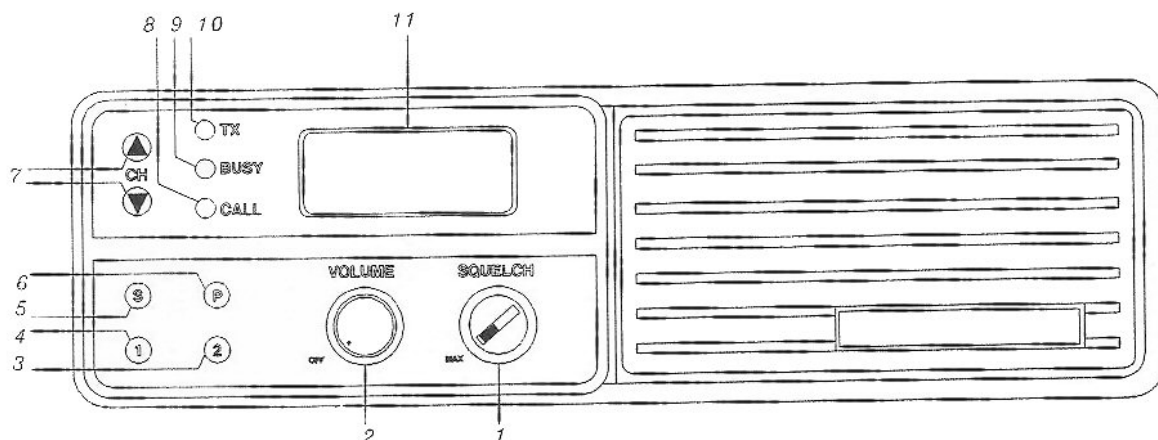
DESCRIPTION OF CONTROLS

DESCRIPTION OF CONTROLS

FRONT PANEL CONTROLS

1. Squelch Control: The squelch control will silence the receiver when no signal is being received.
2. ON/OFF/VOLUME Control: This is the main power switch and volume control.
3. Monitor Button (2): This button performs three functions:
 - a. Disables tone or digital squelch options when in receive mode.
 - b. Returns to normal radio operation from the programming mode.
 - c. Controls display intensity.
4. Auxiliary Speaker Button (1): This button silences the internal speaker and connects the auxiliary speaker (requires the auxiliary option printed circuit board to be installed). It also deletes channels from the scan list while in the programming mode.
5. SCAN Push Button (S): This button turns the scan function "ON" (indicated by a red backlight) and "OFF". It also serves as the ENTER function during SCAN programming.
6. PRIORITY SCAN Push Button (P): This button turns the PRIORITY SCAN function "ON" (indicated by a red backlight) and "OFF". It also provides access to the programming mode when the radio is turned on.
7. Channel Change buttons (CH): The channel change buttons allow the operator to scroll either up or down through the programmed channels.
8. Call Light Indicator (CALL): This green Light Emitting Diode (LED) indicator illuminates to indicate activity on the channel during receive when coded squelch or digital signaling options are used.
9. Busy Channel Indicator (BUSY): This yellow Light Emitting Diode (LED) indicator illuminates to indicate activity on the channel during receive.
10. Transmit LED Indicator (TX): This red Light Emitting Diode (LED) indicator illuminates during transmit mode. It also will flash to indicate that the synthesizer is out of lock.
- 11.

FIGURE 2 - Front Panel Controls



MAXON SM-4450 UHF MOBILE

DESCRIPTION OF CONTROLS

BACK PANEL CONNECTORS

1. External Speaker Connector: This 3.5mm diameter jack is provided for a 4 ohm external speaker. The internal speaker is silenced when the external speaker is connected.
2. Auxiliary Speaker Connector: This 3.5mm diameter jack is provided for an auxiliary speaker (Option MGSU1C Relay Kit is required).
3. Antenna Connector: An SO-239 type connector. The output load must be 50 ohms.
4. DC 13.8V Connector: Polarized plug for 13.8 VDC power input - FOR NEGATIVE GROUND SYSTEMS ONLY.

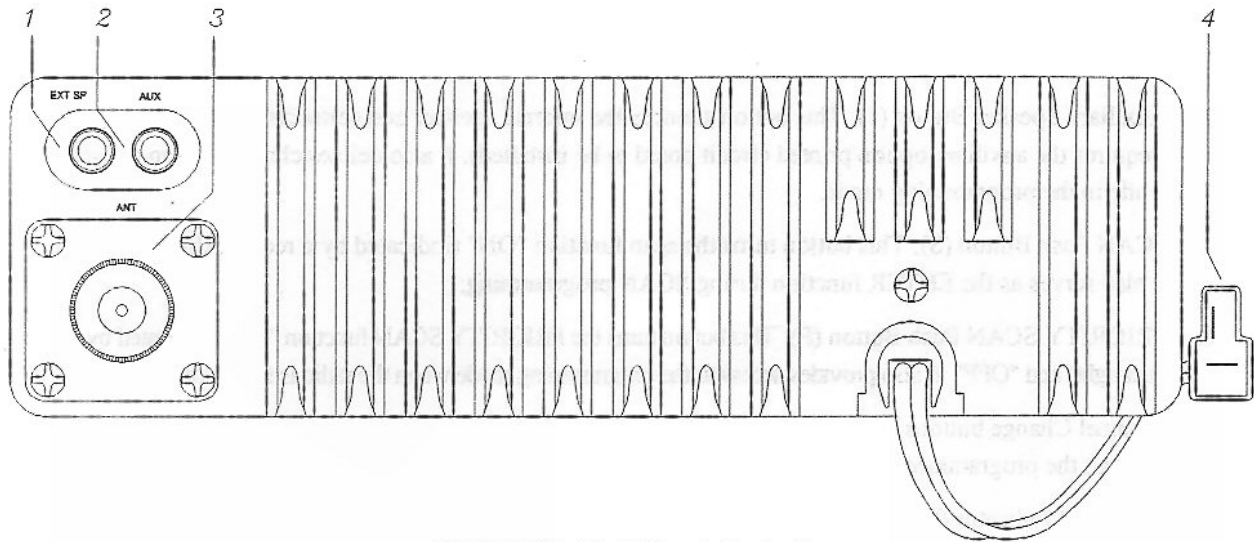


FIGURE 3 - Back Panel Controls

MAXON SM-4450 UHF MOBILE OPERATION

OPERATION

- *NOTE: The following description briefly outlines the operation of your UHF synthesized mobile radio. Consult the operators manual for a complete description of all the modes of operation for which the radio is capable.*

RADIO ON/OFF, POWER UP

1. Turn the radio on by turning the VOLUME control one-half turn clockwise. After 4000 appears in the display and the power up alert tone is generated, the display will change to the #1 priority channel. If no priority channel has been programmed, the display will change to channel 1.
2. Turn the radio off by rotating the VOLUME control fully counter-clockwise.

RECEIVING A CALL

1. Turn the radio on and select the desired channel.
 2. Depress the monitor button (2) if necessary to illuminate it's backlight. Adjust the volume control to a comfortable listening level.
 3. Rotate the SQUELCH control clockwise until the squelch noise (rushing sound) is no longer present.
 4. Depress the MONITOR button (2) to extinguish the backlight.
- *NOTE: If the radio is equipped with coded squelch options, depress the MONITOR button (2) to enable the option; the CALL indicator will no longer be illuminated.*

TRANSMITTING

1. Turn the radio on and select the desired channel.
2. Pick up the microphone and listen briefly to insure the channel is clear. Alternatively, leave the microphone on-hook and depress the MONITOR button (2).
3. Depress the PTT switch on the side of the microphone. Hold the microphone one to two inches from the mouth and speak in a normal tone of voice. The TX indicator should be illuminated.
4. Release the PTT switch when the message is completed.

MAXON SM-4450 UHF MOBILE

OPERATION

DIGITAL CHANNEL GUARD

Channel Guard provides a means of restricting calls to specific radios through the use of a continuous tone coded squelch system (CTCSS), or a multi-code digital squelch system (DCG). tone frequencies range from 67Hz to 250.3Hz. There are 83 standard programmable digital codes.

The Channel Guard tone frequencies and codes are software programmable. Both tone frequencies and digital codes may be mixed on each channel. The frequencies and codes are shown in Tables 1 and 2. A Channel Number display that does not flash, indicates that Channel Guard is enabled, or that Channel Guard is not programmed. A flashing Channel Number indicates that Channel Guard is programmed and disabled.

Table 1 - Channel Guard tone Frequencies

Standard Tone Frequencies in Hertz							
67.0	71.9	74.4	77.0	79.7	82.5	85.4	88.5
91.5	94.8	97.4	100.0	103.5	107.2	110.9	114.8
118.8	123.0	127.3	131.8	136.5	141.3	146.2	151.4
156.7	162.2	167.9	173.8	179.9	186.2	192.8	203.5
210.7	218.1	225.7	233.6	241.8	250.3		

Table 2 - Primary DCS Codes

DIGITAL SQUELCH CODES						
023	114	174	266	411	506	703
025	115	205	271	412	516	712
026	116	212	274	413	523	723
031	122	223	306	423	526	731
032	125	225	311	431	532	732
036	131	226	315	432	546	734
043	132	243	325	445	565	743
047	134	244	331	446	606	754
051	143	245	332	452	612	
053	145	246	343	454	624	
054	152	251	346	455	627	
065	155	252	351	462	631	
071	156	255	356	464	632	
072	162	261	364	465	654	
073	165	263	365	466	662	
074	172	265	371	503	664	

MAXON SM-4450 UHF MOBILE CIRCUIT ANALYSIS

CIRCUIT ANALYSIS

RECEIVER

RF Amplifier

Incoming signals from the antenna jack are routed backwards through the transmitter lowpass filter in PIN diode switch D16. In receive mode, D16 conducts allowing a low impedance path through the diode to the receiver front end circuitry. The receiver RF amplifier section is comprised of two bandpass filter sections separated by an amplifier based around Q1. These two filters allow signals at or near the operating frequency to pass but provide strong rejection of the mixer's spurious response frequencies. The first filter section is a two pole design formed around RF helical resonator T1 and the associated circuitry. This filter is followed by the RF amplifier transistor Q1. This device with its low noise figure, yields good receiver sensitivity while showing strong resistance to overload from strong signals. The output of Q1 drives a pole filter section formed around T2 and T3. The output of the RF amplifier stage is routed to the first mixer.

First Mixer and First IF Amplifier

The action of the first mixer transistor Q2 is to convert incoming signals at the operating frequency to the frequency of the first IF which is 21.4 MHz. the output of the mixer is at a frequency which is equal to the difference between the frequency of the incoming signal and the local oscillator. In this radio, the local oscillator signal is chosen to be 21.4 MHz below the operating frequency. The device chosen to perform the mixing operation is Q2, a high performance JFET. The incoming signal is applied to the gate of Q2 while the local oscillator is applied to the drain. The local oscillator signal is filtered by Helical Resonator T6 and associated circuitry before being supplied to the drain of Q2. The difference frequency signal at 21.4 MHz exits the mixer at the source of Q2 and is tuned for 21.4 MHz by T8, which drives the first IF filter XF1 and XF2. XF1 and XF2 form a 4-pole monolithic crystal filter pair which in part determines the selectivity of the radio. The output of the crystal filter is routed to the first IF amplifier formed around Q3. RF transformer T9 provides proper matching of the crystal filters to insure good bandpass response and selectivity.

Second Mixer, Second IF, and FM Detector

The output of Q3 is applied to the input (pin 16) of IC2. IC2 is a single conversion FM receiver on one integrated circuit chip. The signal at the input is routed straight to a mixer which converts the incoming signal to the second IF frequency of 455 kHz. The second local oscillator is formed with crystal X1 and circuitry within IC2. The output of the second mixer is at pin 3 which is connected to a ceramic bandpass filter CF1 and centered at 455 kHz. This filter, along with XF1 and XF2, determine the adjacent channel selectivity of the radio. The output of CF1 drives a high gain IF amplifier chain internal to IC2 which in turn drives the quadrature detector. The output of the detector is amplified and exits IC2 at pin 9.

Audio

Detected audio from IC2 passes through a lowpass filter formed around L16, C64 and C65 which removes IF frequency components at 455 kHz. the audio signal then passes through buffer amplifier transistor Q7 before being filtered by a two section, 4-pole high pass filter (IC3). This filter removes DCS and CTCSS low frequency tones from the recovered audio. Transistors Q6 and Q108 act as switches around volume control VR2 to mute the audio during squelched receive operation. The audio signal is finally routed to audio power amplifier IC103 and then to the speaker.

MAXON SM-4450 UHF MOBILE

CIRCUIT ANALYSIS

Squelch

The presence of an RF carrier is determined by noting the level of ultrasonic noise at the detector output (pin9) of IC2. When a carrier is present, the noise level drops. The audio at pin 9 of IC2 is filtered by a two-pole bandpass filter formed around L17, L18, C68 and C69. This filter passes audio at and near an audio frequency of 50 kHz. This frequency is high enough that voice audio and its harmonics will not cause improper squelch operation. The output of the filter is routed to an amplifier internal to IC2. The output of the amplifier drives Q4. The DC voltage at the detector output is amplified and filtered by Q4. The output of Q4 send its squelch signal to the microprocessor. When the microprocessor determines that a valid carrier exists, it sends an unmute signal to the audio switch transistors Q6 and Q108.

TRANSMITTER

Audio

The microphone audio is amplified, pre-emphasized and peak limited by circuits within IC113. The output of the limiter is routed through RV4, the microphone deviation control. Input CTCSS and DCS signals are routed through RV5, the CTCSS/DCS deviation control. Both signals are summed through a lowpass filter formed around IC114 to remove high frequency components from the limiter which could cause channel splatter. When the microprocessor enables the TX 8 volt supply, analog gate IC115 delivers the modulation signal to the VCO transistor Q115 by changing the capacitance of D123 and D110.

RF Driver and Power Amplifier

Diode D11 acts as a switch allowing the RF signal from the phase locked loop frequency synthesizer to pass through the RF driver and power amplifier during transmit, but not during receive. Buffer amplifier Q10 amplifies the carrier to the level needed by the driver amplifier stages. The driver amplifiers, of which the last 2 stages are gain controlled by the automatic power control, drive the final amplifier stage formed around Q14. The final amplifier boosts the carrier level to the power level set by the automatic power control. The carrier signal passes through the automatic power control directional coupler, the RF output lowpass filter, and then is routed to the antenna connector.

Automatic Power Control

The automatic power control directional coupler samples a portion of the forward RF power output to determine the RF level. Diode D15 rectifies this RF sample and produces a DC voltage which is proportional to the RF output level. This DC signal is summed with the voltage set from the power output control RV3. This voltage is compared with a voltage derived from the TX 8 volt supply and the difference is amplified by IC5. The output of the RF driver is proportional to its supply voltage. This controls the DC output of Q9, which supplies Q12 and Q13 controlling the output of Q14 over the range from 10 to 40 watts. This completes a negative feedback loop which results in constant output power over supply voltage and temperature variations.

FREQUENCY SYNTHESIZER

The phase locked loop (PLL) frequency synthesizer section is responsible for generating the RF signal at the carrier frequency during transmit and at the local oscillator frequency for the receiver during receive. A PLL functions by comparing the output frequency of a voltage controlled oscillator (VCO) with a fixed frequency reference. An error signal is generated which drives the control input of the voltage controlled oscillator to force its frequency to match the reference. The PLL based frequency synthesizer has a digital frequency divider inserted between the output of the VCO and the frequency comparison circuitry. As this divider number is varied, the output frequency of the VCO varies as well with a frequency step size equal to the reference frequency (6.25 kHz in this radio). This allows a large range of frequencies to be generated with one well controlled oscillator signal, the reference.

