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A World of Communications

SM-2000
SERVICE MANUAL

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MAXON SM-2000 MOBILE
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SPECIFICATIONS

TRANSCEIVER NOMINAL PERFORMANCE

Performance Specifications . . . . . FTZ 17TR2049 July 88
TIA/EIA-603
IEC 68 Series
EC 529 IP54
MIL STD 810 C,D,E

RF Output Power . . . . . 25 W

Modulation Type . . . . . G3E/F3E (PM/FM)

Audio power . . . . . 4 W

Intermediate frequencies . . . . . 45 MHz
455 kHz

Number of Channels 4

Frequency Source . . . . . Synthesizer

GENERAL

Power Supply . . . . . 13.2 VDC nominal CEPT
15.6 VDC maximum (extreme)
10.8 VDC minimum (extreme)
13.8 VDC nominal TIA/EIA-603

Temperature Range

Storage . . . . . 80°C Maximum; -40°C Minimum (Extreme)

Operating (to spec) . . . . . 25°C Nominal;
60°C Maximum; -30°C Minimum (Extreme)

Current Consumption

DC Current	
Standby (Muted)	< 140 mA
Unmuted 25% Max. AF power 50% Max. AF power 100% Max. AF power	 < 350 mA < 450 mA < 570 mA
Transmit 1 Watt RF power 3 Watts RF power 25 Watts RF power	 1.6 A 2.4 A 6.7 A

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Switching range TX and RX (without re-tuning)

BAND	Operational Bandwidth			
	TX		RX	
	MIN	MAX	MIN	MAX
VHF Band 1	136	162	136	162
VHF Band 2	148	174	148	174
UHF Band 1	400	430	400	430
UHF Band 2	420	450	420	450
UHF Band 3	440	470	440	470
UHF Band 4	470	490	470	490
UHF Band 5	490	512	490	512

Channel spacing . . . . . 25 kHz / 20 kHz / 12.5 kHz programmable
(25 kHz - 12.5kHz switchable by CPU control)

Dimensions (in / mm). . . . . 2(H) x 7(W) x 6.25(D)
45(H) x 157(W) x 140(D)

Weight 3lbs, 6oz/ 1.6kg (with mic)

TRANSMITTER

Tests methods are ETS 300 086 Jan 1991 unless stated

Performance Without Sub audible Modulation

Carrier Power @ nominal conditions

Max. Rated Output Power . . . . . 25 W +/-10% nominal
25 W +2/-3 dB @ extreme conditions across switching range

Hi Switched by CPU . . . . . 1 – 25 W
Continuously adjustable

Low Switched by CPU . . . . . 1 – 3 W
Continuously adjustable

Frequency stability (SM-2150) . . . . . ±5.0 ppm (± 0.00025%)

Frequency stability (SM-2450) . . . . . ±2.5 ppm (± 0.00025%)

Peak audio frequency deviation
(across switching range)

Channel Spacing (kHz)	Without sub audible tone modulation	With sub audible tone modulation @ 10% peak deviation
	MAX DEV	
25	± 5.0 kHz	± 5.0 kHz
12.5	± 2.5 kHz	± 2.5 kHz

Audio characteristic . . . . . (Method as FTZ 17 TR 2049 July 1988)

MOD Type G3 . . . . . Within +1/-3 dB of 6 dB/octave pre-emphasis curve:
300 Hz – 2.55 kHz for 12.5 kHz Channel Spacing
300 Hz – 3 kHz for 20 , 25 kHz Channel Spacing

MOD Type F3 . . . . . Within +1/-3 dB of 6 dB/octave pre-emphasis curve:
300 Hz – 2.55 kHz for 12.5 kHz Channel Spacing
300 Hz – 3 kHz for 20 , 25 kHz Channel Spacing

Adjacent channel power

25 kHz < 70 dBc
12.5 kHz < 60 dBc

TX spurious emissions (conducted)

9 kHz – 1 GHz < -36 dBm
1 – 4.0 GHz < -30 dBm

TX spurious emissions (radiated)

9 kHz – 1 GHz < -36 dBm
1 – 4.0 GHz < -30 dBm

TX spurious emissions (radiated)

9 kHz – 1 GHz < -36 dBm
1 – 4.0 GHz < -30 dBm

Modulation limiting characteristics . . . . . Method as FTZ17 TR2049 July 1988
=75% peak deviation

Transmitter audio distortion (without CTCSS) . . . . . Method as FTZ17 TR 2049 July 1988

1 kHz modulation input < 5 %

Transmitter audio distortion (with CTCSS) . . . . . Method as EIA RS 220A Mar 79

Audio frequency 1 kHz < 8 %
Any CTCSS frequency combined

Hum & noise (residual modulation) . . . . . > 40 dB

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TX TONE MODULATION CHARACTERISTICS

Sub audible tones - CTCSS

Tone range . . . . . 67 – 250 Hz @ 0.3 % accuracy

Tone standard . . . . . RS-220A EIA Standard

Non-standard tones . . . . . 50 – 260 Hz @ 0.3 % accuracy

Nominal tone deviation . . . . . 10 % peak system deviation

SUB AUDIBLE TONES - DCS

Tone standard . . . . . Normal and inverted

Nominal tone deviation . . . . . 10 % peak system deviation

RECEIVER

Performance without sub audible modulation . . . . . Method ETS 300-086 JAN 1991 unless stated

Sensitivity 12 dB SINAD . . . . . < - 118 dBm

Amplitude characteristic . . . . . ± 3 dB

Co-channel rejection

25 kHz	<- 6 dB
12.5 kHz	<- 10 dB

Adjacent channel selectivity

25 kHz	> 70 dB @ nominal conditions
12.5 kHz	> 60 dB @ nominal conditions

Spurious response rejection . . . . . > 70 dB (100 kHz - 4 GHz)

Intermodulation response rejection

± (25 kHz & 50 kHz) ± (50 kHz & 100 kHz)	> 65 dB (3 generator method)

Blocking

± 1 MHz	> 85 dB
± 5 MHz	> 85 dB
± 10 MHz	> 85 dB

RX spurious emissions (conducted)

9 kHz – 1 GHz	- 57 dBm
1 GHz – 4.0 GHz	- 47 dBm

RX spurious emissions (radiated)

9 kHz – 1 GHz	-57 dBm
1 – 4.0 GHz	-47 dBm

AF power . . . . . 5 W maximum @10% Distortion into a 4 ohm load. 4 Watts nominal.

AF frequency response . . . . . Method as FTZ 17 TR 2049 July 1988

MOD Type G3 . . . . . Within +1/-3 dB of 6 dB/octave de-emphasis curve
300 Hz – 2.55 kHz for 12.5 kHz Channel Spacing
300 Hz – 3 kHz for 25 kHz Channel Spacing

MOD Type F3 . . . . . Within +1/-3 dB of 6 dB/octave de-emphasis curve
300 Hz – 2.55 kHz for 12.5 kHz Channel Spacing
300 Hz – 3 kHz for 25 kHz Channel Spacing

RX Hum & Noise . . . . . > 40 dB

RX TONE DEMODULATION CHARACTERISTICS

Subaudible tones - CTCSS/DCS

CTCSS tone range . . . . . 67 Hz to 250 Hz

CTCSS tone standard . . . . . RS-220A EIA Standard

CTCSS non-standard tones . . . . . 50 – 260 Hz

DCS tone standard . . . . . Standard and inverted

Decode Sensitivity . . . . . Method: Decrease signal level @ 10% peak deviation

All tone . . . . . <= 9 dB SINAD

Environmental . . . . . IEC529 level IP54 MIL STD 810C

EMC . . . . . EMC Directive 89/336/EEC May 1989 ETS 300.279

ACCESSORIES

MA4472 Microphone

RELIABILITY ANALYSIS

Calculation method

MTBF . . . . . 15,000 Hr. MIL-HDBK-217F. Ground benign. Parts stress method.

MTTR . . . . . 30 Min. (Average time to rework any SMD component & reassemble).

PROGRAMMER

. . . . . **SMP4004C**

INTRODUCTION

Advanced state-of-the-art technology is used in the design and manufacturing of the SM-2000 Mobile. The Phase Lock Loop (PLL) synthesizer provides more flexibility and capability in the SM-2000 Mobile. This scanning mobile has 4 channel capability. It offers CTCSS, DCS, scanning, priority channel, and many other functions. All these functions are controlled by the micro controller. The micro controller reads specific channel information from an Electronically Erasable Programmable Read Only Memory (EEPROM).

UNPACKING INFORMATION

Check the carton carefully for the following items:

1 Transceiver Unit

2 Microphone

3 DC Power Cord

4 Mobile Mounting Bracket

5 Assembly Hardware

6 Operating Guide

GENERAL DESCRIPTION

The Maxon SM-2000 is a rugged two way FM mobile radio which operates from 136-174 MHz (VHF) in two bands & 400-512 MHz (UHF) in five bands. The SM-2000 is a synthesized radio utilizing microcomputer technology to provide reliable high quality simplex two-way mobile communications. The SM-2000 transmitter output power level is 25 watts over a wide bandwidth, with a receiver operational bandwidth that covers the specified frequency band. The basic radio package includes the following features:

- ***Microprocessor Control***
- ***Synthesized RF Channel Selection (Frequency Control)***
- ***CTCSS Encode / Decode***
- ***DCS Encode / Decode***
- ***Priority Channel Scan***
- ***5 PPM Frequency Stability (SM-2150/VHF)***
- ***2.5 PPM Frequency Stability (SM-2450/UHF)***
- ***Field Programmable with PC***
- ***Internal 4 watt speaker, with Volume Control***
- ***Busy Channel Lockout***

The small size of the SM-2000 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.

DESCRIPTION OF CONTROLS

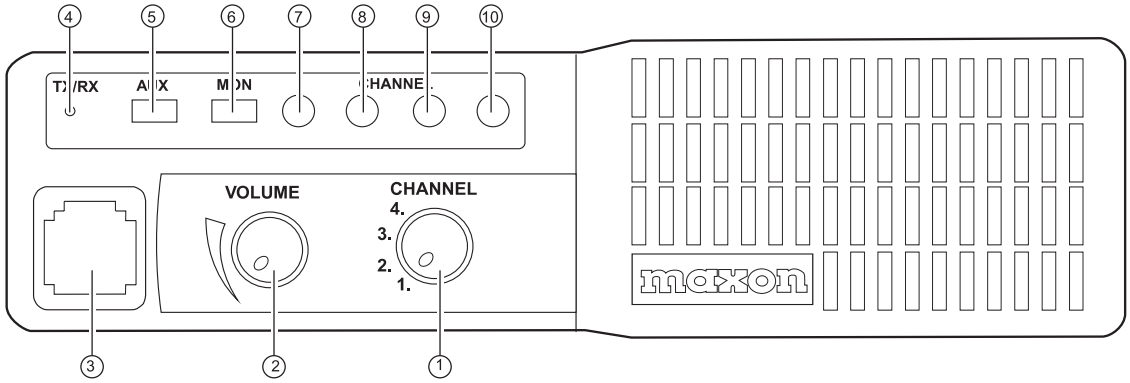

Figure 1 SM-2000 Front Panel

DESCRIPTION OF CONTROLS

The controls, indicators and microphone/programming connector are located on the front panel. The Monitor and Auxiliary buttons are located on the radio's front panel. The following table details the Mobile controls, indicators, and connections.

TABLE 2

Controls, Indicators, And Connections	
ITEM	**FUNCTION**
1. Channel Select Switch	Rotary switch, used to select one of 4 channels (max.) and to engage scanning function
2. ON/OFF Volume Control	Main power switch and volume control. Fully counter clockwise is off position
3. Microphone Connect Jack	Used to connect the microphone to the mobile
4. Busy/Call/TX	Tri-colored LED indicator
5. Auxiliary (AUX) Switch	Used for control of after market accessories
6. Monitor Switch	When pushed, monitors the chosen channel
7-10. Channel Indicator LED's	Indicates the channel when illuminated

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DESCRIPTION OF CONTROLS

Rear Panel Connections	
ITEM	**FUNCTION**
1. Antenna Connector (S0-239)	50 ohm connector
2. DC Power Connector	Used to connect the mobile to the power supply 13.2 VDC or 13.8 VDC U.S.A.
3. External Speaker Connector	Multipurpose socket used to connect to a remote speaker or for test connection

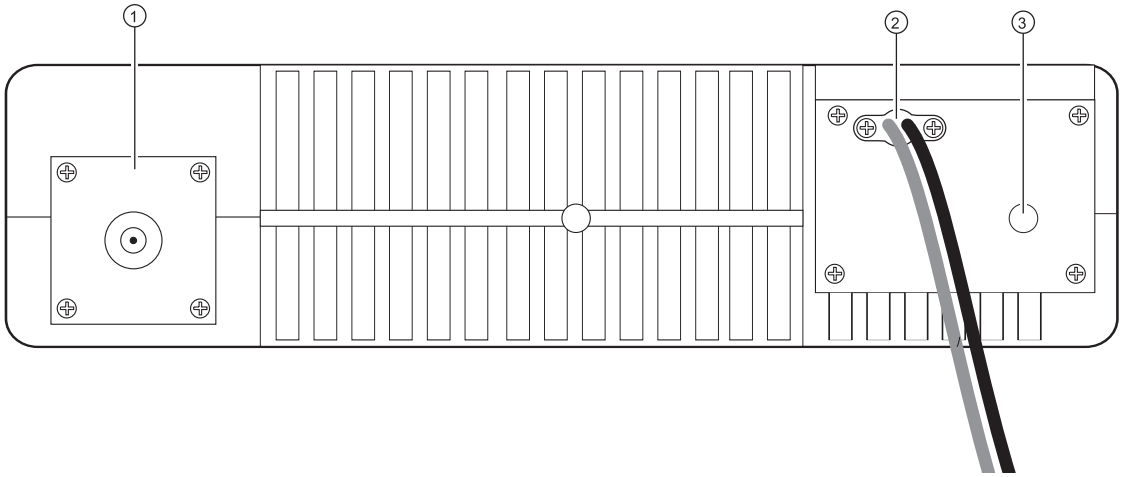


Figure 2 SM-2000 Rear Panel

THEORY OF OPERATION

Each of the Scanning Mobile radios, UHF & VHF, include a unique main P.C.B. consisting of RF, Digital and Analog circuitry.

DIGITAL CIRCUITRY

IC 411 and IC412 are digitally-controlled analog switches which internally consist of three single pole, double throw switches. By placing a high (5V) or low (0V) on the control lines which consists of A,B, and C. "A" controls the X ports "B" controls the Y ports and "C" controls the Z ports. Example: A high on control "A" would connect X to X1. A low on control "A" would connect X to X0.

CTCSS/DCS Decode Circuits

Discriminator audio from Pin 9 of IC 109 is fed to IC 406 and associated parts, which are the first 2 poles of a 6th order 250Hz Chebeyshev low pass filter. The output from Pin 1 (IC406A) is fed into IC411 (Pin 2) and output to Pin 15 (IC411). The signal is then fed to Pin 8 (IC407) which is a 6th order low pass Butterworth switched capacitor filter. The output from the Butterworth filter (Pin 3 IC407) is then fed to the remaining 4 poles of the 6th order Chebeyshev, which consist of IC 406C and one of the two operational amplifiers internal to IC407 (MF6-100) along with associated components. Both the Chebeyshev and the Butterworth combines for a 4dB ripple low pass filter when programmed for 250Hz. The output of IC406C(Pin 8) is fed into the remaining operational amplifier internal to IC407 (MF6-100) which forms the squaring circuit for the Decode signal. The signal is output from Pin 2 IC407 (MF6-100) and fed into IC409 (micro) where it is matched with a preprogrammed frequency. If successful a Decode occurs, which is shown by a green L.E.D. on the front panel of the UHF Scanning Mobile and audio is heard. If valid Decode was not seen, the busy L.E.D. (Yellow) would be shown.

CTCSS/DCS Encoder Circuit

During TX encode the tone squelch digital signal is produced as a 3-bit parallel word at Pins 15 (A), 16 (B), and 18C of the micro controller (IC409). The 3-bit digital signal is converted to an analog signal by resistors R427, 428, and 430. The analog signal is fed into IC411 Pin 1. The signal is output on Pin 15 (IC411) and fed into Pin 8 of IC407 (6th order Butterworth clock tuned low pass filter). The filtered encode output from Pin 3 (IC407) is fed into Pin 13 (IC411) and output on Pin 14 (IC411).

The filtered encode signal is fed to IC405B and RV403 (sub-audible gain control), the output of IC405B is then fed to the audio mixer circuit.

Channel Select Circuit

One of 4 channels may be selected using the channel switch on the front panel. The channel switch SP4T (single pole 4 throw) with output to 4 channel LED's and to diode's to be converted to an inverted 4-Bit binary code. The binary code inverted is equal to the channel number. The binary code is decoded by the micro controller enabling the appropriate RX or TX frequency and associated data to be selected from the EEPROM.

- ***NOTE:It is possible any one of the 4 channel locations can be a scanning position. Refer to Operators Manual for further instructions.***

EEPROM

RX/TX channels, CTCSS/DCS as well as other data from the programmer are stored in the EEPROM. The data stored is retained without power supplied. This is a non-volatile memory. The EEPROM may have information re-programmed or erased. IC408 is an EEPROM with 2048 (256x 8) bit capacity and data is written and read serially, with the Programming cable through the front panel microphone connector.

High Pass Filter

The high pass filter is an 8-pole .1dB chebeyshev active filter that comprises IC410 and associated components. The de-emphasis is provided by resistor R451 and capacitor C452. Receive audio is passed to IC410 by Pin 4 of IC411 where sub-audible tones below 250Hz are removed. Mic audio is also fed into IC410 via IC411 (Pin 4) where sub-audible voice products below 250Hz are also removed.

Mute (Squelch) Circuit

The mute circuit which is controlled by the output of IC409 (micro) pin 77 (386) is connected to Q409 via R438 which opens analog gate IC401D and mutes the audio path to the AF amplifier, in conjunction with Q137 shorting the input to audio amp IC108.

TX Audio and Filter Circuits

Microphone audio from front panel (via IC412), is fed into IC401A, and into IC404B (Pin 6). The TX audio is output on Pin 7 (IC404B) and into the high pass filter (IC410), where sub-audible voice products are removed. The TX audio output from IC410 is fed into IC404A&B which with associated parts form a pre-emphasis mic amplifier and limiter. The output from Pin 1 IC404A is fed to RV402 (TX Modulation Level Adjust) and fed into IC404C&D with associated parts to form a 3kHz low pass filter. The output of IC404D (Pin 14) is then fed into the Audio Mixer Circuit.

Audio Mixer and Inverter

IC405A is an audio mixer where audio and sub-audible tones are combined. RV403 is used as a level control for the Sub-audible tones. This level is summed with amplified, pre-emphasized, and limited audio and feed to IC405A, which is an inverting amplifier. The output is fed to the VCO and TCXO to provide the necessary modulation signal.

Analog Ground Supply

IC406D supplies analog ground (2.0V) to all operational amplifier circuits except for IC405A and IC405D.

PLL

IC101 (MC1459IF) is a PLL frequency synthesizer with an on-board 1.1 GHZ divide by 64/65 dual modulus prescaler. In addition to the prescaler and frequency counters, the synthesizer IC has a a phase detector and a C register (Configuration register) that allows certain functions to be configured as desired.

The synthesizer is serially controlled by three wire input to the IC. Serial data is fed to pin 19 of the IC. Serial data CLK (pin 18) and active low ENABLE (pin 17) are the input pins that allow data transfer into the integrated circuit for control and frequency selection.

Data transfer is byte-oriented and may be shifted in 1, 2 or 3-byte patterns. One byte (8 bits) accesses the C or configuration register, two bytes (16 bits) access the R register and 3 bytes (24 bits) access the A register.

Internally the synthesizer has three counters used as frequency dividers. These counters are the R,A and N counters. The R counter is actually controlled by 3 bits of the R register while the remaining 13 bits determine the divide by R value. The frequency at pin 20 (12.8 MHz) is divided by R to determine the frequency steps of the PLL synthesizer. In programming the radio, 5.0 kHz or 6.250 kHz step sizes can be selected for any channel.

The 24- bit A register controls the N and A (prescaler) counts. Together these counts determine the total synthesizer divide ratio affecting the f_{in} (frequency input) signal from the VCO. A0-A7 are the A counter values. A8-A19 are the N counter values. A21 and A20 must always be set high. A23 and A22 are both set to 0 which controls the function of output A and causes it to be a port. This port, output A, is used to set TX power high or low. A high output on port A sets transmit power low.

The 8-bit C register performs control functions as stated:

C7 sets polarity of the phase detector bits. Logic “0” is normal.
C6 determines the phase detector used. A logic “0” selects theta V and theta R outputs
C5 enables the lock detector when its logic is “1”.
C4 when a logic “1”, puts CMOS sections in standby mode.
C3 and C2 set phase detector current at the PD output. Not used in this application.
C1 is the value present at Output A.
C0 is the value present at Output B.

Transistors Q101 through Q104, along with related resistors and capacitors, connect the dual pin theta V and Theta R outputs into a 2 mA current source that is powered by a 20V DC to DC converter. This allows the tuning voltage to be approximately 3 to 17 VDC.

RF SECTION (SM-2150/VHF)

VHF Transmitter

The Transmitter is comprised of:

1. Microphone Audio Circuit
2. Transmitter Stage and Harmonic Filter
3. Automatic Power Control
4. Frequency Synthesizer Circuit

Microphone Audio Circuit

Microphone audio from the digital circuitry is amplified, pre-emphasized, limited, and mixed with Sub-Audible and applied to the VCO at Pin 1, through RV101, to balance VCO and TCXO modulation.

Transmitter Stage and Harmonic Filter

When in the transmit mode of operation the diode D103 is forward biased enabling the RF signal to pass to the pre-driver Q118 by Q116 and Q117. The amplified RF signal is amplified again by Q120. The amplified RF signal passes through the stripline coupler and is fed to the harmonic low pass filter, comprising of L128, L130, L131, and L132, capacitor 271, 273, 275, 277, and 283 and then to the antenna connector (ANT). The stripline coupler provides a sample of the RF signal for the automatic power control. During transmit D107 is forward biased which connects the power amp, D120, to the antenna. D120 is forward biased inhibiting transmit signal power from being fed to the receiver circuitry.

Automatic Power Control

The automatic power control contains the stripline coupler, diode D107 and variable resistor VR104, IC104A, and three transistors Q123, Q124, and Q125. IC104A forms a differential amplifier. The RF signal present in the coupler is rectified by D107, to produce a DC voltage proportional to RF power which is applied to Pin 3 of IC104A. TX 8.5V is also applied to the input of IC104A via the potential divider R168, VR104, and R170 at pin 2. The different signal at output of IC104A is passed to Q124 and Q125 to produce a constant power output to the antenna connector (ANT). VR104 is used to adjust the RF high power level. VR105 is used to set the low power setting.

RX & TX Voltage Controlled Oscillator Circuit

The circuit contains two VCO's. One for producing carrier frequencies during transmit and one for producing the local oscillator frequency during receive. The circuit also has RX and TX power line filters.

RX & TX Power Line Filters

Transistors Q353 and Q354 are configured as TX5v and RX5v power supply ripple filters respectively.

RX VCO

The RX VCO comprises JFET Q351, coil L356 and varactor D353 and is configured as a Colpits oscillator. D353 produces a change in frequency with a change in DC voltage and is controlled by the phase detector signal present at the anode. The local oscillator signal at the drain of Q351 is applied to RF out of the module when diode D103 is reverse biased and D104 is forward biased. L356 is used for PLL alignment.

TX VCO

The TX VCO comprises JFET Q352 coil L353 and varactor D352 and is configured as a colpits oscillator. The AF signal at MOD port is applied to the cathode of D352. The control voltage from the loop filter is applied to the drain of Q352 and is passed to the power amplifier and harmonic filter via the buffer Q113 and Q114. When diode D103 is forward biased and D104 is reversed biased L353 is used for PLL alignment.

Loop Filter

Transistor Q101 to Q104 and associated components form a loop filter. The phase detector from Pin3 and 4 of IC101 are filtered to remove any reference frequency harmonics and applied to the voltage controlled oscillator.

PLL Frequency Synthesizer

The PLL frequency synthesizer (IC101) contains an oscillator for the reference divider, a programmable divider, a phase/frequency Comparator and an out of lock detector and a Prescaler.

Reference Oscillator

The reference oscillator of IC01 along with a 10.25 or 12.8MHz TCXO, varactor diode D701 and D702, and the thermistors TH701, TH702, and TH703 produce a temperature compensated 10.25 or 12.8MHz reference.

Programmable Dividers

The serial frequency data (DATA) is received by the data programmable divider at Pin 19 of IC101 from Pin 1 of IC409 (Micro controller) out. The internal Prescaler divided input frequency at pin 11 of IC1 is further divided by the programmable divider. The 10.25 or 12.8MHz TCXO frequency at pin 20 is the reference divider to produce a reference frequency of 5 or 6.25kHz respectively. The internal programmable divided frequency (Fv) and the reference frequency (Fr) are fed to the internal phase detector.

Phase Detector

The phase detector produces negative pulses when Fv < Fr, positive pulses when Fv>Fr. When Fv = Fr and phase is the same, the phase detector presents a high impedance at Pin 4. The signal at Pin 2 is applied to the VCO via the loop filter.

Out of Lock Detector

The out-of-lock detector produces a high logic level when Fr and Fv are in the same phase and frequency, low logic level pulses when the loop is out-of-lock at Pin 2 of IC101. The signals at Pin 2 of IC101 are buffered by Q106 and then integrating by R114 and C122. The product of the integrating circuit is fed to L/D port.

Prescaler

The internal Prescaler of IC101 divides the incoming signal frequency from the VCO via input pin 1 by 64 or 65. The divided VCO frequency is passed to the 6-stage A counter and 12-stage N counter.

Receiver

The receiver uses Dual Conversion Superheterodyning techniques, it is comprised of:

1. RF amplifier
2. First Mixer and First IF Amplifier
3. Second Mixer, Second IF Amplifier and FM Detector
4. Receiver Audio Circuit
5. Mute (squelch) Circuit

RF Amplifier

The signal received via the antenna is routed through the 9th chebyshev low-pass filters containing capacitors C273, C275, C277, C280, C283 and coils L128, L130, L131, L132, and is passed through the front-end module (RF amplifier) via pin 1. The front-end module contains L800 to L806 and Q800. The front-end module is configured to enable the RF signal at the operating frequency to pass the first mixer.

