Maintenance Manual

Monogram Series
4/16 Channel Portable

ERICSSON

NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTE

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

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SPECIFICATIONS

The information detailed in the Specifications is for the VHF and UHF Series hand portable radios. Unless otherwise stated the information is the same for both.

General

Power Supply	Rechargeable Nickel-Cadmium Battery, 10.8 VDC
Power Supply Range	9.2 V DC-13.5 V DC

Current Consumption

VHF

Standby	19 mA (Battery Save On) 35 mA (Battery Save Off)
Receive	150 mA
Transmit	1100 mA (5W) Battery Life (5-5-90% duty cycle)

UHF

Standby	18 mA (Battery Save On) 50 mA (Battery Save Off)
Receive	150 mA
Transmit	1200 mA (5W) Battery Life (5-5-90% duty cycle)

Typically

600 mAh	7 hrs.. at 5W (save on), 5 hrs.. at 5W (save off).
1200 mAh	12 hrs.. at 5W (save on), 9 hrs.. at 5W (save off).
Environmental	Designed to meet EIA
Temperature Range	-30° C to + 60 ° C
Relative Humidity	90% at 40 ° C Non-condensing
Speaker Impedance	8 ohm
Microphone Impedance	1.5k Ohm
Frequency Control	Synthesizer
Number of RX/TX Channels	16 or 4 Maximum

MONOGRAM SERIES HANDHELD
SPECIFICATIONS

Frequency Bands

VHF Low Band	136 MHz to 150 MHz
VHF Medium Band	148 MHz to 162 MHz
VHF High Band	160 MHz to 174 MHz
UHF A Band	400 MHz to 420 MHz
UHF B Band	420 MHz to 440 MHz
UHF C Band	450 MHz to 470 MHz
UHF D Band	470 MHz to 490 MHz
UHF E Band	490 MHz to 520 MHz

Dimensions (mm)

Radio	99(H) x 64(W) x 36(D)
600 mAh	59(H) x 64(W) x 36(D)
1200 mAh	84(H) x 64(W) x 36(D)

Weight

Radio	270 gm
600 mAh	230 gm
1200 mAh	300 gm

Controls

Volume On/Off Switch	Used to turn radio On/Off and set the Volume
Channel Select Switch	Used to select one of four or one of sixteen channels, depending on radio.
Press To Talk Button	Used to Transmit (Referred to as PTT)
Monitor Button	Push to Monitor
Hi/Low Power Button	Push to change from 1 to 5 watts.
Accessories Socket	6 way socket, used for connecting the remote speaker/microphone and programming.

Transmitter

Output Power	Variable 1W or 5W nominal
RF Load Stability	Unconditionally stable into an infinitive VSWR at any phase angle.
RF Power Stability	+2 dB - 3 dB of nominal power (-30 ° C to +60 ° C).
Operational Bandwidth	8 MHz

Conducted Spurious Emissions	-60 dBc max.
Radiated Spurious Emissions	-60 dBc max.
Adjacent Channel Noise Power (25 kHz)	70 dBc in 16 kHz.
Modulation System	FM (F3E)
Audio Frequency Response	6 dB/octave pre-emphasized response 300-3000 Hz
Audio Frequency Response	(<6 kHz) 24 dB/octave
Audio Harmonic Distortion	<5% at 60% System Deviation modulated with 1 kHz.
Maximum Deviation	± 5 kHz at 25 kHz
Microphone Sensitivity	Better than 94 dB S.P.L.
Hum and Noise (Unsquelched)	≥ 45 dB

RECEIVER

Sensitivity	12 dB SINAD/0.3 μ Vpd 20 dB/0/40 μ V
Modulation Acceptance Bandwidth	
N Bandwidth	4.0 kHz for 12.5 kHz
M Bandwidth	7.0 kHz for 20 KHz
S Bandwidth	8.5kHz for 25 kHz
Adjacent Channel Signal Selectivity	≥ 70 dB
Spurious Response Rejection	≥ 80 dBc
Avg. System Frequency Deviation	60% of peak at 1 kHz
Blocking	≥ 100 dB
Intermodulation Rejection	≥ 73 dBuv
Max Audio Power Output	0.5 W min. at 10% THD into 8 Ω
AF Distortion	2.0% THD at 200 mV into 8 Ω
Frequency Response	6 dB/octave de-emphasized response in the range 300 Hz-3000 Hz.
Hum and Noise (Unsquelched)	≥ 50 dB

MONOGRAM SERIES HANDHELD
SPECIFICATIONS

Conducted and Radiated Spurious Emission	Per FCC and DOC Rules and Regulations
Temperature Stability	0.0005% (-30 ° C To +60 ° C)
Amplitude Characteristic	≥ 1db
Operational Bandwidth	7 MHz VHF (3 dB) 8 MHz UHF (3 dB)

- ***Due to continuing research and development the company reserves the right to alter these specifications without prior notice.***

UNPACKING

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

1. Transceiver Unit
2. Belt Clip
3. Operating Guide

Options:

4. Antenna
5. Battery

Packing is cardboard tray box.

INTRODUCTION

Advanced state-of-the-art technology is used in the design and manufacturing of the VHF and UHF scanning hand-helds. The Phase Lock Loop (PLL) synthesizer provides more flexibility and capability in a radio than ever before offered. The VHF and UHF scanning hand-helds has 4 or 16 channel capability, depending on which model is chosen. 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 Read Only Memory (EEPROM).

GENERAL FEATURES

The main features of the VHF and UHF scanning hand-helds are:

1. SCAN
2. PRIORITY CHANNEL/LOOK BACK
3. BUSY CHANNEL LOCK-OUT/MARKED IDLE
4. CTCSS/DCS
5. TRANSMIT TIME-OUT-TIMER/TX INHIBIT
6. TX DELAY
7. POWER SAVE
8. LOW BATTERY INDICATION
9. MONITOR
10. BEEP TONE
11. PROGRAM MODE

These features enable the VHF and UHF scanning hand-helds to be used in different operational environments within competing systems.

SCAN

With the scan feature enabled only one channel can be selected as the Scan Channel. Any amount of channels can be added to the scan list depending on the channel capability of the VHF and UHF scanning hand-held.

Scan is indicated by a flashing green LED which can be programmed ON or OFF. A Scan Delete can be accomplished by depressing the monitor button when a scanned channel is busy. The deleted scanned channel can be returned by turning the channel select switch from the Scan Channel and returning to the Scan Channel or by turning the radio OFF and back ON.

If Carrier + Tone is ON the radio scans channels that are carrier only and channels programmed with tone. If Carrier + Tone is OFF the radio scans all channels for carrier. Scan Delay is amount of time the radio waits after a call is received or a transmission is made before the radio resumes scanning.

Scan Speed is the amount of time the radio takes to scan between channels.

Within the scan feature there are four scan modes:

1. NORMAL SCAN TX
2. RECEIVE ONLY/TX DISABLED
3. PRIORITY SCAN TX
4. PRIORITY ONLY TX

NORMAL SCAN TX

This allows a transmission only after a call is received, depending on the programmed SCAN DELAY TIME (The channel the call is received on is not indicated by the radio). After the scan resumes ,and a transmission is made the radio will sound an alarm (TWO BEEPS) not allowing a transmission.

RECEIVE ONLY /TX DISABLED

This allows only receive and if a transmission is made at any time the radio will sound an alarm (TWO BEEPS) not allowing a transmission.

PRIORITY SCAN TX

This allows a transmission after a call is received depending on programmed SCAN DELAY TIME . The transmission will be made on the channel that the call was received. After the radio resumes scanning , if a transmission is made the radio will transmit the programmed PRIORITY channel.

PRIORITY ONLY TX

This transmits the programmed PRIORITY channel every time a transmission is made.

PRIORITY CHANNEL/LOOK BACK

Only one channel can be selected as PRIORITY . This feature can be used in conjunction with the Look back feature. Any channel other than the Priority channel can be programmed as a Look back channel. Whenever a Look back channel is selected by the channel select switch , the radio will Look back to the PRIORITY channel at the programmed time intervals. Look back also occurs while receiving a call unless the priority channel is received.

BUSY CHANNEL LOCK-OUT/MARKED IDLE

The Busy Channel Lock-out feature is used to stop the radio from transmitting on a frequency that is busy (Yellow LED, With Tone Green LED). If the PTT is depressed while the receiver is busy, an alert tone is sounded (ONE BEEP) and no transmission is made. Once the busy signal is gone normal transmission may resume. When Busy Channel Lock-out is used in conjunction with the Marked Idle feature a transmission may occur if the proper tone is seen with the carrier (Green LED).

CTCSS/DCS

The CTCSS (Continuous Tone Coded Squelch System) and the DCS (digital Coded Squelch) features operate in a similar manner. These features reduce the amount of communication traffic heard by the user by keeping a user from hearing others on the same frequency using another tone or no tone at all.

- ***NOTE: There are a maximum of two Non-standard Tone settings on the VHF and UHF scanning hand-helds .(The lowest tone that can be used is 55.0 Hz and the highest tone that can be used is 260.0 Hz).***

TRANSMIT TIME-OUT-TIMER/TX INHIBIT

The Transmit Time-out-timer is a programmable feature that limits the time the user can continuously transmit while holding the PTT switch . The radio will sound an alert tone once five seconds before the time out occurs , five seconds later another alert tone will be heard , this time disabling the transmitter until the PTT is released and depressed again. When TX Inhibit is used in conjunction with the Time out timer the user cannot PTT again for a programmed period of time after the time-out occurs, a continuous alert

tone (FOUR BEEPS) will occur ,until PTT is released, or the PTT is depressed again . After the TX INHIBIT time has expired an alert tone will be heard and the user may transmit again.

TX DELAY

The TX DELAY feature when enabled causes the radio to transmit a "dead-carrier" after a PTT occurs on a channel with transmit CTCSS tones. This feature is used to eliminate SQUELCH TAIL.

POWER SAVE

The Power Save feature is used to extend the daily battery life of the radio. When the Power Save is enabled the receiver is asleep (the receiver toggles on and off at programmed power save rate). When the Power Save is disabled the receiver is active. Delay time is the time period for the Power Save to resume after a call is received , or a PTT has occurred.

LOW BATTERY INDICATION

When a Low Battery Indication occurs an alert tone will be heard (FOUR BEEPS), and a continuous flashing LED will be seen. At this time the radio will allow the user one more transmission , when the PTT is released a continuous flashing LED will be seen. If the user transmits again an alert tone will be heard (FOUR BEEPS) and no transmission will occur , the LED will continue to flash and at this time the battery should be recharged or replaced.

MONITOR

The MONITOR button can be enabled or disabled. Enabled the Monitor is depressed and audio will be heard from the radio. Disabled the Monitor is depressed and no audio will be heard from the radio, normal programming modes are not affected.

BEEP TONE

The BEEP TONE can be enabled or disabled.

PROGRAM MODE

All programming is done through the radio accessory jack. The monitor button is used to place the radio in the desired program mode .

Diagnostic Function

The Diagnostic function is designed to inform the user about the radio operating status. The possible audible warnings and indications are:

Battery Low	Red BUSY, TX/BT LED Flashing, Four Tones, Repeated
EEPROM Error	Red BUSY, TX/BT LED Flashing, One Single Tone, Repeated
PLL Error	Red BUSY, TX/BT LED Flashing, Two Tones, Repeated
Filtering Error	Red BUSY, TX/BT LED Flashing, 3 Tones, Repeated

Should any of the error messages listed below appear, the user should consult the dealer from whom the unit was purchased so that the radio can be serviced by a qualified service technician.

TABLE 1-Status Indications And Audible Tones

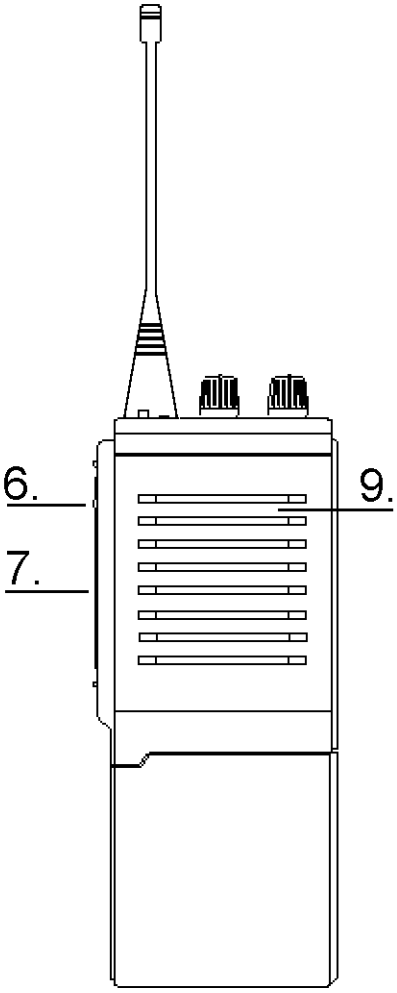
STATUS	DESCRIPTION	LED COLOR	AUDIBLE TONE
NORMAL	Power on ready	N/A	Melody
	Busy	Yellow	N/A
	Correct Tone	Green	N/A
	Transmit	Red	N/A
	Scan	Green, Flashing	N/A
	Busy Lock	Yellow, Flashing	Single Tone
WARNING	Time Out Timer	N/A	Single Tone
	Battery Low	Red, Flashing	Four Tone, Repeated
ERROR	EEPROM Error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

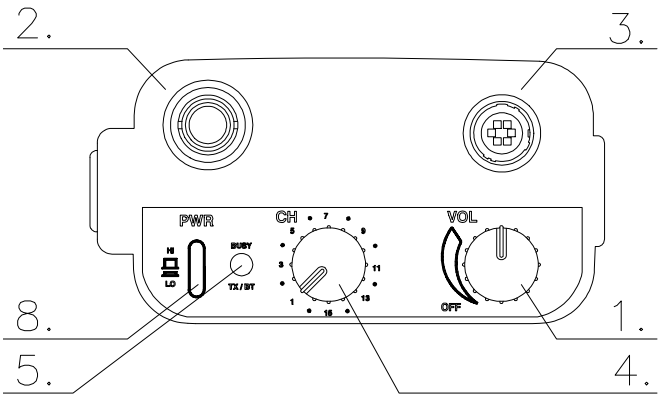
DESCRIPTION OF CONTROLS

The controls, indicators, accessories socket and antenna connections on the VHF and UHF Scanning Handheld Series radios are all located on the top panel. The monitor and PTT buttons are located on the radio chassis left hand side. Figure 1 details the VHF and UHF Scanning Handheld controls, indicators and connections.