PLL Integrated Circuit

IC118 contains most of the digital circuitry to form a PLL frequency synthesizer. This includes a reference oscillator, programmable reference frequency divider, a programmable variable frequency divider, a modulus

MAXON SM-4450 UHF MOBILE CIRCUIT ANALYSIS

control counter, a phase/frequency comparator and a frequency lock detector. The operation of this integrated circuit is controlled by the radio's microprocessor through a serial data line.

Reference Oscillator

Crystal X2, varactor D122, a thermistor/resistor network and the oscillator stage of IC118 form a temperature compensated 12.8 MHz oscillator. This frequency is divided by 2048 to generate the 6.25 kHz frequency for the PLL frequency synthesizer. This reference determines the frequency stability of the overall radio.

Voltage Controlled Oscillator

Transistor Q115 and its associated circuitry form a voltage controlled oscillator which is voltage tuned and band switched by varactor diodes D123 and D110. the VCO output is buffered and isolated by Q117, Q118 and Q119. Audio modulation is applied to the cathodes of D123 and D110 to produce frequency modulation during transmit.

Dual Modulus Prescaler

The internal dividers within IC118 are not able to operate at the VCO output frequency. To alleviate this problem, part of the overall frequency division necessary between the VCO and the phase/frequency comparator is placed external to, and controlled by, IC118. IC117 divides the VCO frequency by 128 or 129, determined by the state of IC118 pin 6. This produces a lower frequency which can be further divided by IC108. By strategic timing when to divide by 128 or 129, the overall division will be that necessary to put the VCO on the correct frequency.

Loop Filter

Resistors R317 through R322 and capacitors C291, C294 and C295 form the loop filter. The purpose of the loop filter is to filter out the 6.25 kHz reference frequency products from the output of phase/frequency comparator IC118 and to determine the dynamic operation of the overall loop.

R316, C289, Q113 and Q114 act to speed up operation of the synthesizer loop during channel changes and during frequency transition (receive to transmit and transmit to receive).

Out-of-Lock Detector

IC118 contains a circuit which compares the timing difference of the 6.25 kHz reference frequency and the divided down VCO frequency. The output is a 6.25 kHz pulse whose duration is equal to the timing difference. R306 and C274 filter this pulse and average it producing a DC voltage which is proportional to the pulse width. When the loop is in lock, this voltage is zero, but when the loop is out of lock, it rises to a level which will forward bias Q112. The output of Q112 drives the microprocessor. The microprocessor will not allow the radio to transmit unless the synthesizer is in lock. This is to prevent out of band signals from being transmitted.

MAXON SM-4450 UHF MOBILE

PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE

To ensure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routing checks should be made of all mechanical and electrical parts at regular intervals. Preventive maintenance should include the following checks:

CONNECTIONS

Ground connections to the voltage source should be periodically checked for tightness. Loose or poor connections to the power source will cause excessive voltage drops and faulty operation. When ground connections are not made directly to the battery, the connection from the battery to vehicle chassis must be checked for low impedance. A high impedance may cause excessive voltage drops and alternator noise problems.

ELECTRICAL SYSTEM

Check the voltage regulator and alternator or generator periodically to keep the electrical system within safe and economical operation limits. Over voltage is indicated when the battery loses water rapidly. Usage of 1 or 2 ounces of water per cell per week is acceptable for batteries in continuous operation. A weak battery will often cause excessive noise or faulty operation.

MECHANICAL INSPECTION

Since mobile units are subject to constant shock and vibration, check for loose plugs, nuts, screws and other parts to make sure that nothing is working loose.

ANTENNA

The antenna, antenna base and all contacts should be kept clean and free from corrosion. If the antenna or its base should become coated or poorly grounded, loss of radiation and a weak signal will result.

ALIGNMENT

The transmitter and receiver meter readings should be checked periodically, and the alignment "touched up" when necessary. Refer to the Alignment Procedure in this Service Manual.

FREQUENCY CHECK

Check the transmitter frequency and deviation. Normally, these checks are made when the unit is first put into operation, after the first six months, and once a year thereafter.

MAXON SM-4450 UHF MOBILE

DISASSEMBLY

DISASSEMBLY

TOP AND BOTTOM COVERS

There are no screws used to secure the top and bottom covers. Both top and bottom covers are removed with a flat blade screwdriver or similar tool. On each side of the radio there are two small slots (one at the top and one at the bottom). Insert the screwdriver into the slot and gently pry the lip of the cover out from the radio. Without removing the screwdriver from the slot and in the same motion, pry the cover up. Both covers can be removed from either side of the radio.

FRONT PANEL

1. Remove the (6) M3 x 6 machine screws (3 on top and 3 on bottom) that secure the front panel to the chassis.
2. Two cables connect the volume board to the RF board (at PL1) and to the digital board at (PL2). These cables may be unplugged at the RF board and at the digital board. A ribbon cable from the display board to the digital board must be unplugged to remove front panel.

RF BOARD

1. Remove the (13) M3 x 24 machine screws securing the RF shield to the chassis.
2. Remove the M3 x 8 machine screw that secures the DC cord bracket to the chassis. Slide the bracket and cord out of the chassis.
3. Remove the (6) M3 x 6 machine screws (3 on top and 3 on bottom) that secure the front panel to the chassis.
4. Remove the RF shield by pushing the front panel forward so the shield will clear and then sliding the DC cord, bracket and connector through the rectangular hole in the shield.
5. De-solder the antenna connector from the RF board.
6. Remove the remaining (10) machine screws securing RF board, IC1, and Q14 and Q9.
7. Q13 is mounted to the chassis with a spanner nut which is only accessible from top of the radio through a hole in the digital board. Remove the spanner nut.
8. Remove the RF board.

MAXON SM-4450 UHF MOBILE

DISASSEMBLY

DIGITAL BOARD

1. Remove the (6) M3 x 18 machine screws that secure the top panel shield to the chassis.
2. Unplug and remove the Auxiliary Relay PCB at PL5.
3. Remove the (6) machine screws (3 on top and 3 on bottom) that secure the front panel to the chassis.
- *The following steps detail the removal of the RF shield which is necessary before continuing with the removal of the digital board.*
4. Remove the (13) M3 x 24 machine screws securing the RF shield to the chassis.
5. Remove the M3 x 8 machine screw that secure the DC cord bracket to the chassis. Slide the bracket and cord out of the chassis.
6. Remove the RF shield by pushing the front panel forward so the shield will clear and then sliding the DC cord, bracket and connector through the rectangular hole in the shield.
7. Unplug the VCO cable from the jack.
8. Remove the remaining (10) screws securing the digital board, IC5, IC6 and IC104 to the chassis.
9. The digital board can now be removed from the chassis, however the front panel assembly is still attached by two cables (one from the Control board and one from the display board). The cable from the Control board at PL2 may be unplugged. The ribbon cable from digital board may be unplugged at FLT.

MAXON SM-4450 VHF MOBILE PROGRAMMING INSTRUCTIONS

PROGRAMMING INSTRUCTIONS

The SM-4450 UHF synthesized mobile radio is equipped with a personality EEPROM. All customer information such as the customer frequencies, customer tones and customer options are stored in the EEPROM. The EEPROM contains all information to tailor the operation of the radio to the user's requirements. The EEPROM is programmed by using the SMP-4000 or SMP-4000C Stand Alone Programmer and a programming cable.

PROGRAMMING THE RADIO

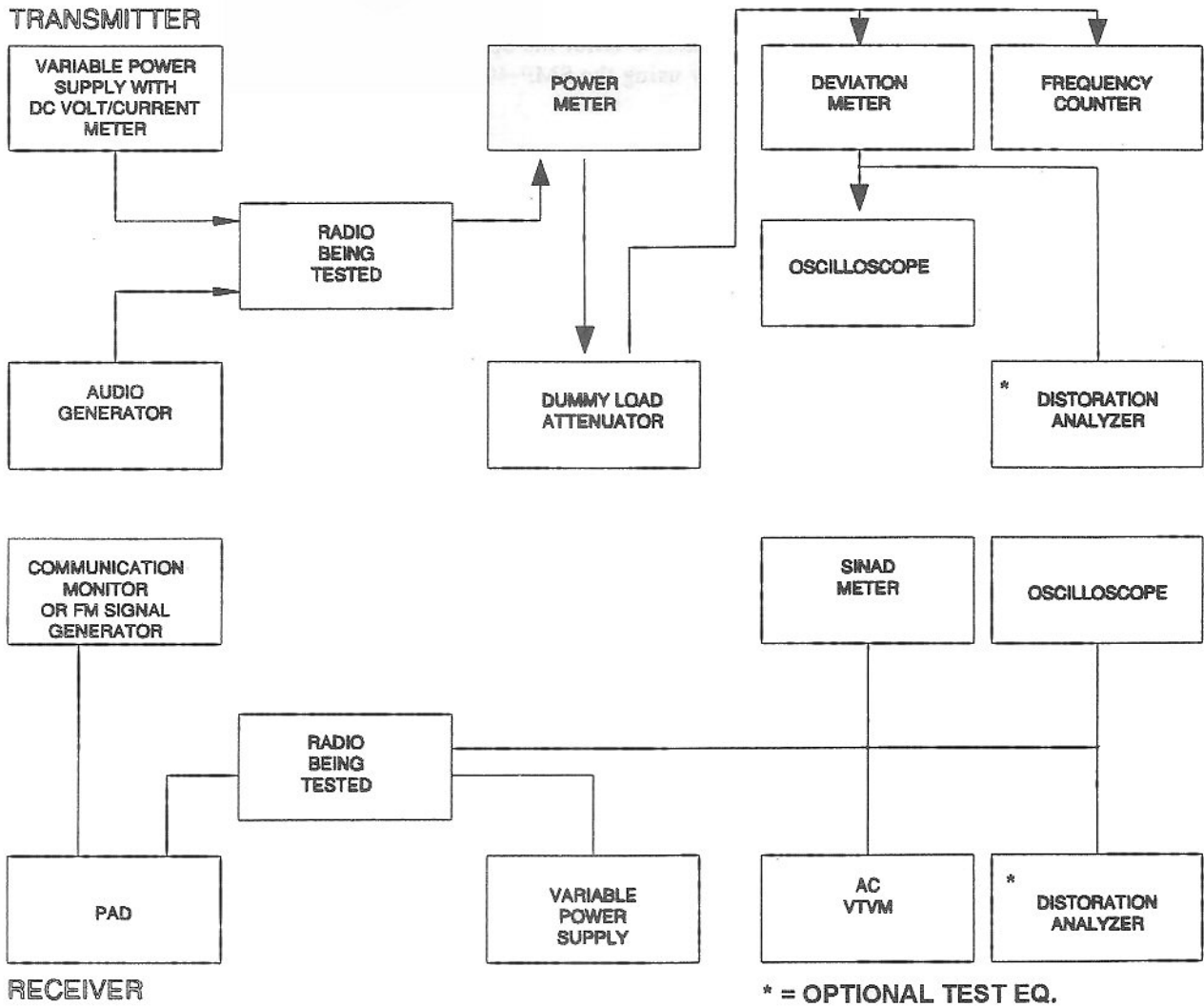
Programming with the SMP-4000 or SMP-4000C STAND ALONE PROGRAMMER

The SM-4450 Series radios have available a programming cable. This cable when used in conjunction with the SMP-4000C stand alone programmer can be plugged into the programming jack (PL1) inside the SM-4450 series radio and is used to program the radio's EEPROM without removing it from its socket. The other end of the cable has a 6 pin connector that plugs into the Textool programming connector on the SMP-4000C stand alone programmer. This accessory comes with the SMP-4000C. To use this cable, remove the top cover of the radio as described in the DISASSEMBLY section. Plug the six pin connector into the socket inside the radio (PL1), which is located near the EEPROM IC107. In order to program the radio with the programming cable, it is necessary to put the radio into the programming mode. To do this, press the P "PRIORITY" button/LED on the radio and turn the radio ON. The radio will sound a prompt tone and show the words "PROG" on the display. Please refer to the Software Manual for further instructions on the operation of the programming software. After completing the programming instructions in the manual, remove the cable from PL1 and replace the cover on your UHF synthesized mobile radio. For further information please see the SMP-4000 PN:999-093-6 or the SMP-4000C PN:999-134-1 Operation Manual.

MAXON SM-4450 UHF MOBILE

TEST EQUIPMENT SETUP

TEST EQUIPMENT SETUP



MAXON SM-4450 UHF MOBILE ALIGNMENT PROCEDURE

ALIGNMENT PROCEDURE

SUGGESTED TEST EQUIPMENT

- **WARNING:** Any repairs or adjustments should be made under the supervision of a certified technician.

The following equipment, or its equivalent, is required for proper alignment of the UHF synthesized mobile radio:

1. Termlane watt meter or Through-line watt meter with termination into 50 ohm dummy load.
2. AC/DC VOM with a minimum of 1 Megohm input impedance.
3. SINAD Meter.
4. FM Communications Monitor.
5. Regulated power supply capable of 9 to 16 volts adjustable; at least 10 ampere capability.
6. Oscilloscope.
7. Audio Distortion Meter (desirable but not necessary).
8. Frequency Counter.

PROGRAMMING FOR ALIGNMENT

For the alignment procedures the EEPROM should be programmed as follows:

1. An EEPROM should be programmed with 3 transmit and 3 receive frequencies.
2. The lowest and highest frequencies should enclose the user's frequencies and be 10 MHz apart. The lowest and highest frequencies must be within the appropriate frequency band.
3. In addition to programming frequencies, CTCSS and DCS codes must also be programmed to insure that the modulation deviation for these potential options is correct, even if they are not to be used for the customer's operation. The following format should be used:

Lowest RX/TX frequency	67.0Hz CTCSS Tone
Middle RX/TX frequency	DCS Code 072
Highest RX/TX frequency	250.3Hz CTCSS Tone
Highest RX/TX frequency	No Tone Options

MAXON SM-4450 UHF MOBILE

ALIGNMENT PROCEDURE

4. The middle RX/TX frequencies should be halfway between the lowest and the highest frequencies.
- *NOTE: There should be 4 channels programmed with a total of 3 different frequencies.*
5. The highest transmit frequency can typically be only 10 MHz above the lowest receiver frequency.

PLL ALIGNMENT

1. Connect an RF dummy load or power attenuator (50 watt minimum rating) to the antenna receptacle.
2. Connect a VOM or DVM to TP1, accessed through a hole in the VCO cover.
3. Set the CHANNEL selector to the lowest receive frequency.
4. Adjust TC13 setting the voltage measured at TP1 to 1.5 volts (± 0.05).
5. Change the CHANNEL selector to the highest transmit frequency.
6. Press the PTT switch. The VOM should read less than 7.5 volts.
7. Release the PTT switch.

CHANNEL	TP1 VOLTAGE	
	TRANSMIT	RECEIVE
Lowest Frequency	1.5 VDC	2.0 VDC
Highest Frequency	7.5 VDC	7.0 VDC

TRANSMITTER ALIGNMENT

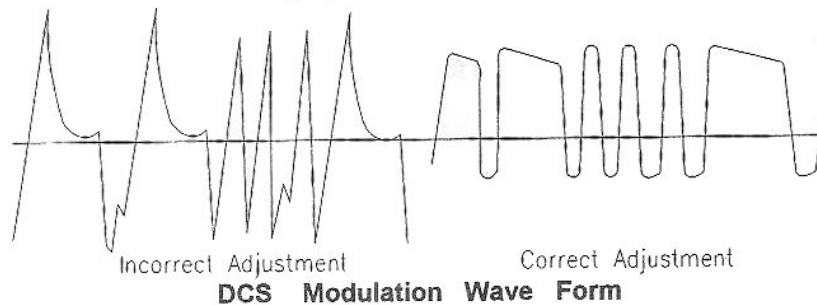
1. Connect a 50 ohm RF dummy load or a power attenuator (50 watt minimum rating) through a watt meter (50 watt scale) to the antenna receptacle.
2. Turn RV2 (Automatic power adjustment) fully clockwise.
3. Connect variable DC power supply (10 Ampere capability) to the DC power cable on the radio. Set the voltage to 13.8 VDC measured at the radio during transmit. (Voltage drops in the power cable during transmit will lower the voltage at the radio).
4. Set the CHANNEL selector to a mid-frequency transmit channel.
5. Press the PTT switch.
- *NOTE: The power output may exceed 50 watts.*
6. Adjust RV2 for 40 watts, or the desired power output. (10 - 40 watts). Release the PTT switch.