First Mixer and First IF Amplifier

The VCO local oscillator signal routed through buffer transistor Q113 and Q114 is filtered by C164, C165, C281, C310, and L110, L123. IC102 produces a difference frequency IF of 45MHz from pin 6 of the front-end module and the filtered VCO local oscillator signal at pin 1. The 45MHz difference frequency is filtered by the 2-pole crystal filter CF101. The tuned circuit T101 and T102 and associated components provide matching of the crystal filter to insure good band-pass response and selectivity. The IF signal is amplified by Q130 and passed to the second mixer, second IF and FM detector IC109.

Second Mixer, Second IF and FM Detector

A signal conversion FM receiver integrated chip, IC109 contains the second mixer, second IF and FM detector functions. The second local oscillator frequency is determined by the crystal X101 connected to pin 1 of IC109. The IF signal is received at pin 16 of IC109 via R203 and coupling capacitor C182. The second IF frequency of 455kHz is produced when the different frequency is applied to the mixer via Pin 6. The output of the second mixer via Pin 3 is applied to a 455kHz band-pass filter, CF104 for 25kHz and CF103 for 12.5kHz channel spacing. The output of CF104 is passed to a high gain IF amplifier (limiter) in IC109 via Pin 5. The amplified signal is coupled to the adjustable quadrature detector T103. Any detected signal is produced at Pin 9 of IC109 and applied to the Receiver Audio Circuit and the Mute (Squelch) Circuit.

Receiver Audio Circuit

The receiver audio circuit is comprised of a low pass filter and an audio amplifier on the RF PCB.

Low Pass Filter

The low pass filter is configured from coil L227, capacitor C201 and resistor R206.AF signals from Pin 9 of IC109 are filtered by the low pass filter to remove any components of the 455kHz IF signal. The filtered is passed to the high pass filter.

High Pass Filter

The de-emphasized audio signal from the high pass filter is fed to the audio amplifier (IC108).

Audio Amplifier

IC108 is the audio amplifier. The audio signal is passed to IC108. The gain of the amplifier is set by resistor R153. The amplified audio signal at Pin 4 of IC108 is applied to the external speaker.

Mute (Squelch) Circuit

The squelch circuit switches off the audio power amplifier in the absence of audio signal. The squelch circuit comprises a 50kHz pass band filter, squelch control (RV103) and a noise detect circuit.

The audio signal from Pin 9 of IC 109 is filtered by the 50kHz bandpass filter formed by L228, L229, C191, C192, and C193. The noise in the IF pass band is accepted, frequencies in the voice frequency band are rejected and noise present at the output of the filter is applied to the noise detect circuit via RV103. RV103 is used to adjust the squelch sensitivity.

Noise Detect Circuit (SQ Board)

The noise detect circuit in conjunction with IC109 consists of transistor Q133 and Q132, thermistor TH101 and diode D125. Any noise signal present is applied to the base of Q133 of the SQ circuit from Pin 11 of IC109. The signal is amplified by Q133 rectified by D11 and then buffered by Q132. The buffered signal output is applied to the squelch trigger of IC109 Pin 12 via resistor R200. The squelch trigger out put (Pin 13 of IC109) is applied to the Micro controller on the Digital circuit. When noise is present, the voltage at Pin 12 of IC109 exceeds 0.7V, the squelch trigger output is 0V (logic0) muting the receiver audio circuit. When no noise is present the voltage at Pin 12 of IC109 is less than 0.7 and Pin 13 of IC109 is at 5V (logic1), unmuting the audio circuit.

RF SECTION (SM-2450/UHF)

UHF Transmitter

The Transmitter is comprised of:

1. Microphone Audio Circuit
2. Transmitter Stage and Harmonic Filter
3. Automatic Power Control
4. Frequency Synthesizer Circuit

Microphone Audio Circuit

Microphone audio is pre-emphasized, limited and mixed with sub-audible tones to provide the modulating signal for the transmitter. This combined modulation is applied to TCXO modulation pin 1 and also to the VCO modulation input via RV101 to effect 2-point modulation. RV101 is a modulation balance control that equalizes modulation sensitivities of the two oscillators.

Transmitter Stage and Harmonic Filter

Power Amplifier IC103 is an RF Module. In transmit, diode D103 is forward biased allowing the RF signal to pass to the input of IC103 via Q116 and Q117. The amplified RF output passes through the stripline coupler and is fed to the harmonic low pass filter, consisting of spring coils L118, L120, L121 and L125 and capacitors C271, 273, 275, 277 and 280, and then to the antenna connector. The stripline coupler provides a sample of the RF signal for automatic power control. During TX, D108 connects the power amp to the antenna. D120 and D121 are forward biased reducing transmit signal power at the receiver input.

Automatic Power Control

The automatic power control contains the stripline coupler, diode D107, and variable resistor RV104, op amp IC104 , and two transistors: Q124 and Q125. IC104 acts as a differential amplifier. The RF signal is rectified by D107 to produce a DC voltage, proportional to RF power, that is applied to IC404 pin 3. Voltage divider R168, RV104 and R170 monitors TX 8.5V dc to develop a reference for IC104A pin 2. The difference at the output of (IC104 pin 1) is passed to Q124 and drives the collector of Q125. This feedback controls the gain of IC103 to maintain a constant RF power output. RV104 is used to adjust the RF high power level. RV105 is used to set the low power setting.

Frequency Synthesizer Circuit

With data received from the EEPROM (IC408) the frequency synthesizer circuit controls and produces the RF carrier frequency for the transmitter during transmit and the local oscillator frequency for the receiver.

The frequency synthesizer circuit is comprised of:

1. RX and TX voltage controlled oscillator module.
2. Loop Filter
3. PLL Frequency Synthesizer

Voltage Controlled Oscillator Circuit

The circuit produces carrier frequencies during transmit and local oscillator frequencies during receive. Transistor Q107 is configured as a power supply ripple filter. The VCO utilizes transistor Q108, varactor D101 , D102 and trimmer capacitor TC101 . These components are configured as a Colpitts oscillator. D101 and D102 produce a change in frequency with a change in DC voltage and are controlled by the phase detector. Q110 and Q111 are an amplifier and buffer for the output of the oscillator.

Receiver

The receive signal passes through the low pass filter, then onward to pin 1 of the Front End module. A bandpass filter consisting of C801-C810 (see band chart for different band values) and L801-L803 is coupled to the base of Q801 (2SC5084) which is the RF amplifier. Diode D801 serves as protection from static and RF overload from nearby transmitters. The output of Q801 is coupled to a second bandpass filter consisting of C812-C824 and L804-L807. The output of the Front End (pin 6) is coupled to the double balanced mixer IC102. The receiver Front End Module is factory pre-tuned and requires no field adjustment. Repair is effected by replacement of the entire (properly banded) module. Frequency bands are listed in the SPECIFICATIONS section of this manual.

The receiver Front End module pin-outs are:

1. RF Input
2. Input Ground
3. Ground
4. Receive +5VDC
5. Output Ground
6. RF Output

First Mixer

IC102 is a Double Balanced Mixer which provides a 45MHz intermediate frequency output. The filtered frequency from the Front End is coupled to signal input pin3 of the mixer. The Local Oscillator from the VCO module runs 45MHz lower than the receive frequency and is coupled to IC102 at pin6. The resultant IF output exits at mixer pin2. The 45MHz IF output is matched to the input of the 4 pole monolithic crystal filter by C179 , L119 , C172 and C173 . The crystal filter provides a bandwidth of + and - 7.5kHz from the operating frequency for the signal providing a high degree of spurious and intermodulation protection. Additionally, a 90MHz trap is placed at the filter input to provide additional attenuation of the second order IMD (Intermodulation Distortion). The output of the filter is impedance matched by T101 , C175 , and C176 to the base of the post filter IF amplifier Q130 (MMBC1321).

Second Oscillator- Mixer- Limiter and FM Detector

The output of IF amplifier Q130 is coupled through C182 to the input of IC109 (Pin16), an MC3371 device. IC109 is a monolithic single-conversion FM receiver containing a mixer, the second local oscillator, limiter and quadrature detector. The second local oscillator is crystal-controlled by X101 and operates at 44.545 Mhz. Mixing the second L.O. with the 45.0 Mhz IF input signal provides a resultant 455 kHz signal at the second mixer output. The mixer output is then routed to CF103 (455HT) for channel spacing of 12.5 kHz or to CF104 (455F) for channel spacing of 20 or 25kHz. These ceramic filters provide adjacent channel selectivity for the desired bandwidths. Selection of CF103 or CF104 is software controlled and programmable on a channel to channel basis.

Filter selection is performed by Q135, D126 and D126. The selected filter output drives a high gain limiting amplifier that is internally coupled to the quadrature detector. Refering to the RF schematic, with Channel Spacing low, Q135 is off and CF104 is the selected filter.

The quadrature detector is also configurable for narrow or wide channel spacing by software control of Q219 and diode D127. These components with R219 parallel R211 to maintain audio output at the proper level for the selected bandwidth.

Q134 inserts wideband squelch adjustment RV102 into the circuit whenever standard filter CF104 is selected. This tends to broaden the filter response and provide the higher frequency noise components needed to activate the squelch.

Squelch (Mute) Circuit

The squelch output is sent to microcontroller pin 7 after processing by the squelch circuits. The squelch circuit consists of a double-tuned BPF (Band Pass Filter) and also a noise detector circuit. Details of these circuits are discussed next.

Squelch Noise Band Pass Filter

The output signal from pin 9 of IC109 (MC3371) is filtered to remove the 455 kHz IF variations. The remaining audio is then filtered by a double-tuned BPF consisting of resonator L228-C191, resonator L229-C193 and coupling capacitor C192. The noise in the IF passband is accepted and voice frequencies are rejected. Any noise present at the filter output is applied to the noise detector via RV103. RV103 is used to set the squelch circuit sensitivity and is normally adjusted to produce a noise squelch opening sensitivity of 10dB to 12dB SINAD.

Noise Detector

The noise detector operating in conjunction with IC109 consists of Q132, Q133, D125, D129, TH101 and their associated biasing components. Noise from RV103 is amplified by an op amp within IC109. This noise sprectrum is further amplified by Q133 and rectified by D125. This output is buffered by Q132 and fed to the SQ IN (IC109 pin 12) through R200. When the mute is activated, (IC109 pin9) goes low to pull the base of inverter Q131 low. Q131 collector goes high thereby signalling the microprocessor to mute the receiver audio.

Low Pass Filter

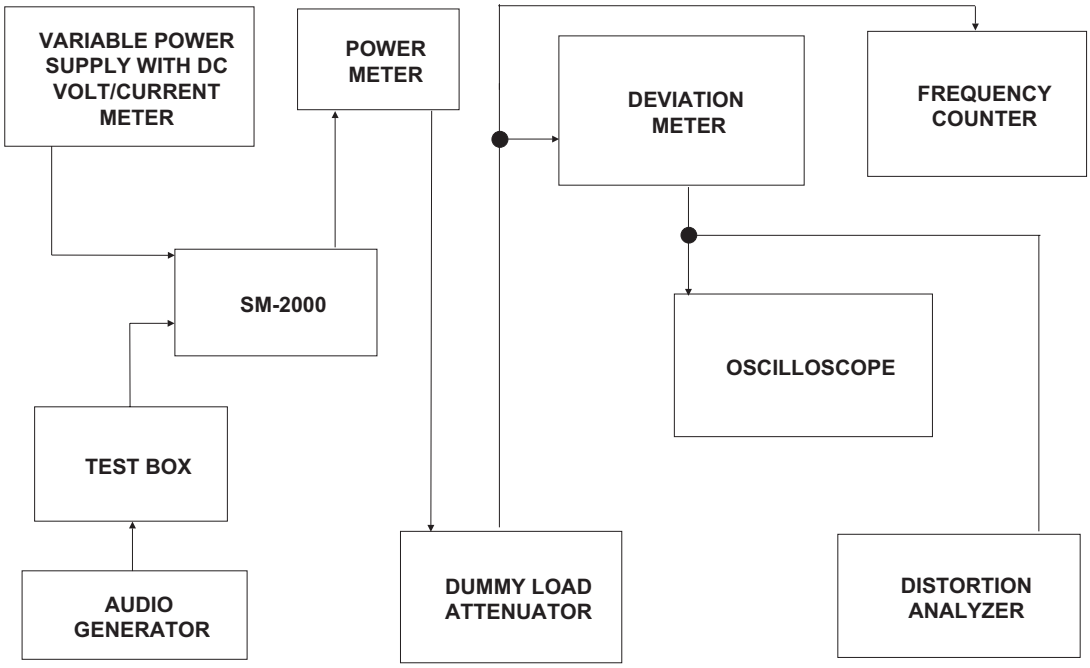
The audio output of (IC109 pin9) is fed to a LPF (Low Pass Filter) consisting of R206 and C201. This RC attenuates 455 kHz IF energy which normally appears at the output of the FM receiver chip. The audio is then routed to the input of IC406A LPF for audio processing.

Speaker Audio Amplifier

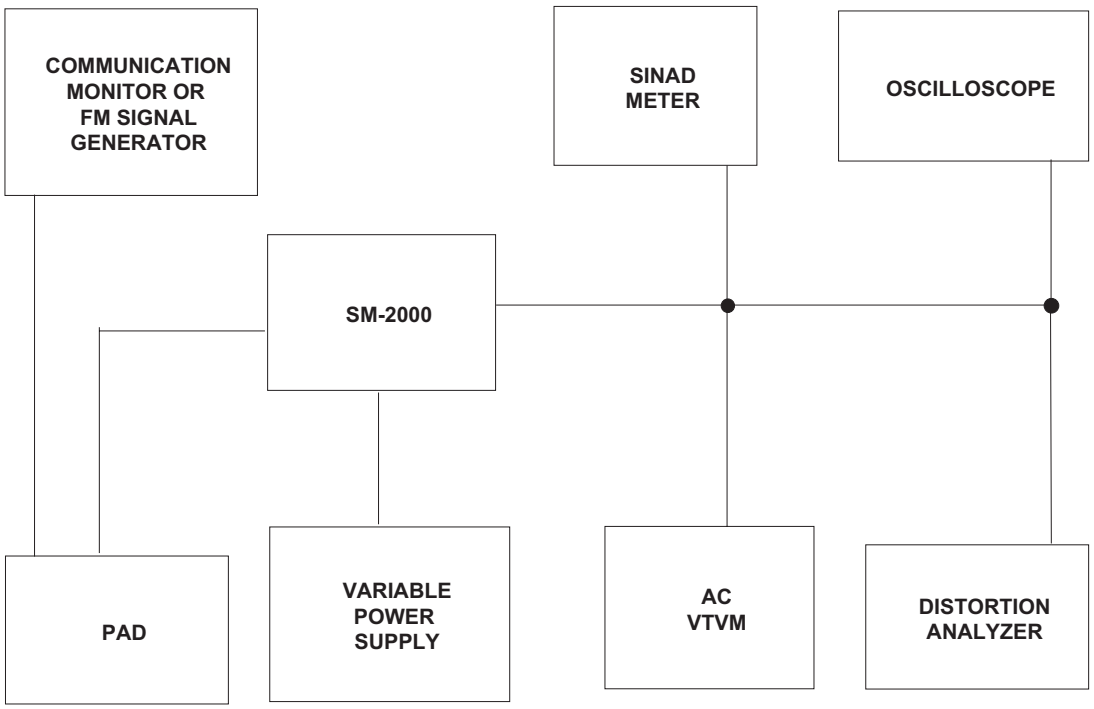
After signal detection and audio filtering, the low level audio is returned to pin 1 of IC108, the Audio PA. IC108, a TDA2003 device, provides sufficient power gain to drive the mobile speaker. Digital transistor Q137 mutes the audio amplifier by grounding R157 when the transistor turns on. When Q137 base is high, the transistor is on and the mobile is muted. Conversely when Q137 is off, the mute is released and audio is heard.

TEST SETUP

TRANSMIT TESTS



RECEIVER TESTS



SM-2150/VHF ALIGNMENT PROCEDURE

It is important that the TCXO be on the correct frequency before performing a complete alignment of the radio. An incorrect TCXO frequency can impair the performance and even cause mis-alignments.

Normally the transmitter is monitored with a frequency counter or service monitor while the transmitter is keyed at it's highest frequency. The TCXO is adjusted for the least frequency error. Typically the frequency is 470MHz with a frequency error of +/-750Hz or less. TC701 adjusts the center frequency if necessary.

PLL Alignment

- ***NOTE: If the PLL is out- of- lock, an audible warning will be heard and the front panel red LED will flash.***

1. Connect an RF power meter to the ANT socket.
2. Using the channel switch, select channel with the lowest transmit frequency.
3. Connect a DC voltmeter to test point 1 (TP1) accessed via the hole in the VCO cover.
4. Set the PTT switch to transmit.

- ***Note:The transmitter switching band width of this radio is 25MHz. A transmitter frequency range of more than 26MHz may be programmed and used if the voltage specification in step 5 is met.***

5. Adjusting L353, set the voltage measured at TP1, measure and check that the voltage is above 2.1 volts. If the voltage is below 2.1 volts the transmitter frequency programmed is too high for the operating bandwidth of the radio.
6. Set the PTT switch to receive.
7. Using the channel switch select channel with the lowest receive frequency.
8. Adjusting L356, set the voltage measured at TP1. Measure and check that the voltage is above 1.5 volts. If the voltage is below 1.5 volts the receive frequency programmed is too high for the operating bandwidth of the radio.

- ***Note:The receiver switching bandwidth of this radio is 26MHz. A receiver frequency range of more than 26MHz may be programmed and used if the voltage specification in Step 8 is met. There may be some degradation in actual receiver performance, if bandwidth of more than 26MHz is used.***

Receiver Alignment RF

- ***NOTE: The Receiver front end is a pre-aligned module. There are no available field adjustments.***

1. Connect an RF signal generator to the ANT socket and a SINAD meter to the external speaker jack (J1) located at the rear panel.

2. Adjust RV103 to the fully open position to hear receiver noise.

3. Adjust the VOLUME control to mid position.

4. Using the channel switch, select the programmed middle receive frequency.

5. Set the RF signal generator to the same receive channel frequency.

6. Set the audio frequency to 1kHz at 3K deviation for wide band (25kHz).

6B. Set the audio frequency to 1kHz at 1.5K deviation for narrow band (12.5kHz).

7. Adjust the RF output voltage level of the RF signal generator until the 1kHz signal is heard.

- ***NOTE: The RF output voltage level and the SINAD reading.***

8. Adjust T102 for an improvement in SINAD.

9. Adjust the RF output voltage level of the RF signal generator keeping the SINAD meter readings between 6dB and 12dB.

10. Adjust T101 for an improvement in SINAD.

11. Adjust the RF output voltage level of the RF signal generator keeping the SINAD meter readings between 6dB and 12dB .

12. Check for an RF voltage signal level of 0.31uV and a SINAD meter reading of 12dB or greater.

13. Select the highest receive frequency and check for a SINAD meter reading of 12dB or greater, at 0.42uV . (Sensitivity at the operational band edge).

14. Select the lowest receive frequency and check for a SINAD meter reading of 12dB or greater, at 0.42uV.

Discriminator Tuning

1. Set the RF level to 1.0mV .

2. Adjust T103 for a maximum audio output and on the oscilloscope monitor the sinewave distortion. Adjust T101 and T102 for lowest distortion as observed on a distortion analyzer. This is normally less than 3%.

Squelch Adjustment

1. Select a receiver channel that is programmed for narrow band (12.5 kHz) operation.
2. Set the RF signal generator to the receiver frequency. Set the AF modulation signal to 1 kHz at 1.5k deviation.
3. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.
4. Adjust the RF signal to the level desired for squelch sensitivity as you monitor SINAD. This is usually 8dB to 12dB SINAD.
5. On the main board adjust RV103 until the squelch is just unmuted (open)
6. Switch off the RF generator (squelch should close).
7. Switch on the RF generator. Squelch should open at the SINAD point where RV103 was adjusted. This completes the narrow band adjustment.
8. Select a receiver channel that is programmed for wide band operation (25 kHz).
9. Set the RF signal generator to the receiver frequency. Set the AF modulation signal to 1 kHz at 3k deviation.
10. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.
11. Adjust the RF signal to the level desired for squelch sensitivity as you monitor SINAD. This is usually 8dB to 12dB SINAD.
12. On the main board adjust RV102 until the squelch is just unmuted (open).
13. Switch off the RF generator (squelch should close).
14. Switch on the RF generator. Squelch should open at the SINAD point where RV102 was adjusted.
15. Disconnect the test equipment.

Automatic Power Adjustment

- ***Continuous transmit periods longer than 5 minutes are to be avoided.***

1. Connect the antenna output to a RF power meter or service monitor.
2. Set the PTT switch to the ON position.
3. Adjust the variable resistor RV104 to give the appropriate transmit power. Normally this is 25watts.
4. Set the PTT switch to the OFF position.
5. Select a channel programmed to low transmit power.
6. Set PTT to ON and adjust RV105 for desired low power.
7. Set PTT to OFF.

CTCSS/DCS Deviation Adjustment

- ***Note:The following adjustment should be preset with factory alignment. If an adjustment must be made the following procedures must be followed:***

1. Program the radio with a 67.0Hz tone on one channel and 250.3Hz on another channel.

2. Connect a power meter and modulation meter to the radio antenna jack.

3. Adjust RV101 to the center of its adjustment.

- ***Note:Release the PTT button when changing channels.***

4. Alternately select the channel with tone 250.3Hz and the channel with tone 67Hz. Key up and note the level for each. If necessary, adjust RV101 until a balance occurs between tone 250.3Hz and tone 67Hz.

- ***Note:This adjustment also sets DCS balance even if a DCS tone is not programmed at this time.***

5. Select tone 250.3Hz or tone 67Hz and adjust RV403 for the tone level, typically between 500Hz to 1kHz.

6. Release the PTT button.

Modulation Deviation Adjustment

1. Connect a power meter and a coupler to the radio.

2. Connect an AF generator to the test box.

3. Set the audio output to 30mV and the audio frequency to 1kHz .

4. Using the channel switch, select the highest transmit channel that does not have CTCSS or DCS programmed.

5. Press and hold the PTT switch.

6. Adjust RV402 for 90% of maximum, system deviation.

6a. Adjust RV402 for 2.25kHz for narrow band (12.5kHz).

6b. Adjust RV402 for 4.5kHz for wide band (25kHz).

7. Using the channel switch, select the lowest transmit channel that does not have CTCSS or DCS programmed.

8. Press and hold the PTT switch.

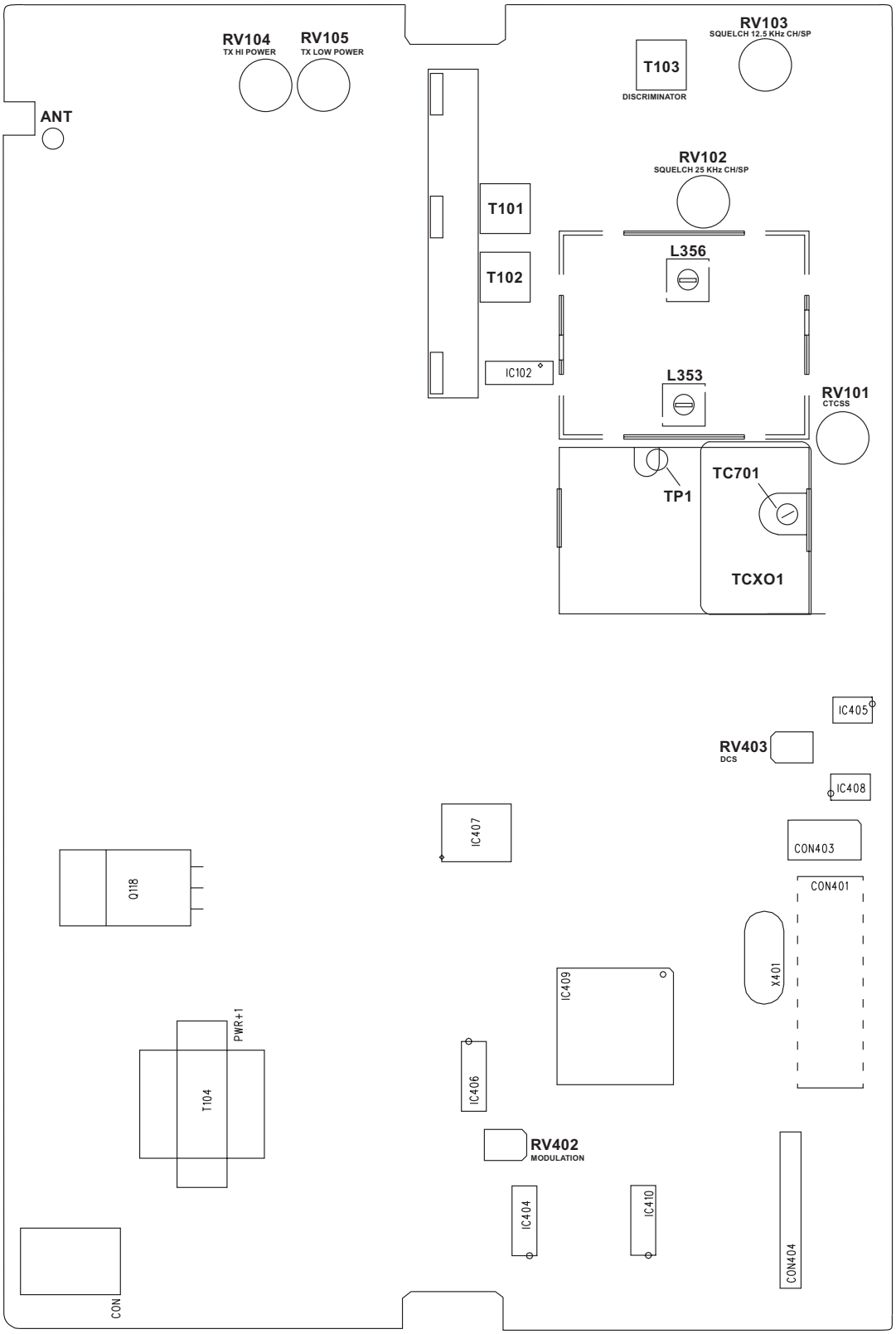
9. Measure and check that the deviation is not below 3.8k . If the deviation is below 3.8k, adjust RV402 to 3.8k .

10. Return to highest transmit channel having a sub- audible tone and verify deviation does not exceed 5k.

11. At the channel that highest deviation is found, sweep the audio frequency between 300kHz and 3kHz . Adjust RV402 to ensure deviation is below peak system deviation at all frequencies.

12. Set the PTT switch to the OFF position.

ALIGNMENT POINTS DIAGRAM (SM-2150/VHF)



SM-2450/UHF ALIGNMENT PROCEDURE

It is important that the TCXO be on the correct frequency before performing a complete alignment of the radio. An incorrect TCXO frequency can impair the performance and even cause mis-alignments.

Normally the transmitter is monitored with a frequency counter or service monitor while the transmitter is keyed at its highest frequency. The TCXO is adjusted for the least frequency error. Typically the frequency is 470MHz with a frequency error of +/- 750Hz or less. TC701 adjusts the center frequency if necessary.