TABLE 2-Controls, Indicators And Connections

ITEM:	FUNCTION:
1. ON/OFF Volume Control	Main power switch and volume control. Fully counter clockwise is off position.
2. Antenna Connector	1/4 in UNEF socket.
3. Accessories Connector	Multipurpose socket used to connect to a remote speaker/microphone or VOX unit.
4. Channel Select Switch	Rotary switch, used to select one of 4 or one of 16 channels (maximum) and to engage scanning function.
5. Status Indicator (busy TX/BT)	Tri-colored LED indicator.
6. Monitor Button	When pressed, monitors the chosen channel.
7. Push-To-Talk Button	Push to talk, release to listen.
8. Hi/Low Power Button	Push to change power level (5 watts or 1 watt).
9. Microphone/Speaker	Sound transmission and reception.





CIRCUIT ANALYSIS

The VHF and UHF Scanning Handheld series radios are comprised of two main PCB's (an RF PCB and a Digital PCB). The RF PCB contains the Transmitter and Receiver circuits. The Digital PCB contain the Micro controller and associated digital circuits.

DIGITAL BOARD

IC 411

IC 411 is a digitally-controlled analog switch which internally consist of three single pole, double throw switches. By placing a high (5V) or low (0V) on the control lines which consist 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.

- ***NOTE: On Contact Resistance is around 100 Ohms.***

CTCSS/DCS Decode Circuits

Discriminator audio from Pin 15 CON 402 is fed into IC406A and associated parts, which are the first 2 poles of a 6th order 250 Hz 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 4 db ripple low pass filter when programmed for 250 Hz. 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 top panel of the VHF and UHF Scanning Handheld 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 18(C) of the micro controller (IC409). The 3-bit digital signal is converted to an analog signal by resistors R478, 479 and 480. 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 IC406B and RV403 (sub-audible gain control), the output of IC406B is then fed to the audio mixer circuit.

External MIC/PTT Control Circuit

When the external microphone is connected to the six pin Hiroshi connector on the top panel of the VHF and UHF Scanning Handheld, Pin 4 of the connector is shorted to ground, disabling the internal mic and internal speaker via pin 12 of Con 402 and IC402A. When external PTT is depressed Pin 5 of the connector shorts to ground, which drops the voltage on Pin 1 (mic audio) of the connector, to less than 2V. Pin 1 of the connector is connected to IC405D (Voltage Comparator) via R416, R415, and Pin 11 of CON 4. When pin 13 of IC405D goes below 2V the output of IC405D (Pin 4) goes high (5V) and turns on Q402. Q402's output is in parallel with the internal PTT line, which is connected to IC409 (micro), Pin 24.

Channel Select Circuit

One of 16 channels or 4 channels (depending on VHF and UHF Scanning Handheld model) may be selected using the channel switch on the top panel. The channel switch encodes the channel number selected into a 4-Bit binary code. The binary code plus 1 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 16 channel locations can be a scanning position. Refer To Operators Manual For Further Instructions.***

Battery Low Indicator Circuit

When the battery voltage drops below 7.7VDC, IC405A (Voltage Comparator) turns on Q403. The micro controller disables the transmitter and at the same time enables the red LED and sends an alert tone to warn the user. The battery should be replaced or recharged at this time.

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 (8 x 256) capacity and data is written and read serially.

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 C471. Receive audio is passed to IC410 by Pin 4 of IC411 where sub-audible tones below 250 Hz are removed. Mic audio is also fed into IC410 via IC411 (Pin 4) where sub-audible voice products below 250 Hz are also removed.

Mute (Squelch) Circuit

The mute circuit which is controlled by the output of IC409 (micro) pin 77(386EN) is connected to pin 3 of con402 via R467 which mutes the LM386IC on the RF board. Pin 77 also controls Q408 and IC402B which mutes the audio path to the RF board.

TX Audio and Filter Circuits

The Tx audio from the internal mic (via IC402A, C424) or external mic is fed into IC401D, L401 and into IC411 (Pin 3). The Tx audio is output on Pin 4 (IC411) and into the high pass filter (IC410), where sub-audible voice products are removed. The Tx audio output from IC410 is fed into IC404D&C which with associated parts form a mic amplifier and limiter. The output from Pin 8 IC404C is fed to RV402 (TX Modulation Level Adjust) and fed into IC404A&B with associated parts to form a 3K low pass filter. The output of IC404A (PIN 1) is then fed into the Audio Mixer Circuit.

Analog Ground Supply

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

Audio Mixer and Invertor

IC405B is an audio mixer where audio and sub-audible tones are combined. RV401 is used as a balance control. IC405C is an invertor, which when the appropriate links are opened or installed would adapt the digital board to the appropriate VHF and UHF Scanning Handheld series models.

Alignment Mode Circuit

When the VHF and UHF Scanning Handheld is placed in the alignment mode, Pin 17 of the micro controller is pulled low (0V), disabling IC401D via D403, which mutes the Tx audio path. A square CTCSS tone is sent to Pin 12 (IC411) via Pin 18 of the micro controller. The signal is output on Pin 14 (IC411) to the audio mixer circuit where RV401 is adjusted for encode balance.

RF BOARD

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 from the digital board which has been amplified, pre-emphasized, and limited is applied to the VCO via con 401 PIN 15 and flexible PCB 8 PIN 14.

Transmitter Stage and Harmonic Filter

The power amplifier contains transistors Q1 to Q3, inductor L3 to L9 and capacitors C74 to C86. When in the transmit mode of operation the diode D6 is forward biased enabling the RF signal to pass to the input buffer Q3. The buffered RF signal is further amplified by Q2. The output from Q3 is impedance matched to Q2 by inductor L6 and capacitors C83 to C86. Q1 is the power amplifier. Diode D5 is reversed biased inhibiting the TX signal through the receiver stage. The amplified RF signal passed through the stripline coupler and is fed to the harmonic low pass filter, comprising of L1 to L3 and then to the antenna connector (ANT). The stripline coupler provides a sample of the RF signal for the automatic power control.

Automatic Power Control

The automatic power control contains the stripline coupler, diode D3 and variable resistor VR2, and two transistors Q8 and Q11. Q8 and Q9 form a differential amplifier. The RF signal present in the coupler is rectified by D2, to produce a DC voltage TX 8.5V is also applied to the base of Q8 via the potential divider R7/R8. The different signal at the collector of Q9 is passed to Q10 and Q11 to produce a constant power output to the antenna connector (ANT). VR2 is used to adjust the RF power level.

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
4. Dual Modulus Prescaler

Voltage Controlled Oscillator Module

The module produces carrier frequencies during transmit and local oscillator frequencies during receive. The module also has a power line filter. Transistor Q301 is configured as a power supply ripple filter. Transistor Q301 is configured as a power supply power line filter. The VCO comprises of transistors Q302, Q304 and Q305, varactor VD301, VD302 and trimmer capacitor TC301. These components are figured as a Colpits oscillator. VD301 and VD302 produces a change is frequency with a change in DC voltage and is controlled by the phase detector signal present at the anodes of VD301 and VD302. The local oscillator

signal at the emitter of Q302 is applied to an amplifier Q303. The amplified signal from Q303 drives the output buffers Q302 and Q305. When D6 is forward biased, carrier frequencies at the collector of Q304 pass to the transmitter stage and harmonic filter. When D7 is forward biased local oscillator frequencies at the collector of Q304 pass to the first mixer and the first IF amplifier circuit. RX and TX oscillator frequencies are passed to the dual modulus prescaler. TC301 is used for PLL alignment.

Loop Filter

Transistors Q18 and Q19 and resistors R42 to R47 and capacitors C7 and C101 to C112 form the loop filter. The phase detector from Pin 6 of IC1 is filtered to remove any reference frequency harmonics and then applied to the voltage controlled oscillator module.

PLL Frequency Synthesizer

The PLL frequency synthesizer (IC1) contains an oscillator for the phase/frequency comparator, an out-of-lock detector and a prescaler controller.

Reference Oscillator

The reference oscillator of IC1 along with a 10.25 or 12.8 MHz crystal X1, varactor diode VD13, and the thermistors TH1, TH2 and TH3 produce a temperature compensated 10.25 or 12.8 MHz reference signal at Pin 18 of IC1 respectively.

Programmable Dividers

IC1 has two dividers, a data programmable divider and a hardwired programmable reference divider. Pins 1,2 and 20 are all connected to +8V supply to divide by 2048. Serial frequency data (DATA) is received by the data programmable divider at Pin 12 of IC1 from pin 20 of IC409 (Micro controller) via flexible PCB 8, Pin 10 and CON401, serial frequency data (DATA) is received by the data programmable divider at Pin 12 of IC1 from Pin 23 of IC409 (Micro controller) via flexible PCB 8 Pin 10 and CON 401 Pin 11. The 10.25 or 12.8 MHz frequency at Pin 18 is the reference divider to produce a reference of 5 or 6.25 Khz respectively. The programmable divider frequency (Fv) and the reference frequency (Fr) are fed to the phase detector.

Phase Detector

The phase detector (Pin 6 IC1) produces negative pulses when Fr Fr positive pulses when FvFr. When Fv=Fr and phase is the same the phase detector presents a high impedance at Pin 6. The signal at Pin 6 is applied to the VCO via the loop filter.

Out-of-Lock Detector

The out-of-lock detector produces a high logic level pulses when the loop is out of lock at Pin 9 of IC1. The signals at Pin 9 of IC1 are buffered by Q17 and then integrated by R46 and C53. The product of the integrating circuit is fed to flexible PCB 8 Pin 8.

Prescaler Controller

The prescaler controller via Pin 8 (IC1) sets the prescaler to divide by 128 or 129.

Dual Modulus Prescaler

The prescaler (IC2) divides the VCO frequency by 64 or 65 from signals received from the PLL frequency synthesizer. A low logic level received at Pin 6 of IC2 will divide the VCO frequency at Pin 1 by 128. A high logic level received at Pin 6 of IC2 will divide the VCO frequency at Pin 1 by 129. The divided VCO frequency is passed to the PLL frequency synthesizer via Pin 4.

UHF RECEIVER

The receiver uses dual conversion superheterodyning techniques and 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 receiver RF amplifier contains helical resonators FL1 to FL3 and Q13. FL1 and FL2 are configured as 2-pole band-pass filters. The RF signal passes through the tuned circuit FL1, RF amplifier Q13, FL2, enabling the RF signal at the operating frequency to pass to the first mixer.

First Mixer and First IF Amplifier

FET Q12, transistor Q16, crystal filter XF1, helical resonators FL3 and coils T4 form the First Mixer and First IF Amplifier. The vco local oscillator signal is filtered by FL3. Q12 produces a difference frequency of 21.4 MHz at the drain connection, from the filtered RF signal at the gate connection and the filtered VCO local oscillator signal at the source connection. The 21.4 MHz difference frequency is filtered by the 2-pole crystal filter XF1.The tuned circuit T4 and associated components provide matching of the crystal filter to insure good pass-band response and selectivity. The IF signal is amplified by Q16 and passed to the second mixer, second IF, and FM detector.

Second Mixer, Second IF, FM Detector

A single conversion FM receiver integrated chip, IC3 contains the second mixer, second IF, and FM detector functions. The second local oscillator frequency is determined by the crystal X2 connected to Pin 1 of IC3. The IF signal is received at Pin 16 of difference frequency is applied to the mixer via Pin 16. The output of the second mixer via Pin 3 is applied to a 455KHz band-pass filter, CF1. The output of CF1 is passed to a high gain IF coupled to the adjustable quadrature detector T5. Any detected signal is produced at Pin 9 of IC3 and applied to the Receiver Audio Circuit and the Mute (Squelch) Circuit.

Receiver Audio Circuit

The receiver audio circuit comprises a low pass filter, high pass filter and an audio amplifier on the RF PCB.

Low Pass Filter

The low pass filter is configured from coil L12, capacitor C64 and resistor R39. AF signals from Pin 9 of IC3 are filtered by the low pass filter to remove any components of the 455KHz IF signal. The filtered signal at flexible PCB 7 Pin 14 is passed to the high pass filter on the digital PCB via CON 402 Pin 15.

High Pass Filter

The de-emphasized audio signal from the high pass filter on the digital PCB is fed to the audio amplifier (IC4) on the RF PCB via VR3, R156 and flexible PCB 7 Pin 12.

Audio Amplifier

IC4 is the audio amplifier. The audio signal at flexible PCB 7 Pin 12 is passed to IC4, Pin 3 via variable resistor VR3 (located on the top of the radio). The gain of the amplifier is set by resistor R124 and C145. The amplified audio signal at Pin 5 of IC4 is applied to the internal speaker (SPKR) by flexible PCB 7 Pin

9, CON 401 Pin 10, and CON 408 Pin 1 of the digital PCB. The external speaker connection is via the 6 Pin Hiroshi connector (Pin 3).

Mute (Squelch) Circuit

The squelch circuit switches off the audio power amplifier in the absence of audio signals. The squelch circuit comprises a 50 kHz pass band filter, squelch control (VR201) and a noise detect circuit.