MAXON SM-4450 UHF MOBILE ALIGNMENT PROCEDURE

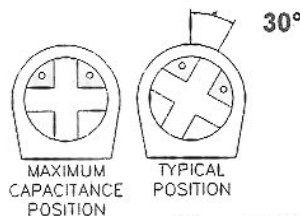
- **WARNING:** To prevent damage to the radio, avoid keying the radio for periods longer than 1 minute. Allow a 5 minute cool down period after keying the radio for 1 minute.
7. Check the power output at the lowest, middle and highest transmit channels and adjust RV2 if necessary, to maintain 40 watts at all frequencies.
 8. Press PTT and adjust TC11 for the correct frequency.

DCS Modulation Balance Adjustment

1. Connect test equipment to the radio as shown in the Test Equipment Setup.
 2. Set the CHANNEL selector to a transmit channel which has a DCS code pre-programmed (should be mid-frequency channel).
- **WARNING:** The power attenuator must have enough attenuation to prevent damage to the deviation meter.
3. Press the PTT switch.
 4. Observe the waveform on the oscilloscope and compare with that shown in Figure 6.
 5. Adjust RV5 and TC12 to achieve the proper wave form. Release the PTT switch.



6. Replace the deviation meter with a frequency counter.
 7. Set the CHANNEL selector to the highest transmit channel. Ensure that this channel has no DCS or CTCSS tones pre-programmed.
 8. Press PTT switch. Adjust TC11 for the correct transmit frequency. Release the PTT.
- **NOTE:** TC12 should not be allowed to be placed at the maximum capacitance position, if TC12 should be found to be at the maximum capacitance position, place TC12 at the typical position and adjust RV5 for the proper wave form.



TC12 Maximum capacitance position and typical position

MAXON SM-4450 UHF MOBILE

ALIGNMENT PROCEDURE

Modulation Deviation Adjustment

1. Connect an RF deviation meter to the radio through a power attenuator.
2. Set the CHANNEL selector to a transmit channel which has a DCS code pre-programmed (should be a mid-frequency channel).
3. Press the PTT switch.
4. Adjust RV3 for proper deviation, typically 750Hz. Release the PTT switch.
5. Set the CHANNEL selector to a transmit channel which has a low-frequency CTCSS tone (67.0Hz) pre-programmed.
6. Press the PTT switch and verify that the deviation is between 500Hz and 1000Hz. Release the PTT switch.
7. Set the CHANNEL selector to a transmit channel which has a high-frequency CTCSS tone (250.3Hz) pre-programmed.
8. Press the PTT switch and verify that the deviation is between 500Hz and 1000Hz. Release the PTT switch.
 - a. If deviation level is not that obtained in Step 6 adjust RV 401 to same level.
9. Connect an audio frequency generator to the MIC input (connected to the white wire in the microphone cable) of the radio. Set the audio output level for 30 mV. the audio frequency should be 1 kHz.
10. Press the PTT switch.
11. Adjust RV4 (maximum deviation adjustment) for the 4.2 kHz deviation if no CTCSS tones are present, and 4.9 kHz deviation if CTCSS tones are present.

RECEIVER ALIGNMENT

1. Connect an RF signal generator or communications service monitor to the antenna receptacle.
2. Connect a SINAD meter and an audio distortion analyzer across the speaker terminals. If an audio distortion analyzer is not available, connect an oscilloscope across the speaker terminals.
3. Turn the SQUELCH control fully counter-clockwise.
4. Adjust the VOLUME control to the proper level for the SINAD meter and audio distortion analyzer.
5. Set the CHANNEL selector to a mid-frequency receive channel.
6. Tune the RF signal generator to the channel frequency. the RF output level should be set for -47 dBm. The modulation should be set for ± 3 kHz FM deviation of a 1 kHz tone.
7. Adjust T10 for maximum audio output. Readjust the VOLUME control if necessary to avoid clipping on the output audio wave form. (This adjustment is typically not required.)
8. Decrease the RF generator output and adjust T1 through T9 for maximum sensitivity.
9. Check the sensitivity at the lowest and highest receive frequencies. If necessary, repeat steps (8) and (9) above at the lowest middle and highest frequencies for the best overall sensitivity.

MAXON SM-4450 UHF MOBILE ALIGNMENT PROCEDURE

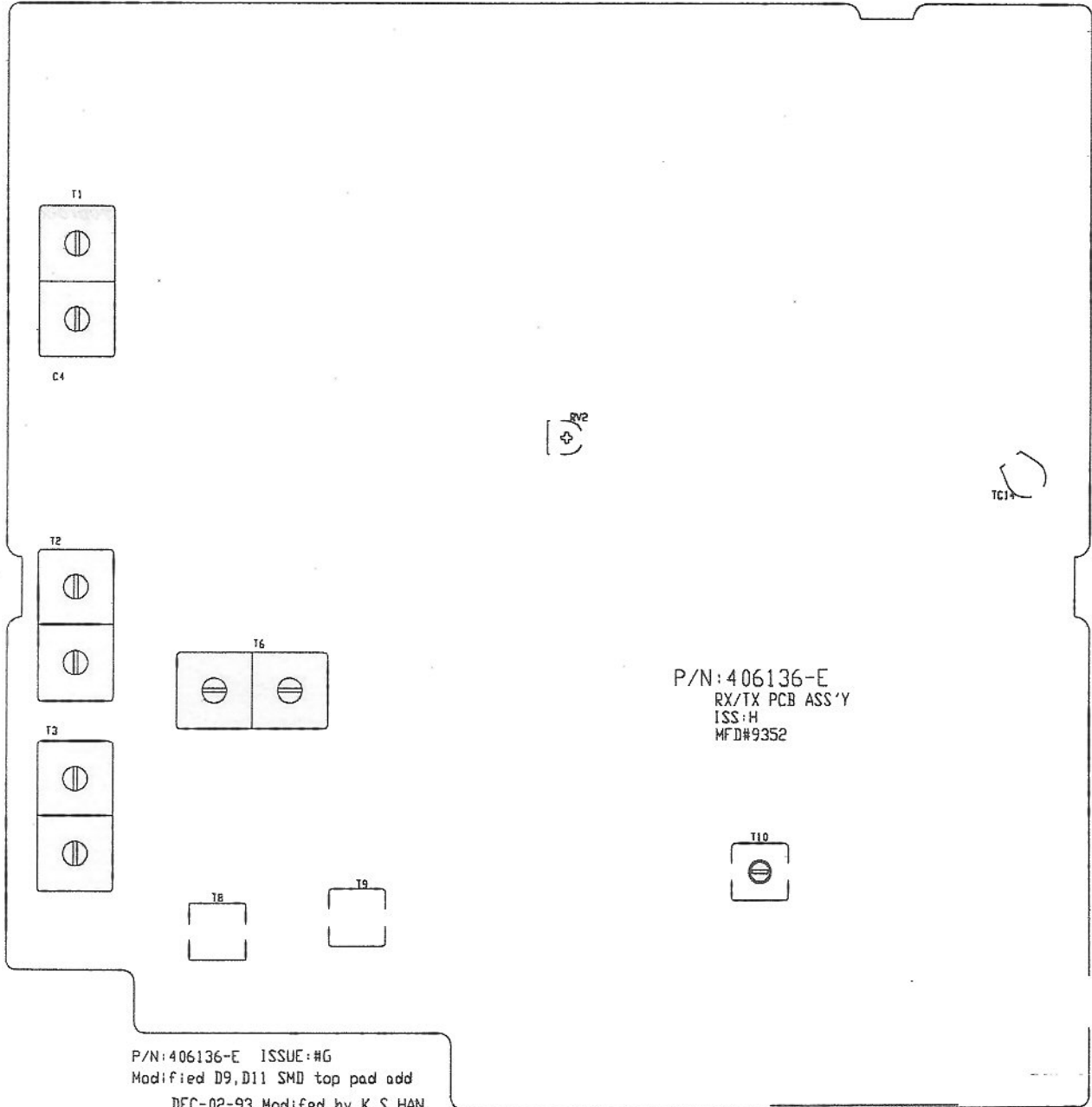
Receiver Squelch Adjustment

1. Set the channel selector for the mid frequency receive channel.
 2. Connect an RF signal generator or communications service monitor to the antenna receptacle. The modulation should be set for ± 3 kHz FM modulation of a 1kHz tone. The RF output level should be at a minimum.
 3. Adjust the SQUELCH control to the threshold point (the point where the speaker audio disappears).
 4. Increase the RF signal generator output level until speaker audio output reappears. Note the generator level.
 5. Turn the SQUELCH control fully clockwise.
 6. Increase the RF signal generator level by 16 dB.
- *NOTE: This squelch adjustment procedure is very important for the correct operation of the microprocessor aided squelch system.*

MAXON SM-4450 UHF MOBILE

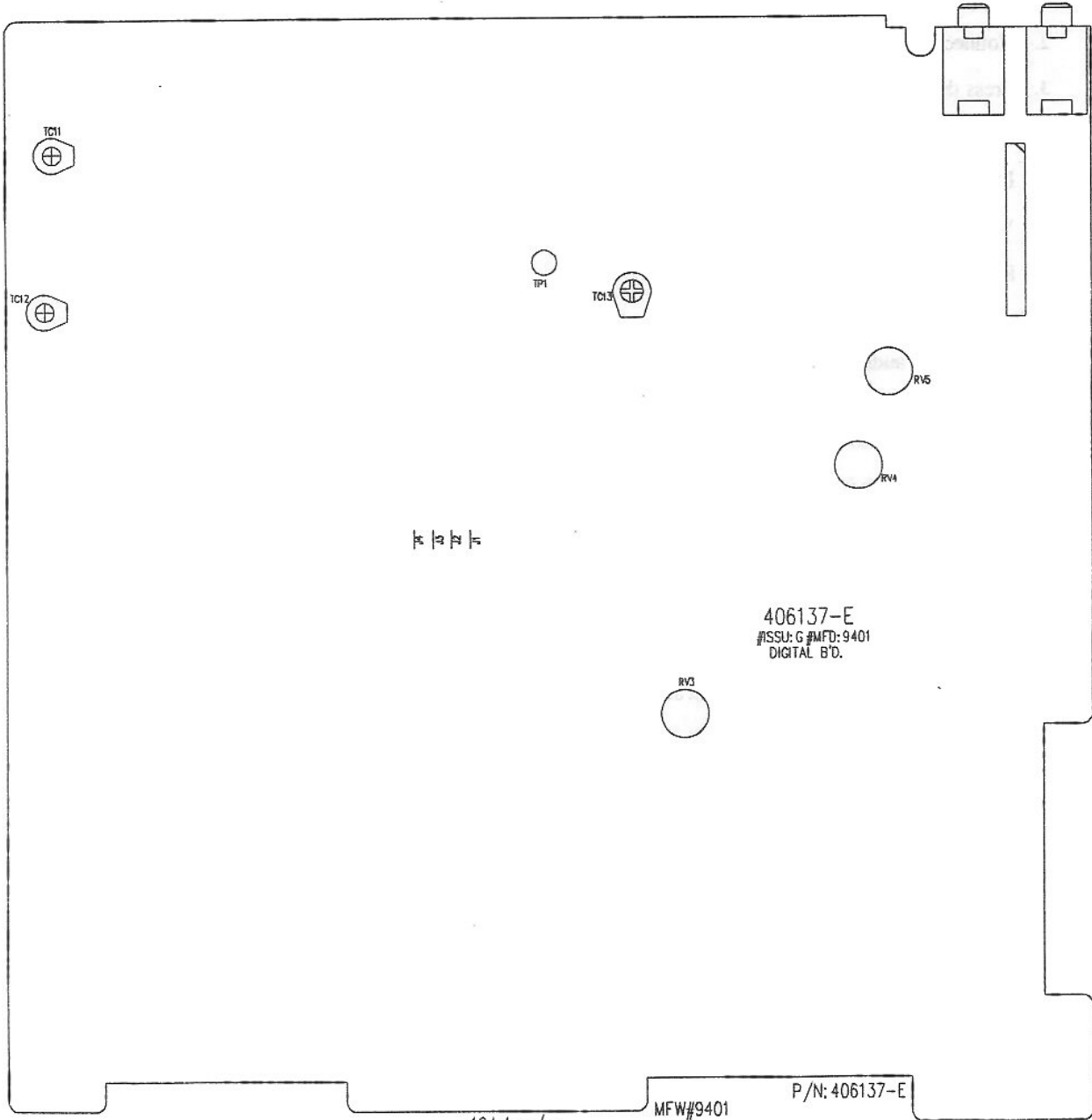
RF BOARD ALIGNMENT AND TEST POINTS

RF BOARD ALIGNMENT AND TEST POINTS



MAXON SM-4450 UHF MOBILE DIGITAL BOARD ALIGNMENT AND TEST POINTS

DIGITAL BOARD ALIGNMENT AND TEST POINTS



ISSU: G [Parts add.(C360,C361,C362,C363,R360)] [Top/Bot,X-tal soldermask add.]

MAXON SM-4450 UHF MOBILE

PERFORMANCE TEST

PERFORMANCE TEST

TRANSMITTER PERFORMANCE TEST

Power Output

1. Set the power supply voltage to 13.8 VDC (measured at the radio during transmit).
2. Connect an RF watt meter and dummy load to the antenna receptacle.
3. Press the PTT switch.
4. Verify that the output is at least 40 watts.
5. Reduce the power supply voltage to 11 volts.
6. Verify that the output is at least 15 watts.
7. Release the PTT switch.

Audio Response

1. Connect an audio generator to the microphone jack on the radio. Set the generator for a frequency of 1 kHz.
2. Connect a communication service monitor to the RF output of the radio through a power attenuator. Set the monitor to read average peak FM deviation.
3. Press the PTT switch.
4. Adjust the audio generator level to produce 1 kHz deviation.
5. Set the audio generator frequency to 2 kHz. The transmitter deviation should be approximately 2 kHz.
6. As the audio generator frequency is varied from 300Hz to 10 kHz, the deviation should increase until it reaches a maximum at an audio frequency of 2.5 kHz to 2.9 kHz. At higher frequencies, the deviation should decrease. the deviation at an audio frequency of 6 kHz should be less than 1 kHz.
7. Release the PTT switch.

Limiting Test

1. Set the audio generator frequency to 1 kHz.
2. Press the PTT switch and adjust the generator level to produce 1 kHz deviation. Note the generator level.
3. Increase the audio generator level by 20 dB (factor of 10 times).
4. Sweep the audio generator over a frequency range of 300Hz to 3 kHz. the deviation should not exceed ± 1 kHz within this range.
5. Release the PTT switch.

MAXON SM-4450 UHF MOBILE

PERFORMANCE TEST

Spectrum Test

1. Connect a spectrum analyzer to a sampled RF output of the radio.
2. Press the PTT switch. Observe the output spectrum on the spectrum analyzer.
3. All spurious and harmonics should be at least 60 dB below the carrier level.
4. Release the PTT switch.