PLL Alignment

- ***NOTE: If the PLL is out- of- lock, an audible warning will be heard and the front panel red LED will flash.***

1. Connect an RF power meter to the ANT jack.

2. Using the channel switch, select the channel with the highest transmit frequency.

3. Connect a DC voltmeter to test point 1 (TP1), accessed via the hole in the VCO cover.

4. Set the PTT switch to transmit.

5. Adjusting TC101 , set the voltage measured at TP1 to 12.0 (+/- 0.05) volts.

6. Release the PTT switch.

7. Using the channel switch, select the channel with the lowest receive frequency.

8. At TP1 measure and check that the voltage is 1.4 volts or more. If the voltage is below 1.4 volts the VCO may not lock because the lowest RX frequency is programmed too far below the TX frequency.

Receiver Alignment RF

- ***NOTE: The Receiver front end is a pre-aligned module. There are no available field adjustments.***

1. Connect an RF signal generator to the ANT socket and a SINAD meter to the external speaker jack (J1) located at the rear panel.

2. Adjust RV103 to the fully open position to hear receiver noise.

3. Adjust the VOLUME control to mid position.

4. Using the channel switch, select the programmed middle receive frequency.

5. Set the RF signal generator to the same receive channel frequency.

6. Set the audio frequency to 1kHz at 3K deviation for wide band (25kHz).

6B. Set the audio frequency to 1kHz at 1.5K deviation for narrow band (12.5kHz).

7. Adjust the RF output voltage level of the RF signal generator until the 1kHz signal is heard.

- ***NOTE: The RF output voltage level and the SINAD reading.***

8. Adjust T102 for an improvement in SINAD.

9. Adjust the RF output voltage level of the RF signal generator keeping the SINAD meter readings between 6dB and 12dB .

10. Adjust T101 for an improvement in SINAD.

11. Adjust the RF output voltage level of the RF signal generator keeping the SINAD meter readings between 6dB and 12dB .

12. Check for an RF voltage signal level of 0.31uV and a SINAD meter reading of 12dB or greater.

13. Select the highest receive frequency and check for a SINAD meter reading of 12dB or greater, at 0.42uV . (Sensitivity at the operational band edge).

14. Select the lowest receive frequency and check for a SINAD meter reading of 12dB or greater, at 0.42uV.

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1. Set the RF level to 1.0mV .

2. Adjust T103 for a maximum audio output and on the oscilloscope monitor the sinewave distortion. Adjust T101 and T102 for lowest distortion as observed on a distortion analyzer. This is normally less than 3%.

Squelch Adjustment

1. Select a receiver channel that is programmed for narrow band (12.5 kHz) operation.

2. Set the RF signal generator to the receiver frequency. Set the AF modulation signal to 1 kHz at 1.5k deviation.

3. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.

4. Adjust the RF signal to the level desired for squelch sensitivity as you monitor SINAD. This is usually 8dB to 12dB SINAD.

5. On the main board adjust RV103 until the squelch is just unmuted (open)

6. Switch off the RF generator (squelch should close).

7. Switch on the RF generator. Squelch should open at the SINAD point where RV103 was adjusted. This completes the narrow band adjustment.

8. Select a receiver channel that is programmed for wide band operation (25 kHz).

9. Set the RF signal generator to the receiver frequency. Set the AF modulation signal to 1 kHz at 3k deviation.

10. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.

11. Adjust the RF signal to the level desired for squelch sensitivity as you monitor SINAD. This is usually 8dB to 12dB SINAD.

12. On the main board adjust RV102 until the squelch is just unmuted (open).

13. Switch off the RF generator (squelch should close).

14. Switch on the RF generator. Squelch should open at the SINAD point where RV102 was adjusted.

15. Disconnect the test equipment.

Automatic Power Adjustment

- ***NOTE: Continuous transmit periods longer than 5 minutes are to be avoided.***

1. Connect the antenna output to an RF power meter or service monitor.
2. Set the PTT switch to the ON position.
3. Adjust the Variable resistor RV104 to give the appropriate transmit power. Nominally this is 25watts .
4. Set the PTT switch to the OFF position.
5. Select a channel programmed to low transmit power.
6. Set PTT to ON and adjust RV105 for desired low power .
7. Set PTT to OFF.

CTCSS/DCS Deviation Adjustment

- ***NOTE: The following adjustment should be preset with factory alignment. If an adjustment must be made the following procedures must be followed:***

1. Program the radio with a 67.0Hz tone on one channel and 250.3Hz on another channel.
2. Connect a power meter and modulation meter to the radio antenna jack.
3. Adjust RV101 to the center of its adjustment.

- ***Note: Release the PTT button when changing channels.***

4. Alternately select the channel with tone 250.3Hz and the channel with tone 67Hz . Key up and note the level for each. If necessary, adjust RV101 until a balance occurs between tone 250.3Hz and tone 67Hz .

- ***Note:This adjustment also sets DCS balance even if a DCS tone is not programmed at this time.***

5. Select tone 250.3Hz or tone 67Hz and adjust RV403 for the tone level, typically between 500Hz to 1kHz.
6. Release the PTT button.

Modulation Deviation Adjustment

1. Connect a power meter and a coupler to the radio.

2. Connect an AF generator to the test box.

3. Set the audio output to 30mV and the audio frequency to 1kHz .

4. Using the channel switch, select the highest transmit channel that does not have CTCSS or DCS programmed.

5. Press and hold the PTT switch.

6. Adjust RV402 for 90% of maximum, system deviation.

6a. Adjust RV402 for 2.25kHz for narrow band (12.5kHz).

6b. Adjust RV402 for 4.5kHz for wide band (25kHz).

7. Using the channel switch, select the lowest transmit channel that does not have CTCSS or DCS programmed.

8. Press and hold the PTT switch.

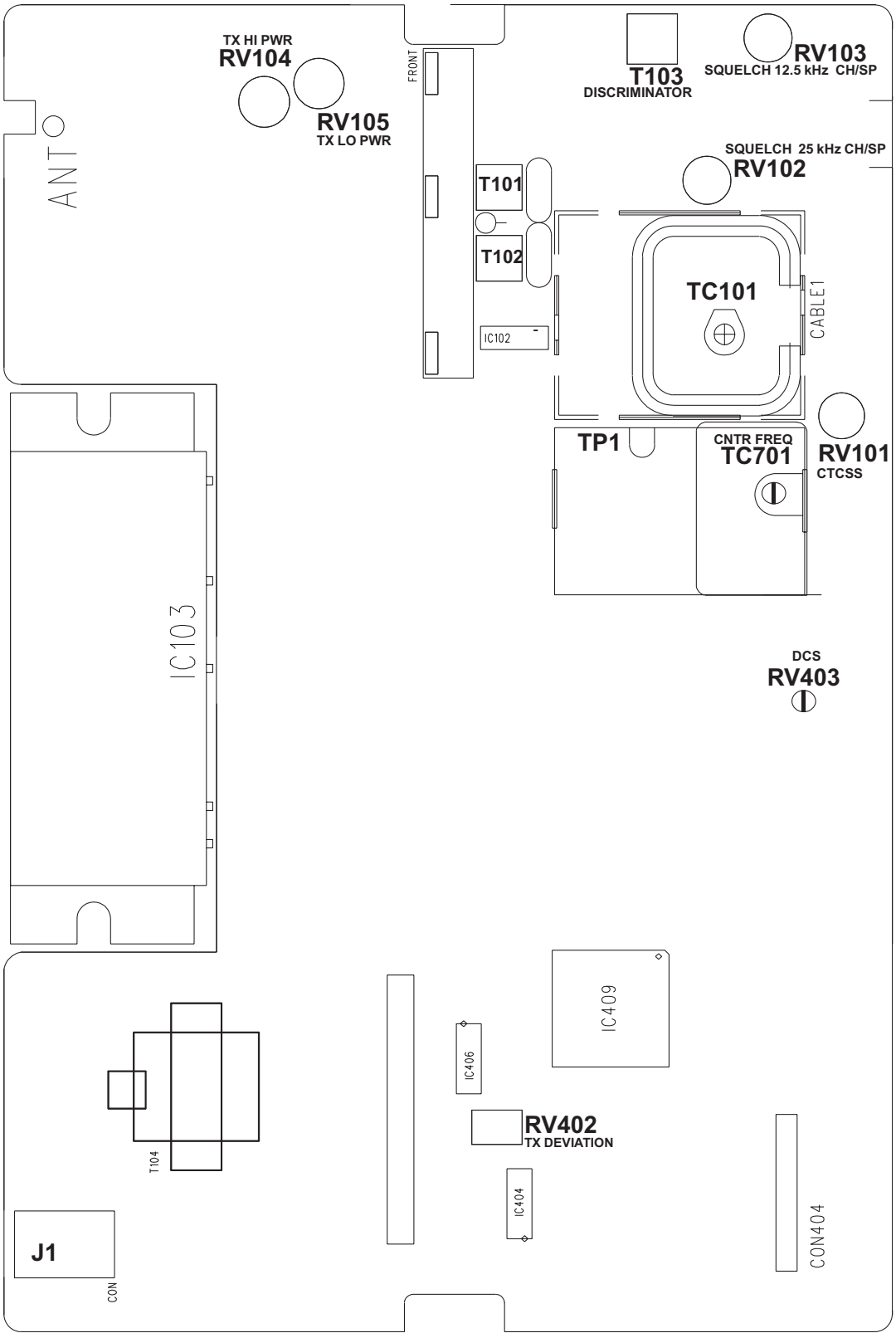
9. Measure and check that the deviation is not below 3.8k . If the deviation is below 3.8k, adjust RV402 to 3.8k .

10. Return to highest transmit channel having a sub- audible tone and verify deviation does not exceed 5k.

11. At the channel that highest deviation is found, sweep the audio frequency between 300kHz and 3kHz . Adjust RV402 to ensure deviation is below peak system deviation at all frequencies.

12. Set the PTT switch to the OFF position.

ALIGNMENT POINTS DIAGRAM (SM-2450/UHF)



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 these boards. 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 metalized 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 metalized 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 or 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 polarity 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.

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

4. Allow the component and the board to cool and then remove all flux from the area using alcohol or another approved flux remover.

SURFACE MOUNTED INTEGRATED CIRCUIT REPLACEMENT

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. The IC’s can easily be removed and installed using the hot-air system. See the manufacturer’s 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.

PARTS LIST COMMON TO SM-2000

REF #	DESCRIPTION	PART #
650-100-0002 TCXO PCB ASSY. (SEE NOTE 1)		
650-090-0003 MA-4472 MIC ASSY. (SEE NOTE 1)		

REF #	DESCRIPTION	PART #
650-050-0003 CONTROL HEAD PCB ASSY.		
CON1	HEADER PIN	Z422-492-1
CON801	JACK MODULAR	420-709-9
C801	CHIP CERAMIC 47PF	134-722-1Z
C802	CHIP CERAMIC 47PF	134-722-1Z
C803	CHIP CERAMIC 47PF	134-722-1Z
C804	CHIP CERAMIC 47PF	134-722-1Z
C805	CHIP CERAMIC 47PF	134-722-1Z
C806	CHIP CERAMIC 47PF	134-722-1Z
C807	CHIP CERAMIC 47PF	134-722-1Z
C808	CHIP CERAMIC 47PF	134-722-1Z
C809	CHIP CERAMIC 47PF	134-722-1Z
C815	DISK CERAMIC (FOR SP1) 470PF	134-710-8
C821	CHIP CERAMIC 0.001UF	130-A17-6Z
C823	ELECT CAPACITOR 10UF	101-025-9
D801	DIODE SI CHIP KDS193	243-052-6
D802	DIODE SI CHIP KDS193	243-052-6
D803	DIODE SI CHIP KDS193	243-052-6
D804	DIODE SI CHIP KDS184S	243-051-5
D807	DIODE ZENER	241-099-9
D808	DIODE ZENER	241-099-9
D810	DIODE ZENER	241-099-9
D811	DIODE ZENER	241-099-9
LED1	LED LAMP GRN 3 V 75MW	251-160-3
LED2	LED LAMP GRN 3 V 75MW	251-160-3
LED3	LED LAMP GRN 3 V 75MW	251-160-3
LED4	LED LAMP GRN 3 V 75MW	251-160-3
LED5	LED LAMP RED/GRN 3 V	251-168-1
Q821	TRANSISTOR	202-106-5
Q822	TRANSISTOR	202-106-5
R801	CHIP RESISTOR 470 OHM	060-471-0Z
R821	CHIP RESISTOR 22 OHM	060-220-0Z
R822	CHIP RESISTOR 4.7K	060-472-1Z
SP1	SPEAKER 4 OHM	420-108-4A
SW3	SW PUSH	432-063-7
SW4	TACT SWITCH	436-038-8
SW405	SW ROTARY	430-070-5
VR801	VR 20KA	450-523-5
	HOLDER(LED)	892-390
	HOLDER(LED)	892-540
	P.C.B. CONTROL HEAD	416-988-C

NOTES:

1. **Components are not available, assembly is non-repairable.**

650-000-0001 SM-2150/VHF MAIN BOARD

DIGITAL SECTION

Digital Parts Common on Both VHF & UHF

REF #	DESCRIPTION		PART #
C401	CHIP CERAMIC	0.001UF	130-A17-6Z
C402	CHIP CERAMIC	0.22UF	130-270-7Y
C403	CHIP CERAMIC	0.01UF	130-172-2Z
C404	ELECT CAPACITOR	10UF	101-025-9
C405	CHIP CERAMIC	220PF	132-220-2Z
C406	CHIP CERAMIC	220PF	132-220-2Z
C407	ELECT CAPACITOR	10UF	101-025-9
C408	CHIP CERAMIC	0.033UF	130-314-5Z
C409	CHIP CERAMIC	0.0068UF	130-602-4Y
C410	CHIP CERAMIC	47PF	134-722-1Z
C411	CHIP CERAMIC	0.1UF	130-170-0Y
C412	CHIP CERAMIC	0.015UF	130-A44-0Y
C413	CHIP CERAMIC	47PF	134-722-1Z
C414	CHIP CERAMIC	0.047UF	130-424-0Z
C415	CHIP CERAMIC	220PF	132-220-2Z
C416	CHIP CERAMIC	0.01UF	130-172-2Z
C417	CHIP CERAMIC	0.0047UF	134-719-7Z
C418	CHIP CERAMIC	0.022UF	130-263-1Z
C419	CHIP CERAMIC	0.0018UF	130-A22-0Z
C420	CHIP CERAMIC	470PF	134-761-4Z
C421	CHIP CERAMIC	470PF	134-761-4Z
C422	CHIP CERAMIC	220PF	132-220-2Z
C423	CHIP CERAMIC	220PF	132-220-2Z
C424	CHIP CERAMIC	220PF	132-220-2Z
C425	CHIP CERAMIC	0.1UF	130-A60-4Y
C426	CHIP CERAMIC	0.022UF	130-263-1Z
C428	CHIP CERAMIC	0.01UF	130-172-2Z
C429	CHIP CERAMIC	47PF	134-722-1Z
C430	CHIP CERAMIC	0.1UF	130-A60-4Y
C431	CHIP CERAMIC	0.0033UF	130-315-6Z
C432	CHIP CERAMIC	0.68UF	130-624-4
C433	CHIP CERAMIC	0.082UF	130-808-4Y
C434	CHIP CERAMIC	120PF	131-107-9Z
C435	ELECT CAPACITOR	1UF	101-006-2
C436	CHIP CERAMIC	0.1UF	130-170-0Y
C437	CHIP CERAMIC	0.1UF	130-A60-4Y
C438	ELECT CAPACITOR	10UF	101-025-9
C440	CHIP CERAMIC	15PF	131-511-0Z
C441	CHIP CERAMIC	15PF	131-511-0Z
C442	CHIP CERAMIC	0.047UF	130-424-0Z
C443	CHIP CERAMIC	0.047UF	130-424-0Z
C445	CHIP CERAMIC	0.033UF	130-314-5Z
C446	CHIP CERAMIC	0.033UF	130-314-5Z
C447	CHIP CERAMIC	0.033UF	130-314-5Z
C448	CHIP CERAMIC	0.033UF	130-314-5Z

REF #	DESCRIPTION		PART #
C450	CHIP CERAMIC	0.047UF	130-424-0Z
C452	CHIP TANTALUM	1UF	141-036-1Z
C453	CHIP CERAMIC	0.01UF	130-172-2Z
C454	CHIP TANTALUM	1UF	141-036-1Z
C455	CHIP CERAMIC	0.033UF	130-314-5Z
C456	CHIP CERAMIC	0.001UF	130-A17-6Z
C457	CHIP CERAMIC	0.047UF	130-424-0Z
C458	CHIP CERAMIC	0.01UF	130-172-2Z
C460	CHIP CERAMIC	0.1UF	130-170-0Y
C464	CHIP CERAMIC	0.033UF	130-314-5Z
C550	CHIP CERAMIC	18PF	131-816-6Z
C551	CHIP CERAMIC	18PF	131-816-6Z
C552	CHIP CERAMIC	0.01UF	130-172-2Z
C553	CHIP CERAMIC	0.01UF	130-172-2Z
C554	CHIP CERAMIC	0.01UF	130-172-2Z
C555	CHIP CERAMIC	0.01UF	130-172-2Z
C558	ELECT CAPACITOR	10UF	101-025-9
C559	CHIP CERAMIC	0.01UF	130-172-2Z
CON403	PROG CONNECTOR		421-677-7
CON404	OPTION BOARD CONNECTOR		422-746-1
D401	DIODE SI CHIP		243-051-5
D402	DIODE SWITCHING		243-063-6
D551	DIODE SI CHIP		243-049-4
D552	DIODE SI CHIP		243-049-4
IC401	I.C.		223-224-9
IC402	I.C. REGULATOR		220-378-0
IC404	I.C. OP AMP		222-018-5
IC405	I.C. OP AMP		231-064-4
IC406	I.C. OP AMP		222-018-5
IC407	I.C.		231-073-3
IC408	I.C. EEPROM		229-463-8A
IC409	I.C.		220-130-2
IC410	I.C. OP AMP		222-018-5
IC411	I.C.		223-261-2
IC412	I.C.		223-261-2
Q131	TRANSISTOR		202-095-8Z
Q401	TRANSISTOR		202-095-8Z
Q402	TRANSISTOR		202-095-8Z
Q403	TRANSISTOR		202-095-8Z
Q404	TRANSISTOR		202-095-8Z
Q405	TRANSISTOR		202-095-8Z
Q406	TRANSISTOR		202-095-8Z
Q407	BRT		202-091-4
Q409	TRANSISTOR		202-095-8Z
Q504	TRANSISTOR		202-106-5

MAXON SM-2000 MOBILE

650-000-0001 SM-2150/VHF MAIN BOARD

DIGITAL SECTION (continued)

Digital Parts Common on Both VHF & UHF

REF #	DESCRIPTION		PART #
Q550	TRANSISTOR		202-113-1
Q551	TRANSISTOR		202-113-1
Q552	TRANSISTOR		202-113-1
Q553	TRANSISTOR		202-113-1
R186	CHIP RESISTOR	47K	060-473-2Z
R401	CHIP RESISTOR	680K	060-684-6Z
R402	CHIP RESISTOR	47K	060-473-2Z
R403	CHIP RESISTOR	10K	060-103-8Z
R404	CHIP RESISTOR	56K	060-563-0Z
R405	CHIP RESISTOR	7.5K	060-752-4Z
R406	CHIP RESISTOR	18K	060-183-0Z
R407	CHIP RESISTOR	330K	060-334-0Z
R408	CHIP RESISTOR	3.3K	060-332-8Z
R410	CHIP RESISTOR	220K	060-224-4Z
R411	CHIP RESISTOR	100K	060-104-9Z
R412	CHIP RESISTOR	39K	060-393-3Z
R414	CHIP RESISTOR	8.2K	060-822-4Z
R415	CHIP RESISTOR	8.2K	060-822-4Z
R416	CHIP RESISTOR	220K	060-224-4Z
R417	CHIP RESISTOR	8.2K	060-822-4Z
R418	CHIP RESISTOR	8.2K	060-822-4Z
R419	CHIP RESISTOR	47K	060-473-2Z
R420	CHIP RESISTOR	10K	060-103-8Z
R421	CHIP RESISTOR	10K	060-103-8Z
R422	CHIP RESISTOR	43K	060-433-6Z
R423	CHIP RESISTOR	47K	060-473-2Z
R424	CHIP RESISTOR	560	060-561-8Z
R425	CHIP RESISTOR	10K	060-103-8Z
R426	CHIP RESISTOR	47K	060-473-2Z
R427	CHIP RESISTOR	39K	060-393-3Z
R428	CHIP RESISTOR	20K	060-203-5Z
R429	CHIP RESISTOR	100K	060-104-9Z
R430	CHIP RESISTOR	10K	060-103-8Z
R431	CHIP RESISTOR	22K	060-223-3Z
R433	CHIP RESISTOR	47K	060-473-2Z
R434	CHIP RESISTOR	47K	060-473-2Z
R435	CHIP RESISTOR	47K	060-473-2Z
R436	CHIP RESISTOR	22K	060-223-3Z
R437	CHIP RESISTOR	4.7K	060-472-1Z
R438	CHIP RESISTOR	4.7K	060-472-1Z
R439	CHIP RESISTOR	47K	060-473-2Z
R440	CHIP RESISTOR	1M	060-105-0Z
R441	CHIP RESISTOR	43K	060-433-6Z
R442	CHIP RESISTOR	33K	060-333-9Z
R443	CHIP RESISTOR	20K	060-203-5Z
R444	CHIP RESISTOR	220K	060-224-4Z
R445	CHIP RESISTOR	120K	060-124-6Z
R446	CHIP RESISTOR	82K	060-823-5Z
R447	CHIP RESISTOR	120K	060-124-6Z
R448	CHIP RESISTOR	220K	060-224-4Z
R449	CHIP RESISTOR	820	060-821-3Z
R450	CHIP RESISTOR	22K	060-223-3Z
R451	CHIP RESISTOR	2.2K	060-222-2Z
R452	CHIP RESISTOR	1M	060-105-0Z
R453	CHIP RESISTOR	3K	060-302-1Z
R454	CHIP RESISTOR	4.7K	060-472-1Z
R455	CHIP RESISTOR	3.6K	060-362-5Z
R456	CHIP RESISTOR	27K	060-273-8Z
R457	CHIP RESISTOR	47K	060-473-2Z
R458	CHIP RESISTOR	47K	060-473-2Z
R459	CHIP RESISTOR	2.4K	060-242-0
R460	CHIP RESISTOR	470	060-471-0Z
R461	CHIP RESISTOR	470	060-471-0Z
R462	CHIP RESISTOR	47K	060-473-2Z
R463	CHIP RESISTOR	47K	060-473-2Z
R464	CHIP RESISTOR	47K	060-473-2Z
R465	CHIP RESISTOR	47K	060-473-2Z
R466	CHIP RESISTOR	100K	060-104-9Z
R469	CHIP RESISTOR	10K	060-103-8Z
R470	CHIP RESISTOR	30K	060-303-2Z
R471	CHIP RESISTOR	36K	060-363-6Z
R472	CHIP RESISTOR	30K	060-303-2Z
R473	CHIP RESISTOR	4.7K	060-472-1Z
R474	CHIP RESISTOR	360K	060-364-7
R490	CHIP RESISTOR	47K	060-473-2Z
R550	CHIP RESISTOR	7.5K	060-752-4Z
R551	CHIP RESISTOR	27K	060-273-8Z
R552	CHIP RESISTOR	27K	060-273-8Z
R553	CHIP RESISTOR	7.5K	060-752-4Z
R554	CHIP RESISTOR	2.2K	060-222-2Z
R555	CHIP RESISTOR	4.7K	060-472-1Z
R556	CHIP RESISTOR	2.2K	060-222-2Z
R559	CHIP RESISTOR	470	060-471-0Z
RLK3	CHIP RESISTOR	0	060-000-8Z
RLK4	CHIP RESISTOR	0	060-000-8Z
RLK5	CHIP RESISTOR	0	060-000-8Z
RLK7	CHIP RESISTOR	0	060-000-8Z
RLK8	CHIP RESISTOR	0	060-000-8Z
RLK10	CHIP RESISTOR	0	060-000-8Z
RLK11	CHIP RESISTOR	0	060-000-8Z
RLK12	CHIP RESISTOR	0	060-000-8Z
RLK13	CHIP RESISTOR	0	060-000-8Z
RLK14	CHIP RESISTOR	0	060-000-8Z
RV402	RES.CHIP SEMIFIXED	22K	067-223-8Y
RV403	RES.CHIP SEMIFIXED	47K	067-473-7Y
X401	CRYSTAL		262-228-0Z

BAND CHART

SM-2150L VHF BAND 1 (136-162 MHz)

REF #	DESCRIPTION	PART #
FRONT-END PCB ASSEMBLY		**650-110-0011**
MAIN BOARD PARTS		
C155	CHIP CERAMIC 4PF	134-007-7Y
C160	CHIP CERAMIC 24PF	132-407-5Y
C164	CHIP CERAMIC 18pF	131-816-6Y
C165	CHIP CERAMIC 9pF	139-003-8Y
C245	CHIP CERAMIC 5PF	135-010-4Y
C248	CHIP CERAMIC 27PF	132-714-2Y
C249	CHIP CERAMIC 20PF	132-012-1Y
C253	CHIP CERAMIC 75PF	137-504-4Y
C254	CHIP CERAMIC 33PF	133-336-9Y
C269	CHIP CERAMIC 9PF	139-003-8Y
C270	CHIP CERAMIC 4PF	134-013-2Y
C273	CHIP CERAMIC 43PF	134-302-2Y
C275	CHIP CERAMIC 47PF	134-773-5Y
C277	CHIP CERAMIC 43PF	134-302-2Y
C278	CHIP CERAMIC 82PF	138-216-9Z
C280	CHIP CERAMIC 24PF	132-408-6Y
C281	CHIP CERAMIC 36pF	133-611-7Y
C283	CHIP CERAMIC 18PF	131-829-8Y
C354	CHIP CERAMIC 39PF	133-932-7Y
C356	CHIP CERAMIC 4PF	134-007-7Y
C357	CHIP CERAMIC 4.7PF	134-767-0Y
C358	CHIP CERAMIC 4.7PF	134-767-0Y
C365	CHIP CERAMIC 16PF	131-603-0
C367	CHIP CERAMIC 3.3PF	133-321-5Y
C368	CHIP CERAMIC 3.3PF	133-321-5Y
L353	COIL CORE CHIP	311-117-4
L356	COIL CORE CHIP	311-117-4
R182	CHIP RESISTOR 120 OHM	060-121-4Z