50 kHz Band Pass Filter

The audio signal from Pin 9 of IC3 is filtered by the 50 khz bandpass filter formed by L13, L14, C104, and C105. The noise in the IF pass band is accepted; frequencies in the voice frequency band are rejected. Any noise present at the output of the filter is applied to the noise detect circuit.

Noise Detect Circuit (Squelch Board)

The noise detect circuit in conjunction with IC3 consists of transistors Q201 and Q202, thermistor TH201 and diode D204. Any noise signal present is applied to Pin 2 of the Sq Board from Pin 11 of IC3. The signal is amplified by Q201, rectified by D201 then buffered by Q202. The buffered signal is applied to VR201 for adjustment of squelch sensitivity and is applied to the squelch trigger of IC3 Pin 12 via resistor R149. The squelch trigger output (pin 13, IC3) is applied to the micro controller on the Digital PCB via Pin 1 on the flexible PCB 8. WHen noise is present, the voltage at Pin 12 of IC3 exceeds 0.7V, the squelch trigger output is 0 V (logic 0) muting the receiver audio circuit. When no noise is present, the voltage at Pin 12 of IC3 is less than 0.7 V and pin 13 of IC3 is at 5V (logic 1), unmuting the receiver audio circuit. Resistor R119 is used to provide hysteresis of 3 to 6 dB.

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 board which has been amplified, pre-emphasized, and limited is applied to the VCO via con 401 Pin 15 and flexible PCB 8 Pin 14.

Transmitter Stage and Harmonic Filter

The power amplifier contains transistors Q1 to Q4, inductors L3 to L9 and capacitors C3 to C6, C12, C13 and C17. When in the transmit mode of operation the diode D1 is forward biased enabling the RF signal to pass to the input buffer Q1. The buffered RF signal is further amplified by Q2 and power amplifier driver transistor Q3 (class c). C5 couples Q1 to Q2. L3, C6 and L4 are configured to provide filtering with impedance matching. The output from Q3 is impedance matched by C12, C13, L6 and C4 and passed to the power amplifier Q4. Diode D3 is reversed biased inhibiting the TX signal through the receiver stage. The amplified RF signal passes through the stripline coupler and is fed to the harmonic low pass filter, comprising L10 and L11 and then to the antenna connector (ANT). The coupler provides a sample of the RF signal for the automatic power control.

Automatic Power Control

The automatic power control contains the stripline coupler, diode D2 and variable resistor VR1 two comparators (IC6A and IC6B) and transistors Q6 and Q7. The RF signal present in the coupler is rectified by D2, to produce a dc voltage that is passed to VR1. The voltage TX (5v) is applied to Pin 2 of IC6A via a potential divider. The voltage TX (5v) is applied to Pin 6 of IC6A via a potential divider. IC6B determines the RF power level by producing a difference signal. The difference signal is passed to Q7 and Q6 to produce a constant power output to the antenna connector (ANT). VR1 is used to adjust the RF power level.

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
4. Prescaler

RX and TX Voltage Controlled Oscillator Module

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

RX and TX Power Line Filters

Transistors Q301 and Q303 are configured as TX 5v (module, Pin 8) and RX 5v (module, Pin 5) power supply ripple filters respectively.

RX VCO

The RX VCO comprises JFET Q304, coil L307, and varactor VD302 and is configured as a Colpits oscillator. VD302 produces a change in frequency with a change in DC voltage and is controlled by the phase detector signal (via Pin 2) present at the anode. The local oscillator signal at the drain of Q304 is applied to Pin 7 of the module when diode D1 is reverse biased and D7 is forward biased. L307 is used for PLL alignment.

TX VCO

The TX VCO comprises JFET Q302, coil L302, and varactor VD301 and is configured as a colpits oscillator. The AF signal at flexible PCB 8 pin 14 is applied to the anode of VD 301 via Pin 3 of the module. The control voltage from the loop filter is applied to the drain of Q304 (module Pin 7) is passed to the power amplifier and harmonic filter via the buffer amplifier (Q1). When diode D1 is forward biased and D7 is reversed biased. L302 is used for PLL alignment.

Loop Filter

Transistors Q101 and Q102 and resistors R101 to R106 and capacitors C101 to C107 from the loop filter. The phase detector from Pin 6 of IC1 is filtered to remove any reference frequency harmonics and applied to the voltage controlled oscillator module Pin 2.

PLL Frequency Synthesizer

The PLL frequency synthesizer (IC1) contains an oscillator for the reference divider, a programmable divider, a phase/frequency comparator, an out-of-lock detector and a prescaler controller.

Reference Oscillator

The reference oscillator of IC1 along with a 10.25 or 12.8MHz crystal (X1), varactor diode VD1, and the thermistors TH1, TH2 and TH3 produce a temperature compensated 10.25 or 12.8MHz reference

Programmable Dividers

IC1 has two dividers, a data programmable divider and a hardwired programmable reference divider. Pins 1,2 and 20 are all connected to +5v supply to divide by 2048. Serial frequency data (DATA) is received by the data programmable divider at Pin 12 of IC1 from Pin 20 of IC409 (Micro controller) via flexible PCB 8, Pin 10 and CON 401. Serial frequency data (DATA) is received by the data programmable divider at Pin 12 of IC1 from Pin 20 of IC409 (Micro controller) via flexible PCB Pin 10 and CON 401, Pin 11. The prescaler divided output frequency at Pin 10 of IC1 is further divided by the programmable divider. The 10.25 or 12.8MHz frequency at Pin 18 is the reference divider to produce a reference frequency of 5 or 6.25KHz respectively. The programmable divided frequency (Fv) and the reference frequency (Fr) are fed to the phase detector.

Phase Detector

The phase detector (Pin 6) produces negative pulses when Fv positive pulses when FvFr. When Fv=Fr and phase is the same, the phase detector presents a high impedance at Pin 6. The signal at Pin 6 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, or low logic level pulses when the loop is out-of-lock at Pin 9 of IC1. The signals at Pin 9 of IC1 are buffered by Q105 and then integrated by R116 and C124. The product of the integrating circuit is fed to flexible PCB 8, Pin 8.

Prescaler Controller

The prescaler controller via 8 (IC1) sets the prescaler to divide by 64 or 65.

Prescaler

The prescaler (IC2) divides the VCO frequency 64 or 65 from signals received from the PLL frequency synthesizer. A low logic received at Pin 1 of IC2 will divide the VCO frequency at Pin 5 by 64. A high logic level received at Pin 1 IC2 will divide the VCO frequency at Pin 5 by 65. The divided VCO frequency is passed to the PLL frequency synthesizer via Pins 2 and 3.

VHF RECEIVER

The receiver used dual conversion superheterodyning techniques and 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 receiver RF amplifier contains coils T1 to T4 and MOSFET Q11. Coils T1, T2, T3 and T4 are configured as 2-pole band-pass filters. The RF signal passed through the tuned circuit T1 and T2, RF amplifier Q11, T3 and T4 enabling the RF signal at the operating frequency to pass to the first mixer.

First Mixer and First IF Amplifier

FET Q9, Q10 and Q106, crystal filter XF1 and coils T5 to T7 form the First Mixer and First IF Amplifier. The VCO local oscillator signal, via buffer transistor Q9, is filtered by T5 and T6. Q10 produces a difference frequency of 21.4 MHz at the drain connection, from the filtered RF signal at the gate connection and the filtered VCO local oscillator signal at the source connection. The 21.4 MHz difference frequency is filtered by the 2-pole crystal filter XF1. The tuned circuit T7 and associated components provide matching of the crystal filter to insure good pass-band response and selectivity. The IF signal is amplified by Q106 and passed to the second mixer, second IF, and FM detector.

Second Mixer, Second If And Fm Detector

A single conversion FM receiver integrated chip, IC3 contains the second mixer, second IF, and FM detector functions. The second local oscillator frequency is determined by the crystal X2 connected to Pin 1 of IC3. The IF signal is received at Pin 16 of IC3 via R117 and coupling capacitor C126. The second IF frequency of 455Khz is produced when the difference 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, CF1. The output of CF1 is passed to a high gain IF amplifier (limiter) in IC3 via Pin 5. The amplified signal is coupled to the adjustable quadrature detector T8. Any detected signal is produced at Pin 9 of IC3 and applied to the Receiver Audio Circuit and the Mute (Squelch) Circuit.

Receiver Audio Circuit

The receiver audio circuit comprises a low pass filter, high pass filter and an audio amplifier on the RF PCB.

Low Pass Filter

The low pass filter is configured from coil L21, capacitor C138 and resistor R127. AF signals from Pin 9 of IC3 are filtered by the low pass filter to remove any components of the 455KHz IF signal. The filtered signal at flexible PCB 7 Pin 14 is passed to the high pass filter on the digital PCB via CON 402 Pin 15.

High Pass Filter

The de-emphasized audio signal from the high pass filter on the digital PCB is fed to the audio amplifier (IC4) on the RF PCB via VR3, R156 and flexible PCB 7 Pin 12.

Audio Amplifier

IC4 is the audio amplifier. The audio signal at flexible PCB 7 Pin 12 is passed to IC4, Pin 3 via variable resistor VR153 (located on the top of the radio). The gain of the amplifier is set by resistor R124 and C145. The amplified audio signal at Pin 5 of IC4 is applied to the internal speaker (SPKR) by flexible PCB 7 Pin 9, CON 401 Pin 10, and CON 408 Pin 1 of the digital PCB. The external speaker connection is via the 6 Pin Hiroshi connector (Pin 3).

Mute (Squelch) Circuit

The squelch circuit switches off the audio power amplifier in the absence of audio signals. The squelch circuit comprises a 50 kHz pass band filter, squelch control (VR2) and a noise detect circuit.

50kHz Band Pass Filter

The audio signal from Pin 9 of IC3 is filtered by the 50 kHz bandpass filter formed by L22, L23, C135, C136 and C137. The noise in the IF pass band is accepted; frequencies in the voice frequency band are rejected. Any noise present at the output of the filter is applied to the noise detect circuit via VR2. VR2 is used to adjust the squelch sensitivity.

Noise Detect Circuit (Squelch Board)

The noise detect circuit in conjunction with IC3 consists of transistors Q201 and Q202, thermistor TH201 and diode D201. Any noise signal present is applied to Pin 2 of the SQ Board from Pin 11 of IC3. The signal is amplified by Q202, rectified by D201 then buffered by Q201. The buffered signal at Pin 1 of the SQ board is appled to the squelch trigger of IC3 Pin 12 via resistor R201. The squelch trigger output (Pin 13, IC3) is applied to the micro controller on the Digital PCB via Pin 1 on the flexible PCB 8. When noise is present, the voltage at Pin 12 of IC3 exceeds 0.7V, the squelch trigger output is 0V (logic 0) muting the receiver audio circuit. When no noise is present, the voltage at Pin 12 of IC3 is less than 0.7 V and Pin 13 of IC3 is at 5V (logic 1), unmuting the receiver audio circuit. Resistor R119 is used to provide hystereis of 3 to 6 dB.

Maintenance And Repair

General

UHF

The UHF handportable radios covers the UHF band from 420 to 520 MHz. The radios have been factory aligned for operation within the center portion of one of five frequency bands. The bands covered are:

Band A	400 MHz to 420 MHz
Band B	420 MHz to 440 MHz
Band C	450 MHz to 470 MHz
Band D	470 MHz to 490 MHz
Band E	490 MHz to 520 MHz

VHF

The VHF handportable radios covers the VHF band from 136 to 174 MHz. The radios have been factory aligned for operation within the center portion of one of three frequency bands. The bands covered are:

L Band	136 MHz to 150 MHz
M Band.	148 MHz to 162 MHz
H Band	160 MHz to 174 MHz

Any repairs or adjustments should only be made by or under the supervision of a qualified radio-telephone service technician.

REMOVING AND REPLACING

When removing or replacing use the Exploded View and Parts List in conjunction with the following procedures.

Removing And Replacing The Battery

To remove the battery:

1. Holding the radio chassis in one hand, press and hold the battery release catch.
2. Using the other hand slide the battery away from the battery release catch and off the battery guide rail.

To replace the Battery:

1. With the slides of the battery positioned in line with the radio battery rail guides ,slide the battery into position until a click is heard.

Removing And Replacing The Bezel

To remove the bezel:

1. Remove the battery.
2. Using a phillips head screw driver (No. 0) remove the two screw located on the battery rail guide.
3. Holding the bezel firmly with thumb and forefinger, gently apply pressure towards the top panel and lift the bezel from the radio chassis.
4. Unplug the speaker and microphone lead from the speaker and microphone connector on the control PCB.

To replace the bezel:

1. Ensure all gaskets are not broken and are in position.
2. Place the lip at the top end of the bezel into the gasket recess of the top panel.
3. Press the bezel firmly into position.
4. Using a phillips head screw driver (No. 0) replace the two screws located on the battery rail guide.

Removing And Replacing The Microphone And Speaker

To remove the microphone and speaker:

1. Remove the bezel.
2. Unscrew the two speaker mounting screws.
3. Gently pry the rubber microphone holder from the microphone slot on the bezel.
4. Remove the speaker and microphone.

To replace the speaker and microphone reverse the procedures given in steps 4 to 2.

Removing and Replacing the Control PCB

To remove the control PCB:

1. Remove the Bezel.
2. Disconnect the three flexible PCBs from the appropriate connectors.

3. Remove the three PCB mounting screws.
4. Gently lift the control PCB from the radio chassis.

To fit a control PCB reverse the procedures given in steps 4 to 2.

Removing and Replacing the PCB Shield Plate

To remove the PCB shield plate:

1. Remove the Bezel and the control PCB.
2. Using a small phillips head screw driver remove the screw located on the square black insulating pad and the screw fixing the PCB shield to the top panel PCB.
3. Gently lift the PCB shield from the radio chassis.

To replace the PCB shield plate reverse the procedures given in steps 3 to 2.