RECEIVER PERFORMANCE TESTS

SINAD Sensitivity

1. Connect the FM signal generator of communication service monitor to the antenna jack.
2. Connect a SINAD meter across the speaker leads.
3. Turn the SQUELCH control fully counterclockwise for maximum noise.
4. Adjust the VOLUME control to approximately mid-range.
5. Set the FM signal generator or service monitor to the receive frequency. The modulation should be set for 3 kHz deviation of a 1 kHz tone.
6. Adjust the generator RF level so that the SINAD meter reads 12 dB. The signal generator RF level should be .35 uV or less.

Noise Quieting Sensitivity

1. Connect a VOM to the speaker leads.
2. Turn the SQUELCH control fully counterclockwise for maximum noise.
3. With no RF signal generator or communication service monitor connected to the radio, adjust the VOLUME control to obtain a noise reading of 1 volt RMS on the VOM.
4. Connect the RF signal generator or service monitor to the radio. Set the RF frequency to the receiver frequency of radio and remove any modulation.
5. Adjust the signal generator RF level for a noise reading on the VOM of 0.1 volt RMS. This is the 20 dB noise quieting point. the RF level should be 0.5 uV or less.

Squelch Sensitivity

1. Set the RF signal generator or service monitor to the receive frequency. Set the modulation to 3 kHz deviation of a 1 kHz audio tone.
2. Reduce the signal generator RF output to zero.
3. Rotate the SQUELCH control clockwise to the point where the speaker noise just goes away.
4. Increase the signal generator or service monitor RF level until the speaker noise returns. This is the threshold squelch setting. The generator output level should not exceed 0.20 uV.
5. Turn the SQUELCH control to maximum clockwise rotation.
6. Increase the generator output level until the squelch opens (busy LED is on). The output level should be between 10 and 20 dB (3 to 10 times) above the threshold setting.

MAXON SM-4450 UHF MOBILE

PERFORMANCE TEST

Audio Output

1. Increase the RF signal generator or service monitor RF level to 1000 uV.
2. Connect a 4 ohm audio dummy load to the AUXILIARY speaker jack.
3. Connect a true RMS audio voltmeter (the audio distortion analyzer may include this function) to the speaker leads.
4. With a 3 kHz deviation of a 1 kHz tone modulation applied to the signal generator, rotate the VOLUME control clockwise until the audio distortion is 10% or until the VOLUME controls reaches stop, whichever comes first.
5. The audio voltmeter should read 4.0 volts or greater.

MAXON SM-4450 UHF MOBILE COMPONENT REPLACEMENT

COMPONENT REPLACEMENT

SURFACE MOUNT COMPONENTS

Surface mount components should always be replaced using a temperature controlled soldering system. The soldering tools may be either a temperature controlled soldering iron or a temperature controlled hot-air soldering station. A hot-air system is recommended for the removal of components on the multi-layered boards used in the UHF synthesized mobile radio. With either soldering system, a temperature of 700°F (371°C) should be maintained.

The following procedures outline the removal and replacement of surface mount components. If a hot-air soldering system is employed, see the manufacturer's operating instructions for detailed information on the use of your system.

- *CAUTION: Avoid applying heat to the body of any surface mount component using standard soldering methods. Heat should be applied only to the metallized terminals of the components. Hot-air systems do not damage the components since the heat is quickly and evenly distributed to the external surface of the component.*
- *CAUTION: The CMOS Integrated Circuit devices used in this equipment can be destroyed by static discharges. Before handling one of these devices, service technicians should discharge themselves by touching the case of a bench test instrument that has a 3-prong power cord connected to an outlet with a known good earth ground. When soldering or desoldering a CMOS device, the soldering equipment should have a known good earth ground.*

SURFACE MOUNT REMOVAL

1. Grip the component with tweezers or small needle nose pliers.
2. Alternately heat the metallized terminal ends of the surface mount component with the soldering iron. If a hot-air system is used, direct the heat to the terminals of the component. Use extreme care with the soldering equipment to prevent damage to the printed circuit board (PCB) and the surrounding components.
3. When the solder on all terminals is liquefied, gently remove the component. Excessive force may cause the PCB pads to separate from the board if all solder is not completely liquefied.
4. It may be necessary to remove excess solder using a vacuum de-soldering tool or Solder wick. Again, use great care when de-soldering on the printed circuit boards. It may also be necessary to remove the epoxy adhesive that was under the surface mount component and any flux on the printed circuit board.

SURFACE MOUNT COMPONENT REPLACEMENT

1. "Tin" one terminal end of the new component and the corresponding pad of the PCB. Use as little solder as possible.
2. Place the component on the PCB pads, observing proper orientation for capacitors, diodes, transistors, etc.
3. Simultaneously touch the "tinned" terminal end and the "tinned" pad with the soldering iron. Slightly press the component down on the board as the solder liquefies. Solder all terminals, allowing the component time to cool between each application of heat. Do not apply heat for an excessive length of time and do not use excessive solder. With a hot-air system, apply hot air until all "tinned" areas are melted and the component is seated in place. It may be necessary to slightly press the component down on the board. Touch-up the soldered connections with a standard soldering iron if needed. Do not use excessive solder.
4. Allow the component and the board to cool and then remove all flux from the area using alcohol or another approved flux remover.

MAXON SM-4450 UHF MOBILE COMPONENT REPLACEMENT

SURFACE MOUNTED INTEGRATED CIRCUIT REPLACEMENT

- *CAUTION: Some chemicals may damage the internal and external plastic parts of the radio.*

Soldering and de-soldering techniques of the surface mounted IC's are similar to the above outlined procedures for the surface mounted chip components. Use extreme care and observe static precautions when removing or replacing the defective (or suspect) IC's. this will prevent any damage to the printed circuit board or the surrounding circuitry.

The hot-air soldering system is the best method of replacing surface mount IC's can easily be removed and installed using the hot-air system. See the manufacturers instructions for complete details on tip selection and other operating instructions unique to your system.

If a hot-air system is not available, the service technician may wish to clip the pins near the body of the defective IC and remove it. the pins can then be removed from the PCB with a standard soldering iron and tweezers, and the new IC installed following the Surface Mount Component Replacement procedures. It may not be necessary to "tin" all (or any) of the IC pins before the installation process.

ELECTRICAL PARTS LIST

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
140-103-3Z	TANTALUM DIP 0.1UF, 16WV (AUDIO RELAY PCB)	C1
144-702-4Z	CAP, TANTALUM 4.7UF, (RF PCB)	C1
131-043-4	CERAMIC AXIAL 100PF	C2
131-003-8Z	CAP, CERAMIC DISK 10PF	C3
135-630-4	CAP, CERAMIC 5.6PF	C4
131-204-3Z	CAP, CERAMIC DISK 12PF	C5
132-248-8	CERAMIC AXIAL 220PF	C6
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C8
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C9
132-248-8	CERAMIC AXIAL 220PF	C10
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C11
132-248-8	CERAMIC AXIAL 220PF	C12
131-003-8Z	CAP, CERAMIC 10PF	C13
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C14
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C15
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C16
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C17
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C18
132-248-8	CERAMIC AXIAL 220PF	C19
132-248-8	CERAMIC AXIAL 220PF	C20
112-212-9Z	CAP, MYLAR .0022UF, 50WV +/-5% MINI SIZE	C21
104-760-4	CAP, ELECTROLYTIC 4.7UF, 16V	C22
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C23
111-008-8Z	CAP, MYLAR 0.1UF, 50WV +/-10% MINI SIZE	C24
130-427-3	CERAMIC AXIAL 0.047UF	C25
102-210-4	CAP, ELECTROLYTIC 22UF, 16V	C26
142-212-8Z	CAP, TANTALUM 2.2UF, 16WV	C27
130-187-7	CAP, CERAMIC AXIAL .001UF	C28
130-187-7	CAP, CERAMIC AXIAL .001UF	C29
130-187-7	CAP, CERAMIC AXIAL .001UF	C30
130-187-7	CAP, TANTALUM 1.0UF, 16WV	C31
130-187-7	CAP, CERAMIC AXIAL .001UF	C31
141-008-6Z	CAP, TANTALUM 0.1UF, 16WV	C32
132-248-8	CERAMIC AXIAL 220PF	C34
132-218-1Z	CAP CHIP 220PF	C35
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C36
132-248-8	CERAMIC AXIAL 220PF	C37
101-023-7	CAP, ELECTROLYTIC 100 UF, 25V	C38
132-248-8	CERAMIC AXIAL 220PF	C39
130-187-7	CAP, CERAMIC AXIAL .001UF	C40
130-187-7	CAP, CERAMIC AXIAL .001UF	C41
132-248-8	CERAMIC AXIAL 220PF	C42
104-711-0	CAP, ELECTROLYTIC 47UF, 16V	C43
132-248-8	CERAMIC AXIAL 220PF	C45
104-711-0	CAP, ELECTROLYTIC 47UF, 16V	C46

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
132-248-8	CERAMIC AXIAL 220PF	C47
132-248-8	CERAMIC AXIAL 220PF	C48
131-043-4	CERAMIC AXIAL 100PF	C49
132-248-8	CERAMIC AXIAL 220PF	C50
132-248-8	CERAMIC AXIAL 220PF	C51
132-248-8	CERAMIC AXIAL 220PF	C52
130-187-7	CAP, CERAMIC AXIAL .001UF	C53
133-922-8	CAP, CERAMIC 39PF	C54
131-064-3	CAP, 100PF	C55
130-164-6	CAP, MULTILAYER CERAMIC .1UF,50V	C56
130-164-6	CAP, MULTILAYER CERAMIC .1UF,50V	C57
130-164-6	CAP, MULTILAYER CERAMIC .1UF,50V	C58
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C59
131-204-3Z	CAP, CERAMIC DISK 12PF	C60
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C61
135-624-9	CAP, CERAMIC 56PF	C62
111-008-8Z	CAP, MYLAR 0.1UF, 50WV +/-10% MINI SIZE	C63
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C64
114-709-2	CAP, MYLAR 0.01UF, 50WV +/-10% MINI SIZE	C65
111-008-7Z	CAP, MYLAR 0.01UF, 50WV +/-10% MINI SIZE	C66
115-603-4Z	CAP, MYLAR 0.0068UF, 50WV +/-5% MINI SIZE	C67
113-904-6Z	CAP, MYLAR 0.0039UF, 50WV +/-5% MINI SIZE	C68
116-806-6Z	CAP, MYLAR 0.0068UF, 50WV +/-5% MINI SIZE	C69
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C70
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C71
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C72
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C73
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C74
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C75
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C76
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C77
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C78
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C79
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C80
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C81
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C82
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C83
132-218-1Z	CAP CHIP 220PF	C84
131-034-6Z	CAP, CERAMIC CHIP 100PF	C85
132-248-8	CERAMIC AXIAL 220PF	C86
132-218-1Z	CAP CHIP 220PF	C87
131-034-6Z	CAP, CERAMIC CHIP 100PF	C88
132-248-8	CERAMIC AXIAL 220PF	C89
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C90
131-043-4	CERAMIC AXIAL 100PF	C91

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C92
135-106-8Z	CAP, CERAMIC CHIP 51PF	C94
131-023-8Z	CAP, CHIP 0.001UF	C95
132-248-8	CERAMIC AXIAL 220PF	C96
132-248-8	CERAMIC AXIAL 220PF	C97
111-008-7Z	CAP, MYLAR 0.01UF, 50WV +/-10% MINI SIZE	C98
132-218-1Z	CAP CHIP 220PF	C99
132-248-8	CERAMIC AXIAL 220PF	C100
102-242-3	CAP, ELECTROLYTIC 220UF, 16V	C101
132-218-1Z	CAP CHIP 220PF	C102
135-627-2	CAP, CERAMIC MONOLITHIC 5.6PF	C103
131-043-6Z	CERAMIC CHIP 100PF	C104
101-A02-8	CAP, ELECTROLYTIC 1000UF 25V	C105
132-248-8	CERAMIC AXIAL 220PF	C106
132-218-1Z	CAP CHIP 220PF	C107
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C108
132-248-8	CERAMIC AXIAL 220PF	C109
133-937-2Z	CAP, CERAMIC CHIP 39PF	C110
135-019-3Z	CAP, CERAMIC CHIP 5PF	C111
122-217-0Z	CAP, CERAMIC MONOLITHIC 22PF	C112
133-608-5	CAP, CERAMIC CHIP 36PF	C113
135-019-3Z	CAP, CERAMIC CHIP 5PF	C114
132-408-6Z	CERAMIC CHIP 24PF	C115
135-019-3Z	CAP, CERAMIC CHIP 5PF	C116
132-218-1Z	CAP, CERAMIC CHIP 220PF	C117
131-034-6Z	CAP, CERAMIC CHIP 100PF	C118
132-723-0Z	CERAMIC CHIP 27PF	C119
132-723-0Z	CERAMIC CHIP 27PF	C120
132-408-6Z	CAP CHIP 24PF	C121
132-026-4Z	CAP CHIP 2PF	C122
101-023-7	CAP, ELECTROLYTIC 100 UF, 25V	C123
131-034-6Z	CAP, CERAMIC CHIP 100PF	C124
132-218-1Z	CAP CHIP 220PF	C125
133-608-5	CAP, CERAMIC CHIP 36PF	C126
133-608-5	CAP, CERAMIC CHIP 36PF	C127
132-715-3	CERAMIC MONOLITHIC GR111COG270	C130
131-539-6	CAP MONOLITHIC GR111COG150	C131
131-539-6	CAP MONOLITHIC GR111COG150	C132
132-225-7	CAP, CERAMIC MONOLITHIC	C133
132-715-3	CERAMIC MONOLITHIC GR111COG270	C136
132-715-3	CERAMIC MONOLITHIC GR111COG270	C137
133-938-3	CAP, CERAMIC 39PF	C138
133-317-2	CAP, CERAMIC 33PF	C139
131-539-6	CAP, MONOLITHIC GR111COG150	C140
131-045-6	CERAMIC MONOLITHIC 10PF	C141

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
131-045-6	CERAMIC MONOLITHIC 10PF	C142
130-025-8Z	CAP, CHIP 0.001UF	C143
133-339-2Z	CAP, CERAMIC CHIP 330PF	C144
133-907-5	CAP, CERAMIC MONOLITHIC 3.9PF	C145
131-045-6	CERAMIC MONOLITHIC 10PF	C146
131-045-6	CERAMIC MONOLITHIC 10PF	C147
135-104-6	CAP, CERAMIC MONOLITHIC 3PF	C148
132-218-1Z	CAP CHIP 220PF	C149
133-938-3	CAP, CERAMIC 39PF	C150
135-019-3Z	CAP, CERAMIC CHIP 5PF	C151
135-019-3Z	CAP, CERAMIC CHIP 5PF	C152
132-248-8	CERAMIC AXIAL 220PF	C153
132-248-8	CERAMIC AXIAL 220PF	C154
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C155
132-218-1Z	CAP CHIP 220PF	C156
138-227-9	CAP, CERAMIC 82PF	C157
134-722-1Z	CERAMIC, CHIP 47PF	C158
101-007-3	CAP, ELECTROLYTIC 1.0UF, 50V	C201
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C202
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C203
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C204
104-713-2	CAP, ELECTROLYTIC 47UF, 25V	C205
141-008-6Z	CAP, TANTALUM 1.0UF, 16WV	C206
111-008-7Z	CAP, MYLAR 0.1UF, 50WV +/-10% MINI SIZE	C207
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C208
104-739-6	CAP, ELECTROLYTIC 47UF, 16V	C209
102-210-4	CAP, ELECTROLYTIC 22UF, 16V	C210
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C211
104-723-1	CAP, ELECTROLYTIC 470UF, 16V	C212
140-103-3Z	CAP, TANTALUM 0.1UF 16WV	C213
141-008-6Z	CAP, TANTALUM 1.0UF, 16WV	C215
104-723-1	CAP, ELECTROLYTIC 470UF, 16V	C216
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C217
101-094-1	CAP, ELECTROLYTIC (AX)1000UF	C218
111-009-8Z	CAP, MYLAR 0.1UF, 50WV +/-10% MINI SIZE	C219
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C220
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C221
101-003-9	CAP, ELECTROLYTIC 1.0UF, 16V	C222
101-003-9	CAP, ELECTROLYTIC 1.0UF, 16V	C223
101-003-9	CAP, ELECTROLYTIC 1.0UF, 16V	C224
141-012-92	CAP, TANTALUM 10UF, 16WV	C225
104-723-1	CAP, ELECTROLYTIC 470UF, 16V	C226
111-009-8Z	CAP, MYLAR 0.1UF, 50WV +/-10% MINI SIZE	C227
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C228
133-004-9Z	CAP, CERAMIC 30PF, 50WV	C229