SM-2150H VHF BAND 2 (148-174 MHz)

REF #	DESCRIPTION	PART #
FRONT-END PCB ASSEMBLY		**650-110-0002**
MAIN BOARD PARTS		
C155	CHIP CERAMIC 11PF	131-103-5Y
C160	CHIP CERAMIC 24PF	132-407-5Y
C164	CHIP CERAMIC 24PF	132-407-5Y
C165	CHIP CERAMIC 16PF	131-603-0
C245	CHIP CERAMIC 8PF	138-004-4Y
C248	CHIP CERAMIC 27PF	132-714-2Y
C249	CHIP CERAMIC 18PF	131-816-6Y
C253	CHIP CERAMIC 75PF	137-504-4Y
C254	CHIP CERAMIC 43PF	134-302-2Y
C269	CHIP CERAMIC 2.7PF	132-725-2Y
C270	CHIP CERAMIC 6PF	136-015-4Y
C273	CHIP CERAMIC 51PF	135-106-8Y
C275	CHIP CERAMIC 56PF	135-639-1Y
C277	CHIP CERAMIC 47PF	134-773-5Y
C278	CHIP CERAMIC 75PF	137-512-1Z
C280	CHIP CERAMIC 20PF	132-021-9
C281	CHIP CERAMIC 56PF	135-613-9Y
C283	CHIP CERAMIC 27PF	132-723-0Y
C354	CHIP CERAMIC 30PF	133-010-4Y
C356	NOT USED	NOT USED
C357	CHIP CERAMIC 5.6PF	135-627-2Y
C358	CHIP CERAMIC 5.6PF	135-627-2Y
C365	CHIP CERAMIC 18PF	131-816-6Y
C367	CHIP CERAMIC 4.7PF	134-767-0Y
C368	CHIP CERAMIC 4.7PF	134-767-0Y
L353	COIL CORE CHIP	320-859-9
L356	COIL CORE CHIP	311-117-4
R182	CHIP RESISTOR 150 OHM	060-151-1Z

MAXON SM-2000 MOBILE

650-000-0001 SM-2150/VHF MAIN BOARD

REF #	DESCRIPTION		PART #
FRONT-END PCB ASSEMBLY (REFER TO BAND CHART)			
C1	CHIP CERAMIC	470PF	134-761-4Y
C101	CHIP CERAMIC	220PF	132-220-2Y
C102	CHIP CERAMIC	220PF	132-220-2Y
C103	CHIP CERAMIC	220PF	132-220-2Y
C104	CHIP CERAMIC	220PF	132-220-2Y
C105	CHIP CERAMIC	5PF	135-010-4Y
C106	CHIP CERAMIC	470PF	134-761-4Y
C107	CHIP CERAMIC	0.1UF	130-170-0Y
C108	CHIP CERAMIC	1UF	131-089-7Y
C109	CHIP CERAMIC	220PF	132-220-2Y
C110	CHIP CERAMIC	0.001UF	130-A17-6Y
C113	CHIP TANTALUM	1UF	141-036-1Z
C114	MYLAR CAPACITOR	0.1UF	111-022-9
C115	CHIP CERAMIC	0.1UF	130-170-0Y
C119	CHIP CERAMIC	10PF	131-039-1Y
C120	MYLAR CAPACITOR	0.01UF	111-008-7Z
C121	CHIP CERAMIC	470PF	134-761-4Y
C122	CHIP CERAMIC	0.1UF	130-A60-4Y
C129	CHIP CERAMIC	0.001UF	131-025-8Y
C139	CHIP CERAMIC	220PF	132-220-2Y
C144	CHIP CERAMIC	1.5PF	131-559-4Y
C145	CHIP CERAMIC	0.001UF	130-A17-6Y
C147	ELECT CAPACITOR	47UF	104-713-2
C148	CHIP CERAMIC	220PF	132-220-2Y
C149	CHIP CERAMIC	220PF	132-220-2Y
C150	CHIP CERAMIC	220PF	132-220-2Y
C151	CHIP CERAMIC	470PF	134-761-4Y
C152	ELECT CAPACITOR	2200UF	102-278-6
C156	CHIP CERAMIC	0.001UF	130-A17-6Y
C157	CHIP CERAMIC	15PF	131-511-0Y
C158	CHIP CERAMIC	0.001UF	130-A17-6Y
C159	CHIP CERAMIC	0.001UF	130-A17-6Y
C161	CHIP CERAMIC	0.1UF	130-170-0Y
C162	CHIP CERAMIC	220PF	132-220-2Y
C167	CHIP CERAMIC	82PF	138-210-3Y
C168	CHIP CERAMIC	0.001UF	130-A17-6Y
C169	CHIP CERAMIC	0.01UF	130-172-2Y
C170	CHIP CERAMIC	220PF	132-220-2Y
C172	CHIP CERAMIC	15PF	131-511-0Y
C173	CHIP CERAMIC	56PF	135-613-9Y
C174	CHIP CERAMIC	3.3PF	133-321-5Y
C175	CHIP CERAMIC	20PF	132-012-1Y
C176	CHIP CERAMIC	39PF	133-932-7Y
C177	CHIP CERAMIC	0.001UF	130-A17-6Y
C178	CHIP CERAMIC	0.001UF	130-A17-6Y
C179	CHIP CERAMIC	82PF	138-210-3Y
C180	CHIP CERAMIC	0.01UF	130-172-2Y
C181	DIP TANTALUM	10UF	141-012-9Z
C182	CHIP CERAMIC	0.001UF	130-A17-6Y
C183	CHIP CERAMIC	47PF	134-722-1Y
C184	CHIP CERAMIC	33PF	133-306-2Y
C185	CHIP CERAMIC	20PF	132-012-1Y
C186	CHIP CERAMIC	0.1UF	130-A60-4Y
C187	CHIP CERAMIC	0.1UF	130-A60-4Y
C188	CHIP CERAMIC	220PF	132-220-2Y
C189	CHIP CERAMIC	0.68UF	130-624-4
C190	CHIP CERAMIC	0.033UF	130-314-5Y
C191	CHIP CERAMIC	0.1UF	130-A60-4Y
C192	CHIP CERAMIC	0.033UF	130-314-5Y
C193	CHIP CERAMIC	0.1UF	130-A60-4Y
C194	CHIP CERAMIC	0.0033UF	130-315-6Y
C195	CHIP CERAMIC	10PF	131-039-1Y
C196	CHIP CERAMIC	0.01UF	130-172-2Y
C197	CHIP CERAMIC	47PF	134-722-1Y
C198	CHIP CERAMIC	0.001UF	130-A17-6Y
C200	CHIP CERAMIC	0.1UF	130-A60-4Y
C201	CHIP CERAMIC	0.01UF	130-172-2Y
C202	CHIP CERAMIC	0.01UF	130-172-2Y
C203	CHIP CERAMIC	0.001UF	130-A17-6Y
C207	CHIP CERAMIC	0.001UF	130-A17-6Y
C209	CHIP CERAMIC	0.1UF	130-A60-4Y
C211	CHIP CERAMIC	0.01UF	130-172-2Y
C212	CHIP CERAMIC	0.01UF	130-172-2Y
C214	CHIP CERAMIC	220PF	132-220-2Y
C216	CHIP CERAMIC	220PF	132-220-2Y
C217	CHIP CERAMIC	220PF	132-220-2Y
C219	CHIP CERAMIC	220PF	132-220-2Y
C220	CHIP CERAMIC	220PF	132-220-2Y
C221	DIP TANTALUM	1UF	141-008-6Z
C222	DIP TANTALUM	10UF	141-012-9Z
C223	CHIP CERAMIC	220PF	132-220-2Y
C224	ELECT CAPACITOR	1000UF	101-A02-8
C225	CHIP CERAMIC	0.1UF	130-A60-4Y
C226	ELECT CAPACITOR	1000UF	101-048-0R
C227	CHIP CERAMIC	0.001UF	130-A17-6Y
C228	CHIP CERAMIC	0.001UF	130-A17-6Y
C230	CHIP CERAMIC	0.001UF	130-A17-6Y
C232	ELECT CAPACITOR	100UF	101-023-7
C233	ELECT CAPACITOR	220UF	102-224-7
C234	CHIP CERAMIC	220PF	132-220-2Y
C235	CHIP CERAMIC	0.001UF	130-A17-6Y
C236	CHIP CERAMIC	220PF	132-220-2Y
C237	CHIP CERAMIC	0.001UF	130-A17-6Y
C238	ELECT CAPACITOR	2200UF	102-278-6
C239	ELECT CAPACITOR	10UF	101-025-9
C240	CHIP CERAMIC	39PF	133-932-7Y
C241	CHIP CERAMIC	82PF	138-210-3Y
C244	CHIP CERAMIC	0.001UF	130-A17-6Y
C247	CHIP CERAMIC	220PF	132-220-2Y

REF #	DESCRIPTION		PART #
C247	CHIP CERAMIC	220PF	132-220-2Y
C248	CHIP CERAMIC	27PF	132-714-2Y
C250	ELECT CAPACITOR	47UF	104-713-2
C251	CHIP CERAMIC	470PF	134-761-4Y
C252	CHIP CERAMIC	0.001UF	130-A17-6Y
C253	CHIP CERAMIC	75PF	137-504-4Y
C255	CHIP CERAMIC	470PF	134-761-4Y
C256	CHIP CERAMIC	75PF	137-504-4Y
C257	CHIP CERAMIC	0.01UF	130-172-2Y
C258	CHIP CERAMIC	470PF	134-761-4Y
C259	CHIP CERAMIC	0.01UF	130-172-2Y
C260	CHIP CERAMIC	0.01UF	130-172-2Y
C261	CHIP CERAMIC	39PF	133-937-2Y
C262	CHIP CERAMIC	75PF	137-512-1Z
C263	CHIP CERAMIC	0.001UF	130-A17-6Y
C264	CHIP CERAMIC	0.1UF	130-A60-4Y
C265	CHIP CERAMIC	0.001UF	130-A17-6Y
C266	CHIP CERAMIC	0.001UF	130-A17-6Y
C267	CHIP CERAMIC	0.001UF	130-A17-6Y
C268	CHIP CERAMIC	22PF	132-225-7Z
C271	CHIP CERAMIC	0.001UF	131-025-8Y
C272	CHIP CERAMIC	15PF	131-539-6Z
C274	CHIP CERAMIC	0.001UF	131-025-8Y
C279	ELECT CAPACITOR	10UF	101-025-9
C282	CHIP CERAMIC	470PF	134-761-4Y
C285	CHIP CERAMIC	0.001UF	130-A17-6Y
C286	CHIP CERAMIC	0.001UF	130-A17-6Y
C287	CHIP CERAMIC	0.001UF	130-A17-6Y
C288	CHIP CERAMIC	220PF	132-220-2Y
C289	CHIP CERAMIC	82PF	138-210-3Y
C290	CHIP CERAMIC	0.047UF	130-424-0Y
C292	CHIP CERAMIC	220PF	132-220-2Y
C295	CHIP CERAMIC	0.01UF	130-172-2Y
C296	CHIP CERAMIC	47PF	134-722-1Y
C297	CHIP CERAMIC	47PF	134-722-1Y
C298	CHIP CERAMIC	22PF	132-216-9Y
C299	CHIP CERAMIC	47PF	134-722-1Y
C300	CHIP CERAMIC	470PF	134-761-4Y
C301	CHIP CERAMIC	220PF	132-220-2Y
C302	CHIP CERAMIC	0.1UF	130-170-0Y
C310	CHIP CERAMIC	30PF	133-010-4Y
C311	CHIP CERAMIC	0.001UF	131-025-8Y
C312	CHIP CERAMIC	7PF	137-011-5Y
C313	CHIP CERAMIC	180PF	131-847-4Y
C314	CHIP CERAMIC	180PF	131-847-4Y
C315	CHIP CERAMIC	15PF	131-539-6Z
C351	CHIP CERAMIC	0.001UF	130-A17-6Y
C352	CHIP CERAMIC	7PF	137-007-1Y
C353	CHIP CERAMIC	9PF	139-003-8Y

REF #	DESCRIPTION		PART #
C355	CHIP CERAMIC	1.2PF	131-216-4Y
C356	CHIP CERAMIC	4PF	134-007-7Y
C359	CHIP CERAMIC	0.001UF	130-A17-6Y
C360	CHIP CERAMIC	2PF	132-011-0Y
C361	CHIP CERAMIC	0.001UF	130-A17-6Y
C362	CHIP CERAMIC	0.001UF	130-A17-6Y
C363	CHIP CERAMIC	0.001UF	130-A17-6Y
C364	CHIP CERAMIC	0.001UF	130-A17-6Y
C369	CHIP CERAMIC	1PF	131-030-2Y
C370	CHIP CERAMIC	0.001UF	130-A17-6Y
C371	CHIP CERAMIC	0.1UF	130-A60-4Y
C372	CHIP CERAMIC	0.01UF	130-172-2Y
C373	CHIP TANTALUM	3.3UF	143-312-0Z
C374	CHIP CERAMIC	0.001UF	130-A17-6Y
C375	CHIP CERAMIC	0.001UF	130-A17-6Y
C376	CHIP CERAMIC	0.1UF	130-A60-4Y
CF101	FILTER CRYSTAL		271-053-6
CF103	FILTER CERAMIC		270-007-0Z
CF104	FILTER CERAMIC		270-027-8Z
D102	DIODE SI CHIP		243-051-5
D103	DIODE		243-012-0
D104	DIODE		243-012-0
D106	DIODE SI CHIP		243-052-6
D107	DIODE SCHOTTKY CHIP		249-005-4
D108	DIODE CHIP		243-081-2
D120	DIODE CHIP		243-087-8
D124	DIODE RECTIFIER		245-008-7Z
D125	DIODE SI CHIP		243-052-6
D126	DIODE SWITCHING		243-063-6
D127	DIODE PIN		243-073-5
D128	DIODE SWITCHING		243-063-6
D129	DIODE SI CHIP		243-052-6
D351	DIODE		243-054-8
D352	DIODE		243-054-8
D353	DIODE		243-054-8
FB101	FERITE BEAD		320-423-8
IC101	I.C PLL		220-131-3
IC102	DBM MIXER MODULE		220-375-7
IC104	I.C OP AMP		231-064-4
IC105	I.C REGULATOR		220-378-0
IC107	I.C REGULATOR		222-013-0A
IC108	I.C		229-289-8
IC109	I.C POWER FM IF		223-421-0
IC113	I.C OP AMP		231-064-4
J1	JACK MINIATURE		420-728-5
L107	COIL CHIP	1UH	310-657-0
L108	COIL CHIP	1.0UH	311-079-3
L110	COIL CHIP	47NH	310-861-7
L111	COIL CHIP	0.15UH	310-706-1

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650-000-0001 SM-2150/VHF MAIN BOARD

REF #	DESCRIPTION		PART #
L113	COIL SPRING		310-794-0
L115	COIL SPRING		310-793-9
L116	COIL SPRING		310-224-2
L117	COIL SPRING		310-368-9
L118	COIL CHOKE 1K		310-218-7
L119	COIL CHIP	0.15UH	310-706-1
L120	COIL CHOKE 1K		310-218-7
L121	COIL SPRING		310-275-8
L122	COIL ASS'Y		509-772
L123	COIL CHIP	47NH	310-861-7
L124	COIL CHIP	0.68UH	310-711-5
L125	COIL SPRING		310-368-9
L126	COIL SPRING		310-627-3
L127	COIL SPRING		311-224-7
L128	COIL SPRING		311-214-8
L129	COIL SPRING		310-536-4
L130	COIL SPRING		311-214-8
L131	COIL SPRING		311-214-8
L132	COIL SPRING		311-305-7
L134	COIL ASS'Y		509-772
L135	COIL ASS'Y		509-013
L225	COIL AXIAL	2.2UH	310-378-7
L226	COIL CHIP	1UH	310-657-0
L227	COIL CHIP	220UH	310-862-8Y
L228	COIL AXIAL	1MH	310-381-0
L229	COIL AXIAL	1MH	310-381-0
L351	COIL CHIP	1.0UH	311-079-3
L352	COIL CHIP	0.82UH	311-078-2
L354	COIL CHIP	2.2UH	311-083-6
L356	COIL CHIP		311-117-4
L357	COIL CHIP	2.2UH	311-083-6
L358	COIL CHIP	1.0UH	311-079-3
Q101	TRANSISTOR		202-113-1
Q102	TRANSISTOR		202-106-5
Q103	TRANSISTOR		202-106-5
Q104	TRANSISTOR		202-113-1
Q105	TRANSISTOR		218-057-7Z
Q106	TRANSISTOR		203-096-4
Q108	TRANSISTOR		202-095-8Z
Q113	TRANSISTOR		200-003-5
Q114	TRANSISTOR		200-003-5
Q116	TRANSISTOR		203-181-7
Q117	TRANSISTOR		200-045-3
Q118	TRANSISTOR		203-043-6Z
Q120	TRANSISTOR		203-087-6
Q121	TRANSISTOR		202-095-8Z
Q122	TRANSISTOR		203-111-4
Q123	TRANSISTOR		202-095-8Z
Q124	TRANSISTOR		202-113-1
Q125	TRANSISTOR		202-066-2

REF #	DESCRIPTION		PART #
Q127	TRANSISTOR		202-095-8Z
Q128	BRT		202-092-5
Q130	TRANSISTOR		200-003-5
Q132	TRANSISTOR		202-113-1
Q133	TRANSISTOR		202-113-1
Q134	TRANSISTOR		202-095-8Z
Q135	TRANSISTOR		202-095-8Z
Q137	TRANSISTOR		202-095-8Z
Q139	BRT		202-092-5
Q140	TRANSISTOR		202-095-8Z
Q219	TRANSISTOR		202-095-8Z
Q351	TRANSISTOR		203-116-9
Q352	TRANSISTOR		203-116-9
Q353	TRANSISTOR		202-099-2Z
Q354	TRANSISTOR		202-098-1
Q360	TRANSISTOR		202-113-1
R100	CHIP RESISTOR	2.2K	060-222-2Z
R1001	CHIP RESISTOR	470	060-471-0Z
R101	CHIP RESISTOR	1.8K	060-182-9Z
R102	CHIP RESISTOR	0	060-000-8Z
R103	CHIP RESISTOR	0	060-000-8Z
R104	CHIP RESISTOR	1.8K	060-182-9Z
R105	CHIP RESISTOR	470	060-471-0Z
R106	CHIP RESISTOR	1.8K	060-182-9Z
R107	CHIP RESISTOR	470	060-471-0Z
R108	CHIP RESISTOR	0	060-000-8Z
R110	CHIP RESISTOR	1.2K	060-122-5Z
R111	CHIP RESISTOR	2.7K	060-272-7Z
R112	CHIP RESISTOR	7.5K	060-752-4Z
R113	CHIP RESISTOR	100K	060-104-9Z
R114	CHIP RESISTOR	10K	060-103-8Z
R116	CHIP RESISTOR	10K	060-103-8Z
R117	CHIP RESISTOR	24K	060-243-1Z
R118	CHIP RESISTOR	10K	060-103-8Z
R119	CHIP RESISTOR	10K	060-103-8Z
R130	CHIP RESISTOR	1.2K	060-122-5Z
R131	CHIP RESISTOR	91K	060-913-3Z
R132	CHIP RESISTOR	4.7K	060-472-1Z
R133	CHIP RESISTOR	20K	060-203-5Z
R134	CHIP RESISTOR	6.8K	060-682-4Z
R135	CHIP RESISTOR	39	060-390-8Z
R136	CHIP RESISTOR	2.7K	060-272-7Z
R137	CHIP RESISTOR	2.7K	060-272-7Z
R138	CHIP RESISTOR	470	060-471-0Z
R139	CHIP RESISTOR	22K	060-223-3Z
R140	CHIP RESISTOR	10	060-100-5Z
R141	CHIP RESISTOR	470	060-471-0Z
R142	CHIP RESISTOR	10K	060-103-8Z
R143	CHIP RESISTOR	1.8K	060-182-9Z
R144	CHIP RESISTOR	51	060-510-2

REF #	DESCRIPTION		PART #
R146	CHIP RESISTOR	15K	060-153-3Z
R147	CHIP RESISTOR	560K	060-564-1Z
R148	CHIP RESISTOR	15K	060-153-3Z
R149	CHIP RESISTOR	10	060-100-5Z
R150	CHIP RESISTOR	560K	060-564-1Z
R151	CHIP RESISTOR	22K	060-223-3Z
R152	CHIP RESISTOR	47	060-470-9Z
R153	CHIP RESISTOR	3.9K	060-392-2Z
R154	CHIP RESISTOR	2.2	060-229-9Z
R156	CHIP RESISTOR	6.8K	060-682-4Z
R157	CHIP RESISTOR	300	060-301-8Z
R158	CHIP RESISTOR	3.3K	060-332-8Z
R159	CHIP RESISTOR	4.7	060-479-8Z
R160	CHIP RESISTOR	22	060-220-0Z
R161	CHIP RESISTOR	1.8K	060-182-9Z
R162	CHIP RESISTOR	6.8	060-689-5Z
R163	CHIP RESISTOR	47	060-470-9Z
R164	CHIP RESISTOR	150	060-151-1Z
R168	CHIP RESISTOR	10K	060-103-8Z
R170	CHIP RESISTOR	470	060-471-0Z
R172	CHIP RESISTOR	3.3K	060-332-8Z
R173	CHIP RESISTOR	3.3K	060-332-8Z
R174	CHIP RESISTOR	10	060-100-5Z
R175	FILM RESISTOR	330	030-331-8Z
R176	FILM RESISTOR	120	030-121-5Z
R177	CHIP RESISTOR	1.2K	060-122-5Z
R178	CHIP RESISTOR	1.2K	060-122-5Z
R180	CHIP RESISTOR	10K	060-103-8Z
R181	FILM RESISTOR	120	030-121-5Z
R182	CHIP RESISTOR	120	060-121-4Z
R182	CHIP RESISTOR	150	060-151-1Z
R183	CHIP RESISTOR	470K	060-474-3Z
R184	CHIP RESISTOR	10	060-100-5Z
R185	CHIP RESISTOR	47K	060-473-2Z
R187	CHIP RESISTOR	10K	060-103-8Z
R190	CHIP RESISTOR	22K	060-223-3Z
R191	CHIP RESISTOR	2.7K	060-272-7Z
R192	CHIP RESISTOR	22K	060-223-3Z
R193	CHIP RESISTOR	2.7K	060-272-7Z
R194	CHIP RESISTOR	10K	060-103-8Z
R195	CHIP RESISTOR	18K	060-183-0Z
R196	CHIP RESISTOR	82K	060-823-5Z
R197	CHIP RESISTOR	100K	060-104-9Z
R198	CHIP RESISTOR	1K	060-102-7Z
R200	CHIP RESISTOR	47K	060-473-2Z
R201	CHIP RESISTOR	330K	060-334-0Z
R202	CHIP RESISTOR	2.7K	060-272-7Z
R203	CHIP RESISTOR	150K	060-154-4Z
R204	CHIP RESISTOR	1K	060-102-7Z
R205	CHIP RESISTOR	100	060-101-6Z

REF #	DESCRIPTION		PART #
R206	CHIP RESISTOR	2.7K	060-272-7Z
R207	CHIP RESISTOR	100	060-101-6Z
R210	CHIP RESISTOR	100	060-101-6Z
R211	CHIP RESISTOR	68K	060-683-5Z
R213	CHIP RESISTOR	22K	060-223-3Z
R214	CHIP RESISTOR	22K	060-223-3Z
R215	CHIP RESISTOR	10K	060-103-8Z
R217	CHIP RESISTOR	10K	060-103-8Z
R218	CHIP RESISTOR	10K	060-103-8Z
R219	CHIP RESISTOR	39K	060-393-3Z
R220	CHIP RESISTOR	56K	060-563-0Z
R221	CHIP RESISTOR	22K	060-223-3Z
R222	CHIP RESISTOR	22K	060-223-3Z
R223	CHIP RESISTOR	2.2K	060-222-2Z
R224	CHIP RESISTOR	0	060-000-8Z
R250	CHIP RESISTOR	12K	060-123-6Z
R251	CHIP RESISTOR	2K	060-202-4Z
R252	CHIP RESISTOR	1K	060-102-7Z
R253	CHIP RESISTOR	1.8K	060-182-9Z
R351	CHIP RESISTOR	10K	060-103-8Z
R352	CHIP RESISTOR	330	060-331-7Z
R353	CHIP RESISTOR	47	060-470-9Z
R354	CHIP RESISTOR	10K	060-103-8Z
R355	CHIP RESISTOR	330	060-331-7Z
R356	CHIP RESISTOR	47	060-470-9Z
R357	CHIP RESISTOR	1.2K	060-122-5Z
R358	CHIP RESISTOR	10K	060-103-8Z
RV101	RESISTOR SEMIFIXED	22KB	071-223-1
RV102	RESISTOR SEMIFIXED	1KB	071-102-5
RV103	RESISTOR SEMIFIXED	10KB	071-103-6
RV104	RESISTOR SEMIFIXED	10KB	071-103-6
RV105	RESISTOR SEMIFIXED	4.7KB	071-472-9
T101	COIL IFT	600NH 45MHZ	321-014-7
T102	COIL IFT	600NH 45MHZ	321-014-7
T103	COIL	455KHZ DETECTOR	320-232-2
T104	TRANSFORMER	CHOKE	300-008-1
TH101	THERMISTOR CHIP	33K	098-333-8
X101	CRYSTAL NR2B	44.545M	261-932-7Z

650-000-0002 SM-2450/UHF MAIN BOARD

BAND CHART

SM-2450A UHF BAND 1 (400-430 MHz)

REF #	PART #	VALUE
FRONT-END PCB ASSEMBLY 650-110-0007		
MAIN BOARD PARTS		
C130	133-932-7Y	39pF
C133	131-039-1Y	10pF
C134	134-767-0Y	4.7pF
C135	139-003-8Y	9pF
C136	139-003-8Y	9pF
C158	131-039-1Y	10pF
C242	131-039-1Y	10pF
C243	131-039-1Y	10pF
C272	136-015-4Y	6pF
C273	131-029-2Y	10PF
C275	131-029-2Y	10PF
C277	131-029-2Y	10PF
C281	131-039-1Y	10pF
C283	137-011-5Y	7pF
IC103	220-347-2	M57729L
R180	060-472-1Z	4.7K
R182	060-221-1Z	220 OHM
R210	060-470-9Z	47 OHM

SM-2450C UHF BAND 2 (420-450 MHz)