Removing and Replacing the RF PCB

1. Remove the Bezel, control PCB and the PCB shield plate.
2. Remove the four hexagonal mounting pillars.
3. Unsolder the lead of the fuse connected to the positive terminal of the battery connector.
4. Locate and remove the three TX transistor heatsink securing screws inside the radio chassis.
5. On the outside of the radio chassis remove the securing screw by the monitor and PTT switches and the securing screw on the opposite side.
6. Holding the top panel, gently pull the radio chassis away from the top panel.

To fit a RF PCB reverse the procedures given in steps 6 to 2.

Removing and Replacing the Daughter Boards

The daughter boards are soldered onto the main PCBs. To remove control or TX/RX daughter boards:

1. Remove the control or RF board as required.
2. Unsolder the daughter board on the solderside of the appropriate main PCB.

To replace a daughter board:

1. Ensure that the main PCB and daughter board are mechanically clean.
2. Insert the daughter board in the required position.
3. Ensure the daughter board is properly seated in the main PCB.
4. Solder the daughter board into position.

CAUTION: To avoid damage to the main PCB soldering must be accomplished quickly.

Removing and Replacing SMD Components

The removing and replacing of SMD components and any repairs should only be made by or under the supervision of a qualified radiotelephone technician.

Removing SMD Components

1. Unsolder the component by apply the soldering iron bit to one pad and using a solder sucker to remove the solder. Apply the bit of the soldering iron to the other pad and lift the component from the board.

Replacing SMD Components

With the PCB appropriately held in the best position for repair:

1. Ensure:

   (a) That excess solder and old glue is removed.

   (b) The pads on the PCB and component solder pads are mechanically clean.

2. Centrally locate the component between the PCB pads.
3. Using the soldering iron apply sufficient heat to the SMD component pads and the corresponding PCB pads to set the component in position.

CAUTIONS:

1. Avoid contact of the soldering iron bit with the body of the replacement SMD component.
2. Avoid prolonged application of heat to the pads of the replacement SMD component as the pads of the SMD component and/or characteristics of the SMD component may be damaged.
3. Do not use SMD components that do not solder properly as the pads of the SMD component may be chemically contaminated. They may not function as required or the working life of the component may be reduced.

PERFORMANCE TEST

The information detailed in this section covers the use of discrete test equipment given in the following alignment and performance test procedures. The parameters detailed should be used for discrete test equipment and test set use.

Test Equipment Required

One of the following lists of test equipment is suggested to carry out the test and alignment procedures:

TABLE 7 - TEST EQUIPMENT

Discrete Test Equipment
1. Volt, Ohm and Amp Meter, AVO 8
2. Power Meter, Bird 43
3. Power Supply, Farnell LS30-10
4. Oscilloscope, 20 MHz dual beam (HAMEG HM203 5)
5. Frequency Counter, Farnell 600 MHz
6. AF Signal Generator
7. RF Signal Generator, Marconi 2018A
8. Sinadder
9. Modulation Meter
10. Power Meter
11. Spectrum Analyzer (optional)
12. Coupler
13. 1/4 UNEF to BNC Adapter, Part No 4207999

Test Set
1. Test Set, Marconi TF 2955
2. Volt Ohm and Amp Meter, AVO 8
3. Power Supply, Farnell LS30-10

Test Equipment Connection

Discrete Test Equipment connection and Test Set connection is shown in Figure 7.

Power Supply Connections

Connect the power supply leads as follows:

1. Ensure the power supply is switched off.
2. Positive lead of the power supply to the fuse connected at the 10.8V terminal connection.
3. Negative lead of the power supply radio chassis.

Audio and PTT Connections

The audio and PTT connections are via the 6-pin accessories socket on the top panel. The audio and PTT test lead wire connections to the accessories socket are detailed in the following table.

TABLE 8 - AUDIO AND PTT CONNECTIONS

Accessories Socket Pinouts	Function
1	Transmitter Audio Microphone Load, 600 Ohm Impedance
2	Not used
3	Receiver audio speaker load, 8 Ohm impedance
4	Ground
5	PTT
6	Ground

Prerequisites

For the following tests, signal generator modulation level should be set to Average System Deviation, i.e. 60% of maximum system deviation. The level should therefore, be set to:

1.5 kHz for 12.5 kHz

2.4 kHz for 20 kHz

3.0 kHz for 25 kHz

If the radio has had components installed to change the channel spacing and/or operating band from those installed at the factory, ensure that the correct components are installed in the receiver and transmitter stages prior to testing. Refer to the appropriate Electrical Parts List if necessary.

EEPROM Programming for Alignment

Ensure that the EEPROM has the required customer parameters programmed, otherwise ensure that a test EEPROM is programmed with at least the lowest, middle and highest RX/TX frequencies prior to aligning the VHF and UHF Scanning Handheld Series radio.

When CTCSS and DCS performance checks are also required ensure that the lowest, middle and highest RX/TX frequencies include:

Lowest RX/TX frequency channel	67.0 Hz CTCSS
Middle RX/TX frequency channel	DCS Code 072
Highest RX/TX frequency channel	250.3 Hz CTCSS

The middle RX/TX frequencies should be halfway between the lowest and the highest frequencies. The full CTCSS and DCS frequency codes are given in the following Table.

TABLE 9 - STANDARD CTCSS TONES

NO.	FREQ. (HZ)	NO.	FREQ. (HZ)	NO.	FREQ. (HZ)	NO.	FREQ. (HZ)
01	67.0	11	97.4	21	136.5	31	192.8
02	71.9	12	100.0	22	141.3	32	203.5
03	74.4	13	103.5	23	146.2	33	210.7
04	77.0	14	107.2	24	151.4	34	218.1
05	79.7	15	110.9	25	156.7	35	225.7
06	82.5	16	114.8	26	162.2	36	233.6
07	85.4	17	118.8	27	167.9	37	241.8
08	88.5	18	123.0	28	173.8	38	250.3
09	91.5	19	127.3	29	179.9		
10	94.8	20	131.8	30	186.2		

TABLE 10 - STANDARD DCS TONES

NO.	CODE/ INVERT	NO.	CODE/ INVERT	NO.	CODE/ INVERT	NO.	CODE/ INVERT
1	023/047	22	143/412	43	315/423	64	532/343
2	025/244	23	152/115	44	331/465	65	546/132
3	026/464	24	155/731	45	343/532	66	
4	031/627	25	156/265	46	346/612	67	606/531
5	032/051	26	162/503	47	351/243	68	612/346
6	043/445	27	165/251	48	364/131	69	624/632
7	047/023	28	172/036	49	365/125	70	627/031
8	051/032	29	174/074	50	371/734	71	631/606
9	054/413	30	205/263	51	411/226	72	632/624
10	065/271	31	223/134	52	412/143	73	654/743
11	071/306	32	226/411	53	413/054	74	662/466
12	072/245	33	243/351	54	423/315	75	664/311
13	073/506	34	244/025	55	431/723	76	703/565
14	074/174	35	245/072	56	432/516	77	712/114
15	114/712	36	251/165	57	445/043	78	723/431
16	115/152	37	261/732	58	464/026	79	731/155
17	116/754	38	263/205	59	465/331	80	732/261
18	125/365	39	265/156	60	466/662	81	734/371
19	131/364	40	271/065	61	503/162	82	743/654
20	132/546	41	306/071	62	506/073	83	754/116
21	134/223	42	311/664	63	516/432		

TRANSMITTER PERFORMANCE TESTS

Power Output

1. Set the power supply voltage to 10.8 V dc and monitor the power supply voltage during transmit.
2. Set the PTT switch to the on position and check and record the output power. The nominal outputs are 1W or 5W.
3. Reduce the power supply voltage to 7.9 V DC and check that the power output is above 65% of the recorded output power.
4. Set the PTT switch to the off position.

Peak Deviation

1. Using the channel switch on the radio select the channel with lowest TX frequency.
2. Set the PTT switch to the off position and check and record the output power. The nominal outputs are 1W or 5W.
3. Reduce the power supply voltage to 7.9 V DC and check that the power output is above 65% of the recorded output power.
4. Set the PTT switch to the off position and observe the oscilloscope display for a noise free 1 kHz audio tone.
5. Set the AF signal generator output level to 3 kHz Deviation and sweep 300 Hz to 3 kHz and record the peak deviation.
6. Check the peak deviation for appropriate channel spacing as follows:

   For 12.5 kHz channel spacing, peak deviation is not greater than 2.5 kHz.

   For 20 kHz channel spacing, peak deviation is not greater than 4 kHz.

   For 25 kHz channel spacing, peak deviation is not greater than 5 kHz.

7. Set the PTT switch to the off position.
8. Using the channel switch select the channel with the highest TX frequency and repeat steps 3 to 7.

Spectrum Test

It may be necessary to notch the fundamental signal during this test.

1. Connect a spectrum analyzer and RF power meter to the antenna (ANT) socket, refer to Figure 7.
2. Set the PTT switch to the on position. Observe the output spectrum on the spectrum analyzer.
3. All spurious signals and harmonics should be below -36 dBm.
4. Set the PTT switch to the off position.

RECEIVER PERFORMANCE TEST

SINAD or noise quieting sensitivity performance test may be used to test the sensitivity of the receiver. Both are listed below.

SINAD Sensitivity

1. Connect the RF signal generator to the coupler.
2. Set the RF signal generator to the receive frequency of current channel on the channel switch.
3. Connect the leads of the SINAD meter the speaker via the adapter socket on the top panel.
4. Press the monitor socket and set the volume control to mid-range.
5. Set the deviation to 3 kHz deviation.
6. Set the AF generator to 1 kHz.
7. Adjust the RF signal generator level until the SINAD Meter reads 12 dB.
8. Check that the signal generator RF level is less than 0.35 μ V.

Noise Quieting Sensitivity

1. Disconnect the signal generator from the radio.
2. Set the audio power meter to volts and connect the audio power meter to the speaker terminals.
3. Press and hold the monitor button.
4. Connect the signal generator to the radio.
5. Adjust the VOLUME control to obtain a noise reading of 1 V RMS.
6. Set the deviation to 3 kHz.
7. Set the AF generator to 1 kHz.
8. Adjust the signal generator RF level for a noise reading on the meter of 0.1 volt RMS. This is the 20 dB noise quieting point. Check that the RF level is less than 0.5 μ V.

Squelch Sensitivity

1. Set the RF signal generator to the receive frequency of the channel indicated.
2. Set the deviation to 3 kHz deviation.
3. Set the AF generator to 1 kHz.
4. Switch off the RF signal generator and ensure that no audio is heard (received).

Audio Output

1. Set the RF signal generator to 1 mV and the deviation to 3 kHz.
2. Set the AF generator to 1 kHz.
3. Set the power voltmeter to ac volts.
4. Connect the power voltmeter to the accessories socket.
5. Adjust the volume control of the radio under test to fully clockwise.
6. The meter should indicate 2.0 V or greater, the power meter should read 500 mW or greater.

PROGRAMMING

Refer to programming manual TQ3375 whem programming the radio. Programming cable TQ3376 is required to interconnect the radio and PC Programmer.

Alignment Procedures

- ***NOTE: All Alignment Procedues are for 25 kHz Bandwidth. Refer to Specifications for other Bandwidths.***

UHF ALIGNMENT

PLL Alignment

If the PLL is out of lock an audible warning will be heard and the top panel red LED will flash.

1. Connect an RF power meter to the ANT socket.
2. Using the channel switch, select 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 TC301, set the voltage measured at TP1 to 6.0 (± 0.05) volts.
6. Set the PTT switch to receive.
7. Using the channel switch, select channel with the lowest receive frequency.
8. Adjust VR201 to unmute the squelch.

   - ***Note: If the power save parameter is programmed and the squelch is closed (muted), there will be a periodic voltage change at TP1 unless step 8 above is performed. If the power save mode has not been selected in programming, it is not necessary to perform step 8.***

9. 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 to far below the highest Tx frequency.

   - ***NOTE: Any transmit frequency between 450 MHz and 470 MHz can be programmed and used, however the highest transmit frequency can typically be only 8 MHz above the lowest receive frequency.***

10. If step 3 was performed, readjust the squelch setting as described under Squelch Adjustment.

Receiver Alignment RF

1. Connect to the radio an RF signal generator to the ANT socket via an adapted and a SINAD meter to the accessories socket.
2. On the TX/RX PCB adjust VR201 to the fully counterclockwise position.
3. Adjust the VOLUME control to the mid position.
4. Using the channel switch select the programmed middle receive frequency.
5. Set the RF signal generator to the receive channel frequency.
6. Set the audio frequency to 1 kHz at 3K Deviation.
7. Adjust the RF output voltage level of the RF signal generator until the 1 kHz signal is heard.

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

8. Adjust FL3 for an improvement in SINAD.

9. Adjust the RF output voltage level of the RF signal generator keeping the SINAD Meter readings between 6 dB and 12 dB.
10. Adjust FL2 for an improvement in SINAD.
11. Adjust the RF output voltage level of the RF signal generator keeping the SINAD Meter readings between 6 dB and 12 dB.
12. Adjust FL1 and check for an RF voltage signal level of .35 µ V and a SINAD meter reading of 12 dB or greater.
13. Select the Highest Receive Frequency and check for a SINAD meter reading of 12 dB or greater, at .35 uV.
14. Select the Lowest Receive Frequency and check for a SINAD meter reading of 12 dB or greater, at .35 uV.

- ***NOTE: It may require switching between the Highest and Lowest Receive Frequency, and adjusting the receiver to achieve a balance (there may be some degradation in actual receiver performance if a bandwidth of more than 8 MHz is used).***

Discriminator Tuning

1. Set the RF level to 10 mV.
2. Adjust T5 for a maximum audio output and on the oscilloscope monitor the sinewave distortion.
3. Adjust T4 for lowest distortion, this is normally less than 3%.