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
133-004-9Z	CAP, CERAMIC 30PF, 50WV	C230
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C231
146-801-0Z	CAP, TANTALUM 6.8UF, 16WV	C232
111-802-7Z	CAP, MYLAR 0.018UF 50V +/-15% MINI SIZE	C233
113-306-6Z	CAP, MYLAR 0.033UF 50V +/-10% MINI SIZE	C234
111-803-8Z	CAP, MYLAR 0.0018UF, 50WV +/-5% MINI SIZE	C235
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C236
128-201-2	CAP, POLY 820PF, 50WV	C237
144-702-4Z	CAP, TANTALUM 4.7UF, 16WV	C238
134-702-1Z	CAP, CERAMIC DISK 470PF, 50WV	C239
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C240
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C241
115-603-4Z	CAP, MYLAR 0.0056UF, 50WV +/-5% MINI SIZE	C242
114-708-1Z	CAP, MYLAR 0.047UF, 50WV +/-10% MINI SIZE	C243
136-825-9	CAP, CERAMIC 68PF	C244
144-702-4Z	CAP, TANTALUM 4.7UF, 16WV	C245
111-802-7Z	CAP, MYLAR 0.018UF, 50WV +/-5% MINI SIZE	C246
115-603-4Z	CAP, MYLAR 0.0056UF, 50WV +/-5% MINI SIZE	C247
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C248
132-220-2Z	CAP, MONOLITHIC 220PF	C249
132-220-2Z	CAP, MONOLITHIC 220PF	C250
132-220-2Z	CAP, MONOLITHIC 220PF	C251
132-220-2Z	CAP, MONOLITHIC 220PF	C252
111-802-7Z	CAP, MYLAR 0.018UF, 50WV +/-2% MINI SIZE	C253
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C254
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C255
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C256
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C257
135-624-9	CAP, CERAMIC 56PF	C258
111-505-9Z	CAP, MYLAR 0.015UF, 50WV +/-10% MINI SIZE	C259
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C260
101-012-7	CAP, ELECTROLYTIC 10UF, 16V	C261
135-624-9	CAP, CERAMIC 56PF	C262
102-210-4	CAP, ELECTROLYTIC 22UF, 16V	C263
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C264
115-603-4Z	CAP, MYLAR 0.0068UF, 50WV +/-5% MINI SIZE	C265
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C266
114-709-2Z	CAP, MYLAR 0.0047UF, 50WV +/-5% MINI SIZE	C267
112-207-5	CAP, MYLAR 0.022UF, 50WV +/-5% MINI SIZE	C268
111-803-8Z	CAP, MYLAR 0.0018UF, 50WV +/-5% MINI SIZE	C269
132-220-2Z	CAP, CHIP 220PF	C270
144-702-4Z	CAP, TANTALUM 4.7UF, 16WV	C271
144-702-4Z	CAP, TANTALUM 4.7UF, 16WV	C272
140-103-3Z	TANTALUM DIP 0.1UF, 16WV	C274
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C275

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
130-188-8	CAP, CERAMIC AXIAL 0.01UF	C276
104-711-0	CAP, ELECTROLYTIC 47UF, 10V	C277
130-198-6	CERAMIC MONOLITHIC	C278
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C279
130-187-7	CAP, CERAMIC AXIAL 0.001UF	C280
135-630-4	CAP, CERAMIC 5.6PF	C281
134-738-4	CAP, CERAMIC 47PF	C282
132-239-0	CAP, CERAMIC 22PF	C283
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C284
136-816-5Z	CAP, CHIP 0.001UF	C285
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C286
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C287
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C289
130-198-6	CAP, CERAMIC MONOLITHIC	C290
141-008-6Z	CAP, TANTALUM 1.0UF 16WV	C291
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C292
132-220-2Z	CAP, CHIP 220PF	C293
140-103-3Z	CAP, TANTALUM 1.0UF 16WV	C294
140-103-3Z	CAP, TANTALUM 1.0UF 16WV	C295
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C296
141-012-9Z	CAP, TANTALUM 10UF 16WV	C297
104-739-6	CAP, ELECTROLYTIC 47UF 16 V	C298
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C299
132-220-2Z	CAP, CHIP 220PF	C300
131-208-7Z	CAP, CERAMIC CHIP 12PF	C301
135-010-4Z	CAP, MONOLITHIC 5PF	C302
134-007-7Z	CAP, CERAMIC MONOLITHIC 4PF	C303
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C304
104-739-6	CAP, ELECTROLYTIC 47UF 16V	C305
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C306
141-012-9Z	CAP, TANTALUM 10UF 16WV	C307
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C308
131-027-0Z	CAP, CERAMIC CHIP 100PF	C309
132-220-2Z	CAP, CHIP 220PF	C310
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C311
131-039-1Z	CAP, CERAMIC CHIP 10PF	C312
132-220-2Z	CAP, CHIP 220PF	C313
138-004-4Z	CAP, CERAMIC MONOLITHIC 8PF	C315
130-504-9Z	CAP, CERAMIC CHIP 0.5PF	C316
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C317
132-220-2Z	CAP, CHIP 220PF	C318
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C319
132-227-9	CAP, CERAMIC NONOLITHIC	C320
131-030-2Z	CAP, CERAMIC CHIP 1PF	C321
132-220-2Z	CAP, CHIP 220PF	C322

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PART NO.	DESCRIPTION	SYMBOL
141-012-9Z	CAP, TANTALUM 10UF, 16WV	C323
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C324
137-005-0	CAP, CERAMIC MONOLITHIC 7PF	C325
132-220-2Z	CAP, CHIP 220PF	C326
135-010-4Z	CAP, MONOLITHIC 5PF	C327
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C328
130-504-9Z	CAP, CERAMIC CHIP 0.5PF	C329
104-739-6	CAP, ELECTROLYTIC 47UF, 16V	C330
130-A17-6Z	CAP, CERAMIC CHIP 0.001UF	C331
132-220-2Z	CAP, CERAMIC CHIP 220P	C332
130-198-6	CERAMIC MONOLITHIC	C333
132-248-8	CERAMIC AXIAL 220PF	C360
132-248-8	CERAMIC AXIAL 220PF	C361
130-417-4Y	CAP, CHIP 0.047UF	C401
130-417-4Y	CAP, CHIP .047UF	C402
130-417-4Y	CAP, CHIP 0.047UF	C403
141-046-0Z	TANTALUM, CHIP 10YF	C404
130-417-4Y	CAP, CHIP 0.047UF	C405
130-417-4Y	CAP, CHIP 0.047UF	C406
130-417-4Y	CAP, CHIP 0.047UF	C420
130-417-4Y	CAP, CHIP 0.047UF	C421
130-417-4Y	CAP, CHIP 0.047UF	C422
130-417-4Y	CAP, CHIP 0.047UF	C423
134-702-1Z	CAP, CERAMIC DISK 470PF, 50WV	C501
270-009-2Z	FILTER, CERAMIC LT455EW	CF1
181-005-5	CAP, FEED THROUGH 1000PF	CF2
243-008-7	DIODE 1N4148 (AUDIO RELAY PCB)	D1
243-008-7	DIODE 1N4148 (RF PCB)	D2
243-008-7	DIODE 1N4148	D2
243-011-9	DIODE 1SS133	D3
243-011-9	DIODE 1SS133	D4
243-011-9	DIODE 1SS133	D6
244-001-5	DIODE GE 1N602	D7
244-001-5	DIODE GE 1N602	D8
243-029-6	DIODE SI 282-BA	D9
243-029-6	DIODE SI 282-BA	D9
243-029-6	DIODE SI 282-BA	D11
243-008-7	DIODE 1N4148	D12
245-008-7	DIODE 2A100V (RF PCB)	D13
245-009-8	DIODE IN4003	D14
243-026-3	DIODE SILICON SCHOTT1SS97	D15
243-016-4	DIODE PIN UM9401	D16
243-016-4	DIODE PIN UM9401	D17
245-009-8	DIODE IN4003	D101
245-009-8	DIODE IN4003	D102

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PART NO.	DESCRIPTION	SYMBOL
241-111-6Z	DIODE ZENER 1N5252B	D103
245-024-1	DIODE 1N5819	D104
241-059-3Z	DIODE ZENER 1N5227B	D105
251-069-5	DIODE LED LAMP SLC22UR3	D109
249-051-5	DIODE SILICON BB515	D110
251-042-0	DIODE LED LAMP SLC22UR3	D111
243-008-7	DIODE 1N4148	D111
251-041-9	DIODE LED LAMP SLC22UR3	D112
243-008-7	DIODE 1N4148	D116
243-008-7	DIODE 1N4148	D117
243-008-7	DIODE 1N4148	D118
241-201-7Z	DIODE ZENER 1N5235B	D119
243-008-7	DIODE 1N4148	D120
243-008-7	DIODE 1N4148	D121
243-037-3	DIODE SI BB609A	D122
249-051-5	DIODE SILICON BB515	D123
243-008-7	DIODE 1N4148	D124
320-536-5	BEAD CORE 56 59065-4B	FB1
320-536-5	BEAD CORE 56 59065-4B	FB2
320-536-5	BEAD CORE 56 59065-4B	FB3
320-536-5	BEAD CORE 56 59065-4B	FB4
320-536-5	BEAD CORE 56 59065-4B	FB5
320-536-5	BEAD CORE 56 59065-4B	FB6
320-536-5	BEAD CORE 56 59065-4B	FB7
320-536-5	BEAD CORE 56 59065-4B	FB8
320-536-5	BEAD CORE 56 59065-4B	FB9
252-039-3	FLUORESCENT DISPLAY 4-ST-01ZS1	FL1
229-074-0	I.C. MB3756	IC1
231-064-4	I.C. LM358M	IC4
223-008-1	I.C. MC3357P	IC2
222-038-3	I.C. KIA358P	IC5
222-038-3	I.C. KIA358P	IC3
229-383-9	I.C. UCN 5810A or AF	IC104
229-075-1	I.C. TDA2003H	IC103
229-104-4	I.C. MB504P	IC109
229-463-8Z	I.C. AT93C56-10PC	IC108
229-383-9	I.C. UCN 5810A or AF	IC105
229-503-1	I.C. 80C51-ARC (SM-4000EX)	IC107
229-516-3	I.C. MB501P DIP 08P MO1	IC117
223-152-7	I.C. MC145048	IC119
225-004-7	I.C. AN6540	IC102
222-024-0	I.C. KIA4558P	IC114
223-109-9	I.C. MC142100CP	IC109
223-119-8	I.C. KA78L05	IC116
222-038-3	I.C. KIA358P	IC111

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PART NO.	DESCRIPTION	SYMBOL
223-001-4Z	I.C. KIA7805PI	IC101
223-080-5	I.C. MC14066B	IC115
224-022-8	I.C. LA6458S	IC110
224-022-8	I.C. LA6458S	IC112
223-137-4	I.C. MC145156P2	IC118
223-140-6	I.C. SN74LS257A	IC106
222-024-0	I.C. KIA4558P	IC113
231-064-4	I.C. LM358M	IC120
310-720-3	SPRING COIL 3.0DIAX0.5DIAX1.5T(R)	L1
310-720-3	SPRING COIL 3.0DIAX0.5DIAX1.5T(R)	L2
310-381-0	COIL, AXIAL 1 MH	L3
310-380-9	COIL, AXIAL 100UH	L4
310-377-7	COIL, AXIAL .22UH	L5
310-381-0	COIL, AXIAL 1 MH	L6
310-377-7	COIL, AXIAL .22UH	L7
310-383-2	COIL, AXIAL .82UH	L8
310-377-7	COIL, AXIAL .22UH	L9
310-384-3	COIL, AXIAL 1 MH	L10
310-377-7	COIL, AXIAL .22UH	L11
310-289-1	COIL, AXIAL 2.2UH	L12
310-377-7	COIL, AXIAL .22UH	L13
310-377-7	COIL, AXIAL .22UH	L14
310-381-0	COIL, AXIAL 1 MH	L15
310-381-0	COIL, AXIAL 1 MH	L16
310-381-0	COIL, AXIAL 1 MH	L17
310-381-0	COIL, AXIAL 1 MH	L18
310-381-0	COIL, AXIAL 1 MH	L19
310-381-0	COIL, AXIAL 1 MH	L20
310-377-7	COIL, AXIAL .22UH	L21
310-719-3	SPRING COIL 3.0DIAX0.5DIAX1.5T(L)	L22
310-377-7	COIL, AXIAL .22UH	L23
310-551-7	SPRING COIL 2.4&XO.L4&X6(1/2)R	L24
310-551-7	SPRING COIL 2.4&XO.L4&X6(1/2)R	L25
310-289-1	COIL, AXIAL 2.2UH	L26
310-718-2	SPRING COIL 3.0DIAX0.7DIAX4.5T(L)	L27
310-142-1	COIL, INDUCTOR MK-30 (100 OHM, 1/2W ON 8T)	L28
310-142-1	COIL, INDUCTOR MK-30 (100 OHM, 1/2W ON 8T)	L29
310-717-1	SPRING COIL 3.0DIAX0.65DIAX6T(R)	L30
310-509-035	COIL, ASS'Y 0.6DIAX15T	L31
300-008-1	TRANSFORMER CHOKE	L32
310-143-2	COIL, INDUCTOR MK-30 (4T)	L33
310-143-2	COIL, INDUCTOR MK-30 (4T)	L34
310-379-9	COIL, AXIAL 1UH	L35
310-379-9	COIL, AXIAL 1UH	L36
310-289-1	COIL, AXIAL 2.2UH	L37

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PART NO.	DESCRIPTION	SYMBOL
310-380-9	COIL, AXIAL 100UH	L101
310-380-9	COIL, AXIAL 100UH	L102
310-379-9	COIL, AXIAL 1UH	L103
310-379-9	COIL, AXIAL 1UH	L104
310-379-9	COIL, AXIAL 1UH	L105
310-378-7	COIL, AXIAL 2.2UH	L106
310-379-9	COIL, AXIAL 1UH	L111
310-379-9	COIL, AXIAL 1UH	L112
310-721-4	SPRING COIL 2.8DIAX0.5DIAX3.5T(R)	L113
310-377-7	COIL, AXIAL 0.22UH	L114
203-009-6	TRANSISTOR MPS9681(T) (AUDIO RELAY PCB)	Q1
203-145-5	TRANSISTOR MRF9511 (RF PCB)	Q1
203-054-6	TRANSISTOR LSP966 (RF PCB)	Q2
203-086-5	FET J310 (RF PCB)	Q2
203-005-2	TRANSISTOR MPS9426(C)	Q3
203-009-6	TRANSISTOR MPS9618(T)	Q4
203-014-0	TRANSISTOR MPS9631(T)	Q5
203-014-0	TRANSISTOR MPS9631(T)	Q6
203-014-0	TRANSISTOR MPS9631(T)	Q7
203-010-6	TRANSISTOR MPS9618(T)	Q8
202-066-2	TRANSISTOR KTB1367	Q9
203-040-3	TRANSISTOR LP1001	Q10
203-055-7	TRANSISTOR MRF581	Q11
209-066-7	TRANSISTOR MRF630	Q12
203-067-8	TRANSISTOR MRF654	Q13
203-186-2	TRANSISTOR MRF650	Q14
203-009-6	TRANSISTOR MPS9681(T)	Q101
203-014-0	TRANSISTOR MPS9631(T)	Q102
203-010-6	TRANSISTOR MPS9618(T)	Q103
218-032-4	TRANSISTOR KSP2222	Q104
218-032-4	TRANSISTOR KSP2222	Q105
203-009-6	TRANSISTOR MPS9681(T)	Q106
203-009-6	TRANSISTOR MPS9681(T)	Q107
203-014-0	TRANSISTOR MPS9631(T)	Q108
203-014-0	TRANSISTOR MPS9631(T)	Q109
203-014-0	TRANSISTOR MPS9631(T)	Q110
203-158-7	TRANSISTOR BC848BT	Q111
203-158-7	TRANSISTOR BC848BT	Q112
203-158-7	TRANSISTOR BC848BT	Q113
203-156-5	TRANSISTOR BC858BL	Q114
203-104-8	TRANSISTOR MRF5711	Q115
203-158-7	TRANSISTOR BC848BT	Q116
200-003-5	TRANSISTOR BFR92A REEL	Q117
213-006-1	FET BF998-E6327	Q118
200-003-5	TRANSISTOR BFR92A REEL	Q119