REF #	PART #	VALUE
FRONT-END PCB ASSEMBLY 650-110-0008		
MAIN BOARD PARTS		
C130	133-932-7Y	39pF
C133	138-004-4Y	8pF
C134	134-767-0Y	4.7pF
C135	138-004-4Y	8pF
C136	138-004-4Y	8pF
C158	135-010-4Y	5pF
C242	138-004-4Y	8pF
C243	134-767-0Y	4.7pF
C272	135-019-3Y	5pF
C273	131-029-2Y	10PF
C275	131-029-2Y	10PF
C277	131-029-2Y	10PF
C281	137-007-1Y	7pF
C283	136-015-4Y	6pF
IC103	220-348-3	M57729
R180	060-472-1Z	4.7K
R182	060-221-1Z	220 OHM
R210	060-470-9Z	47 OHM

SM-2450D UHF BAND 3 (440-470 MHz)

REF #	PART #	VALUE
FRONT-END PCB ASSEMBLY 650-110-0001		
MAIN BOARD PARTS		
C130	132-714-2Y	27pF
C133	136-833-6Y	6.8pF
C134	134-007-7Y	4pF
C135	138-004-4Y	8pF
C136	131-208-7Y	12pF
C158	135-010-4Y	5pF
C242	138-004-4Y	8pF
C243	134-767-0Y	4.7pF
C272	135-019-3Y	5pF
C273	137-011-5Y	7PF
C275	139-006-1Y	9PF
C277	131-029-2Y	10PF
C281	137-007-1Y	7pF
C283	136-015-4Y	6pF
IC103	220-350-5	M57729H
R180	060-392-2Z	3.9K
R182	060-101-6Z	100 OHM
R210	060-470-9Z	47 OHM

BAND CHART(continued)

SM-2450E UHF BAND 4 (470-490 MHz)			*SM-2450B UHF BAND 5 (490-512 MHz)*		
REF #	**PART #**	**VALUE**	**REF #**	**PART #**	**VALUE**
FRONT-END PCB ASSEMBLY 650-110-0009			**FRONT-END PCB ASSEMBLY 650-110-0010**		
MAIN BOARD PARTS			**MAIN BOARD PARTS**		
C130	131-829-8Y	18pF	**C130**	132-407-5Y	24pF
C133	136-015-4Y	6pF	**C133**	134-007-7Y	4pF
C134	133-321-5Y	3.3pF	**C134**	133-321-5Y	3.3pF
C135	135-019-3Y	5pF	**C135**	135-019-3Y	5pF
C136	137-007-1Y	7pF	**C136**	138-004-4Y	8pF
C158	133-321-5Y	3.3pF	**C158**	134-007-7Y	4pF
C242	137-007-1Y	7pF	**C242**	135-019-3Y	5pF
C243	133-321-5Y	3.3pF	**C243**	133-321-5Y	3.3pF
C272	134-007-7Y	4pF	**C272**	135-019-3Y	5pF
C273	137-011-5Y	7PF	**C273**	131-029-2Y	10PF
C275	139-006-1Y	9PF	**C275**	131-029-2Y	10PF
C277	138-230-1Y	8PF	**C277**	131-029-2Y	10PF
C281	131-039-1Y	10pF	**C281**	131-039-1Y	10pF
C283	135-019-3Y	5pF	**C283**	134-007-7Y	4pF
IC103	220-349-4	M57729UH	**IC103**	220-346-1	M57729SH
R180	060-272-7Z	2.7K	**R180**	060-472-1Z	4.7K
R182	060-101-6Z	100 OHM	**R182**	060-221-1Z	220 OHM
R210	060-470-9Z	47 OHM	**R210**	060-470-9Z	47 OHM

MAXON SM-2000 MOBILE

650-000-0002 SM-2450/UHF MAIN BOARD

REF #	DESCRIPTION	PART #
FRONT-END PCB ASSEMBLY (REFER TO BAND CHART)		
ANT1	CONNECTOR ANT	422-907-0
ANT1	CONNECTOR SW-1456(BNC-R)	421-655-7
ANT1	PIN CU &1.1X13(101-01)	860-129
C101	CHIP CERAMIC 220PF	132-220-2Y
C102	CHIP CERAMIC 220PF	132-220-2Y
C103	CHIP CERAMIC 220PF	132-220-2Y
C104	CHIP CERAMIC 220PF	132-220-2Y
C105	CHIP CERAMIC 5PF	135-010-4Y
C106	CHIP CERAMIC 470PF	134-761-4Y
C107	CHIP CERAMIC 0.1UF	130-170-0Y
C108	CHIP CERAMIC 220PF	132-220-2Y
C109	CHIP CERAMIC 220PF	132-220-2Y
C110	CHIP CERAMIC 0.001UF	130-A17-6Y
C113A	POLY CAPACITOR 0.33UF	120-313-6
C114	MYLAR CAPACITOR 0.01UF	111-008-7Z
C115	CHIP CERAMIC 220PF	132-220-2Y
C118	CHIP CERAMIC 4.7PF	134-767-0Y
C119	CHIP CERAMIC 15PF	131-511-0Y
C120	MYLAR CAPACITOR 0.01UF	111-008-7Z
C121	CHIP CERAMIC 220PF	132-220-2Y
C122	CHIP CERAMIC 0.1UF	130-170-0Y
C125	CHIP TANTALUM 1UF	141-036-1Z
C126	CHIP CERAMIC 220PF	132-220-2Y
C127	CHIP CERAMIC 470PF	134-761-4Y
C128	CHIP CERAMIC 0.001UF	130-A17-6Y
C129	CHIP CERAMIC 0.1UF	130-170-0Y
C131	CHIP CERAMIC 220PF	132-220-2Y
C137	CHIP CERAMIC 68PF	136-816-5Y
C138	CHIP CERAMIC 2.2PF	132-266-4Y
C139	CHIP CERAMIC 220PF	132-220-2Y
C140	CHIP CERAMIC 47PF	134-722-1Y
C141	CHIP CERAMIC 5PF	135-010-4Y
C142	CHIP CERAMIC 12PF	131-208-7Y
C143	CHIP CERAMIC 220PF	132-220-2Y
C144	CHIP CERAMIC 0.5PF	130-504-9Y
C145	CHIP CERAMIC 0.001UF	130-A17-6Y
C146	CHIP CERAMIC 12PF	131-208-7Y
C147	ELECT CAPACITOR 47UF	104-713-2
C148	CHIP CERAMIC 220PF	132-220-2Y
C149	CHIP CERAMIC 220PF	132-220-2Y
C150	CHIP CERAMIC 220PF	132-220-2Y
C151	CHIP CERAMIC 470PF	134-761-4Y
C152	ELECT CAPACITOR 2200UF	102-278-6
C155	**C**HIP CERAMIC 2.2PF	132-266-4Y
C156	CHIP CERAMIC 47PF	134-722-1Y
C157	CHIP CERAMIC 5.6PF	135-627-2Y
C159	CHIP CERAMIC 6PF	136-005-5Y
C160	CHIP CERAMIC 0.001UF	130-A17-6Y
C162	CHIP CERAMIC 3.3PF	133-321-5Y
C163	CHIP CERAMIC 6PF	136-005-5Y
C164	CHIP CERAMIC 12PF	131-208-7Y
C165	CHIP CERAMIC 6PF	136-005-5Y
C167	CHIP CERAMIC 82PF	138-210-3Y
C168	CHIP CERAMIC 0.001UF	130-A17-6Y
C169	CHIP CERAMIC 47PF	134-722-1Y
C172	CHIP CERAMIC 15PF	131-511-0Y
C173	CHIP CERAMIC 56PF	135-613-9Y
C174	CHIP CERAMIC 3.3PF	133-321-5Y
C175	CHIP CERAMIC 20PF	132-012-1Y
C176	CHIP CERAMIC 39PF	133-932-7Y
C177	CHIP CERAMIC 0.001UF	130-A17-6Y
C178	CHIP CERAMIC 0.001UF	130-A17-6Y
C179	CHIP CERAMIC 82PF	138-210-3Y
C180	CHIP CERAMIC 0.01UF	130-172-2Y
C181	DIP TANTALUM 10UF	141-012-9Z
C182	CHIP CERAMIC 0.001UF	130-A17-6Y
C183	CHIP CERAMIC 47PF	134-722-1Y
C184	CHIP CERAMIC 30PF	133-010-4Y
C185	CHIP CERAMIC 15PF	131-511-0Y
C186	CHIP CERAMIC 0.1UF	130-A60-4Y
C187	CHIP CERAMIC 0.1UF	130-A60-4Y
C188	CHIP CERAMIC 220PF	132-220-2Y
C189	CHIP CERAMIC 0.1UF	130-170-0Y
C190	CHIP CERAMIC 0.033UF	130-314-5Y
C191	CHIP CERAMIC 0.1UF	130-A60-4Y
C192	CHIP CERAMIC 0.033UF	130-314-5Y
C193	CHIP CERAMIC 0.1UF	130-A60-4Y
C194	CHIP CERAMIC 0.0033UF	130-315-6Y
C195	CHIP CERAMIC 10PF	131-039-1Y
C196	CHIP CERAMIC 0.01UF	130-172-2Y
C197	CHIP CERAMIC 47PF	134-722-1Y
C198	CHIP CERAMIC 0.001UF	130-A17-6Y
C199	CHIP CERAMIC 12PF	131-208-7Y
C200	CHIP CERAMIC 0.1UF	130-A60-4Y
C201	CHIP CERAMIC 0.01UF	130-172-2Y
C202	CHIP CERAMIC 0.01UF	130-172-2Y
C203	CHIP CERAMIC 0.001UF	130-A17-6Y
C204	CHIP CERAMIC 6PF	136-005-5Y
C207	CHIP CERAMIC 0.001UF	130-A17-6Y
C209	CHIP CERAMIC 0.1UF	130-A60-4Y
C210	MYLAR CAPACITOR 0.022UF	112-211-8Z
C211	CHIP CERAMIC 0.01UF	130-172-2Y
C212	CHIP CERAMIC 0.01UF	130-172-2Y
C214	CHIP CERAMIC 220PF	132-220-2Y
C216	CHIP CERAMIC 220PF	132-220-2Y
C217	CHIP CERAMIC 220PF	132-220-2Y
C218	ELECT CAPACITOR 10UF	101-025-9
C218	ELECT CAPACITOR 10UF	101-025-9
C219	CHIP CERAMIC 220PF	132-220-2Y

REF #	DESCRIPTION	PART #
C219	CHIP CERAMIC 220PF	132-220-2Y
C220	CHIP CERAMIC 220PF	132-220-2Y
C221	DIP TANTALUM 1UF	141-008-6Z
C222	DIP TANTALUM 10UF	141-012-9Z
C223	CHIP CERAMIC 220PF	132-220-2Y
C224	ELECT CAPACITOR 1000UF	101-A02-8
C225	CHIP CERAMIC 0.1UF	130-A60-4Y
C226	ELECT CAPACITOR 1000UF	101-048-0
C227	CHIP CERAMIC 0.001UF	130-A17-6Y
C230	CHIP CERAMIC 0.001UF	130-A17-6Y
C231	CHIP CERAMIC 220PF	132-220-2Y
C232	ELECT CAPACITOR 100UF	101-023-7
C233	ELECT CAPACITOR 220UF	102-224-7
C234	CHIP CERAMIC 220PF	132-220-2Y
C235	CHIP CERAMIC 0.001UF	130-A17-6Y
C236	CHIP CERAMIC 220PF	132-220-2Y
C237	CHIP CERAMIC 0.001UF	130-A17-6Y
C238	ELECT CAPACITOR 2200UF	102-278-6
C239	ELECT CAPACITOR 10UF	101-025-9
C240	CHIP CERAMIC 10PF	131-039-1Y
C247	CHIP CERAMIC 470PF	134-761-4Y
C249	CHIP CERAMIC 220PF	132-220-2Y
C250	ELECT CAPACITOR 47UF	104-713-2
C251	CHIP CERAMIC 470PF	134-761-4Y
C252	CHIP CERAMIC 220PF	132-220-2Y
C253	CHIP CERAMIC 33PF	133-306-2Y
C255	CHIP CERAMIC 470PF	134-761-4Y
C256	CHIP CERAMIC 220PF	132-220-2Y
C257	CHIP CERAMIC 0.001UF	130-A17-6Y
C258	CHIP CERAMIC 220PF	132-220-2Y
C259	CHIP CERAMIC 220PF	132-220-2Y
C260	CHIP CERAMIC 0.001UF	130-A17-6Y
C261	CHIP CERAMIC 220PF	132-220-2Y
C262	CHIP CERAMIC 0.001UF	130-A17-6Y
C263	CHIP CERAMIC 0.001UF	131-025-8Y
C264	CHIP CERAMIC 220PF	132-220-2Y
C265	CHIP CERAMIC 220PF	132-220-2Y
C266	CHIP CERAMIC 220PF	132-220-2Y
C267	CHIP CERAMIC 220PF	132-220-2Y
C269	CHIP CERAMIC 4PF	134-007-7Y
C271	CHIP CERAMIC 0.001UF	131-025-8Y
C273	CHIP CERAMIC 10PF	131-029-2Y
C279	ELECT CAPACITOR 47UF	104-713-2
C280	CHIP CERAMIC 5PF	135-019-3Y
C282	CHIP CERAMIC 470PF	134-761-4Y
C284	CHIP CERAMIC 470PF	134-761-4Y
C285	CHIP CERAMIC 220PF	132-220-2Y
C286	CHIP CERAMIC 220PF	132-220-2Y
C287	CHIP CERAMIC 220PF	132-220-2Y
C288	CHIP CERAMIC 220PF	132-220-2Y
C289	CHIP CERAMIC 82PF	138-210-3Y
C290	CHIP CERAMIC 0.047UF	130-424-0Y
C292	CHIP CERAMIC 220PF	132-220-2Y
C294	CHIP CERAMIC 220PF	132-220-2Y
C295	CHIP CERAMIC 0.01UF	130-172-2Y
C296	CHIP CERAMIC 47PF	134-722-1Y
C297	CHIP CERAMIC 12PF	131-208-7Y
C298	CHIP CERAMIC 22PF	132-216-9Y
C299	CHIP CERAMIC 47PF	134-722-1Y
C300	CHIP CERAMIC 470PF	134-761-4Y
C301	CHIP CERAMIC 220PF	132-220-2Y
C303	CHIP CERAMIC 220PF	132-220-2Y
C407	ELECT CAPACITOR 10UF	101-025-9
C435	ELECT CAPACITOR 1UF	101-006-2
C438	ELECT CAPACITOR 10UF	101-025-9
C558	ELECT CAPACITOR 10UF	101-025-9
CABLE1	COAXIAL UT85 SEMI-RIGID	427-335-8
CF1	FEED THROUGH CAP 0.001UF	181-005-5
CF101	FILTER CRYSTAL	271-054-7
CF103	FILTER CERAMIC	270-007-0Z
CF104	FILTER CERAMIC	270-027-8Z
CON405	CONNECTOR BOX SOCKET	421-677-7
D101	DIODE VARICAP CHIP	242-022-4
D102	DIODE VARICAP CHIP	242-022-4
D103	DIODE	243-012-0
D104	DIODE	243-012-0
D105	DIODE SI CHIP	243-051-5
D106	DIODE SI CHIP	243-052-6
D107	DIODE SCHOTTKY CHIP	249-005-4
D108	DIODE PIN	243-081-2
D120	DIODE	243-058-2
D121	DIODE	243-012-0
D124	DIODE RECTIFIER	245-008-7Z
D125	DIODE SI CHIP	243-052-6
D126	DIODE SWITCHING	243-063-6
D127	DIODE PIN	243-073-5
D128	DIODE SWITCHING	243-063-6
D129	DIODE SI CHIP	243-052-6
FB	CORE BEAD	320-536-5
IC101	I.C PLL	220-131-3
IC102	DBM MIXER MODULE	220-375-7
IC104	I.C OP AMP	231-064-4
IC105	I.C REGULATOR	220-378-0
IC107	I.C REGULATOR	222-013-0A
IC108	I.C	229-289-8
IC109	I.C POWER FM IF	223-421-0
IC401	I.C	223-224-9
J1	JACK MINIATURE	420-728-5

MAXON SM-2000 MOBILE

650-000-0002 SM-2450/UHF MAIN BOARD

REF #	DESCRIPTION	PART #
L101	COIL CHIP 0.68UH	310-711-5
L102	COIL CHIP 0.68UH	310-711-5
L103	COIL CHIP 47NH	310-861-7
L104	COIL CHIP 27NH	310-860-6
L106	COIL CHIP 27NH	310-860-6
L107	COIL SPRING	310-304-1
L108	COIL CHIP 18NH	310-859-6
L110	COIL CHIP 18NH	310-859-6
L111	COIL CHIP 0.15UH	310-706-1
L113	COIL SPRING	311-158-1
L114	COIL CHIP 0.15UH	310-706-1
L115	COIL SPRING	311-158-1
L116	COIL SPRING	311-178-9
L118	COIL SPRING	311-180-1
L119	COIL CHIP 0.15UH	310-706-1
L120	COIL SPRING	311-180-1
L121	COIL SPRING	311-180-1
L122	COIL SPRING	311-179-0
L123	COIL CHIP 18NH	310-859-6
L124	COIL CHIP 18NH	310-859-6
L125	COIL SPRING	311-180-1
L225	COIL AXIAL 2.2UH	310-378-7
L226	COIL CHIP 1UH	310-657-0
L227	COIL CHIP 220UH	310-862-8Y
L228	COIL AXIAL 1MH	310-381-0
L229	COIL AXIAL 1MH	310-381-0
Q101	TRANSISTOR	202-113-1
Q102	TRANSISTOR	202-106-5
Q103	TRANSISTOR	202-106-5
Q104	TRANSISTOR	202-113-1
Q105	TRANSISTOR	218-057-7Z
Q106	TRANSISTOR	203-096-4
Q107	TRANSISTOR	202-113-1
Q108	TRANSISTOR	203-104-8
Q110	TRANSISTOR	200-003-5
Q111	TRANSISTOR	200-003-5
Q113	TRANSISTOR	200-003-5
Q114	TRANSISTOR	200-003-5
Q116	TRANSISTOR	200-003-5
Q117	TRANSISTOR	200-045-3
Q119	BRT	202-092-5
Q121	TRANSISTOR	202-095-8Z
Q122	TRANSISTOR	203-111-4
Q123	TRANSISTOR	202-095-8Z
Q124	TRANSISTOR	202-113-1
Q125	TRANSISTOR	202-066-2
Q127	TRANSISTOR	202-095-8Z
Q128	BRT	202-092-5
Q130	TRANSISTOR	200-003-5

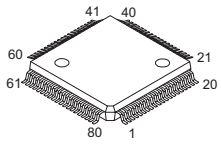
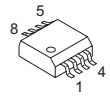
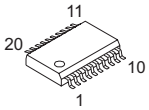
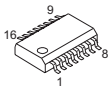
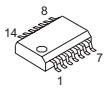
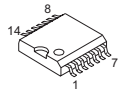
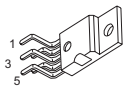
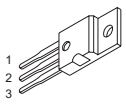
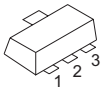
REF #	DESCRIPTION	PART #
Q132	TRANSISTOR	202-113-1
Q133	TRANSISTOR	202-113-1
Q134	TRANSISTOR	202-095-8Z
Q135	TRANSISTOR	202-095-8Z
Q137	TRANSISTOR	202-095-8Z
Q140	TRANSISTOR	202-095-8Z
Q219	TRANSISTOR	202-095-8Z
R100	CHIP RESISTOR 2.2K	060-222-2Z
R101	CHIP RESISTOR 1.8K	060-182-9Z
R102	CHIP RESISTOR 0	060-000-8Z
R103	CHIP RESISTOR 0	060-000-8Z
R104	CHIP RESISTOR 910	060-911-1Z
R105	CHIP RESISTOR 100	060-101-6Z
R106	CHIP RESISTOR 910	060-911-1Z
R107	CHIP RESISTOR 100	060-101-6Z
R108	CHIP RESISTOR 0	060-000-8Z
R109	CHIP RESISTOR 10K	060-103-8Z
R110	CHIP RESISTOR 3K	060-302-1Z
R111	CHIP RESISTOR 2.7K	060-272-7Z
R112	CHIP RESISTOR 2.7K	060-272-7Z
R113	CHIP RESISTOR 100K	060-104-9Z
R114	CHIP RESISTOR 10K	060-103-8Z
R115	CHIP RESISTOR 100	060-101-6Z
R116	CHIP RESISTOR 22	060-220-0Z
R117	CHIP RESISTOR 5.6K	060-562-9Z
R118	CHIP RESISTOR 3.3K	060-332-8Z
R119	CHIP RESISTOR 100	060-101-6Z
R120	CHIP RESISTOR 47	060-470-9Z
R121	CHIP RESISTOR 10	060-100-5Z
R122	CHIP RESISTOR 150	060-151-1Z
R123	CHIP RESISTOR 6.8K	060-682-4Z
R124	CHIP RESISTOR 10	060-100-5Z
R125	CHIP RESISTOR 220	060-221-1Z
R126	CHIP RESISTOR 12K	060-123-6Z
R127	CHIP RESISTOR 3.9K	060-392-2Z
R128	CHIP RESISTOR 1.2K	060-122-5Z
R130	CHIP RESISTOR 270K	060-274-9Z
R131	CHIP RESISTOR 1.2K	060-122-5Z
R132	CHIP RESISTOR 7.5K	060-752-4Z
R133	CHIP RESISTOR 12K	060-123-6Z
R134	CHIP RESISTOR 3.9K	060-392-2Z
R135	CHIP RESISTOR 1.2K	060-122-5Z
R136	CHIP RESISTOR 2.7K	060-272-7Z
R137	CHIP RESISTOR 2.7K	060-272-7Z
R138	CHIP RESISTOR 470	060-471-0Z
R139	CHIP RESISTOR 22K	060-223-3Z
R140	CHIP RESISTOR 10	060-100-5Z
R141	CHIP RESISTOR 470	060-471-0Z
R142	CHIP RESISTOR 10K	060-103-8Z

REF #	DESCRIPTION	PART #
R140	CHIP RESISTOR 10	060-100-5Z
R141	CHIP RESISTOR 470	060-471-0Z
R142	CHIP RESISTOR 10K	060-103-8Z
R143	CHIP RESISTOR 1.8K	060-182-9Z
R144	CHIP RESISTOR 51	060-510-2
R146	CHIP RESISTOR 15K	060-153-3Z
R147	CHIP RESISTOR 560K	060-564-1Z
R148	CHIP RESISTOR 15K	060-153-3Z
R149	CHIP RESISTOR 10	060-100-5Z
R150	CHIP RESISTOR 560K	060-564-1Z
R151	CHIP RESISTOR 22K	060-223-3Z
R152	CHIP RESISTOR 47	060-470-9Z
R153	CHIP RESISTOR 3.9K	060-392-2Z
R154	CHIP RESISTOR 2.2	060-229-9Z
R156	CHIP RESISTOR 15K	060-153-3Z
R157	CHIP RESISTOR 300	060-301-8Z
R158	CHIP RESISTOR 10K	060-103-8Z
R159	CHIP RESISTOR 68	060-680-2Z
R160	CHIP RESISTOR 10	060-100-5Z
R161	CHIP RESISTOR 560	060-561-8Z
R162	CHIP RESISTOR 2.2K	060-222-2Z
R163	CHIP RESISTOR 470	060-471-0Z
R164	CHIP RESISTOR 10	060-100-5Z
R165	CHIP RESISTOR 470	060-471-0Z
R166	CHIP RESISTOR 0	060-000-8Z
R168	CHIP RESISTOR 10K	060-103-8Z
R170	CHIP RESISTOR 470	060-471-0Z
R172	CHIP RESISTOR 3.3K	060-332-8Z
R173	CHIP RESISTOR 3.3K	060-332-8Z
R175	FILM RESISTOR 330	030-331-8Z
R176	FILM RESISTOR 120	030-121-5Z
R177	CHIP RESISTOR 1.2K	060-122-5Z
R178	CHIP RESISTOR 1.2K	060-122-5Z
R181	FILM RESISTOR 120	030-121-5Z
R183	CHIP RESISTOR 470K	060-474-3Z
R184	CHIP RESISTOR 10	060-100-5Z
R185	CHIP RESISTOR 47K	060-473-2Z
R187	CHIP RESISTOR 10K	060-103-8Z
R190	CHIP RESISTOR 22K	060-223-3Z
R191	CHIP RESISTOR 2.7K	060-272-7Z
R192	CHIP RESISTOR 22K	060-223-3Z
R193	CHIP RESISTOR 2.7K	060-272-7Z
R194	CHIP RESISTOR 10K	060-103-8Z
R195	CHIP RESISTOR 18K	060-183-0Z
R196	CHIP RESISTOR 82K	060-823-5Z
R197	CHIP RESISTOR 100K	060-104-9Z
R198	CHIP RESISTOR 1K	060-102-7Z
R200	CHIP RESISTOR 47K	060-473-2Z
R201	CHIP RESISTOR 330K	060-334-0Z
R202	CHIP RESISTOR 2.7K	060-272-7Z
R203	CHIP RESISTOR 150K	060-154-4Z
R204	CHIP RESISTOR 1K	060-102-7Z
R205	CHIP RESISTOR 100	060-101-6Z
R206	CHIP RESISTOR 2.7K	060-272-7Z
R207	CHIP RESISTOR 100	060-101-6Z
R211	CHIP RESISTOR 68K	060-683-5Z
R213	CHIP RESISTOR 22K	060-223-3Z
R214	CHIP RESISTOR 22K	060-223-3Z
R215	CHIP RESISTOR 10K	060-103-8Z
R217	CHIP RESISTOR 10K	060-103-8Z
R218	CHIP RESISTOR 10K	060-103-8Z
R219	CHIP RESISTOR 39K	060-393-3Z
R220	CHIP RESISTOR 56K	060-563-0Z
R221	CHIP RESISTOR 22K	060-223-3Z
R222	CHIP RESISTOR 22K	060-223-3Z
R223	CHIP RESISTOR 2.2K	060-222-2Z
R225	CHIP RESISTOR 470	060-471-0Z
R250	CHIP RESISTOR 12K	060-123-6Z
R251	CHIP RESISTOR 2K	060-202-4Z
R252	CHIP RESISTOR 1K	060-102-7Z
R253	CHIP RESISTOR 1.8K	060-182-9Z
R458	CHIP RESISTOR 47K	060-473-2Z
R601	CHIP RESISTOR 56K	05B-563-7Z
R602	CHIP RESISTOR 100	05B-101-3Z
RV101	RESISTOR SEMIFIXED 22KB	071-223-1
RV102	RESISTOR SEMIFIXED 1KB	071-102-5
RV103	RESISTOR SEMIFIXED 10KB	071-103-6
RV104	RESISTOR SEMIFIXED 10KB	071-103-6
RV105	RESISTOR SEMIFIXED 4.7KB	071-472-9
T101	COIL IFT 600NH 45MHZ	321-014-7
T102	COIL IFT 600NH 45MHZ	321-014-7
T103	COIL 455KHZ DETECTOR	320-232-2
T104	TRANSFORMER CHOKE	300-008-1
TC101	DIP TRIMMER 10PF	171-013-9
TH101	THERMISTOR CHIP 33K	098-333-8
TP1	PIN CU	860-129
X101	CRYSTAL	261-932-7Z
	P.C.B. MAIN (SM-2450)	406-194-C

COMPONENT PINOUT

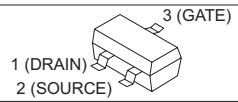
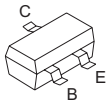
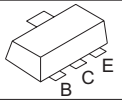
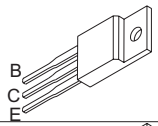
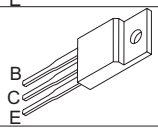
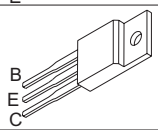
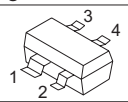
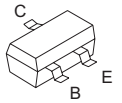
✱ = SM-2150/VHF

Unless otherwise indicated all parts are common to the SM-2000 Series Radio. ✱✱ = SM-2450/UHF

BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.	TYPE
	HD4074818	IC409	CPU
	LM358M	IC104, IC105	OP Amp
	AT93C56-10S1	IC408	EEPROM
	MC14519IF	IC101	PLL
	MC14053	IC411,412	Analog SW IC
	MC14066	IC401	Analog SW IC
	MC3371D	IC109	IF IC
	KIA324F	IC404,406,410	OP Amp
	MF6CWM-100	IC407	Switched Cap Filter
	TDA2003V	IC108	Audio AMP
 1:IN 2:GND 3:OUT	KIA7808PI	IC107	Regulator
 1:OUT 2:GND 3:IN	KIA78L05F	IC105,402	Regulator

✻ = SM-2150/VHF

Unless otherwise indicated all parts are common to the SM-2000 Series Radio. ✻✻ = SM-2450/UHF

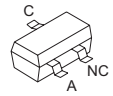
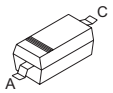
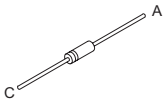
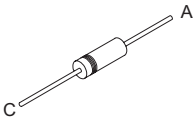
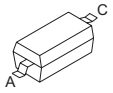
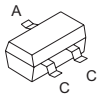
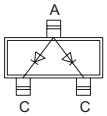
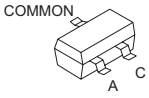
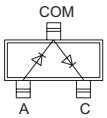
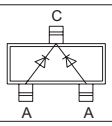
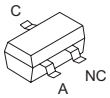
BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.
	MMBFJ309LT1	*Q351,*352
	KTA1504S(ASG)	Q102,103,504,821,822
	BCX-18LT1	*Q122
	MMBC1321(Q4)	**Q130
	MMBC1321	*Q106
	KTC3875S(ALG)	Q101,104,360,550-553
	KRA110S(PK)	**Q119,*139,128
	KRC111S	*Q353
	KRA104S	*Q105,*407
	MMBR951	*Q116
	KRC104S(ND)	Q121,123,127,131,134,135 Q137,140,219,401-406,409 *Q108,*Q354, **Q105,**Q407
	BFG35	Q117
	KTB1367	**Q125,135
	KTA1658	*Q125
	C1971	*Q118
	MRF5711	**Q108
	BFR92A	Q113,114, *Q130, **Q110,**Q111,**Q116
	MMBR951	*Q800
	2SC5084	**Q601
	MMBR9426	Q701,702

MAXON SM-2000 MOBILE
COMPONENT PINOUT

✻ = SM-2150/VHF

Unless otherwise indicated all parts are common to the SM-2000 Series Radio.