Squelch Adjustment

1. Set the RF signal generator to the receiver frequency. Set the AF signal to 1 kHz at 3K deviation.
2. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.
3. Adjust the RF signal to the level desired for squelch sensitivity. Monitor SINAD, this is usually 8 dB to 12 dB SINAD.
4. On the TX/RX board adjust VR201 until the squelch is just unmuted (open).
5. Switch off the RF generator (squelch should close).
6. Switch on the RF generator. Squelch should open at the SINAD point where VR201 was adjusted.

7. Disconnect the test equipment.

VHF ALIGNMENT

PLL Alignment

If the PLL is out of lock an audible warning will be heard and the top panel red LED will flash.

1. Connect an RF power meter to the ANT socket.
2. Using the channel switch, select 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.

- ***NOTE: The transmitter operational bandwidth of this radio is typically 8 MHz. A transmitter frequency range of more than 8 MHz may be programmed and used, if the voltage specification in step 14 is met.***

5. Adjusting L302, set the voltage measured at TP1 to 3.5 Volts (± 0.1).
6. Set the PTT switch to receive.
7. Using the channel switch, select channel with lowest transmit frequency.
8. Set the PTT switch to transmit.
9. 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.
10. Set the PTT switch to receive.
11. Using the channel switch, select channel with the highest receive frequency.
12. Adjust VR2 to unmute the squelch.

- ***Note: If the power save parameter is programmed and the squelch is closed (muted), there will be a periodic voltage change at TP1 unless step 12 above is performed. If the power save mode has not been selected in programming, it is not necessary to perform step 12.***

13. Adjusting L307, set the voltage measured at TP1 to 3.5 volts (± 0.1).

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

- ***NOTE: The receiver operational bandwidth of this radio is typically 7 MHz. A receiver frequency range of more than 7 MHz may be programmed and used, if the voltage specification in step 7 is met. There may be some degradation in actual receiver performance if a bandwidth of more than 7 MHz is used.***

15. At TP1 measure and check that the voltage is above 1.2 volts . If the voltage is below 1.2 volts the receive frequency programmed is too high for the operating bandwidth of the radio.
16. If step 12 was performed, readjust the squelch setting as described under Squelch Adjustment.

RF Tuning

1. Connect to the radio an RF signal generator to the ANT socket via an adapter and a SINAD meter to the accessories socket.
2. On the TX/RX PCB adjust VR2 to the fully counterclockwise position.
3. Adjust the VOLUME control to the mid position.
4. Using the channel switch select the programmed Middle Receive Frequency.
5. Set the RF signal generator to the receive channel frequency.
6. Set the audio frequency to 1 kHz at 3K deviation.
7. Adjust the RF output voltage level of the RF signal generator until the 1 kHz signal is heard.

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

8. Adjust T5 and T6 for an improvement in SINAD.
9. Adjust the RF output voltage level of the RF signal generator keeping the SINAD Meter readings between 6 dB and 12 dB.

10. Adjust T4 and T3 for an improvement in SINAD.
11. Adjust the RF output voltage level of the RF signal generator keeping the SINAD Meter readings between 6 dB and 12 dB.
12. Adjust T2 and T1 and check for an RF voltage signal level of 0.35 µ V and a SINAD meter reading of 12 dB or greater.
13. Select the Highest Receive Frequency and check for a SINAD meter reading of 12 dB or greater, at .35 uV.
14. Select the Lowest Receive Frequency and check for a SINAD meter reading of 12 dB or greater, at .35 uV.

- ***NOTE: It may require switching between the Highest and Lowest Receive Frequency, and adjusting the receiver to achieve a balance (there may be some degradation in actual receiver performance if a bandwidth of more than 7 MHz is used).***

Discriminator Tuning

1. Set the RF level to 10 mV.
2. Adjust T8 for a maximum audio output, and on the oscilloscope monitor the sinewave distortion.
3. Adjust T7for lowest distortion, this is normally less than 3%.

Squelch Adjustment

1. Set the RF signal generator to the receiver frequency. Set the AF signal to 1 kHz at 3K deviation.
2. Adjust the RF output level of the RF signal generator until the 1 kHz signal is heard.
3. Adjust the RF signal to the level desired for squelch sensitivity. Monitor SINAD, this is usually 8 dB to 12 dB SINAD.
4. On the TX/RX board adjust VR2 until the squelch is just unmuted (open).
5. Switch off the RF generator (squelch should close).
6. Switch on the RF Generator. Squelch should open at the SINAD point where VR2 was adjusted.
7. Disconnect the test equipment.

Automatic Power Adjustment

Transmit periods longer than 5 minutes are to be avoided.

1. Using the channel switch, select the middle transmit frequency channel.
2. Set the PTT switch to the On position
3. Adjust the variable resistor to give the appropriate transmit power.

VR1 in the VHF

VR2 in the UHF

4. Record the transmit power set.
5. Set the PTT switch to the OFF position.

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 VHF and UHF Scanning Handheld with tone 67.0 Hz on one channel and tone 250.3 Hz on another channel.
2. Connect a power meter and modulation meter to the radio.
3. Adjust RV401 to the center of its adjustment.
4. Depress the PTT switch.

- ***NOTE: Release PTT button when changing channels.***

5. Select the channel with tone 250.3 Hz and the channel with tone 67 Hz. Note the level when each occur. If necessary, adjust RV401 until a balance occurs between tone 250.3 Hz and tone 67 Hz.

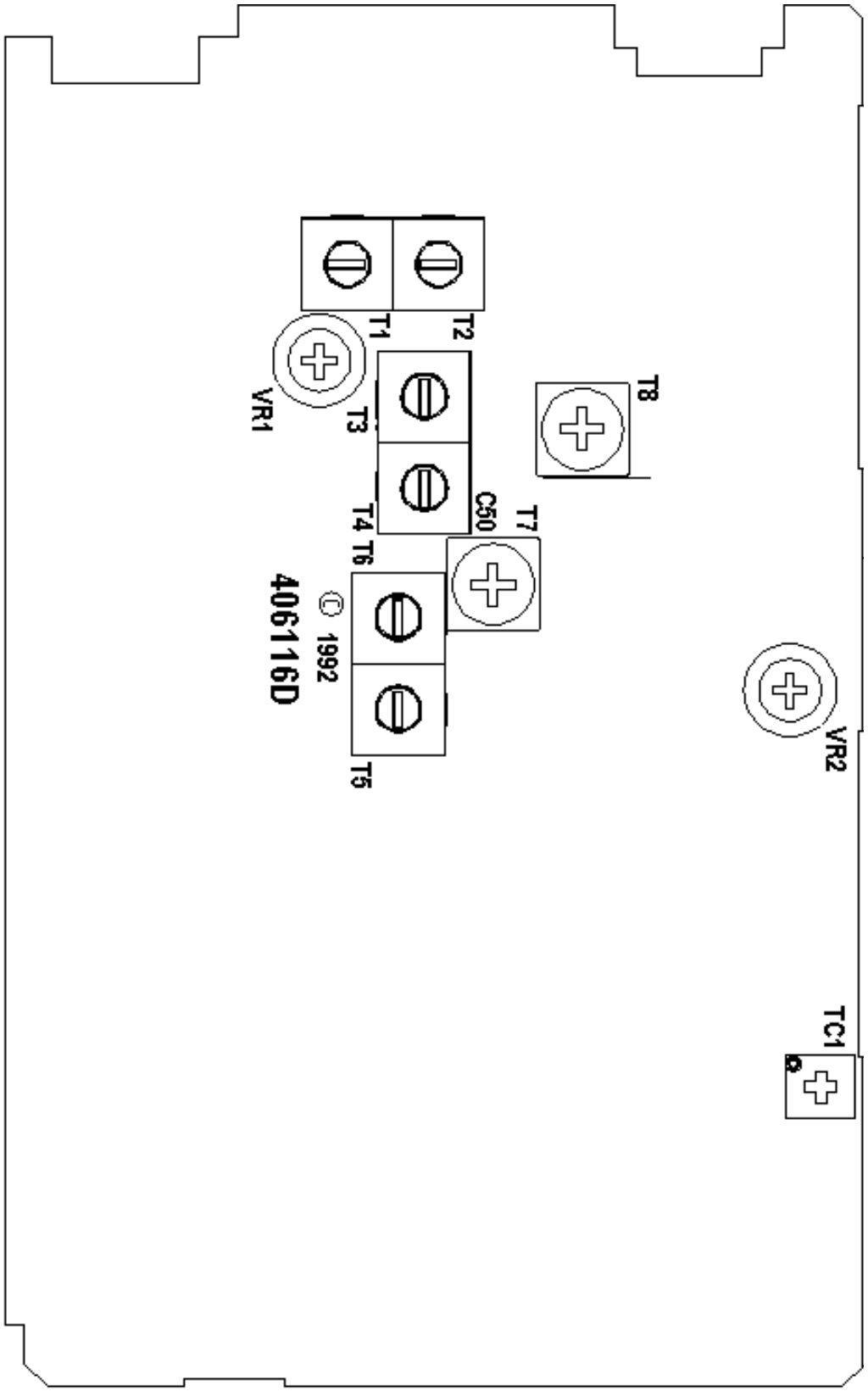
- ***NOTE: This adjustment also sets DCS balance even if a DCS tone is not programmed at this time.***

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

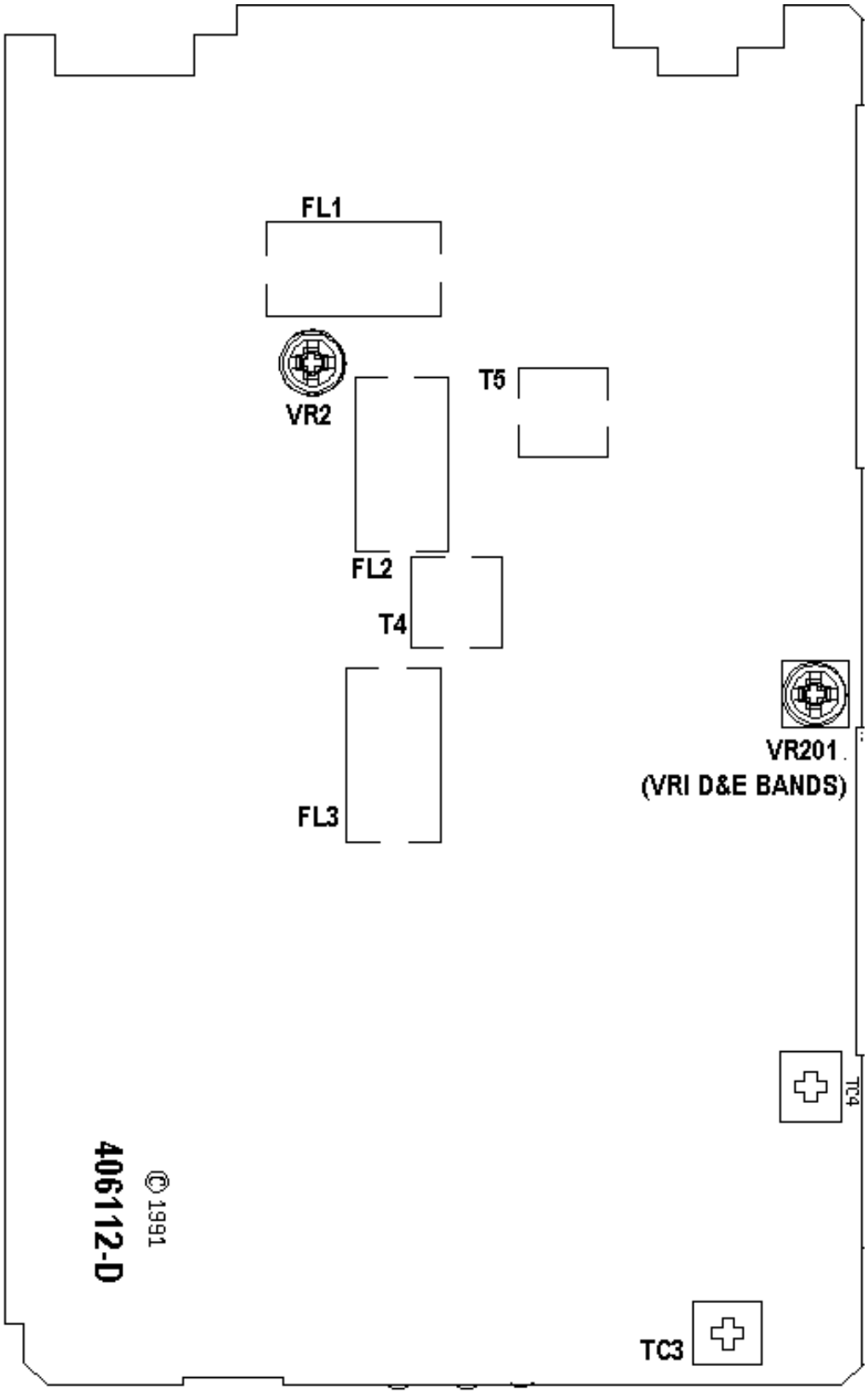
Modulation Deviation Adjustment

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 60 mV and the audio frequency to 1 kHz.
4. Using the channel switch select the highest transmit channel that does not have CTCSS ot DCS programmed.
5. Press and hold the PTT switch.
6. Adjust RV402 for 90% (4.5k) maximum system deviation.
7. Using 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 3.8 k. If the deviation is below 3.8k adjust RV402 to 3.8k, return to highest transmit channel and verify deviation does not exceed 5k.
10. At channel that highest deviation is found sweep the audio frequency between 300 kHz and 3 kHz. Adjust RV402 to ensure deviation is below peak system deviation at all frequencies.
11. Disconnect the AF generator and set the PTT switch to the off position.