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PART NO.	DESCRIPTION	SYMBOL
002-101-8Z	RES, METAL 100 OHM 1/8W +/-5% (RF PCB)	R1
002-474-5Z	RES, METAL 470K OHM 1/8W +/-5% "S"+C433	R1
002-332-0Z	RES, METAL 100 OHM 1/8W +/-5%	R3
002-821-5Z	RES, METAL 6.2K OHM 1/8 +/-5% "S"	R4
002-683-7Z	RES, METAL 2.7K OHM 1/8W +/-5% "S"	R5
002-223-5Z	RES, METAL 100 OHM 1/8W +/-5%	R6
002-152-4Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R7
002-822-6Z	RES, METAL 8.2K OHM 1/8W +/-5% "S"	R8
002-222-4Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R9
002-561-0Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R10
002-470-1Z	RES, METAL 820 OHM 1/8 +/-5% "S"	R11
002-272-9Z	RES, METAL 68K OHM 1/8W +/-5% "S"	R12
002-272-9Z	RES, METAL 22K OHM 1/8W +/-5% "S"	R13
002-512-6Z	RES, METAL 560 OHM 1/8W +/-5% "S"	R14
002-271-8Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R15
002-103-0Z	RES, METAL 2.7K OHM 1/8W +/-5% "S"	R16
002-562-1Z	RES, METAL 2.7K OHM 1/8W +/-5% "S"	R17
002-223-5Z	RES, METAL 5.1K OHM 1/8W +/-5% "S"	R18
002-103-0Z	RES, METAL 270 OHM 1/8W +/-5% "S"	R19
002-104-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R20
002-121-6Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R21
002-101-8Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R22
002-331-9Z	RES, METAL 270 OHM 1/8W +/-5% "S"	R23
002-473-4Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R24
002-153-8Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R25
002-680-4Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R26
002-222-4Z	RES, METAL 1.2K OHM 1/8W +/-5% "S"	R27
002-223-5Z	RES, METAL 390 OHM 1/8W +/-5% "S"	R28
002-822-6Z	RES, METAL 330 OHM 1/8 +/-5% "S"	R29
002-103-0Z	RES, METAL 470 OHM 1/8 +/-5% "S"	R30
002-221-3Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R31
002-221-3Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R32
002-473-4Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R33
002-103-0Z	RES, METAL 33K OHM 1/8 W +/-5% "S"	R34
002-103-0Z	RES, METAL 100 OHM 1/8W +/-5%	R35
002-103-0Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R36
002-104-1Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R37
002-473-4Z	RES, METAL 33K OHM 1/8 W +/-5% "S"	R38
002-103-0Z	RES, METAL 39K OHM 1/8W +/-5% "S"	R39
002-103-0Z	RES, METAL 4.43K OHM 1/8W +/-1% "S"	R40
002-470-1Z	RES, METAL 2.42K OHM 1/8W +/-1% "S"	R41
002-822-6Z	RES, METAL 2K OHM 1/8W +/-5% "S"	R42
013-229-9	RES, METAL 33K OHM 1/8 W +/-5% "S"	R42
002-339-7Z	RES, METAL 21.3K OHM 1/8W +/-1% "S"	R43
002-822-6Z	RES, 8.2K 1/8W +/-5%	R43A

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PART NO.	DESCRIPTION	SYMBOL
002-339-7Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R44
002-339-7Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R45
002-339-7Z	RES, METAL 220 OHM 1/8W +/-5% "S"	R46
002-339-7Z	RES, METAL 8.2K OHM 1/8W +/-5% "S"	R47
002-271-8Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R48
002-339-7Z	RES, METAL 1M OHM 1/8W +/-5% "S"	R49
002-339-7Z	RES, METAL 1.2K OHM 1/8W +/-5% "S"	R50
002-339-7Z	RES, METAL 150 OHM 1/8W +/-5% "S" MINI	R51
002-103-0Z	RES, METAL 330 OHM 1/2W +/-5% "S"	R52
002-103-0Z	RES, METAL 1.8K OHM 1/2W +/-5% "S"	R53
002-103-0Z	RES, METAL 100 OHM 1/8W +/-5%	R56
002-103-0Z	RES, CHIP 100 OHM 1/10W +/-5%	R57
002-103-0Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R58
002-222-4Z	RES, METAL 4.7 OHM 1/8W +/-5% "S"	R59
002-222-4Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R60
002-222-4Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R61
002-222-4Z	RES, METAL 10 OHM 1/8W +/-5% "S"	R62
002-243-3Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R63
002-183-2Z	RES, METAL 560 OHM 1/8W +/-5% "S"	R64
002-563-2Z	RES, METAL 820 OHM 1/8 +/-5% "S"	R65
002-103-0Z	RES, METAL 27 OHM 1/8W +/-5% "S"	R66
002-104-1Z	RES, METALOXIDE 33 OHM 1W +/-5%	R67
002-104-1Z	RES, METAL 2.2 OHM 1/8W +/-5% "S"	R68
002-104-1Z	RES, METAL 100 OHM 1/2W +/-5% S MINI	R69
030-101-7Z	RES, METAL 100 OHM 1/2W +/-5% S MINI	R70
002-103-0Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R71
002-102-9Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R71
002-103-0Z	RES, METAL 560 OHM 1/8W +/-5% "S"	R201
002-104-1Z	RES, METAL 22K OHM 1/8W +/-5% "S"	R202
002-104-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R203
002-103-0Z	RES, METAL 120 OHM 1/8W +/-5% "S"	R204
002-224-6Z	RES, METAL 100 OHM 1/8W +/-5%	R205
002-332-0Z	RES, METAL 330 OHM 1/8 +/-5% "S"	R206
002-472-3Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R207
002-562-1Z	RES, METAL 15K OHM 1/8W +/-5% "S"	R208
002-473-4Z	RES, METAL 68 OHM 1/8W +/-5% "S"	R209
002-472-3Z	RES, METAL 22K OHM 1/8W +/-5% "S"	R210
002-472-3Z	RES, METAL 8.2K OHM 1/8W +/-5% "S"	R211
002-102-9Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R212
002-472-3Z	RES, METAL 220 OHM 1/8W +/-5% "S"	R213
002-472-3Z	RES, METAL 220 OHM 1/8W +/-5% "S"	R214
002-472-3Z	RES, METAL 47K OHM 1/8W +/-5% "S" 4.7K	R215
002-472-3Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R216
002-472-3Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R217
002-472-3Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R218

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
002-472-3Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R219
002-122-7Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R220
002-472-3Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R221
002-109-6Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R222
002-102-9Z	RES, METAL 8.2K OHM 1/8W +/-5% "S"	R223
002-103-0Z	RES, CARBONFILM 2.2K OHM 1/5W +/-5%	R224
002-684-8Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R225
002-684-8Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R226
002-103-0Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R227
002-684-8Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R228
002-224-6Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R229
002-391-3Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R230
002-154-6Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R231
002-823-7Z	RES, METAL 3.3 OHM 1/8W +/-5% "S"	R232
002-103-0Z	RES, 10K 1/8W +/-5%	R233
002-562-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R234
002-332-0Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R235
002-621-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R236
002-223-5Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R237
002-244-4Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R238
002-152-4Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R239
002-273-0Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R240
002-335-3Z	RES, METAL 2.2K OHM 1/8W +/-5% "S"	R241
002-331-9Z	RES, METAL 24K OHM 1/5W +/-5% "S"	R242
002-152-4Z	RES, METAL 18K OHM 1/5W +/-5% "S"	R243
002-274-1Z	RES, METAL 56K OHM 1/5W +/-5% "S"	R244
002-152-4Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R245
002-103-0Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R246
002-103-0Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R247
002-472-3Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R248
002-103-0Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R249
002-103-0Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R250
002-473-4Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R251
002-562-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R254
002-101-8Z	RES, METAL 220K OHM 1/8W +/-5% "S"	R255
002-471-2Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R256
002-103-0Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R257
002-103-0Z	RES, METAL 5.6K OHM 1/8 +/-5% "S"	R258
060-473-2Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R259
060-333-9Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R260
060-563-0Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R262
009-470-6Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R263
002-123-8Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R264
002-332-0Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R265
002-152-4Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R266

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
002-102-9Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R267
002-683-7Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R268
060-184-1Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R269
060-222-2Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R270
060-392-2Z	RES, METAL 1 OHM 1/8 W +/-5% "S"	R271
060-682-4Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R272
060-272-7Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R273
060-153-3Z	RES, METAL 680K OHM 1/8W +/-5% "S"	R275
060-100-5Z	RES, METAL 680K OHM 1/8W +/-5% "S"	R276
002-102-9Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R277
002-152-4Z	RES, METAL 680K OHM 1/8W +/-5% "S"	R278
060-472-1Z	RES, METAL 220K OHM 1/8W +/-5% "S"	R279
060-122-5Z	RES, METAL 150K OHM 1/8W +/-5% "S"	R280
060-122-5Z	RES, METAL 82K OHM 1/8W +/-5% "S"	R281
060-100-5Z	RES, METAL 5.6K OHM 1/8 +/-5% "S"	R282
002-470-1Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R283
060-562-9Z	RES, METAL 620K OHM 1/8 W +/-5% "S" <i>620Ω</i>	R284
060-182-9Z	RES, METAL 22K OHM 1/8W +/-5% "S"	R285
060-221-1Z	RES, METAL 220K OHM 1/8 W +/-5% "S"	R286
060-222-2Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R287
060-470-9Z	RES, METAL 27K OHM 1/8 W +/-5% "S"	R288
002-473-4Z	RES, METAL 33K OHM 1/8 W +/-5% "S"	R289
060-100-5Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R290
060-822-4	RES, METAL 270K OHM 1/8 W +/-5% "S"	R291
060-562-9Z	RES, METAL 1.5K OHM 1/8 W +/-5% "S"	R292
060-221-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R293
060-104-9Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R294
060-823-5Z	RES, METAL 4.7K OHM 1/8W +/-5% "S"	R295
060-223-3Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R296
060-822-4	RES, METAL 10K OHM 1/8W +/-5% "S"	R297
060-562-9Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R298
060-181-8Z	RES, METAL 5.6K OHM 1/8 +/-5% "S"	R299
002-333-1Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R300
060-392-2Z	RES, METAL 10K OHM 1/8W +/-5% "S"	R301
060-000-8Z	RES, CHIP 47K OHM 1/10W +/-5%	R303
060-102-7Z	RES, CHIP 33K OHM 1/10W +/- 5%	R304
002-471-2Z	RES, CHIP 56K OHM 1/10 +/-5%	R306
002-101-8Z	RES, METAL 47 OHM 1/4W +/-5% "S"	R307
002-104-1Z	RES, METAL 12K OHM 1/8W +/-5% "S"	R308
002-102-9Z	RES, METAL 3.3K OHM 1/8W +/-5% "S"	R309
002-332-0Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R310
002-394-6Z	RES, METAL 68K OHM 1/8W +/-5% "S"	R311
002-333-1Z	RES, METAL 180K OHM 1/8W +/-5% "S"	R312
002-393-5Z	RES, CHIP 2.2K OHM 1/10W +/-5%	R313
002-622-27	RES, CHIP 3.9K OHM 1/10W +/-5%	R314

SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
014-443-1Z	RES, CHIP 6.8K OHM 1/10W +/-5%	R315
060-563-0Z	RES, CHIP 2.7K OHM 1/10W +/-5%	R316
060-103-8Z	RES, CHIP 15K OHM 1/10W +/-5%	R317
060-333-9Z	RES, CHIP 10 OHM 1/10W +/-5%	R318
060-472-1Z	RES, METAL 1K OHM 1/8W +/-5% "S"	R319
060-332-8Z	RES, CHIP 4.7K OHM 1/10W +/- 5%	R320
060-274-9	RES, CHIP 1.2K OHM 1/10W +/-5%	R321
014-242-1Z	RES, CHIP 1.2K OHM 1/10W +/-5%	R322
002-202-6Z	RES, CHIP 10 OHM 1/10W +/-5%	R323
002-333-1Z	RES, METAL 47K OHM 1/8W +/-5% "S"	R324
060-122-5Z	RES, CHIP 5.6K OHM 1/10W +/-5%	R325
060-121-4Z	RES, CHIP 1.8K OHM 1/10W +/-5%	R326
060-683-5Z	RES, CHIP 220 OHM 1/10W +/-5%	R327
060-123-6	RES, CHIP 2.2K OHM 1/10W +/-5%	R328
060-471-0Z	RES, CHIP 47 OHM 1/10W +/-5%	R329
060-330-6	RES, CHIP 10 OHM 1/10W +/-5%	R330
060-274-9	RES, METAL 8.2K OHM 1/10W +/-5%	R331
060-561-8Z	RES, CHIP 5.6K OHM 1/10W +/-5%	R332
014-213-1Z	RES, CHIP 220 OHM 1/10W +/-5%	R333
002-103-0Z	RES, CHIP 100K OHM 1/10W +/- 5%	R334
002-102-9Z	RES, CHIP 82K OHM 1/10W +/-5%	R335
002-221-3Z	RES, CHIP 22K OHM 1/10W +/-5%	R336
002-822-6Z	RES, METAL 8.2K OHM 1/10W +/-5%	R337
002-332-0Z	RES, CHIP 5.6K OHM 1/10W +/-5%	R338
002-105-2Z	RES, CHIP 180 OHM 1/10W +/-5%	R339
002-272-9Z	RES, CHIP 3.9K OHM 1/10W +/-5%	R340
002-122-7Z	RES, CHIP 0 OHM 1/10W +/-5%	R341
030-151-2Z	RES, CHIP 1K OHM 1/10W +/-5%	R343
030-331-8Z	RES, METAL 470K OHM 1/8W +/-5%" "S"	R344
060-104-9Z	RES, CHIP 100K OHM	R350
030-182-0Z	RES, METAL 100K OHM 1/8W +/-5% "S"	R352
002-562-1	RES, 5.6 OHM 1/8W +/-5%	R360
002-101-8Z	RES, METAL 390K OHM 1/8 W +/-5% "S"	R374
060-101-6Z	RES, CHIP 56K OHM 1/10W +/- 5%	R401
002-102-9Z	RES, CHIP 10K OHM 1/10W +/- 5%	R402
002-479-0Z	RES, CHIP 33K OHM 1/10W +/- 5%	R403
002-101-8Z	RES, CHIP 4.7K OHM 1/10W +/- 5%	R404
002-102-9Z	RES, CHIP 3.3K OHM 1/10W +/- 5%	R406
002-339-7Z	RES, CHIP 270K OHM 1/10W +/-5%	R407
002-100-7Z	RES, CHIP 1.2K OHM 1/10W +/-5%	R420
002-332-0Z	RES, CHIP 120 OHM 1/10W +/-5%	R421
002-561-0Z	RES, CHIP 68K OHM 1/10W +/- 5%	R422
002-821-5Z	RES, CHIP 12K OHM 1/10W +/-5%	R423
002-270-7Z	RES, CHIP 470 OHM 1/10W +/-5%	R424
018-330-1	RES, CHIP 33 OHM 1/10W +/-5%	R425