✻✻ = SM-2450/UHF

BASE DIAGRAM	MANUFACTURER'S PART NUMBER	REFERENCE NO.	Schematic
	MMBV3401(4D)	D103-105,121	
	KRS193S(F3)	D106,125,129,801,803 D805	
	1SS241(TY)	D127	
	BZX84C-5V	D807,808,810,811	ZENER
	MI402	**D108	
	MI301	**D120	
	IN5404	D124	
	1SV229	D101,102	Varicap Diode
	KDS181(A3)	D402,*126,*128	Diode Switching 
	KDS226(C3)	D551,552 *D800 **D601	
	KDS184S(B3)	D401	
	MMBV105	D701	
	MMBD101	D107	
	MMBD101	D702	

VOLTAGE CHARTS (SM-2150/VHF)

IC409

PIN	DESCRIPTION	TX	RX
1	DATA	0	0
2	EEPROM ENABLE	0	0
3	PLL ENABLE	5	5
4	CHANNEL SPACING	5/0	5/0
5	DATA IN	0	0
6	RED L.E.D.	5	0
7	BUSY	5/0	0
8	EXT OPTION	5	5
9	HOOK SW	0/3.7	0/3.7
10	LOCK DET	0	0
11	TEST	5	5
12	X1	5	5
13	X2 (OPEN)	0	0
14	GND	0	0
15	D TO A	5/0	0
16	D TO A	5/0	0
17	TONE ENABLE	5/0	0
18	D TO A	5/0	0
19	CH-1		
20	CH-2		

PIN	DESCRIPTION	TX	RX
21	CH-4		
22	CH-8		
23	MONITOR	5	5/0
24	PTT	0	3.9
25	PROG. ENABLE	5	5
26	TX ENABLE	5	0
27	ALERT TONE	0	0
28	MF6 CLK	CL	CL
29	CALL DETECT	0	0
30	SEND UP CONTROL	0	0
72	GND	0	0
73	VCC	5	5
74	OSC1	2.3	2.3
75	OSC2	2.3	2.3
76	RESET	0	0
77	AUDIO ENABLE	5	5/0
78	GREEN L.E.D.	0	5
79	RX ENABLE	0	5
80	CLK		

IC411

PIN		1	2	3	4	5	6	7	8
RX VOLTAGE		0	4	1.9	1.9	0	0	0	0
TX VOLTAGE		0	1.2	1.9	2.75	2.75	0	0	2
PIN		9	10	11	12	13	14	15	16
RX VOLTAGE		5	5	0	1.9	3.7	1.9	0.5	5
TX VOLTAGE		0	0	0	1.9	4	1.9	1.2	5

IC412

PIN	TX	RX	PROGRAM
1		0	0
2		0	0
3	3.7	3.7	0
4	3.7	3.7	0
5		0	0
6		GND	GND
7		GND	GND
8		GND	GND
9		5	0
10		5	0
11		5	0
12		0	0
13	0	3.8	3.6
14	0	3.8	3.6
15	0	0	0
16		5	5

IC401

PIN	TX	RX
1	0	0
2	0	0
3	2	1.8
4	2	2
5	5	0
6	0	0
7	0	0
8	SAT 1.9	2
9	SAT 1.9	2
10	0	0
11	0	0
12	0	5
13	5	5
14	5	5

MAXON SM-2000 MOBILE
VOLTAGE CHARTS (SM-2150/VHF)

IC404		
PIN	TX UNMODE	RX MODE
1	1.9	VOICE 1.9
2	1.9	VOICE 1.9
3	1.9	VOICE 1.9
4	5	5
5	1.9	VOICE 1.9
6	1.9	VOICE 1.9
7	1.9	VOICE 1.9
8	1.9	VOICE 1.9
9	1.9	VOICE 1.9
10	1.9	VOICE 1.9
11	GND	GND
12	1.9	VOICE 1.9
13	1.9	VOICE 1.9
14	1.9	VOICE 1.9

IC405		
PIN	TX	RX
1	1.93	2.00
2	1.93	2.00
3	1.8	2.00
4	0	0
5	1.92	2.00
6	1.92	2.00
7	1.92	2.10
8	5.00	5.00

IC406		
PIN	TX	RX
1	3.05	AF 1.05
2	1.9	1.9
3	1.9	1.9
4	5	5
5	1.9	1.9
6	1.9	1.9
7	1.9	1.9
8	1.9	1.9
9	1.9	1.9
10	1.9	1.9
11	GND	GND
12	1.9	1.9
13	1.9	1.9
14	1.9	1.9

IC407		
PIN	NORMAL	OPTION
1	1.9	XT2
2	0	XT2
3	3.6	XT2
4	0	XT2
5	2	1.9
6	5	5
7	1.9	1.9
8	1.05	XT2
9	5	CLK
10	GND	GND
11	5	CLK
12	0	0
13	2	1.9
14	2	1.9

IC410		
PIN	BUSY	RX
1	AUDIO	1.9
2	AUDIO	1.9
3	AUDIO	1.9
4	5	5
5	AUDIO	1.9
6	AUDIO	1.9
7	AUDIO	1.9
8	AUDIO	1.9
9	AUDIO	1.9
10	AUDIO	1.9
11	GND	GND
12	AUDIO	1.9
13	AUDIO	1.9
14	AUDIO	1.9

IC107 IC105 IC402			
PIN	1	2	3
IC107	13.7	0	8
IC105/402	8	0	5

IC109								
PIN	1	2	3	4	5	6	7	8
BUSY	7	OSC	6	7.2	6	6	6	7.2
RX (MUTE)	7	OSC	6	7.2	6	6	6	7.2
PIN	9	10	11	12	13	14	15	16
BUSY	AUDIO	0.8	NOISE	2.5	7	4.5	GND	2
RX (MUTE)	AUDIO	0.8	NOISE	0	7	0	GND	2

IC101								
PIN	1	2	3	4	5	6	7	8
RX VOLTAGE	0	5	5	5	5	PD	GND	0
TX VOLTAGE		2.5	5	5	5	0	0	2
PIN	9	10	11	12	13	14	15	16
RX VOLTAGE	5	2	2.7	5	3.5	5	0	0
TX VOLTAGE	2.7	3	2.7	5	3.5	5	0	0
PIN	17	18	19	20				
RX VOLTAGE	5	0	0	OSC				
TX VOLTAGE	5	0	0	2.3				

TRANSISTOR VOLTAGE CHART						
	RX			TX		
REF.NO	B	C	E	B	C	E
Q108	7.5	3.5	GND	0	3.5	GND
Q113	0.7	2.5	1.5	0.7	2.5	1.3
Q114	3.1	5	2.3	3.1	5	2.3
Q116	0	0	0	2	7	1.2
Q117	0	0	0	0.7	7.2	GND
Q125	12	13.72	13.7	12	12.5	13.2
Q106	7	2.5	GND	1	1.5	GND
Q140	0	7.5	GND	5	0	GND
Q130	0.7	5	0	0	2.5	0
Q122	8	0	8	7.3	8	8
Q121	0	8.1	0	5	0	GND
Q127	5	0	GND			
Q128	0	8	8			
Q120	0	13.8	GND	0	13.8	GND
Q118	0	9.5	GND	0	6	GND
Q139	7.5	0	8	0	8	8

VOLTAGE CHARTS (SM-2450/UHF)

IC409

PIN	DESCRIPTION	TX	RX
1	DATA	0	0
2	EEPROM ENABLE	0	0
3	PLL ENABLE	5	5
4	CHANNEL SPACING	5/0	5/0
5	DATA IN	0	0
6	RED L.E.D.	5	0
7	BUSY	5/0	0
8	EXT OPTION	5	5
9	HOOK SW	0/3.7	0/3.7
10	LOCK DET	0	0
11	TEST	5	5
12	X1	5	5
13	X2 (OPEN)	0	0
14	GND	0	0
15	D TO A	5/0	0
16	D TO A	5/0	0
17	TONE ENABLE	5/0	0
18	D TO A	5/0	0
19	CH-1		
20	CH-2		

PIN	DESCRIPTION	TX	RX
21	CH-4		
22	CH-8		
23	MONITOR	5	5/0
24	PTT	0	3.9
25	PROG. ENABLE	5	5
26	TX ENABLE	5	0
27	ALERT TONE	0	0
28	MF6 CLK	CL	CL
29	CALL DETECT	0	0
30	SEND UP CONTROL	0	0
72	GND	0	0
73	VCC	5	5
74	OSC1	2.3	2.3
75	OSC2	2.3	2.3
76	RESET	0	0
77	AUDIO ENABLE	5	5/0
78	GREEN L.E.D.	0	5
79	RX ENABLE	0	5
80	CLK		

IC411

PIN	1	2	3	4	5	6	7	8
RX VOLTAGE	0	4	1.9	1.9	0	0	0	0
TX VOLTAGE	0	1.2	1.9	2.75	2.75	0	0	2
PIN	9	10	11	12	13	14	15	16
RX VOLTAGE	5	2	2.7	5	3.5	5	0	
TX VOLTAGE	0	3	2.7	5	3.5	5	0	0

IC412

PIN	NORMAL	PROGRAM
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	GND	GND
7	GND	GND
8	GND	GND
9	5	0
10	5	0
11	5	0
12	0	0
13	3.6	3.6
14	3.6	3.6
15	0	0
16	5	5

IC401

PIN	TX	RX
1	0	0
2	0	0
3	2	1
4	2	2
5	5	0
6	5	5
7	0	0
8	SAT	2
9	SAT	2
10	0	0
11	0	0
12	0	0
13	5	5
14	5	5

IC404		
PIN	TX UNMODE	RX MODE
1	1.9	VOICE
2	1.9	VOICE
3	1.9	VOICE
4	5	5
5	1.9	VOICE
6	1.9	VOICE
7	1.9	VOICE
8	1.9	VOICE
9	1.9	VOICE
10	1.9	VOICE
11	GND	GND
12	1.9	VOICE
13	1.9	VOICE
14	1.9	VOICE

IC405		
PIN	TX	RX
1	1.93	2.00
2	1.93	2.00
3	1.8	2.00
4	0	0
5	1.92	2.00
6	1.92	2.00
7	1.92	2.10
8	5.00	5.00

IC406		
PIN	TX	RX
1		AF
2	1.9	1.9
3	1.9	1.9
4	5	1.9
5	1.9	1.9
6	1.9	1.9
7	1.9	1.9
8		1.9
9		1.9
10	1.9	1.9
11	GND	GND
12	1.9	1.9
13	1.9	1.9
14	1.9	1.9

IC407		
PIN	NORMAL	OPTION
1	1.9	XT2
2	0	XT2
3	0	XT2
4	3	XT2
5	2	1.9
6	5	5
7	1.9	1.9
8	0	XT2
9	5	CLK
10	GND	GND
11	5	CLK
12	0	0
13	2	1.9
14	2	1.9

IC410		
PIN	BUSY	RX
1	AUDIO	1.9
2	AUDIO	1.9
3	AUDIO	1.9
4	5	5
5	AUDIO	1.9
6	AUDIO	1.9
7	AUDIO	1.9
8	AUDIO	1.9
9	AUDIO	1.9
10	AUDIO	1.9
11	GND	GND
12	AUDIO	1.9
13	AUDIO	1.9
14	AUDIO	1.9

IC107 IC105 IC402			
PIN	1	2	3
IC107	13.2	0	8
IC105/402	5	0	8

MAXON SM-2000 MOBILE

VOLTAGE CHARTS (SM-2450/UHF)

IC109								
PIN	1	2	3	4	5	6	7	8
BUSY	7	OSC	6	7.2	6	6	6	7.2
RX (MUTE)	7	OSC	6	7.2	6	6	6	7.2
PIN	9	10	11	12	13	14	15	16
BUSY	AUDIO	0.8	NOISE	0.6	7	0	GND	2
RX (MUTE)	AUDIO	0.8	NOISE	1.8	7	8	GND	2

IC101								
PIN	1	2	3	4	5	6	7	8
VOLTAGE	0	5	5	5	5	PD	GND	0
PIN	9	10	11	12	13	14	15	16
VOLTAGE	TEST	2	2	5	OSC	5	0	0
PIN	17	18	19	20				
VOLTAGE	5	0	0	OSC				

TRANSISTOR VOLTAGE CHART						
	RX			TX		
REF.NO	B	C	E	B	C	E
Q108	1.2	3.5	0.6	1.2	3.5	0.6
Q110	0.6	1.8	GND	0.6	1.8	GND
Q111	3.6	4.3	2	3.6	4.3	2
Q113	0.7	2.5	GND	0.7	2.5	GND
Q114	3.1	5	2.3	3.1	5	2.3
Q116				1.5	7.5	1.2
Q117				0.7	7.5	GND
Q125				12	12.5	13.2
Q106	2	5	1.4	2	5	1.4
Q140				5	0	GND
Q119				0	8	8
Q130	0.5	5	0			
Q122				7	6.7	6.8
Q121				5	0	GND
Q127	5	0	GND			
Q128	0	8	8			

TROUBLE SHOOTING CHART (SM-2000)

Status Indications & Audible Tones

STATUS	DESCRIPTION	LED COLOR	AUDIBLE TONE
NORMAL	Power on ready	N/A	Melody
	Busy	Yellow	N/A
	Correct Tone	Green	N/A
	Transmit	Red	N/A
	Scan	Green, Flashing	N/A
	Busy Lock	Yellow, Flashing	Single Tone
WARNING	Time Out Timer	N/A	Single Tone
	Battery Low	Red, Flashing	Four Tone, Repeated
ERROR	**EEPROM Error**	Red, Flashing	Single Tone Repeated
	PLL Error	Red, Flashing	Double Tone Repeated
	Filtering Error	Red, Flashing	Three Tone Repeated

Unit Does Not Program

1. Defective Programming Lead
2. Wrong Programming Mode
3. Defective MIC Connector
4. Defective IC412

Unit Does Not Work

1. Open DC fuse in Power Cable
2. Defective Volume Switch
3. Defective Regulator IC107, 105, 402
4. Broken DC Cable

No Output from Speaker

1. Defective internal speaker and external jack
2. Defective IC108
3. Defective VR801

Squelch Does Not Work

1. Wrong alignment of squelch resistor RV103
2. Defective IC109
3. Defective CPU IC409

No Sub Audio Decode

CTCSS/DCS

1. Wrong Programming
2. Defective Switch Filter IC406 (MF-6)
3. Defective CPU IC409

MAXON SM-2000 MOBILE

TROUBLE SHOOTING CHART (SM-2000)

No TX

1. Defective MIC
2. Defective CPU IC409
3. Defective IC412

No TX Power

1. Defective TX enable Q122
2. Defective APC Control Circuit Q125
3. Defective TX Power Buffer AMP Q116 and Q117
4. Defective TX Power Amp (SM-2150) Q118,Q120
5. Defective TX Power Module (SM-2450) IC103
6. Defective ANT SW D108 and D120
7. Defective ANT Connector

Over Power

1. Programming
2. Q125 Short
3. Defective D107 and APC Circuit

Low TX Power Output

1. Wrong Programming
2. Defective TX AMP (SM-2150) Q116 , Q117 , Q118, Q120 and D108
3. Defective TX AMP (SM-2450) Q116 , Q117 , IC103 , and D108
4. Defective Antenna Connector

No Modulation

1. Defective MIC
2. Defective Analog SW IC412 and IC411
3. Defective 300Hz HPF IC410
4. Defective MIC AMP and Splatter Filter IC404
5. Defective Audio Buffer IC405
6. Wrong Alignment of RV402
7. Defective Analog IC401

No Encode of CTCSS/DCS

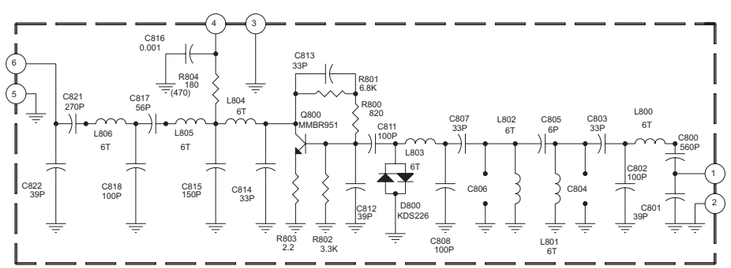
1. Wrong Programming
2. Defective CPU IC409
3. Defective IC407 and IC411

No Sensitivity

1. Defective Antenna Switch D108 , D120 , and D121
2. Defective Front-End Module
3. Defective DBM IC102
4. Defective 45MHz IF Filter CF101
5. Defective IF IC109

Wrong Frequency

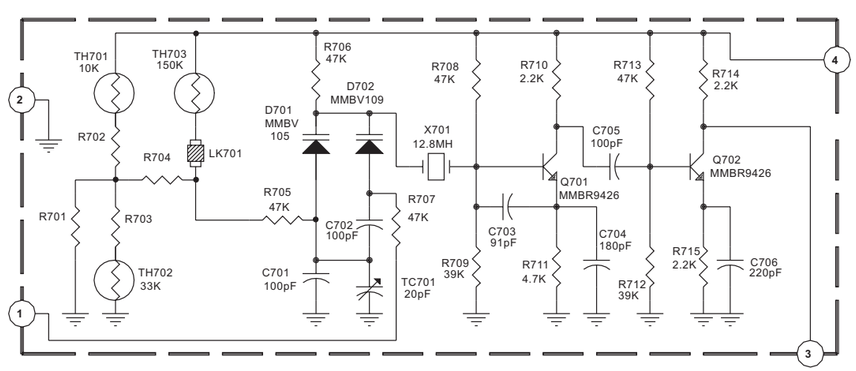
1. Wrong Alignment of 12.8MHz TCXO
2. Wrong Programming



SM-2150/VHF FRONT-END

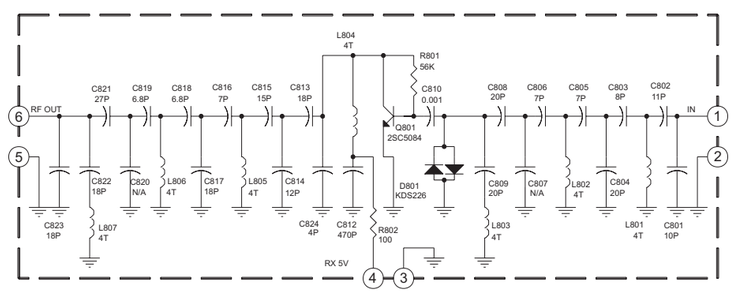
770-110-0002 Rev. B

(VHF Band 2 shown)



SM-2000 TCXO

770-100-0002 Rev. C



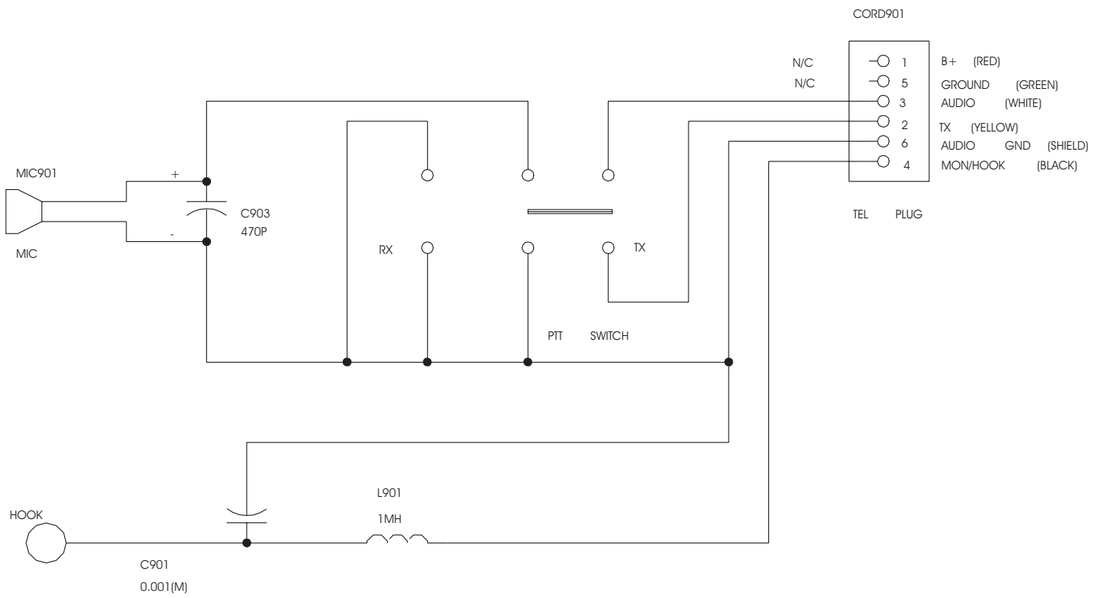
SM-2450/UHF FRONT-END

770-110-0001 Rev. B

(UHF Band 2 shown)

Note 1: Schematics are for reference only. Reference designators and part values may not reflect product configuration.

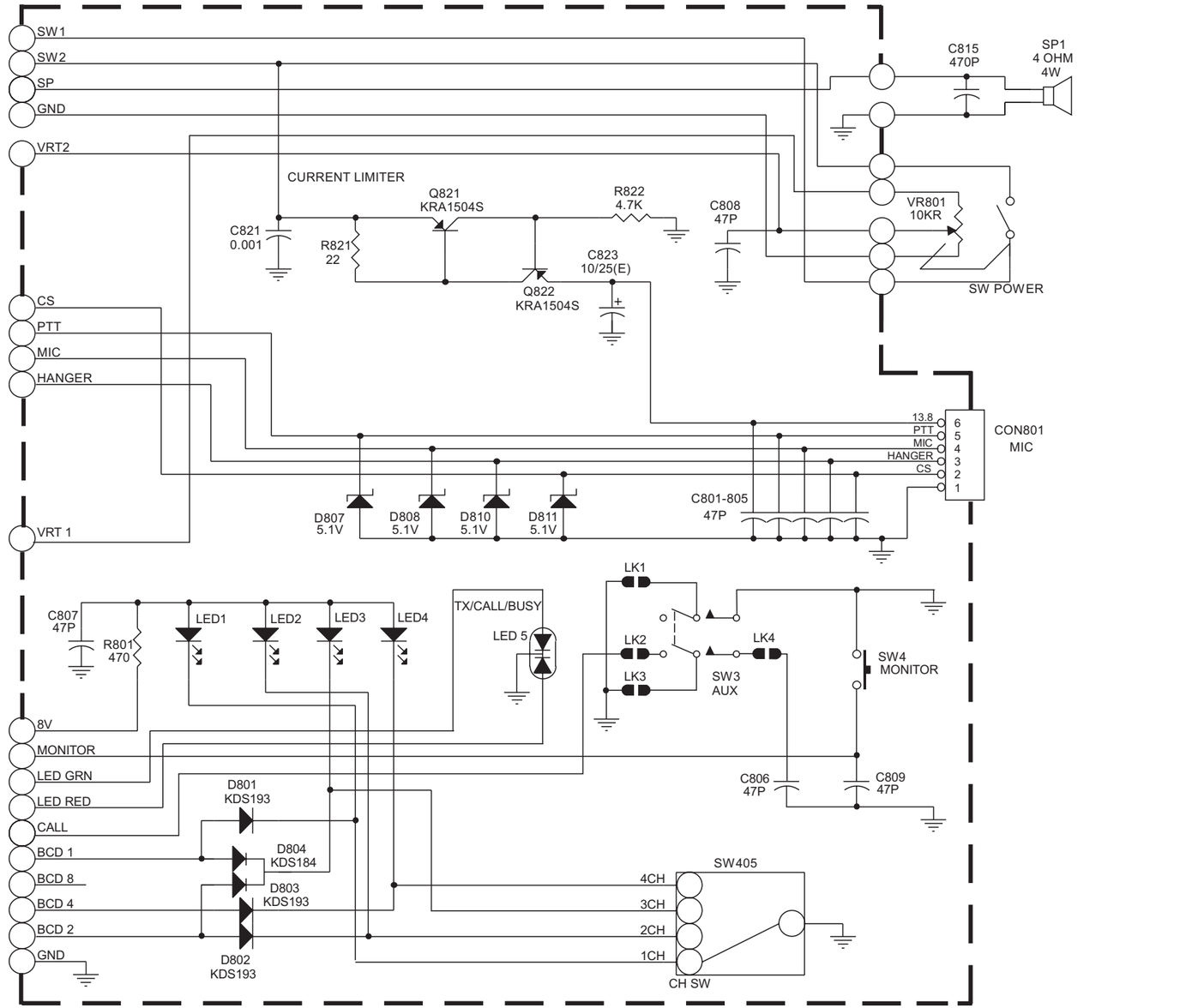
Note 2: Refer to band chart for specific Front-End PCB assemblies.