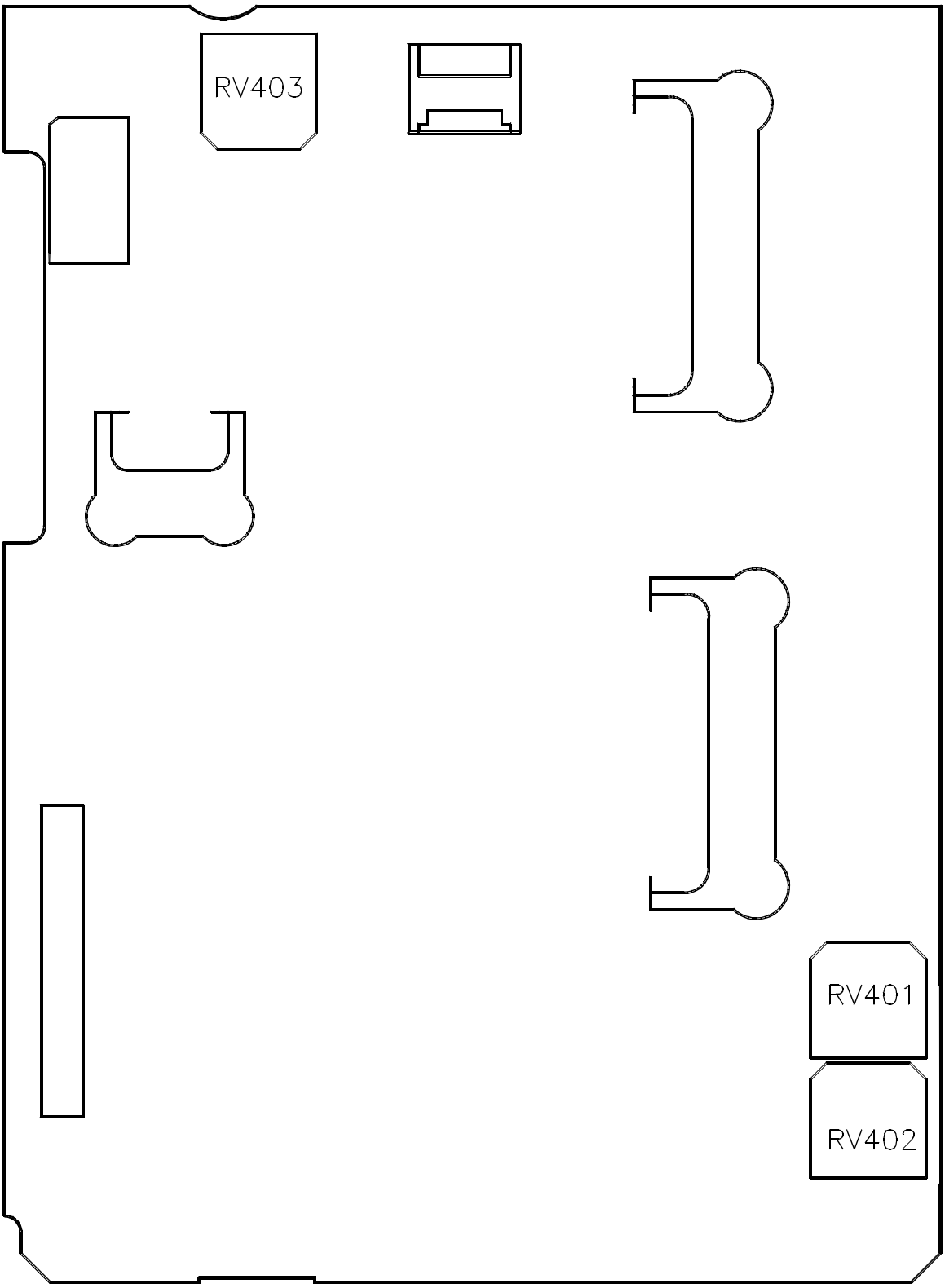
406-116-D ALIGNMENT POINTS



406-112-D/H ALIGNMENT POINTS



406-178 ALIGNMENT POINTS



COMPONENT REPLACEMENT

SURFACE MOUNT COMPONENTS

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

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

- ***CAUTION: Avoid applying heat to the body of any surface mount component using standard soldering methods. Heat should be applied only to the 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 orientation for capacitors, diodes, transistors, etc.

3. Simultaneously touch the "tinned" terminal end and the "tinned" pad with the soldering iron. Slightly press the component down on the board as the solder liquefies. Solder all terminals, allowing the component time to cool between each application of heat. Do not apply heat for an excessive length of time and do not use excessive solder.

With a hot-air system, apply hot air until all "tinned" areas are melted and the component is seated in place. It may be necessary to slightly press the component down on the board. Touch-up the soldered connections with a standard soldering iron if needed. Do not use excessive solder.

- ***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 manufacturers instructions for complete details on tip selection and other operating instructions unique to your system.

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

VOLTAGE CHARTS

The following pages provide voltage readings that may be used in troubleshooting the radio unit.

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VOLTAGE READINGS

IC409 PIN #	RX SQ	RX UNSQ	TX
1	0	0	0
2	0	0	0
3	0	0	0
4	5	5	5
5	0	0	0
6	0	5	5
7	0.023	4.56	0
8	5	5	5
9	4.86	4.86	4.86
10	5	5	5
11	5	5	5
12	5	5	5
13	0	0	0
14	0	0	0
15	5	5	5
16	5	5	5
17	5	5	5
18	0	0	0
19	5	5	5
20	5	5	5
21	5	5	5
22	5	5	5
23	0	0	0
24	5	5	0
25	0	0	0
26	5	5	0
27	0	0	0
28	0	4.8	5
29	0	0	0
30	5	5	5
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	0	0	0
48	0	0	0
49	0	0	0
50	0	0	0
51	0	0	0
52	0	0	0
53	0	0	0
54	0	0	0
55	0	0	0
56	0	0	0
57	0	0	0
58	0	0	0

DIGITAL BOARD
VHF / UHF

IC409 PIN #	RX SQ	RX UNSQ	TX
59	0	0	0
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0	0	0
65	0	0	0
66	0	0	0
67	0	0	0
68	0	0	0
69	0	0	0
70	0	0	0
71	0	0	0
72	0	0	0
73	5	5	5
74	2.3	2.3	2.3
75	2.35	2.35	2.35
76	0	0	0
77	5	0	5
78	0	5	0
79	0	0	5
80	0	0	0

IC401 PIN #	RX SQ	RX UNSQ	TX
1	1.35	0	2
2	1.84	1.84	2
3	1.3	2	2.3
4	1.35	0	2
5	5	0	0
6	5	0	0
7	0	0	0
8	2	2	2
9	2	2	2
10	5	5	0.87
11	5	5	0.87
12	5	5	5
13	0	0	5
14	5	5	5

IC402 PIN #	RX SQ	RX UNSQ	TX
1	0	0	0
2	0.25	0.25	2
3	0	0	0
4	0	0	0
5	0	5	0
6	0	0	0
7	0	0	0
8	0	0	0
9	5	5	0.87
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	5	5	5

UHF		
IC403 PIN #	RX	TX
1	5	5
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	5	0
10	8	0.6
11	0	5
12	0.6	8
13	0	0
14	0	0
15	0	0
16	8	8

IC404 PIN #	RX	TX
1	0	2
2	0	2
3	0	2
4	0.6	5
5	2	2
6	0	2
7	0	2
8	0	2
9	0	2
10	2	2
11	0	0
12	2	2
13	0	2
14	0	2

COPY

IC405 PIN #	RX	TX
1	0	0
2	3.2	3.2
3	2.5	2.5
4	5	5
5	2	2
6	2	2
7	2	2
8	2	2
9	2	2
10	2	2
11	0	0
12	2.5	2.5
13	5	1.6
14	0	3.7

IC408 PIN #	RX	TX
1	0	0
2	0	0
3	0	0
4	0	0

VHF		
IC403 PIN #	RX	TX
1	5.4	5.5
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	5.4	0
10	5.4	1.2
11	0	5.5
12	0.6	5.5
13	0	0
14	0	0
15	0	0
16	5.4	5.5

IC406 PIN #	RX	TX
1	2	3.8
2	2	2
3	2	2
4	5	5
5	2	2
6	2	2
7	2.1	2.2
8	2	2
9	2	2
10	2	2
11	0	0
12	2	2
13	2	2
14	2	2

IC407 PIN #	RX SQ	RX UNSQ	TX
1	2	2	2
2	0	0	0
3	1.5	1.5	1.5
4	2.3	2.3	2.3
5	2	2	2
6	5	5	5
7	2	2	2
8	2	2	2
9	0	4.8	4.8
10	0	0	0
11	5	0.3	0.3
12	0	0	0
13	2	2	2
14	2	2	2

IC408 PIN #	RX	TX
5	0	0
6	5	5
7	5	5
8	5	5

MONOGRAM SERIES HANDHELD
VOLTAGE READINGS

DIGITAL BOARD
VHF / UHF

IC411 PIN #	RX	TX
1	2	2
2	1.9	3.7
3	5	0.8
4	2	0.8
5	2	0.24
6	0	0
7	0	0
8	0	0
9	0.6	5
10	0.6	5
11	5	5
12	0.4	0.4
13	1.5	1.5
14	1.5	1.5
15	2	2
16	5	5

CON 402	RX SQ	RX UNSQ	TX
1	0	0	0
2	0	0	0
3	2.6	0	2.6
4	5	5	5
5	5	5	5
6	5	5	5
7	5	5	5
8	0	1.9	0
9	0	1.9	2
10	4.5	0.6	0.6
11	5	5	0.87
12	0	0	0
13	0	0	0
14	0	0	0
15	1.8	1.8	0.25
16	0	0	0

Q409	RX	TX
C	0	5
B	5	0
E	0.6	5

Q410	RX	TX
C	0	0
B	5	5
E	5	5

Q411	RX	TX
C	1.8	0.25
B	0	0
E	0	0

Q408	RX SQ	RX UNSQ	TX
1	5	0	0
2	0	3.7	3.7
3	0	0	0

Q404	RX		
	SQ	UNSQ	TX
C	0	10.7	10.7
B	5	0	0
E	0	0	0

Q403	RX	TX	ow Batt
C	5	5	0
B	0	0	3.7
E	0	0	0

Q401	RX	TX
C	0.6	5
B	4.45	0.7
E	5	5

Q402	RX	TX
C	5	0
B	0	3.7
E	0	0

CON401 VHF

CON 401	RX SQ	RX UNSQ	TX
1	0	4.5	0
2	0	0	0
3	0	0	0
4	10.8	10.8	10.8
5	5.4	5.4	5.5
6	0.6	0.6	5.5
7	5.4	5.4	1.2
8	5	5	5
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	2.5	2.5	2.5

CON401 UHF

CON 401	RX SQ	RX UNSQ	TX
1	0	4.5	0
2	0	0	0
3	0	0	0
4	10.8	10.8	10.8
5	8	8	8
6	0.6	0.6	8
7	8	8	0.6
8	5	5	5
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	2.5	2.5	2.5

Q405	RX		
	SQ	UNSQ	TX
C	0	10.8	0
B	5	0	5
E	0	0	0

Q406	RX		
	SQ	UNSQ	TX
C	10.8	0	10.5
B	0	10.8	0
E	10.8	10.8	10.5

Q407	RX		
	SQ	UNSQ	TX
C	10.8	0	0
B	0	10.8	10.8
E	10.8	10.5	10.5

Q201 and Q202 for bands B and C

Q201	RX		
	SQ	UNSQ	TX
C	2.4	1.3	1
B	1.3	1.6	1.6
E	0.8	1	1

Q202	RX		
	SQ	UNSQ	TX
C	4.8	7	7.6
B	3.5	1.5	0.78
E	3	0.9	0.24

Q201 and Q202 for bands A,D,E

Q201	RX		
	SQ	UNSQ	TX
C	5.4	7.78	8
B	3.8	1	0.5
E	2.5	0.2	0

Q202	RX		
	SQ	UNSQ	TX
C	2.4	0.67	0.6
B	0.4	0.6	0.6
E	0	0	0

406112-H only

Q22	RX		
	SQ	UNSQ	TX
C	4.7	0	0
B	0	0	0
E	0	0	0

UHF RF BOARD

IC1 PIN #	RX	TX
1	7.75	7.75
2	7.75	7.75
3	7.75	7.73
4	7.75	7.73
5	7.75	7.73
6	1.4	3.97
7	0	0
8	6.4	6
9	7.75	7.73
10	3.7	3.7
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	4.3	4.3
18	+	+
19	3.6	+
20	7.75	7.73

IC4 PIN #	RX	RX UNSQ	TX
1	1.3	1.35	1.3
2	0	0	0
3	0	0	0
4	0	0	0
5	1.4	5.4	1.4
6	10.8	10.8	10.8
7	10.8	5.5	10.8
8	1.4	1.35	1.4

IC5	RX	TX
IN	10.8	10.8
OUT	8	8
G	0	0

IC6	RX	TX
IN	10.8	10.8
OUT	5	5
G	0	0

Q10	RX	TX	
		Hi Pwr	Lo Pwr
C	10.8	9.8	9.8
B	0	1.4	1.1
E	0	0.9	0.56

IC3 PIN #	RX SQ	RX UNSQ	TX
1	4.8	4.8	0.4
2	4.2	4.12	0
3	4.5	4.5	0
4	4.8	4.8	0
5	4.4	4.4	0
6	4.4	4.4	0
7	4.4	4.4	0
8	4.8	4.8	0
9	2	1.8	0
10	0.8	0.8	0
11	0.9	0.8	0
12	0.8	0	0
13	0	4.5	0
14	0.8	0	0
15	0	0	0
16	1.8	1.8	0