R342 2.2 Ω

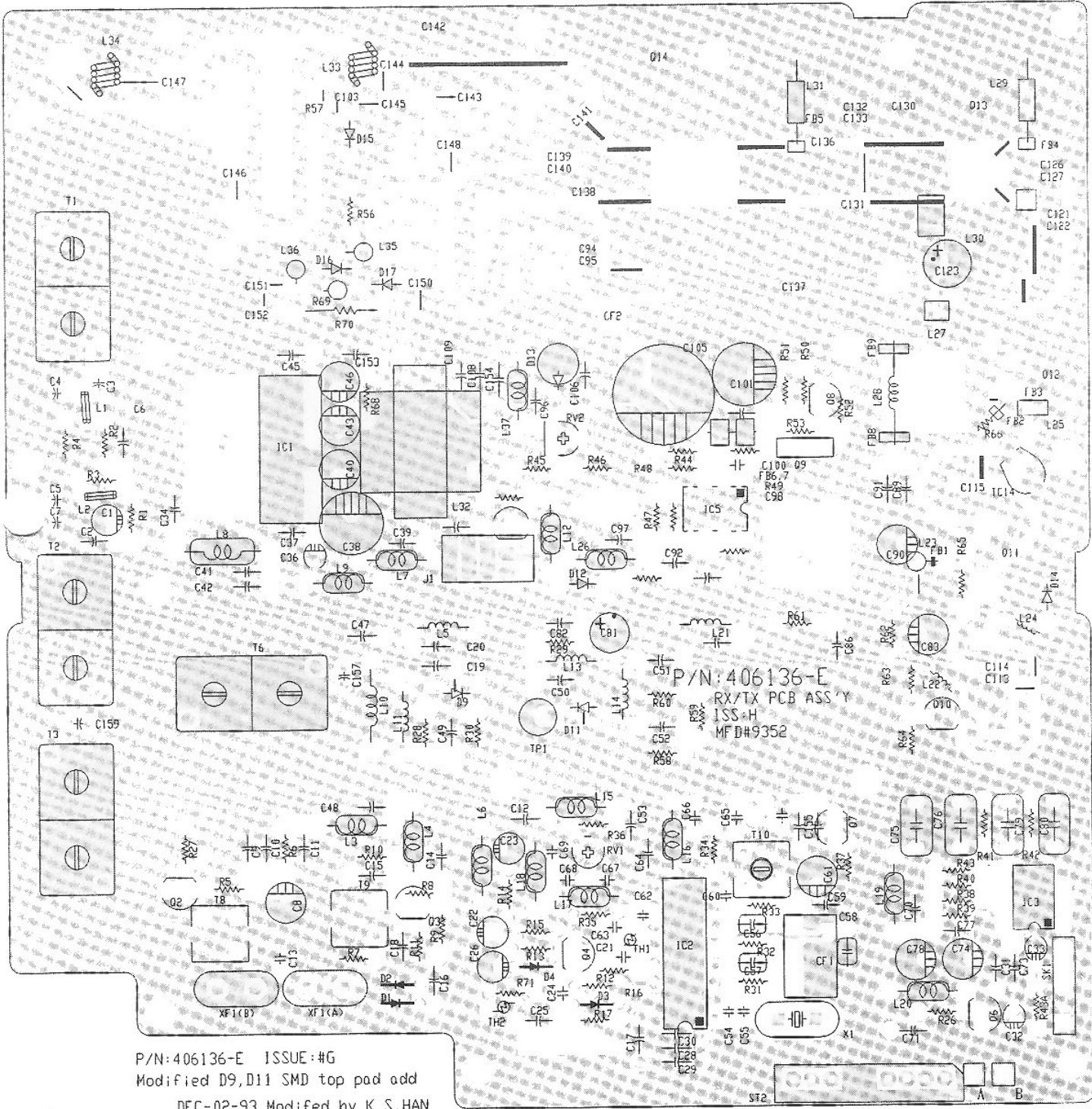
SM-4450 ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	SYMBOL
002-229-1	RES, CHIP 270K OHM 1/10W +/- 5%	R426
030-101-7Z	RES, CHIP 560 OHM 1/10W +/- 5%	R427
002-103-0Z	RES, 10K OHM	R814
002-682-6Z	RES, 6.8K OHM	R815
069-023-4	RES, ARRAY MHR-8-103JA 10K X 8, 9 PIN	RA1
069-023-4	RES, ARRAY MHR-8-103JA 10K X 8, 9 PIN	RA2
069-023-4	RES, ARRAY MHR-8-103JA 10K X 8, 9 PIN	RA3
071-103-6	RES, SEMIFIXED 10K OHM	RV1
071-103-6	RES, SEMIFIXED 10K OHM	RV2
072-103-1	RES, SEMIFIXED 10K	RV3
071-472-9	RES, SEMIFIXED 47K OHM	RV4
071-223-1	RES, SEMIFIXED 22K OHM	RV5
420-648-6	RELAY OUC-SS-105D 5V (AUDIO RELAY PCB)	RY1
070-222-5	RES SEMIFIXED 2.2KB	RV401
436-012-4	SW TACT SKHQFA (RED)	SW7
320-960-6	FILTER HELICAL 460MHZ	T1
320-960-6	FILTER HELICAL 460MHZ	T2
320-960-6	FILTER HELICAL 460MHZ	T3
320-961-7	FILTER HELICAL 440MHZ	T6
320-572-9	COIL, IFT 21.4 MHZ (A)	T8
320-573-0	COIL, IFT 21.4 MHZ (B)	T9
320-426-1	COIL 455 KHZ DET	T10
310-677-8	TRANSFORMER DC/DC CONVERTER	T101
171-014-0	CAP, TRIMMER TZ03Z100ER 169	TC11
171-014-0	CAP, TRIMMER TZ03Z100ER 169	TC12
171-013-9	CAP, TRIMMER 10P (N) ECV-17W10X53T	TC13
171-013-9	CAP, TRIMMER 10PF: ECV-17W10X53T	TC14
098-252-8	THERMISTOR, 2.5K OHM +/-15%:KTD5-225 (DIG PCB)	TH1
097-503-0	THERMISTOR, 50K OHM +/-15%:YTD5-350 (RF PCB)	TH1
098-101-5	THERMISTOR, 100K OHM +/-15%:KTD5-110 (RF PCB)	TH2
097-102-1	THERMISTOR, 1K OHM +/-15%:KTD5-210 (DIG PCB)	TH2
099-303-6	THERMISTOR, 30K OHM +/-15%:KTD5-330	TH3
450-104-0	RES, VARIABLE 171PN2-4 C10K12KC	VR1
450-105-1	RES, VARIABLE 171PN2-4 A10K12KC	VR2
260-862-6Z	CRYSTAL HC-184 8.2944 MHZ (DIG PCB)	X1
260-862-2Z	X-TAL NR-18 20.945MHZ	X1
261-394-2Z	CRYSTAL, UNIT NC-18C12.800MHZ (261-394-2Z)	X2

PRINTED CIRCUIT BOARD LAYOUT

SM-4450 UHF MOBILE
TOP VIEW 406136-E ISSUE: F / RF BOARD

TOP VIEW 406136-E ISSUE: F / RF BOARD



P/N:406136-E ISSUE:#G
 Modified D9,D11 SMD top pad add
 DEC-02-93 Modified by K,S,HAN

SM-4450 UHF MOBILE
BOTTOM VIEW 406136-E ISSUE:F / RF BOARD

BOTTOM VIEW 406136-E ISSUE:F / RF BOARD

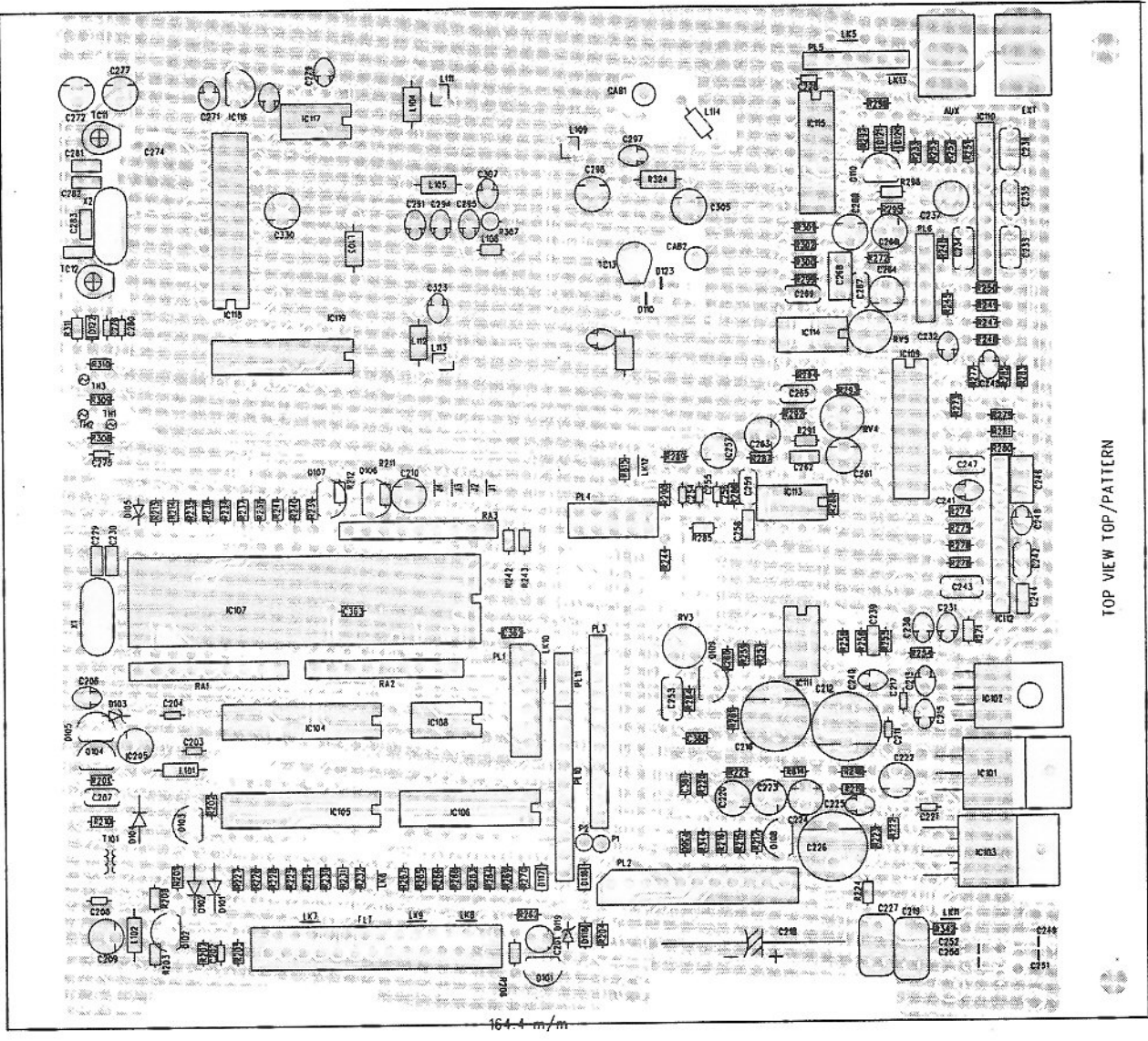


PN:406136-E 122UE:G
Modified D, D11 ZMD top bq oqd
MAH, Z, K, Y, b, s, i, b, o, f, e, q, 05-03

SM-4450 UHF MOBILE

TOP VIEW 406137-D ISSUE: E / DIGITAL BOARD

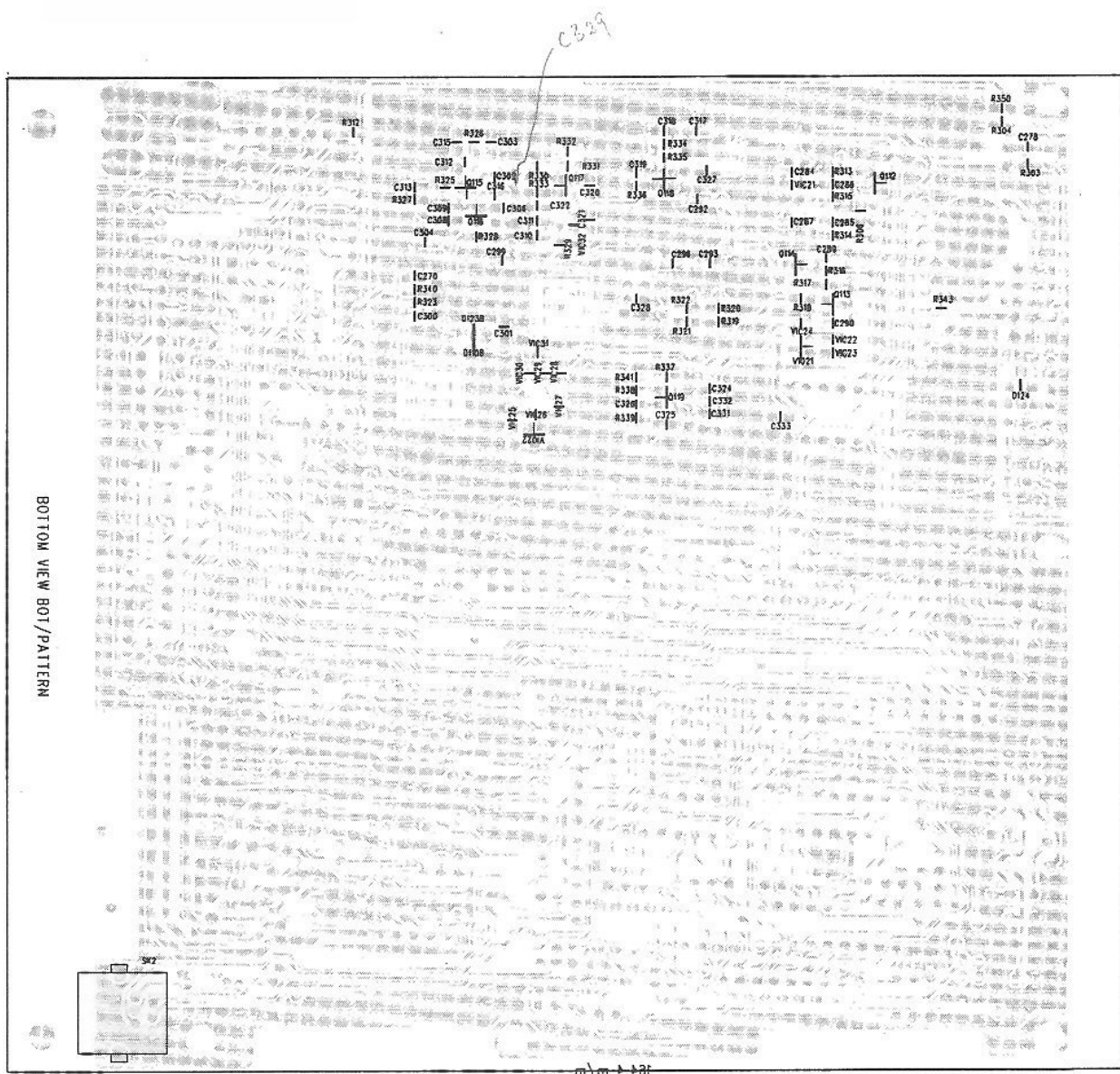
TOP VIEW 406137-D ISSUE: E / DIGITAL BOARD