SM-2000

MA-4472 MICROPHONE SCHEMATIC

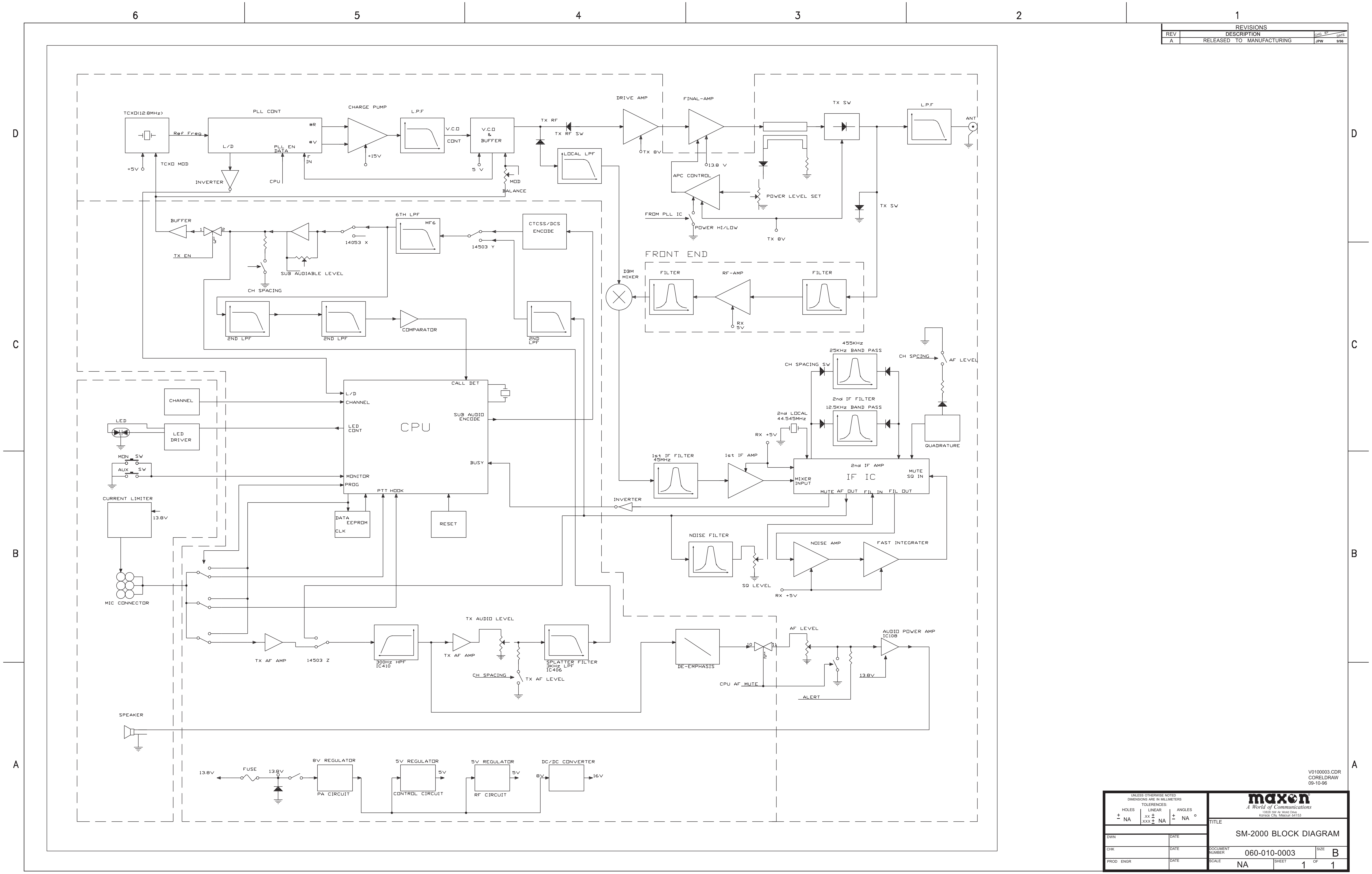
770-090-0003



SM-2000

CONTROL HEAD SCHEMATIC

770-050-0003 Rev. B


REVISIONS
REV
DESCRIPTION
A
RELEASED TO MANUFACTURING
TCXO(12.8MHz)
PLL CONT
CHARGE PUMP
L.P.F
V.C.O
CONT
V.C.O & BUFFER
TX RF
TX RF SW
DRIVE AMP
FINAL-AMP
TX SW
ANT
LOCAL LPF
APC CONTROL
POWER LEVEL SET
FROM PLL IC
POWER HI/LOW
TX 8V
13.8 V
+5V
TCXO MOD
INVERTER
CPU
MOD BALANCE
BUFFER
TX EN
14053 X
6TH LPF
MF6
14503 Y
CTCSS/DCS ENCODE
SUB AUDIABLE LEVEL
CH SPACING
FRONT END
DBM MIXER
FILTER
RF-AMP
2ND LPF
COMPARATOR
455KHz
25KHz BAND PASS
CH SPACING SW
CH SPCING
AF LEVEL
2nd IF FILTER
12.5KHz BAND PASS
2nd LOCAL 44.545MHz
RX +5V
QUADRATURE
1st IF FILTER 45MHz
1st IF AMP
2nd IF AMP
IF IC
MIXER INPUT
MUTE SQ IN
MUTE AF OUT
FIL IN
FIL OUT
CHANNEL
LED
LED DRIVER
MON SW
AUX SW
CURRENT LIMITER
13.8V
MIC CONNECTOR
CALL DET
L/D
SUB AUDIO ENCODE
LED CONT
BUSY
MONITOR
PROG
PTT HOOK
DATA EEPROM
CLK
RESET
NOISE FILTER
SQ LEVEL
NOISE AMP
FAST INTEGRATER
TX AUDIO LEVEL
TX AF AMP
14503 Z
300Hz HPF IC410
SPLATTER FILTER 3KHz LPF IC406
CH SPACING
TX AF LEVEL
DE-EMPHASIS
CPU AF MUTE
ALERT
AUDIO POWER AMP IC108
SPEAKER
FUSE
8V REGULATOR
PA CIRCUIT
5V REGULATOR
CONTROL CIRCUIT
RF CIRCUIT
DC/DC CONVERTER
16V
V0100003.CDR
CORELDRAW
09-10-96
maxon
A World of Communications
TITLE
SM-2000 BLOCK DIAGRAM
DOCUMENT NUMBER
060-010-0003
SIZE
B
SCALE
NA
SHEET 1 OF 1

REVISIONS			
REV	DESCRIPTION	CHKD BY	DATE
A	RELEASED TO MANUFACTURING	JPW	9/96
B	ECO 97014 Change to Sheet 1, Digital Section Onl	JPW	4/97
C	ECO 97020	JPW	4/97
D	ECO 98017 Change to Sheet 2, RF Section Onl	JPW	11/98

NOTES:

1. ALL VALUES ARE IN OHMS, MICROHENRIES OR MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE 1/10W 5% UNLESS OTHERWISE SPECIFIED.
3. FOR CONTROL HEAD SHCEMATIC REFER TO P/N:770-050-0003.

DIGITAL SECTION DIGITAL2.SCH COMMON
FOR BOTH SM2150 AND SM2450

SM-2000 (DIGITAL SECTION)

MAIN BRD SCHEMATIC SHEET 1, DIGITAL SECTION

SCHEMATIC P/N:770-000-0001
SCHEMATIC P/N:770-000-0002

DIGITAL2.SCH (SHEET 1) DIGITAL SECT. PER ECO 98017
S0000001.SCH (SHEET 2) RF SECTION
S0000002.SCH (SHEET 2) RF SECTION

LIBRARY
SM2000.LIB

PCB P/N:610-000-0001 SM-2150 VHF
PCB P/N:610-000-0002 SM-2450 UHF

SM2150 MAIN BRD ASSY P/N:650-000-0001
SM2450 MAIN BRD ASSY P/N:650-000-0002

PADS FILE
SM-2150:P0000001.JOB
SM-2450:P0000002.JOB

CONTROL HEAD 770-050-0003

DIGITAL.DWG
AUTOCAD R13c4
11-18-98

* TONE DEVIATION

REF / MODEL	R412	
SM-2450	22K	
SM-2150 DSM-401/99	39K	

PRODUCT CONDITION

LINK TABLE

REF NO / CONDITION	LK1	LK2	LK3	LK4	LK5	LK6	LK7	LK8	LK9	LK10	LK11	LK12	LK13	LK14	LK15
NORMAL	N/F	N/F	F1T	F1T	F1T	N/F	N/F	N/F	N/F	N/F	F1T	N/F	F1T	F1T	N/F
CA-1133	N/F	N/F	F1T	N/F	F1T	N/F	F1T	F1T	F1T	N/F	F1T	N/F	F1T	N/F	N/F

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN MILLIMETERS
TOLERENCES: HOLES ± NA | LINEAR .xx ± .xxx ± NA | ANGLES ± NA °

maxon
A World of Communications
10808 NW Ambassador Drive
Kansas City, Missouri 64153

DWN		DATE
CHK		DATE
PROD ENGR		DATE

TITLE: SM-2000 MAIN BOARD SCHEMATIC (DIGITAL SECTION)
DOCUMENT NUMBER: 770-000-0001 VHF / 770-000-0002 UHF
SIZE: B
SCALE: NA
SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DWG BY	DATE
A	RELEASED TO MANUFACTURING	JPW	9/96
B	ECO 97014 Change to Sheet 1, Digital Section Onl	JPW	4/97
C	ECO 97020	JPW	4/97
D	ECO 98017 Change to Sheet 2, RF Section Onl	JPW	11/98

NOTES:

1. ALL VALUES ARE IN OHMS, MICROHENRIES OR MICROFARADS
   UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE 1/10W 5% UNLESS OTHERWISE SPECIFIED.
3. REFER TO VHF FRONT-END SCHEMATIC (P/N 770-110-0002) FOR BANDING CHART

DIGITAL SECTION DIGITAL.SCH COMMON
FOR BOTH SM2150 AND SM2450

SM-2150/VHF (RF SECTION)

MAIN BD SCHEMATIC, SHEET 2, RF SECTION

SCHEMATIC P/N:770-000-0001
DIGITAL.SCH (SHEET 1) DIGITAL SECTION (WAS 6728DT-D.SCH)
S0000001.SCH (SHEET 2) RF SECTION PER ECO's 97014, 97020, 98017

LIBRARY
SM2000.LIB

PCB P/N:610-000-0001

SM2150 MAIN BRD ASSY P/N:650-000-0001

PADS FILE
P0000001.JDB

TCXO MODULE
770-100-0002

FRONT-END MODULE
770-110-0002

VCO BAND OPTION

REF NO / CONDITION	C354	C356	C357	C358	C365	C366	C367	C368	L353	L356
BAND 1 136-162MHz	30P	N	5.6P	5.6P	18P	N	4.7P	4.7P	4.5T	3.5T
BAND 2 148-174MHz	39P	4P	4.7P	4.7P	16P	N	3.3P	3.3P	3.5T	3.5T

MAIN BOARD BAND OPTION

REF NO / CONDITION	C155	C160	C241	C245	C248	C249	C253	C254	C256	C261	C262	C268	C269	C270	C273	C275	C277	C278	C280	C281	C283	C312	C313	C314	C315	R182	L132
BAND 1 136-162MHz	11P	24P	82P	8P	27P	18P	75P	43P	75P	39P	75P	22P	0.5P	6P	5.1P	56P	47P	75P	20P	36P	27P	7P	180P	180P	N	150ohm	5T
BAND 2 148-174MHz	4P	24P	82P	5P	27P	20P	75P	33P	75P	39P	75P	22P	9P	4P	4.3P	47P	43P	82P	24P	56P	18P	7P	180P	180P	N	120ohm	6T

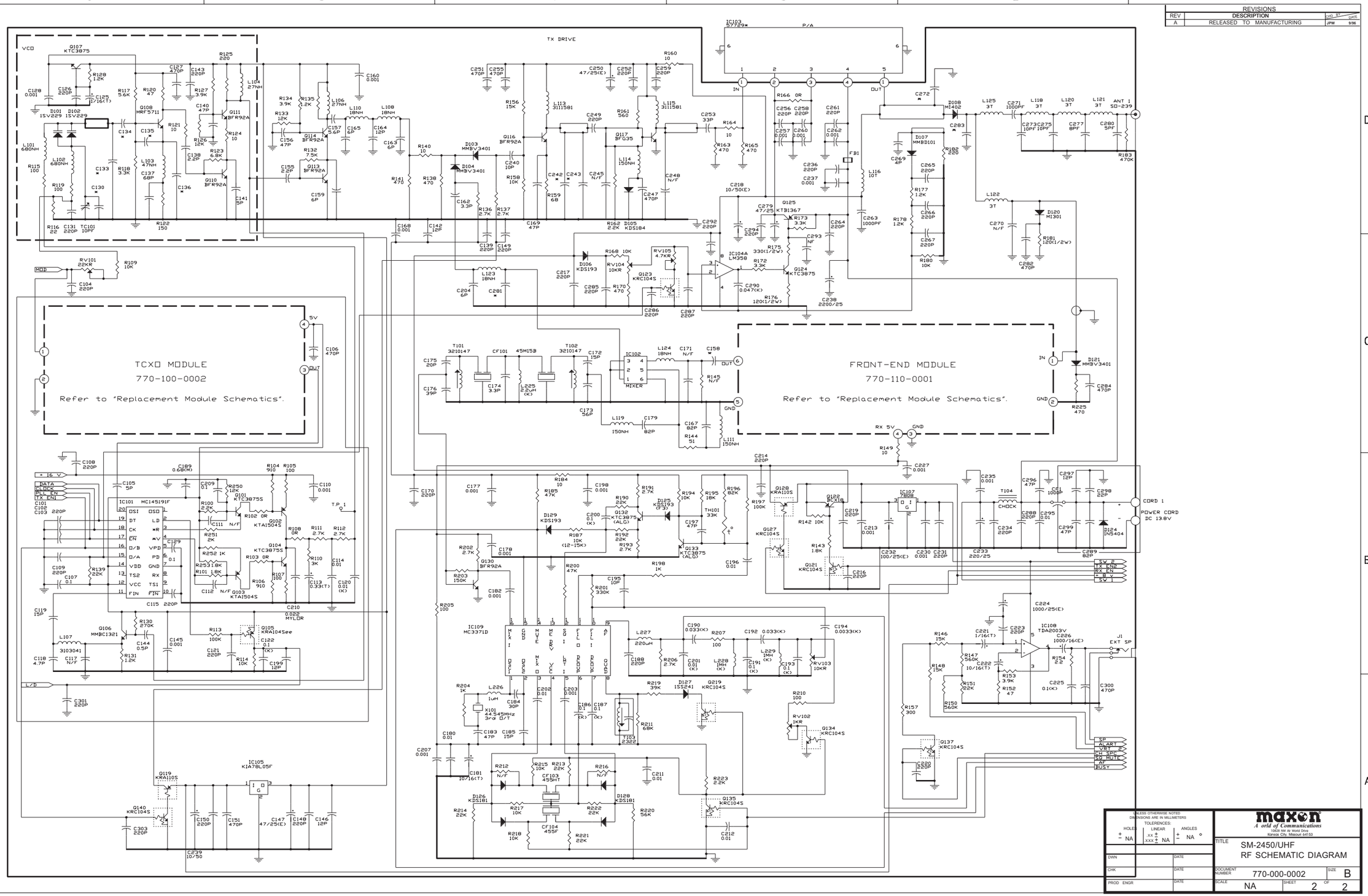
770-000-0001re D.DWG
AUTOCAD R13c4
12-05-98

UNLESS OTHERWISE NOTED
DIMENSIONS ARE IN MILLIMETERS
TOLERENCES:
HOLES ± NA | LINEAR .xx ± NA, .xxx ± NA | ANGLES ± NA °

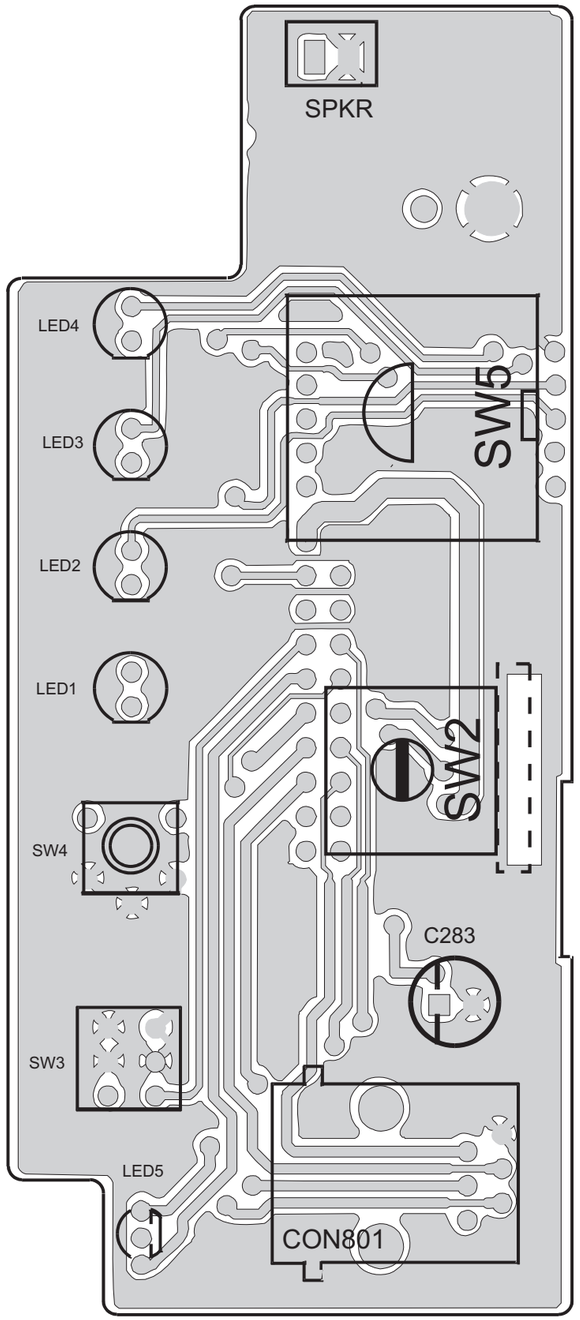
maxon
A orld of Communications
10628 NW Air World Drive
Kansas City, Missouri 64153

TITLE	SM-2150/VHF RF SCHEMATIC DIAGRAM
DWN	DATE
CHK	DATE
PROD ENGR	DATE
DOCUMENT NUMBER	770-000-0001
SIZE	B
SCALE	NA
SHEET	2 OF 2

REVISIONS			
REV	DESCRIPTION	APVD BY	DATE
A	RELEASED TO MANUFACTURING	JPW	9/96

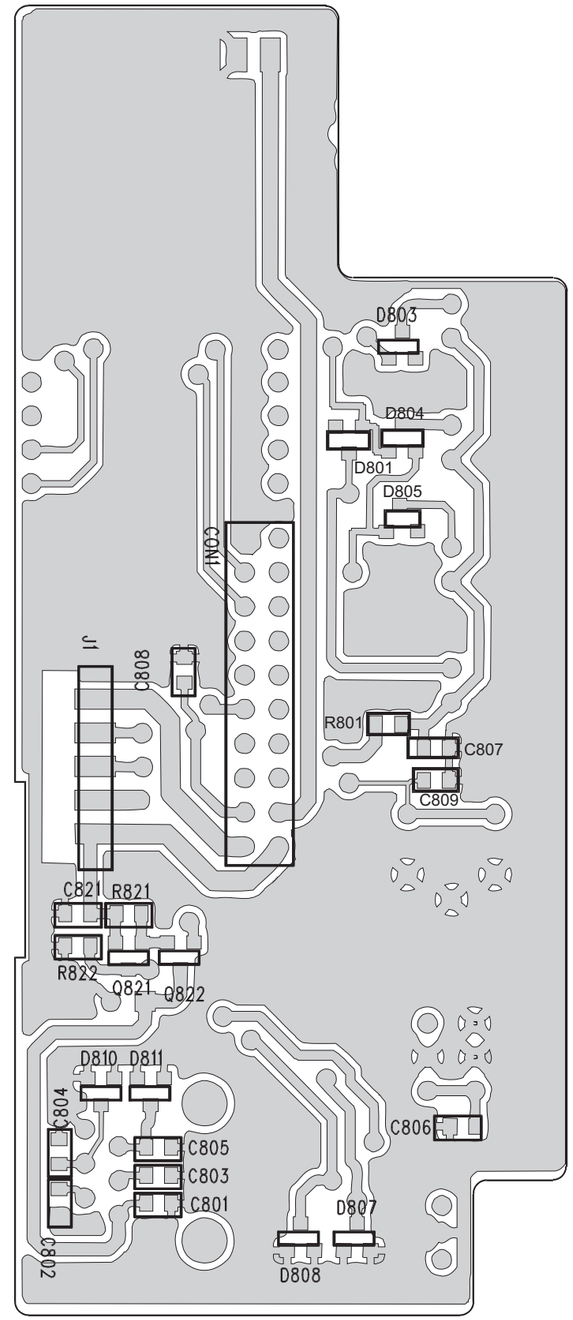


UNLESS OTHERWISE NOTED DIMENSIONS ARE IN MILLIMETERS TOLERENCES: HOLES ± NA, LINEAR XX ± NA, XXX ± NA, ANGLES ± NA °	maxon A orld of Communications 10824 NW Ambassador Drive Kansas City, Missouri 64153		
DWN		DATE	TITLE: SM-2450/UHF RF SCHEMATIC DIAGRAM
CHK		DATE	DOCUMENT NUMBER: 770-000-0002 SIZE: B
PROD ENGR		DATE	SCALE: NA SHEET: 2 OF 2