Q1	RX	TX
C	10.8	10.7
B	0	0
E	0	0

Q2	RX	TX	
		Hi Pwr	Lo Pwr
C	0	10.4	6.7
B	0	0.5	0.5
E	0	0	0

Q3	RX	TX	
		Hi Pwr	Lo Pwr
C	0	7.5	5
B	0	0.5	0.35
E	0	0	0

Q9	RX	TX	
		Hi Pwr	Lo Pwr
C	0	1.4	1.1
B	0	0.86	0.86
E	0	0.29	0.29

Q11	RX	TX	
		Hi Pwr	Lo Pwr
C	0	9.1	5.8
B	10.8	10.2	10.2
E	10.8	10.8	10.8

IC2 PIN #	RX	TX
1	2.7	2.7
2	4.9	4.9
3	0	0
4	3.4	3.4
5	0	0
6	4.15	3.9
7	0	0
8	2.7	2.7

Q4	RX	TX
C	0	7..75
B	8	0.52
E	8	8

Q5	RX	TX
C	7.8	7.8
B	1.2	1.1
E	8	8

Q6	RX	TX
C	5	5
B	1.2	1
E	5	5

Q7	RX	TX
C	8	0
B	0.65	7.9
E	8	8

Q8	RX	TX
C	0	7.74
B	0	0.84
E	0	0.29

Q12	RX	TX
G	0	0
D	7.86	0
S	2.4	0

Q13	RX	TX
C	7.4	0
B	0.9	0
E	0.16	0

Q16	RX	TX
C	3.1	0
B	0.7	0
E	0	0

Q14	RX		
	SQ	UNSQ	TX
C	10.88	5.5	10.88
B	10.2	10.4	10.2
E	10.8	10.8	10.8

Q15	RX		
	SQ	UNSQ	TX
C	0	10.3	0
B	2.6	0	2.6
E	0	0	0

Q17	RX	TX
C	0	0
B	5.76	5.76
E	5	5

Q18	RX	TX
C	0	0
B	*	*
E	*	*

Q19	RX	TX
C	8	8
B	*	*
E	*	*

Q20	RX	TX
C	4.8	0.5
B	0.65	7.8
E	5	5

Q21	RX	TX
C	10.8	0
B	0	0.87
E	0	0

NOTE: For Q201 and Q202 UHF SQ. Board all Bands see page 2 chart

* Voltage depends on Freq.
RX=1.4 to 4.0V TX=2.5 to 6.0V
+ Check with scope for pulse

MONOGRAM SERIES HANDHELD
VOLTAGE READINGS

VHF RF BOARD

IC1 PIN #	RX	TX
1	5.27	5.17
2	5.27	5.17
3	5.27	5.17
4	5.27	5.17
5	5.27	5.17
6	2.7	2.7
7	0	0
8	4.5	4.93
9	5.27	5.16
10	2.3	2.3
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	2.87	2.76
18	2.59	2.58
19	2.18	+
20	5.27	5.17

IC2 PIN #	RX	TX
1	4.54	4.9
2	1.3	2.8
3	1.3	2.8
4	0	0
5	2	2
6	2	2
7	4.1	4
8	5.24	5.14

IC3 PIN #	RX SQ	RX UNSQ	TX
1	4.65	4.65	0
2	3.96	4	0
3	4.4	4.4	0
4	4.66	4.7	0
5	4.28	4.32	0
6	4.28	4.32	0
7	4.28	4.32	0
8	4.67	4.71	0
9	1.78	1.8	0
10	0.77	0.77	0
11	0.9	0.94	0
12	0	1	0
13	4.4	0	0
14	0	1	0
15	0	0	0
16	1.79	1.79	0

IC4 PIN #	RX SQ	RX UNSQ	TX
1	1.3	1.3	1.27
2	0	0	0
3	0	0	0
4	0	0	0
5	1.3	5.5	1.3
6	10.8	10.8	10.8
7	10.8	5.5	10.8
8	1.4	1.3	1.4

IC6	RX	TX	
		Hi Pwr	Lo Pwr
1	10.8	0.48	10.1
2	0	0.82	0.82
3	0	0.82	0.82
4	0	0	0
5	0	2.3	2.3
6	0	4.5	4.5
7	0	0.47	0.2
8	0	4.7	4.7

Q2	RX	TX	
		Hi Pwr	Lo Pwr
C	0	7	2.4
B	0	0.24	0.42
E	0	0	0

Q3	RX	TX	
		Hi Pwr	Lo Pwr
C	0	9.87	4.3
B	0	0	0
E	0	0	0

Q5	RX	TX	
		Hi Pwr	Lo Pwr
C	0	7	2.1
B	4.72	0	0
E	0	0	0

Q6	RX	TX	
		Hi Pwr	Lo Pwr
C	0	10.4	4.2
B	0	9.78	3.6
E	0	10.4	4.3

Q7	RX	TX	
		Hi Pwr	Lo Pwr
C	0	10.56	4.3
B	10.8	9.93	10.3
E	10.8	10.6	10.8

+ Check with scope for pulse

IC5 PIN #	RX	TX
I	10.8	10.8
O	5	5
G	0	0

Q1	RX	TX
C	0	4.6
B	0	0.53
E	0	0

Q4	RX	TX
C	10.8	10.8
B	0	0
E	0	0

Q9	RX	TX
C	0.89	0
B	4.7	0
E	0	0

Q10	RX	TX
C	1.9	0
B	4.75	0
E	0	0

Q11	RX	TX
C	0.65	0
B	4.7	0
E	0	0

Q12	RX	TX
C	0	4.72
B	5.38	4
E	4.9	0

Q13	RX	TX
C	4.73	0
B	0.6	5.3
E	4.9	4.77

Q150	RX	TX
C	5.4	5.4
B	10.16	10.16
E	10.8	10.8

Q151	RX	TX
C	0.4	0.42
B	0.64	0.6
E	0	0

Q152	RX	TX
C	7.6	7.3
B	0.4	0.42
E	0	0

Q101	RX	TX
C	0	0
B	2.7	2.7
E	2.7	2.7

Q102	RX	TX
C	5.3	5.2
B	2.7	2.7
E	2.7	2.7

Q103	RX	TX
C	5.17	5
B	0.84	0.83
E	0.13	0.13

Q104	RX	TX
C	5.3	5.2
B	1.2	1.5
E	5.4	5.3

Q105	RX	TX
C	0	0
B	5.2	5
E	5.2	5.1

Q106	RX	TX
C	2.7	0
B	0.7	0
E	0	0

Q107 PIN #	RX SQ	RX UNSQ	TX
C	0	10.3	0
B	4.4	0	4.3
E	0	0	0

Q108 PIN #	RX SQ	RX UNSQ	TX
C	10.8	5.5	10.6
B	10.3	10.4	9.9
E	10.8	10.8	10.8

Q201 PIN #	RX SQ	RX UNSQ	TX
C	3.6	5.3	5.2
B	2.8	0.55	0.5
E	1.7	0	0

Q202 PIN #	RX SQ	RX UNSQ	TX
C	1.8	0.63	0.62
B	0.47	0.59	0.58
E	0	0	0

ELECTRICAL PARTS LIST
VHF SCANNING

NOTE

Only those items indicated by shading will be stocked by After Market Services. All other items are for reference only.

When ordering parts for your Monogram Series radio, precede all part numbers with the prefix "R29/"

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF. #
131-027-0Z	CERAMIC CHIP 100PF:CM21CG101J50AT	C1
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C2
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C3
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT	C4
131-027-0Z	CERAMIC CHIP 100PF:CM21CG101J50AT	C5
132-012-1Z	CERAMIC CHIP 20PF :CM21CG200J50AT	C6
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C8
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C9
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C10
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C11
132-012-1Z	CERAMIC CHIP 20PF :CM21CG200J50AT	C12
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C13
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C14
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C15
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C16
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C17
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C18
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C19
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT	C20
132-407-5Z	CERAMIC CHIP 24PF:CM21CG240J50AT (HIGH)	C21
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (LOW)	C21
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (MID)	C21
135-010-4Z	CERAMIC CHIP 5PF:CM21CG050C50AT	C22
135-613-9Z	CERAMIC CHIP 56PF:CM21CG560J50AT (HIGH)	C23
136-816-5Z	CERAMIC CHIP 68PF:CM21CG680J50AT (LOW)	C23
136-816-5Z	CERAMIC CHIP 68PF:CM21CG680J50AT (MID)	C23
132-714-2Z	CERAMIC CHIP 27PF:CM21CG270J50AT	C24
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C25
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C26
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C27
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C28
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C29
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C30
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C31
132-012-1Z	CERAMIC CHIP 20PF :CM21CG200J50AT	C32
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C33
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C34
131-208-7Z	CERAMIC CHIP 12PF:CM21CG120J50AT (HIGH)	C35
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (LOW)	C35
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (MID	C35
131-030-2Z	CERAMIC CHIP 1PF:CM21CG010C50AT (HIGH)	C36
131-559-4Z	CERAMIC CHIP 1.5PF:CM21CG1R5C50AT (LOW/MID)	C36
132-714-2Z	CERAMIC CHIP 27PF:CM21CG270J50AT (HIGH)	C37
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (MID)	C37
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (LOW)	C37

ELECTRICAL PARTS LIST

133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT	C38
131-304-0Z	CERAMIC CHIP 13PF:CM21CG130J50AT (HIGH)	C39
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (MID)	C39
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (LOW)	C39
130-702-1Z	CERAMIC CHIP 0.75PF:CM21CG0R75C50AT (HIGH)	C40
131-030-2Z	CERAMIC CHIP 1PF:CM21CG010C50AT (LOW)	C40
131-030-2Z	CERAMIC CHIP 1PF:CM21CG010C50AT (MID)	C40
131-304-0Z	CERAMIC CHIP 13PF:CM21CG130J50AT (HIGH)	C41
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (MID)	C41
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (LOW)	C41
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C42
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C43
131-304-0Z	CERAMIC CHIP 13PF:CM21CG130J50AT (HIGH)	C44
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (MID)	C44
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT (LOW)	C44
131-030-2Z	CERAMIC CHIP 1PF:CM21CG010C50AT (HIGH)	C45
131-559-4Z	CERAMIC CHIP 1.5PF:CM21CG1R5C50AT (MID/LOW)	C45
131-816-6Z	CERAMIC CHIP 18PF:CM21CG180J50AT (HIGH)	C46
132-012-1Z	CERAMIC CHIP 20PF :CM21CG200J50AT (LOW)	C46
132-012-1Z	CERAMIC CHIP 20PF :CM21CG200J50AT (MID)	C46
137-504-4Z	CERAMIC CHIP 75PF:CM21CG750J50AT	C47
135-010-4Z	CERAMIC CHIP 5PF:CM21CG050C50AT	C48
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C49
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C50
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT	C51
104-739-6	CAPACITOR ELECT 47UF 16V SRA:(M) 6.3X7	C52
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C53
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C54
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C55
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C56
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C57
134-007-7Z	CERAMIC CHIP 4PF:CM21CG040C50AT	C58
143-301-0Z	TANTALUM DIP 3.3UF 16V :489D335X0016B1	C59
131-039-1Z	CERAMIC CHIP 10PF:CM21CG100J50AT	C98
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C101
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C102
143-312-0Z	TANTALUM CHIP 3.3UF 10V:293D335X0010A2T	C103
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C104
132-011-0Z	CERAMIC CHIP 2PF:CM21CG020C50AT	C105
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C106
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C107
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C108
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C109
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C110
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C111
144-722-2Z	TANTALUM CHIP 4.7UF 10V:293D475X0010A2T	C112

ELECTRICAL PARTS LIST

130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C113
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C114
131-027-0Z	CERAMIC CHIP 100PF:CM21CG101J50AT	C115
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C116
136-005-5Z	CERAMIC CHIP 6PF:CM21CG060C50AT	C117
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT	C118
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C119
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C120
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C121
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C122
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C123
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C124
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C125
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C126
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C127
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C128
137-504-4Z	CERAMIC CHIP 75PF:CM21CG750J50AT	C129
101-043-5	CAPACITOR ELECT 10UF 16V SRA(M):4X7	C130
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C131
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C132
130-A44-0Z	CERAMIC CHIP 0.015UF:CM21X7R153K50AT	C133
130-315-6Z	CERAMIC CHIP 0.0033UF:CM21X7R332K50AT	C134
130-A44-0Z	CERAMIC CHIP 0.015UF:CM21X7R153K50AT	C135
130-305-6Y	CERAMIC CHIP 0.033UF:GRM40X7R333K50VM	C136
130-305-6Y	CERAMIC CHIP 0.033UF:GRM40X7R333K50VM	C137
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C138
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C139
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C140
104-739-6	CAPACITOR ELECT 47UF 16V SRA:(M) 6.3X7	C141
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C142
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C143
102-275-3	CAPACITOR ELECT 220UF 10WV:6.3X7.5	C144
141-044-8Z	TANTALUM CHIP 10UF 4V :293D106X0004A2T	C145
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C146
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C147
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C152
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C153
144-717-8Z	TANTALUM DIP 47UF 10V:489D476X0010D1	C154
144-722-2Z	TANTALUM CHIP 4.7UF 10V:293D475X0010A2T	C155
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C156
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C157
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C158
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C159
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C160
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C161
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C162

ELECTRICAL PARTS LIST

102-275-3	CAPACITOR ELECT 220UF 10WV:6.3X7.5	C163
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C164
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C165
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C167
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C168
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C169
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C170
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C171
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C172
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C173
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C201
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C202
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C203
134-719-7Z	CERAMIC CHIP 0.0047UF:CM21X7R472K50AT	C204
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C301
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C302
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C303
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C304
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C305
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C306
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT	C307
132-011-0Z	CERAMIC CHIP 2PF:CM21CG020C50AT	C308
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C309
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C310
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (LOW)	C311
133-306-2Z	CERAMIC CHIP 33PF:CM21CG330J50AT (MID)	C311
133-932-7Z	CERAMIC CHIP 39PF:CM21CG390J50AT (HIGH)	C311
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C312
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C313
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C314
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C315
132-216-9Z	CERAMIC CHIP 22PF:CM21CG220J50AT	C316
132-216-9Z	CERAMIC CHIP 22PF:CM21CG220J50AT	C317
132-011-0Z	CERAMIC CHIP 2PF:CM21CG020C50AT	C318
130-A17-6Z	CERAMIC CHIP 0.001UF:CM21X7R102K50AT	C401
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C402
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C403
130-424-0Z	CERAMIC CHIP 0.047UF:CM21X7R473K50AT	C404
140-204-1Z	TANTALUM CHIP 0.22UF 35V:293D224X0035A2T	C405
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C406
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C407
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C408
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C409
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C410
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C411
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C412