SM-4450 UHF MOBILE

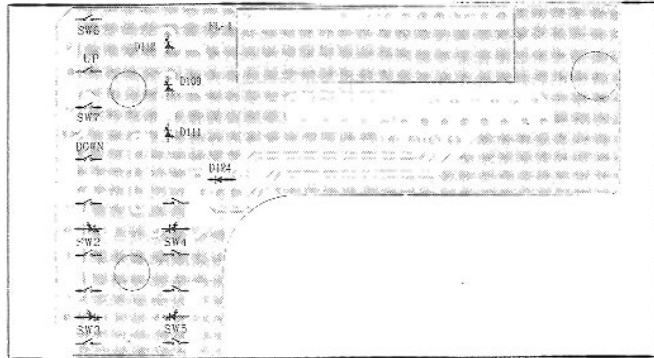
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BOTTOM VIEW 406137-D ISSUE: E / DIGITAL BOARD

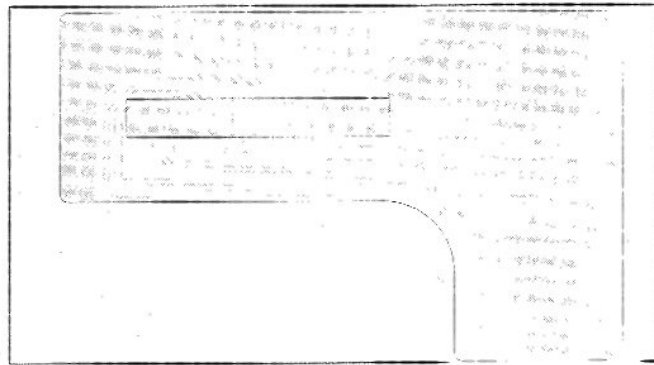


**SM-4450 UHF MOBILE
MISC. PRINTED CIRCUIT BOARDS**

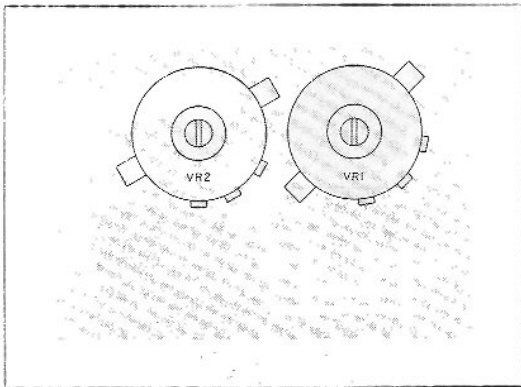
MISC. PRINTED CIRCUIT BOARDS



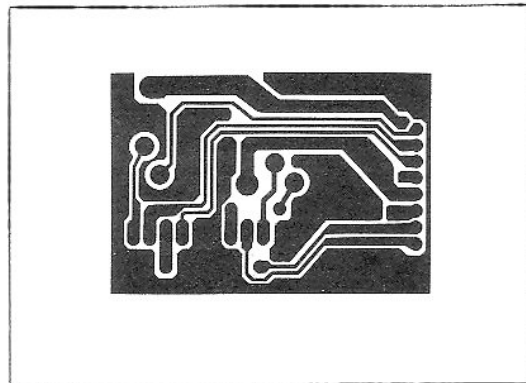
DISPLAY BOARD TOP VIEW



DISPLAY BOARD BOTTOM VIEW



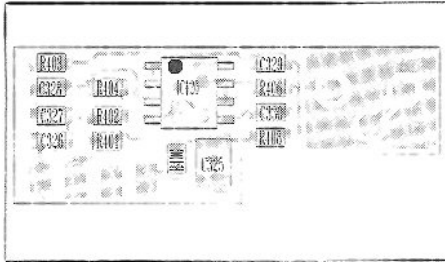
VOLUME BOARD TOP VIEW



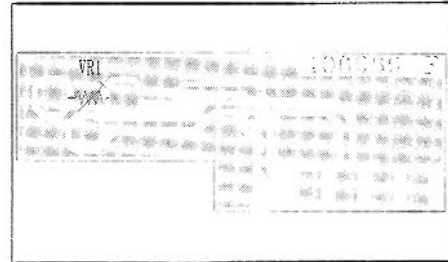
VOLUME BOARD BOTTOM VIEW

SM-4450 UHF MOBILE
MISC. PRINTED CIRCUIT BOARDS

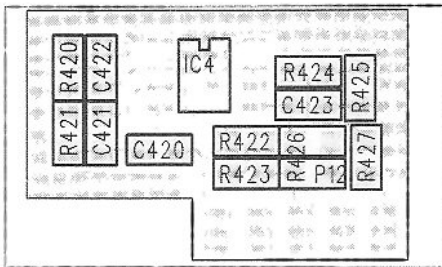
MISC. PRINTED CIRCUIT BOARDS



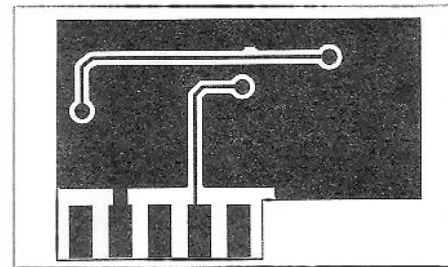
406-969-F (DIG. PCB) TOP



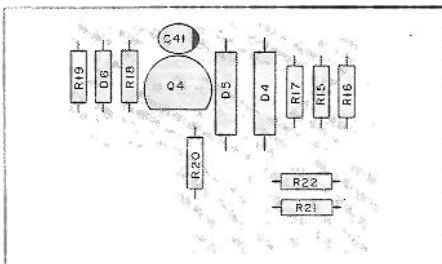
406-969-F (DIG. PCB) BOTTOM



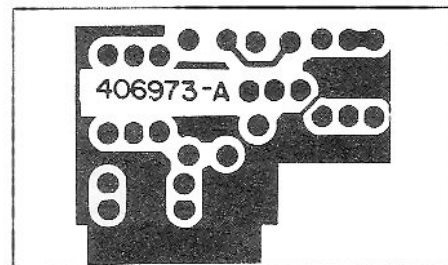
406-968-C (RF. PCB) TOP



406-968-C (RF. PCB) BOTTOM



406-973-A TOP



406-973-A BOTTOM

**EXPLODED VIEW
AND
EXPLODED VIEW PARTS LIST**

EXPLODED VIEW PARTS LIST

REF NO	PART NO	DESCRIPTION
1	801-132-C	E.S.C NORYL N190-7002 BLK SPRAY
2	813-505-A	LENS ACRYL BLUE
3	420-152-4	SPEAKER A1727C03
3B	905-510	FELT (SPEAKER)
4	623-034	(+)TAPPING SCREW(PH)3X8-1S ZN-PLAT
5	406-317-B	P.C.B DISPLAY 71.5X44X1.2T FR4 1/1
6A	436-013-5	LIGHTED SWITCHES (GREEN)
6B	436-012-4	LIGHTED SWITCHES (RED)
7	893-685	RUBBER SPONGE 38X9XT2 RUBBER STICKER BLK
8	252-039-3	FLUORESCENT DISPLAY 4-ST-01ZS1
9	825-155	KNOB (FUNCTION KEY S) ACRYL CLEAR SILVER
10	825-156	KNOB (FUNCTION KEY P) ACRYL CLEAR SILVER
11	825-157	KNOB (FUNCTION KEY 1) ACRYL CLEAR SILVER
12	825-158	KNOB (FUNCTION KEY 2) ACRYL CLEAR SILVER
13	825-159	KNOB (FUNCTION KEY) ACRYL CLEAR SILVER
14	622-201	(+)TAPPING SCREW (PH)2X6-1S ZN-PLAT
15	622-201	(+)TAPPING SCREW (PH)2X6-1S ZN-PLAT
16	406-947-C	P.C.B VOLUME 50X35X1.2T FR4 1/1
17-A	450-104-0	VR 171PN2-4 C10K12KC
17-B	450-105-1	VR 171PS2-4 A10K12KC
18	650-220	NUT HEXAGON BSBM M7 (P:0.75)
19	825-125	KNOB (SQUELCH) N190J-7002 ORANGE
20	825-120	KNOB (VOLUME) N190J-7002 ORANGE
21	717-314	FRAME ALDC12 BLK SANDTONE SPRAY
22	406-137-E	P.C B DIGITAL 164.4X147X1.2T FR4 1/1
23	260-866-6Z	CRYSTAL HC-18U 8.2944MHZ 703142
24	261-394-2Z	CRYSTAL 12.800MHZ SI-1060-0510-32
25	420-728-5	JACK MINIATURE H5J1785-01-030
26	650-348	NUT RING
27	660-314	WASHER(SQUARE) SPC 10X7X&3.2XT1 ZN-PLAT
28	613-040	(+)MACHINE SCREW(PH)3X6 ZN-PLAT 1
29	702-378	PANEL TOP ALDC12 IRIDITE FINISH
30	613-147	(+)MACHINE SCREW(PH)3X18 ZN-PLAT
31	613-068	(+)MACHINE SCREW(PH)3X8 ZN-PLAT
32	893-675	CUSHION SPO.BLK T2 STIC.
33	422-907-0	CONNECTOR ANT SO-239 "M" TYPE
34	613-755	(+)MACHINE SCREW(PH)3X7 NI-PLAT

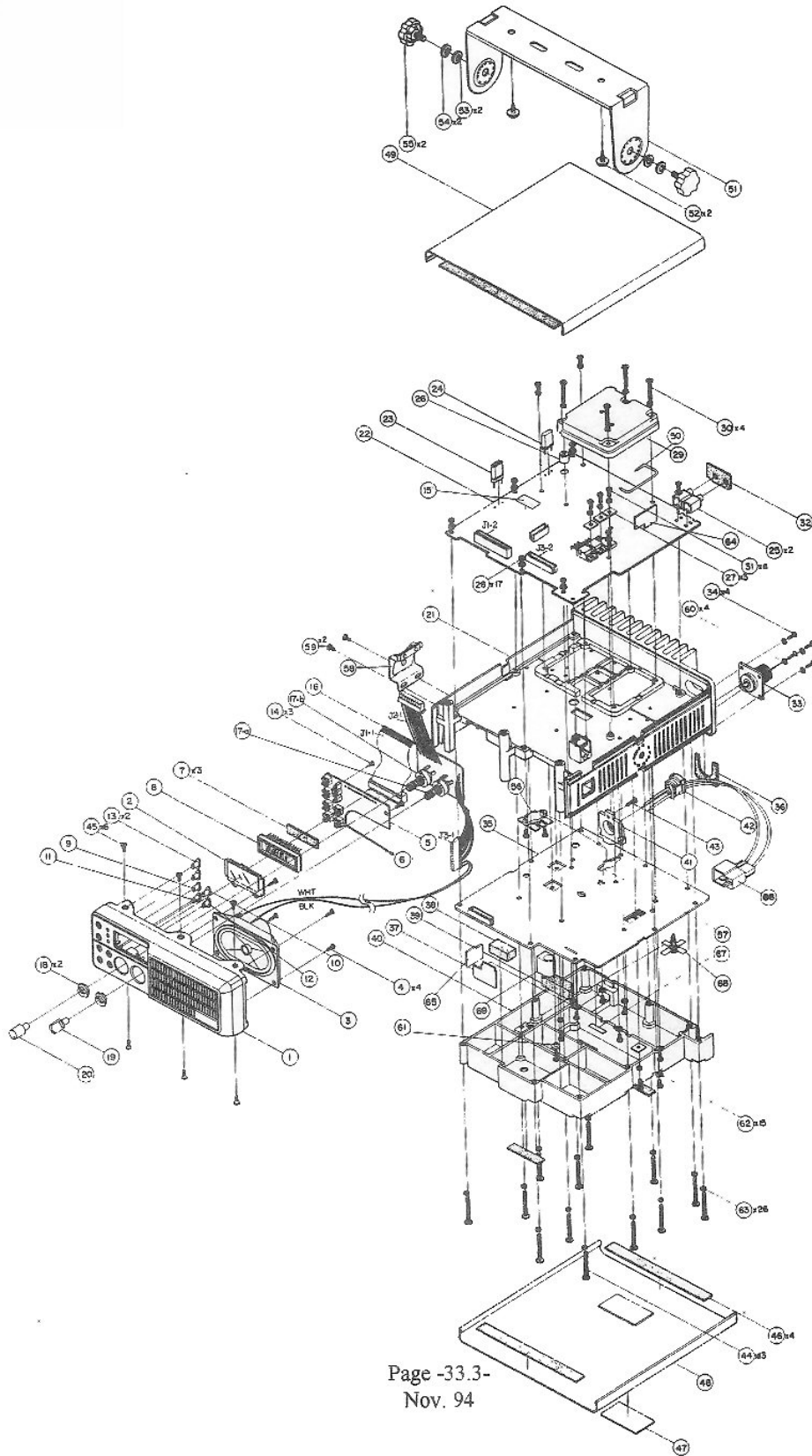
EXPLODED VIEW PARTS LIST

REF NO	PART NO	DESCRIPTION
35	406-136-E	P.C.B RF MAIN 164.4X147X1.6T FR4 1/1
36	894-110	SPONGE RUBBER SPO.T2 STIC.
37	406-973-A	P.C.B SQ SUB 19X25X1.2T FR4 1/1
38	894-186	CUSHION 10X20XT8 RUBB.SPO.STIC.
39	894-190	CUSHION 16X20XT4 RUBB.SPO.STIC.
40	702-023	PANEL BOTTOM ALDC12 IRIDITE FINISH
41	723-400-C	BRACKET (DC CORD)
42	750-233	CORD STOPPER SR-6W-1
43	613-314	(+)MACHINE SCREW(BH)3X8 BLK
44	613-730	(+)MACHINE SCREW(PH)3X24 ZN-PLAT 1
45	613-192	(+)MACHINE SCREW(FH)3X6 BLK
46	905-505	FELT 10X130XT0.5 FELT STIC.
47	959-046-A	FCC LABEL MADE IN KOREA
47	959-046-B	FCC LABEL MADE IN THAILAND
47	958-671-A	POLY LABEL COVER FOR FCC LABEL
48	717-315-C	COVER BOTTOM EGI T1 BLK ST.SPRAY
49	717-320-C	COVER TOP EGI T1 BLK ST.SPRAY
50	894-185	CUSHION 16X20XT4 RUBB.SPO.STIC.
51	723-295-D	BRACKET ALDC12 SANDTONE SPRAY
52	625-007	(+)TAPPING SCREW(TH)5X12-1S ZN-PLAT
53	661-605	WASHER(FLAT) M6 ZN-PLAT
54	662-606	WASHER(SPRING) M6 ZN-PLAT
55	600-051	SECURING SCREW M6X9(P:1) BLK
56	203-186-2	TRANSISTOR MRF650
57	771-685	SHIELD PLATE PBSP 2X7XT0.2
58	508-085-A	BRACKET (MICROPHONE)
59	613-536	(+)MACHINE SCREW(BH)3X4 NI-PLAT
60	662-310	WASHER (SPRING) M3 NI-PLAT
61		NOT USED
62	664-305	WASHER (LOCK"A"TYPE)M3 ZN-PLAT 1
63	662-305	WASHER (SPRING) M3 ZN-PLAT 2
64	406-969-F	P.C.B PLL B'D FILTER30X11X1.6T FR4 1/1
65	406-968-C	P.C.B RF B'D FILTER 23X15X1.6T FR4 1/1
66	504-367	PLUG ASS'Y W/CABLE TMP-P01X-A1 85M/M
67		NOT USED
68	203-067-8	TRANSISTOR MRF-654
69	761-745	HEAT SINK

MAXON SM-4450 UHF MOBILE

SM-4450 EXPLODED VIEW

SM-4450 EXPLODED VIEW



SCHEMATICS