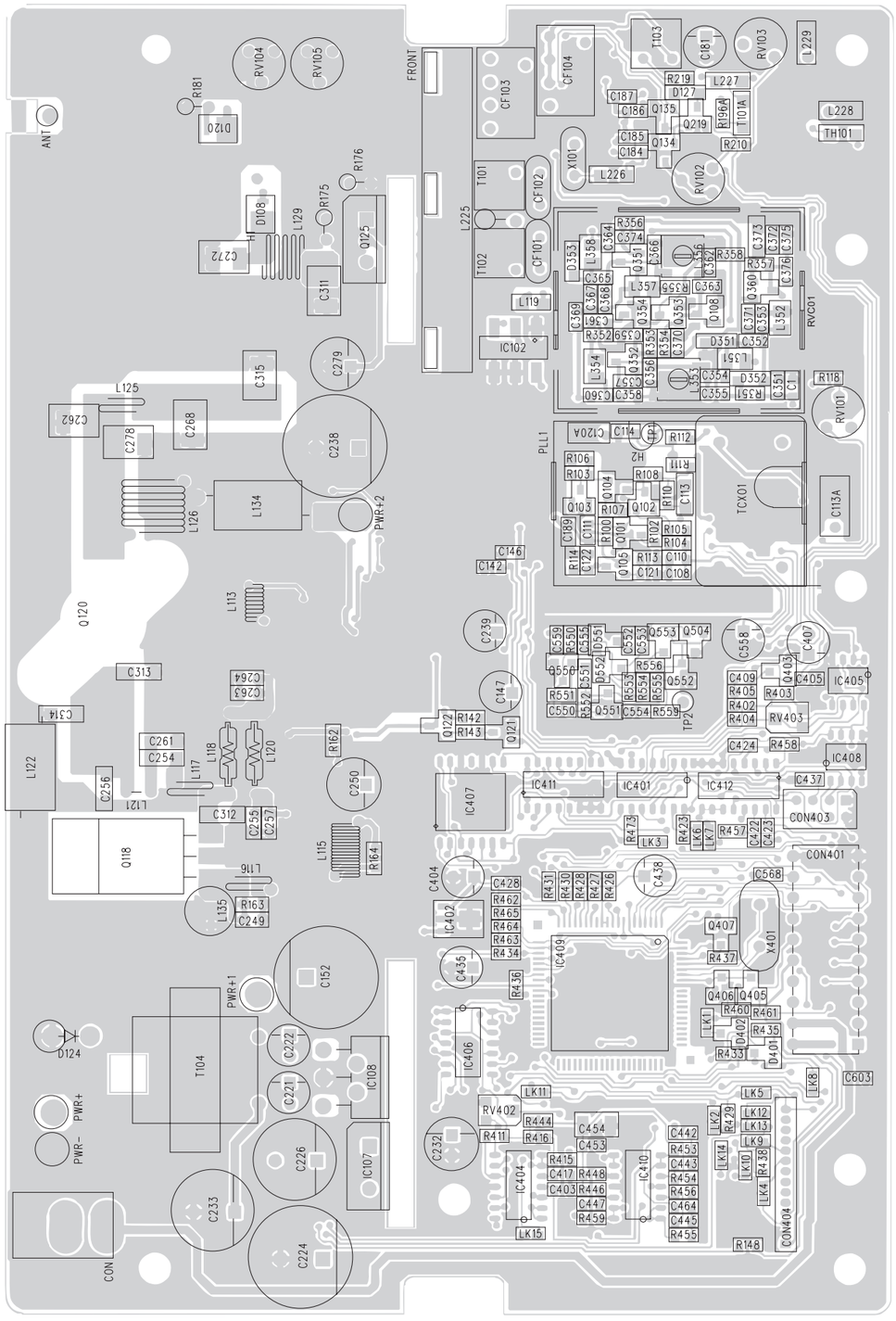
SM-2000 CONTROL HEAD

650-050-0003



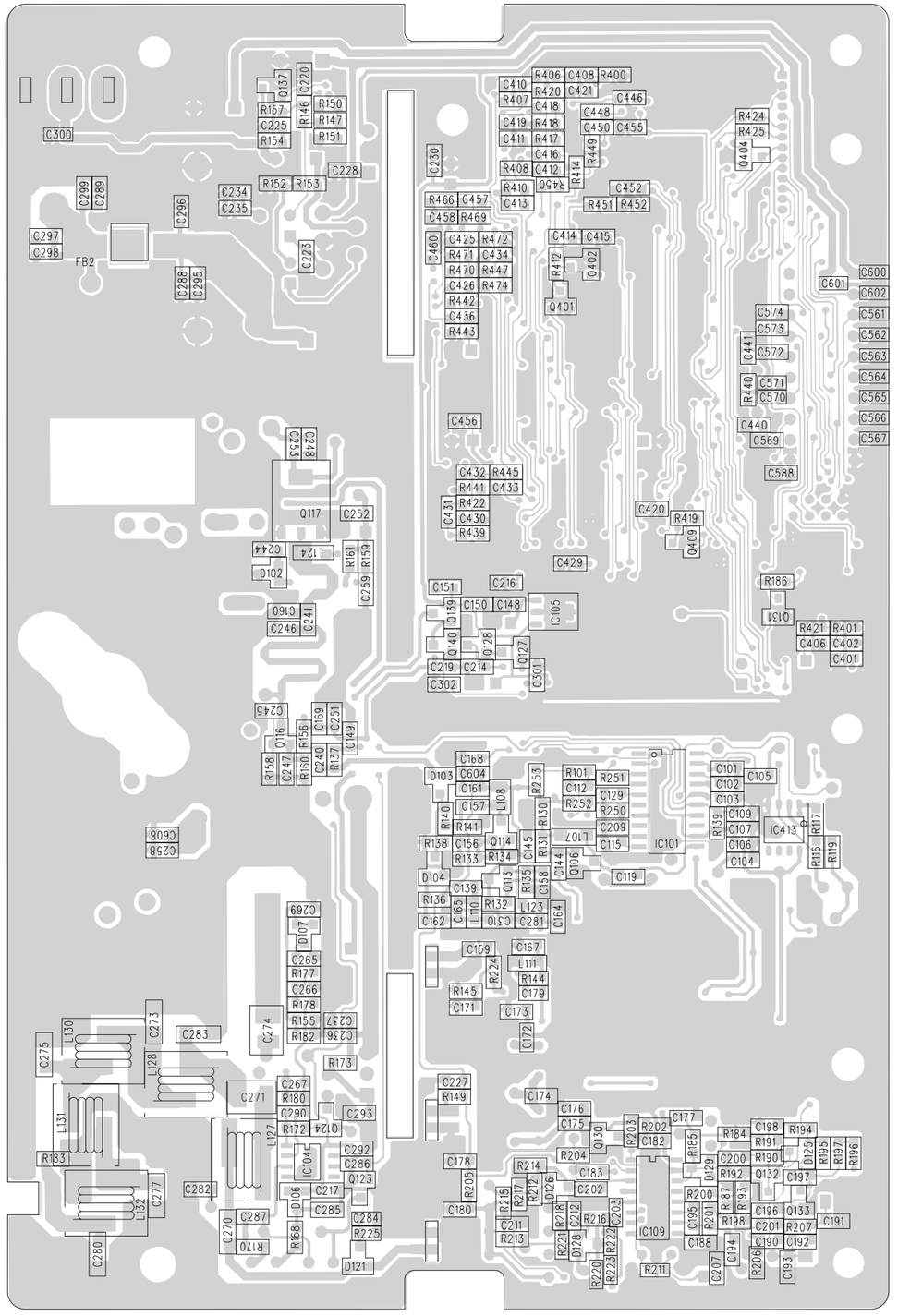
SM-2000 CONTROL HEAD

650-050-0003



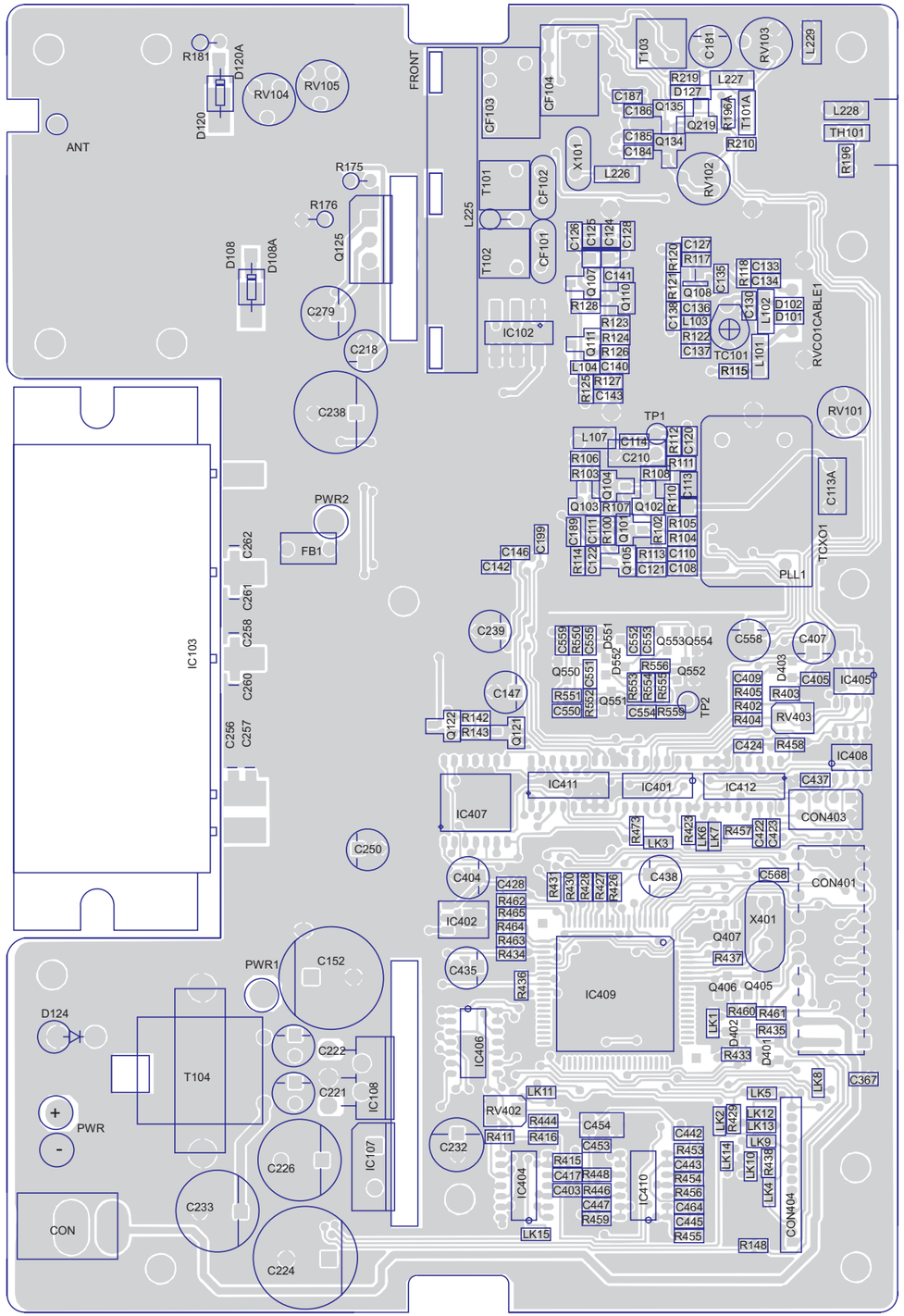
SM-2150/VHF MAIN BOARD ASSY.

650-000-0001



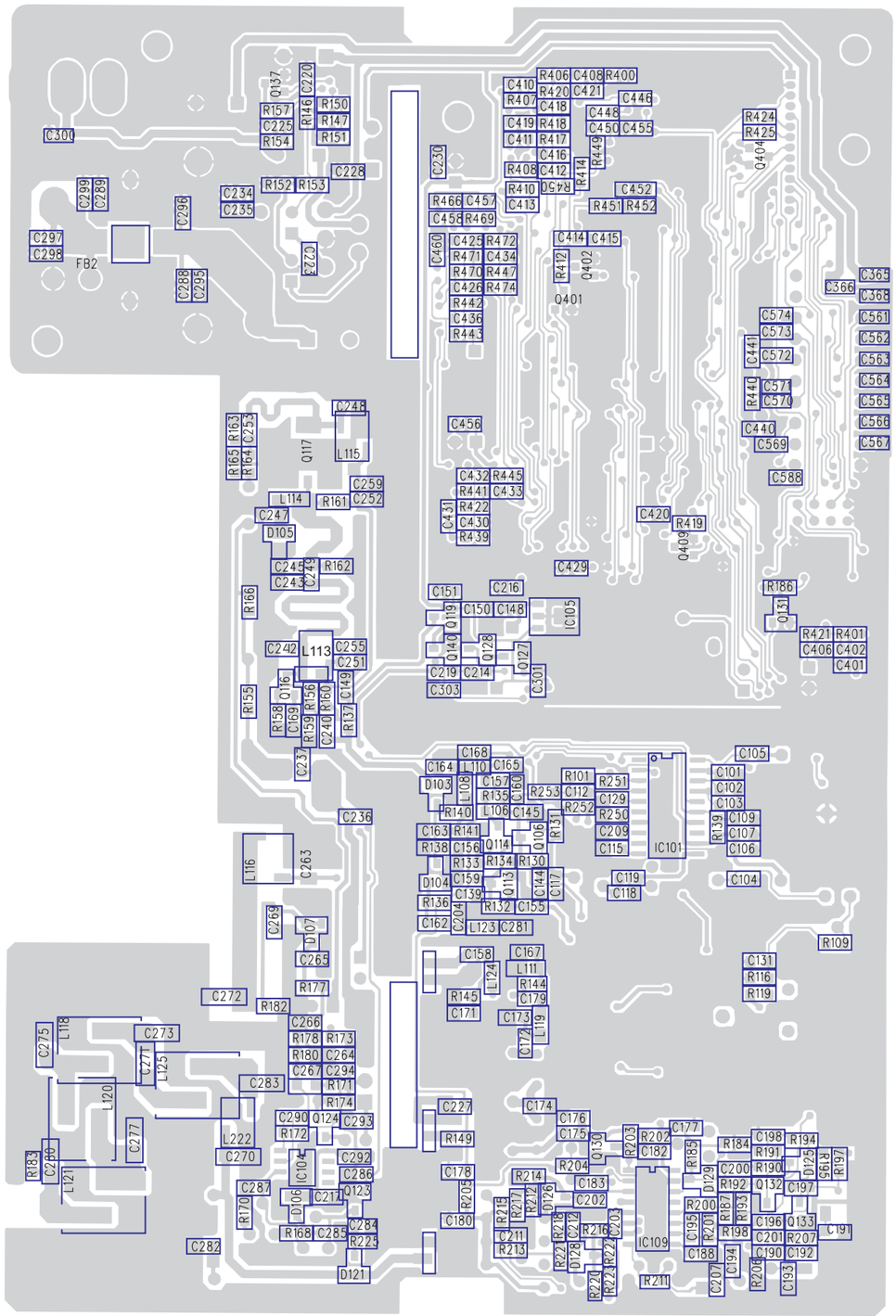
SM-2150/VHF MAIN BOARD ASSY.

650-000-0001



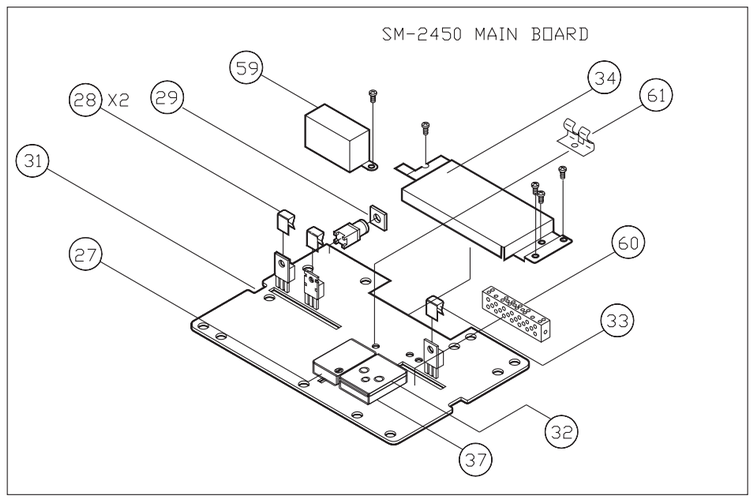
SM-2450/UHF MAIN BOARD ASSY.

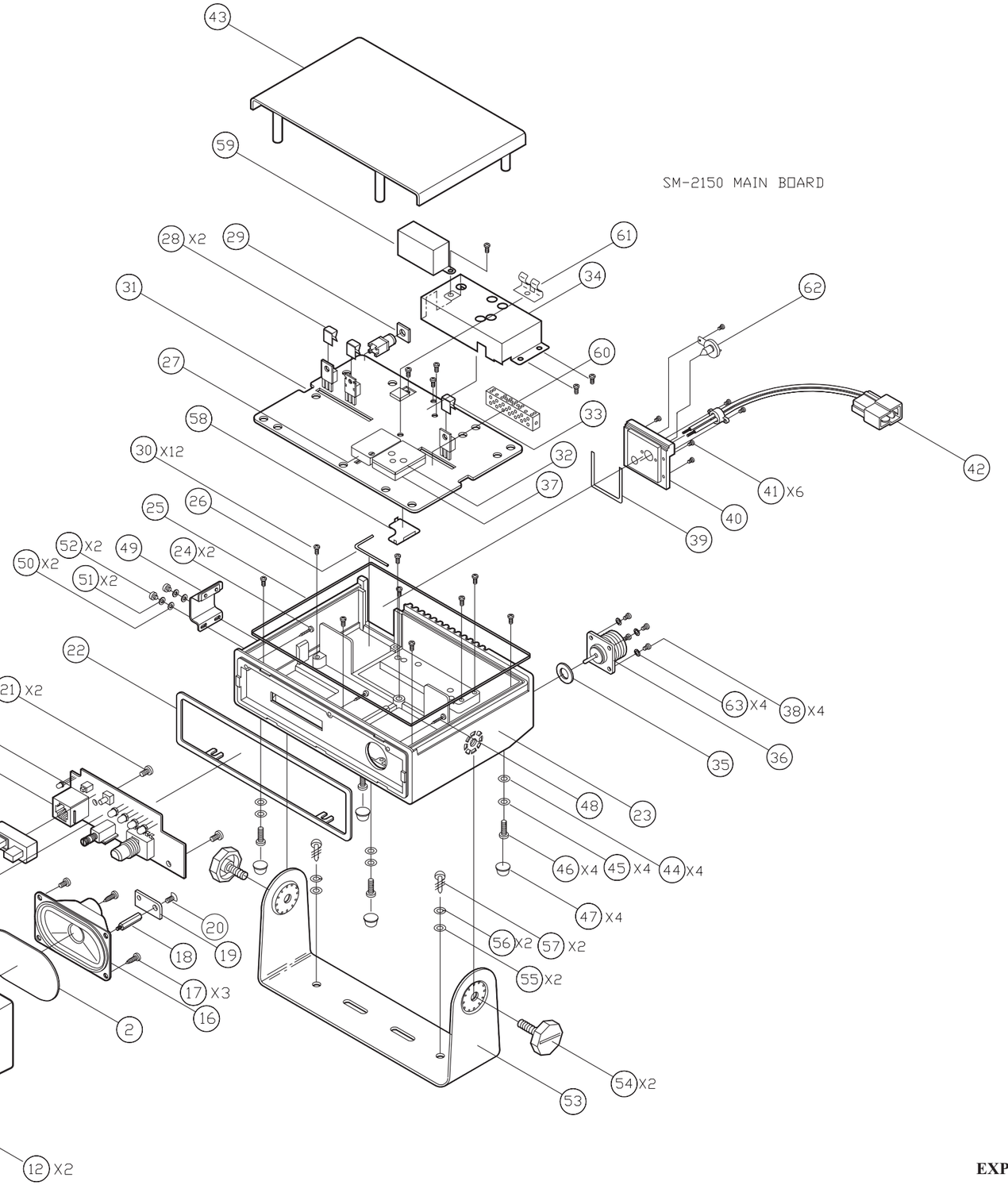
650-000-0002 Rev. C



SM-2450/UHF MAIN BOARD ASSY.

650-000-0002 Rev. C





SM-2000

EXPLODED VIEW

SM-2150/VHF EXPLODED VIEW PARTS LIST

REF #	PART #	DESCRIPTION	QTY
1	801-282-A	E.S.C NORYL N190J-7002	1
2	905-510	FELT 30-R16.5 (2) XT0.3 FELT BLK	1
3	795-654	OVERLAY LEXAN T0.5	1
4	826-137	KNOB (FOR VOL) ABS 94HB BLK	1
5	826-120	KNOB (FOR CH) ABS 94HB BLK	1
6	650-346	NUT RING (FOR VOL) M7X0.75 (P) &9.9 BSBM	1
7	650-335	NUT RING (FOR CH) M9X0.75 (P) &11 BSBM	1
8	661-701	WASHER (FOR VOL) T0.5 SPC	1
9	662-901	WASHER (FOR CH) 13X9.3XT0.5 SPC	1
10	894-650	RING (FOR VOL) &10X&6.9XT0.8 SILI.RUBB BLK	1
11	895-095	RING (FOR CH) &9.3X&12.5 CR BLK	1
12	611-388	(+) MACHINE SCREW (FH) M3X8 (+) FH BLK	2
13	895-040	KEY PAD SILICONE RUBBER	1
14	420-709-9	JACK MODULAR 1130-662	1
15	650-050-0003	CONTROL HEAD P.C.B. ASSY.	1
16	420-108-4A	SPEAKER 4 OHM 5.0W 71MM PB7401A3Y26	1
17	623-034	(+) TAPPING SCREW (PH) T3X6-1S (+) PH ZN-PLAT	3
18	853-078	POST BSBM NI-PLAT	1
19	752-732	PLATE (ESC MTG) SPC T2	1
20	613-174	(+) MACHINE SCREW (FH) M3X5 (+) FH NI-PLAT	1
21	622-039	(+) TAPPING SCREW (BH) T2X6-1S (+) BH ZN-PLAT	2
22	895-044	GASKET (ESC) CR BLK	1
23	702-416-AB	FRAME ALDC12 (SM-2450)	1
24	623-760	(+) TAPPING SCREW (BH) T3X18-2S (+) BH NI-PLAT	2
25	427-411-4	WIRE EMI GASKET 43SM15 (SM-2450)	1
26	427-411-4A	WIRE EMI GASKET 43SM20 (SM-2450)	1
27	772-181	SHIELD CAN SPTE T0.3	1
28	723-844	BRACKET TR SK5 T0.5 NI-PLAT	2
29	895-047	GASKET (EXT JACT) CR BLK	1
30	613-040-S	(+) MACHINE SCREW (PH) M3X6 (+) PH ZN-PLAT 1	12
31	650-000-0001	MAIN P.C.B. ASSY. SM-2150/VHF	1
32	772-298	SHIELD COVER SPTE T0.5	1
33	752-729	CLIP (FOR TR) SUS304 T0.5	1
34	772-243	SHIELD CAN NSP T0.3	1
35	895-041	RING CR BLK	1
36	421-677-7	CONNECTOR BOX SOCKETBCS-110-P-D-HE	1
37	772-179	SHIELD CASE (FOR VCO)	1
38	613-755-SF	(+) MACHINE SCREW (PH) M3X7 (+) PH NI-PLAT	4
39	895-043	GASKET (BRKT) CR BLK	1
40	723-823	BRACKET ALDC12	1
41	612-289	(+) MACHINE SCREW (BH) M2X5 (+) BH BLK	6
42	504-367-B	2P PLUG ASS'Y SH-50101 (SM-2450)	1
43	719-020	COVER TOP ALDC12	1
44	895-075	RUBBER WASHER &6.2X&3.1XT0.5 N.B.R BLK	4
45	660-449	WASHER 6X3.2X0.5T SPC NI-PLAT	4
46	613-764	(+) MECHINE SCREW (PH) M3X20 (+) PH SUS	4
47	893-700	FOOT &11X5 RUBB.STIC.	4
48	613-369	(+) MACHINE SCREW (BH) M3X15 (+) BH ZN-PLAT	1
49	508-085-A	MIC BRACKET ASS'Y	1
50	660-449	WASHER 6X3.2X0.5T SPC NI-PLAT	2
51	662-310	WASHER SPRING M3 NI-PLAT	2
52	613-299	(+) MACHINE SCREW (BH) M3X6 (+) BH NI-PLAT	2
53	723-834	BRACKET SPC T2.0	1
54	600-051	SECURING SCREW M6X9 (P:1) BLK	2
55	661-605	WASHER FLAT M6 ZN-PLAT	2
56	662-606	WASHER SPRING M6 ZN-PLAT	2
57	625-007	(+) TAPPING SCREW (TH) T5X12-1S (+) TH ZN-PLAT	2
58	772-241	SHIELD PLATE SPTE T0.3	1
59	772-242	SHIELD CAN SPTE T0.5	1
60	772-132-A	SHIELD CAN (FR-P) NSP T0.2	1
61	752-769	FINGER STRIP SUS304 T0.3	1
62	895-247	CAP (FOR EXT. JACK)	1
63	662-305	WASHER SPRING M3 ZN-PLAT	4

SM-2450/UHF EXPLODED VIEW PARTS LIST

REF #	PART #	DESCRIPTION	QTY
1	801-282-A	E.S.C NORYL N190J-7002	1
2	905-510	FELT 30-R16.5 (2) XT0.3 FELT BLK	1
3	795-654	OVERLAY LEXAN T0.5	1
4	826-137	KNOB (FOR VOL) ABS 94HB BLK	1
5	826-120	KNOB (FOR CH) ABS 94HB BLK	1
6	650-346	NUT RING (FOR VOL) M7X0.75 (P) &9.9 BSBM	1
7	650-335	NUT RING (FOR CH) M9X0.75 (P) &11 BSBM	1
8	661-701	WASHER (FOR VOL) T0.5 SPC	1
9	662-901	WASHER (FOR CH) 13X9.3XT0.5 SPC	1
10	894-650	RING (FOR VOL) &10X&6.9XT0.8 SILI.RUBB BLK	1
11	895-095	RING (FOR CH) &9.3X&12.5 CR BLK	1
12	611-388	(+) MACHINE SCREW (FH) M3X8 (+) FH BLK	2
13	895-040	KEY PAD SILICONE RUBBER	1
14	420-709-9	JACK MODULAR 1130-662	1
15	650-050-0003	CONTROL HEAD P.C.B. ASSY.	1
16	420-108-4A	SPEAKER 4 OHM 5.0W 71MM PB7401A3Y26	1
17	623-034	(+) TAPPING SCREW (PH) T3X6-1S (+) PH ZN-PLAT	3
18	853-078	POST BSBM NI-PLAT	1
19	752-732	PLATE (ESC MTG) SPC T2	1
20	613-174	(+) MACHINE SCREW (FH) M3X5 (+) FH NI-PLAT	1
21	622-039	(+) TAPPING SCREW (BH) T2X6-1S (+) BH ZN-PLAT	2
22	895-044	GASKET (ESC) CR BLK	1
23	702-416-AB	FRAME ALDC12 (SM-2450)	1
24	623-760	(+) TAPPING SCREW (BH) T3X18-2S (+) BH NI-PLAT	2
25	427-411-4	WIRE EMI GASKET 43SM15 (SM-2450)	1
26	427-411-4A	WIRE EMI GASKET 43SM20 (SM-2450)	1
27	772-181	SHIELD CAN SPTE T0.3	1
28	723-844	BRACKET TR SK5 T0.5 NI-PLAT	2
29	895-047	GASKET (EXT JACT) CR BLK	1
30	613-040-S	(+) MACHINE SCREW (PH) M3X6 (+) PH ZN-PLAT 1	11
31	650-000-0002	MAIN P.C.B. ASSY. SM-2450/UHF	1
32	771-989	SHIELD COVER SPTE T0.5	1
33	752-729	CLIP (FOR TR) SUS304 T0.5	1
34	772-243	SHIELD CAN NSP T0.3	1
35	895-041	RING CR BLK	1
36	421-677-7	CONNECTOR BOX SOCKETBCS-110-P-D-HE	1
37	772-179	SHIELD CASE (FOR VCO)	1
38	613-755-SF	(+) MACHINE SCREW (PH) M3X7 (+) PH NI-PLAT	4
39	895-043	GASKET (BRKT) CR BLK	1
40	723-823	BRACKET ALDC12	1
41	612-289	(+) MACHINE SCREW (BH) M2X5 (+) BH BLK	6
42	504-367-B	2P PLUG ASS'Y SH-50101 (SM-2450)	1
43	719-020	COVER TOP ALDC12	1
44	895-075	RUBBER WASHER &6.2X&3.1XT0.5 N.B.R BLK	4
45	660-449	WASHER 6X3.2X0.5T SPC NI-PLAT	4
46	613-764	(+) MECHINE SCREW (PH) M3X20 (+) PH SUS	4
47	893-700	FOOT &11X5 RUBB.STIC.	4
48	613-369	(+) MACHINE SCREW (BH) M3X15 (+) BH ZN-PLAT	1
49	508-085-A	MIC BRACKET ASS'Y	1
50	660-449	WASHER 6X3.2X0.5T SPC NI-PLAT	2
51	662-310	WASHER SPRING M3 NI-PLAT	2
52	613-299	(+) MACHINE SCREW (BH) M3X6 (+) BH NI-PLAT	2
53	723-834	BRACKET SPC T2.0	1
54	600-051	SECURING SCREW M6X9 (P:1) BLK	2
55	661-605	WASHER FLAT M6 ZN-PLAT	2
56	662-606	WASHER SPRING M6 ZN-PLAT	2
57	625-007	(+) TAPPING SCREW (TH) T5X12-1S (+) TH ZN-PLAT	2
58	772-241	SHIELD PLATE SPTE T0.3	1
59	772-242	SHIELD CAN SPTE T0.5	1
60	772-132-A	SHIELD CAN (FR-P) NSP T0.2	1
61	752-769	FINGER STRIP SUS304 T0.3	1
62	895-247	CAP (FOR EXT. JACK)	1
63	662-305	WASHER SPRING M3 ZN-PLAT	4

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