ELECTRICAL PARTS LIST

134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C413
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C414
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C415
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C416
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C417
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C418
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C419
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C420
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C421
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C422
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C423
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C424
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C425
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C427
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C428
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C429
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C431
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C432
141-044-8Z	TANTALUM CHIP 10UF 4V :293D106X0004A2T	C434
130-A60-4Y	CERAMIC CHIP 0.1UF:GRM40X7R104K25VM	C435
130-263-1Z	CERAMIC CHIP 0.022UF:CM21X7R223K50AT	C436
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C437
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C438
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C439
130-A22-0Z	CERAMIC CHIP 0.0018UF:CM21X7R182K50AT	C441
130-263-1Z	CERAMIC CHIP 0.022UF:CM21X7R223K50AT	C442
134-719-7Z	CERAMIC CHIP 0.0047UF:CM21X7R472K50AT	C443
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C444
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C446
130-263-1Z	CERAMIC CHIP 0.022UF:CM21X7R223K50AT	C447
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C448
130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C449
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C450
134-761-4Z	CERAMIC CHIP 470PF:CM21CG471J50AT	C451
130-A60-4Y	CERAMIC CHIP 0.1UF:GRM40X7R104K25VM	C452
130-315-6Z	CERAMIC CHIP 0.0033UF:CM21X7R332K50AT	C453
130-624-4	CERAMIC MONO 0.68UF:GRM40Y5V684Z16PT	C454
101-A35-8	CAPACITOR 0.082UF:GRM40X7R823K50	C455
131-107-9Z	CERAMIC CHIP 120PF:CM21CG121J50AT	C456
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C457
130-A60-4Y	CERAMIC CHIP 0.1UF:GRM40X7R104K25VM	C458
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT	C460
131-511-0Z	CERAMIC CHIP 15PF:CM21CG150J50AT	C461
130-424-0Z	CERAMIC CHIP 0.047UF:CM21X7R473K50AT	C462
130-424-0Z	CERAMIC CHIP 0.047UF:CM21X7R473K50AT	C463
130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C464

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130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C465
130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C466
130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C467
130-314-5Z	CERAMIC CHIP 0.033UF:CM21X7R333K50AT	C468
130-424-0Z	CERAMIC CHIP 0.047UF:CM21X7R473K50AT	C469
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C470
130-A60-4Y	CERAMIC CHIP 0.1UF:GRM40X7R104K25VM	C471
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C472
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C473
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C474
130-172-2Z	CERAMIC CHIP 0.01UF:CM21X7R103K50AT	C476
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C500
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C601
134-722-1Z	CERAMIC CHIP 47PF:CM21CG470J50AT	C602
132-220-2Z	CERAMIC CHIP 220PF:CM21CG221J50AT	C603
130-A17-6Y	CERAMIC CHIP 0.001UF :GRM40X7R102K50V	C604
130-170-0Z	CERAMIC CHIP 0.1UF:CM21Y5V104Z25AT	C605
270-027-8Z	FILTER CERAMIC LT-455FW	CF1
565-54T-P1	TOP PANEL ASS'Y	CH04
565-54T-P2	TOP PANEL ASS'Y	CH16
422-765-8	CONNECTOR SOCKET GDRS2-04S(M1.2)	CON1
422-367-2	HEADER PIN CONNECTORGDH2-6DBC	CON151
422-709-8	TDH CONNECTOR TDH2-6SG	CON152
421-648-1	CONNECTOR HR10A-7R-6SB	CON153
422-765-8	CONNECTOR SOCKET GDRS2-04S(M1.2)	CON2
422-339-7	HEADER PIN CONNECTORGDH2-4SAT(1.5)	CON201
422-456-9	HEADER PIN GDH2-04SBCR(M1.2 P9.5)	CON301
422-455-8	HEADER PIN GDH2-04SBCR(M1.2 P6.0)	CON302
421-619-5	CONNECTOR 00-6200-167-012-800:ZIF	CON401
421-619-5	CONNECTOR 00-6200-167-012-800:ZIF	CON402
422-689-3	TDH CONNECTOR TDH2-8SG	CON403
422-746-1	CONNECTOR 52231-1417	CON404
421-618-4	CONNECTOR 00-6200-057-012-800:ZIF	CON405
422-470-1	CONNECTOR WAFFER 53048-0410 1.25W/B	CON406
504-916	4P HOUSING ASS'Y 4P UL1061 AWG#28	CON408
243-054-8	DIODE SI TUNING BB619A	D VD1
243-054-8	DIODE SI TUNING BB619A	D VD301
243-054-8	DIODE SI TUNING BB619A	D VD302
243-012-0	DIODE MMBV3401LT1	D1
243-026-3	DIODE SILICON SCHOTT1SS97	D2
243-012-0	DIODE MMBV3401LT1	D3
245-009-8Z	DIODE RECT IN4003T/R	D4
243-063-6	DIODE SWITCHING KDS181S A3	D5
243-012-0	DIODE MMBV3401LT1	D7
243-052-6	DIODE SI KDS193	D8
243-067-0	DIODE SCHOTTKY BAR43	D150

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241-164-4	DIODE ZENER MTZ J5.6B T-72	D151
241-198-5	DIODE ZENER Z02W15(Y)	D152
251-148-1	LED LAMP SEF33G2TT	D153
243-052-6	DIODE SI KDS193	D201
243-063-6	DIODE SWITCHING KDS181S A3	D401
243-063-6	DIODE SWITCHING KDS181S A3	D402
243-052-6	DIODE SI KDS193	D403
243-051-5	DIODE SI KDS184S	D404
320-253-1	COIL FC 3X2 CORE BEAD	FB1
320-253-1	COIL FC 3X2 CORE BEAD	FB2
320-253-1	COIL FC 3X2 CORE BEAD	FB3
320-253-1	COIL FC 3X2 CORE BEAD	FB4
320-253-1	COIL FC 3X2 CORE BEAD	FB5
223-319-2	I.C MC145156DW2	IC1
223-368-6	I.C MC12017DR2	IC2
223-090-4	I.C MC3361D	IC3
231-008-4	I.C LM386(803-N-3)	IC4
223-119-8	I.C KA78L05	IC5
222-022-8	I.C KIA393F	IC6
223-224-9	I.C MC14066BDR2:SO14	IC401
223-224-9	I.C MC14066BDR2:SO14	IC402
223-320-2	I.C MC14504BDR2	IC403
222-018-5	I.C KIA324F	IC404
222-018-5	I.C KIA324F	IC405
222-018-5	I.C KIA324F	IC406
231-073-3	I.C MF6CWM-100	IC407
229-463-8A	I.C EEPROM AT93C56-10SI	IC408
220-130-2	I.C HD4074818H(FP-80A.QFP)	IC409
222-018-5	I.C KIA324F	IC410
223-261-2	I.C MC14053BD	IC411
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L1
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L2
310-092-9	COIL CHOKE MK-4	L3
310-378-7	COIL AXIAL 2.2UH:LAL02TB2R2K	L4
310-218-7	COIL CHOKE 0.3DIAX7T 1KOHM RESISTOR TY	L5
310-224-2	COIL SPRING 3DIAX0.65DIAX1(1/2)T LEFT (MID/LOW)	L6
310-243-9	COIL INDUCTOR SPRING7NH 1/2 TURN LOOP (HIGH)	L6
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L7
310-218-7	COIL CHOKE 0.3DIAX7T 1KOHM RESISTOR TY	L8
310-224-2	COIL SPRING 3DIAX0.65DIAX1(1/2)T LEFT (MID/LOW)	L9
310-243-9	COIL INDUCTOR SPRING7NH 1/2 TURN LOOP (HIGH)	L9
310-573-7	COIL SPRING 2DIAX0.4DIAX4.5T L (LOW)	L10
310-573-7	COIL SPRING 2DIAX0.4DIAX4.5T L (MID)	L10
310-611-8	COIL SPRING 2DIAX0.4DIAX3.5T (L) (HIGH)	L10
310-573-7	COIL SPRING 2DIAX0.4DIAX4.5T L (HIGH)	L11
310-574-8	COIL SPRING 2DIAX0.4DIAX5.5T L (LOW)	L11

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310-574-8	COIL SPRING 2DIAX0.4DIAX5.5T L (MID)	L11
310-092-9	COIL CHOKE MK-4	L13
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L14
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L16
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L17
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L18
310-576-0	COIL AXIAL 100UH:LAL02TB101K	L19
310-576-0	COIL AXIAL 100UH:LAL02TB101K	L20
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L21
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L22
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L23
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L24
310-380-9	COIL AXIAL 100UH:LAL03TB101K	L25
310-221-9	COIL AXIAL 100UH:LAL04TB101K	L150
310-221-9	COIL AXIAL 100UH:LAL04TB101K	L151
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L301
320-839-1	COIL CHIP VCOOSC5.5T E588CN-100024 (MID)	L302
320-840-1	COIL CHIP VCOOSC6.5T E588CN-100025 (LOW)	L302
320-859-9	COIL CHIP VCOOSC4.5T(E558CN-100023) (HIGH)	L302
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L303
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L304
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L305
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L306
320-839-1	COIL CHIP VCOOSC5.5T E588CN-100024 (MID)	L307
320-840-1	COIL CHIP VCOOSC6.5T E588CN-100025 (LOW)	L307
320-859-9	COIL CHIP VCOOSC4.5T(E558CN-100023) (HIGH)	L307
310-293-4	CIOL AXIAL 1UH:LAL02TB1R0K	L308
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q1
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q2
203-055-7	TRANSISTOR MRF581	Q3
203-043-6	TRANSISTOR SRFH1900	Q4
202-095-8Z	TRANSISTOR KRC104SND	Q5
203-111-4	TRANSISTOR BCX-18LT1	Q6
203-111-4	TRANSISTOR BCX-18LT1	Q7
213-001-1	FET BF999LB	Q9
200-024-4	FET BF513S9	Q10
213-001-1	FET BF999LB	Q11
203-111-4	TRANSISTOR BCX-18LT1	Q12
202-092-5	BRT KRA110S PK	Q13
202-082-6	TRANSISTOR KTA1504ST1(G)	Q101
202-113-1	TRANSISTOR KTC3875S(BL)	Q102
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q103
202-092-5	BRT KRA110S PK	Q104
202-091-4	BRT KRA104S PD	Q105
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q106
202-095-8Z	TRANSISTOR KRC104SND	Q107

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202-082-6	TRANSISTOR KTA1504ST1(G)	Q108
203-054-6	TRANSISTOR LSP966	Q150
202-097-0	TRANSISTOR KTN2369S	Q151
202-097-0	TRANSISTOR KTN2369S	Q152
202-113-1	TRANSISTOR KTC3875S(BL)	Q201
202-113-1	TRANSISTOR KTC3875S(BL)	Q202
202-181-2	TRANSISTOR SI KTC3295S TB	Q301
203-116-9	TRANSISTOR MMBFJ310LT1	Q302
202-181-2	TRANSISTOR SI KTC3295S TB	Q303
200-024-4	FET BF513S9	Q304
202-092-5	BRT KRA110S PK	Q401
209-039-3Z	TRANSISTOR KRC101S	Q402
202-095-8Z	TRANSISTOR KRC104SND	Q403
202-095-8Z	TRANSISTOR KRC104SND	Q404
202-095-8Z	TRANSISTOR KRC104SND	Q405
202-089-3	BRT KRA102S PB	Q406
202-089-3	BRT KRA102S PB	Q407
202-095-8Z	TRANSISTOR KRC104SND	Q408
202-091-4	BRT KRA104S PD	Q409
202-091-4	BRT KRA104S PD	Q410
202-095-8Z	TRANSISTOR KRC104SND	Q411
207-006-3	FET 2SK 1579-TMOS	Q412
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R1
060-153-3Z	RESISTOR 15K:MCR10EZH153J	R2
060-471-0Z	RESISTOR 470:MCR10EZH471J	R3
060-100-5Z	RESISTOR 10:MCR10EZH100J	R4
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R5
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R6
060-101-6Z	RESISTOR 100:MCR10EZH101J	R8
060-229-9Z	RESISTOR 2.2:MCR10EZH2R2J	R9
060-101-6Z	RESISTOR 100:MCR10EZH101J	R10
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R11
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R12
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R13
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R14
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R15
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R16
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R17
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R18
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R19
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R20
060-181-8Z	RESISTOR 180:MCR10EZH181J	R21
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R22
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R23
060-471-0Z	RESISTOR 470:MCR10EZH471J	R24
060-103-8Z	RESISTOR 10K:MCR10EZH1035	R25

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060-100-5Z	RESISTOR 10:MCR10EZH100J	R26
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J	R27
060-100-5Z	RESISTOR 10:MCR10EZH100J	R28
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R29
060-331-7Z	RESISTOR 330:MCR10EZH331J	R30
060-471-0Z	RESISTOR 470:MCR10EZH471J	R31
060-100-5Z	RESISTOR 10:MCR10EZH100J	R32
060-821-3Z	RESISTOR 820:MCR10EZH821J	R33
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R34
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R35
060-101-6Z	RESISTOR 100:MCR10EZH101J	R36
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R98
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R101
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R102
060-151-1Z	RESISTOR 150:MCR10EZH151J	R103
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R104
060-333-9Z	RESISTOR 33K:MCR10EZH333J	R105
060-681-3Z	RESISTOR 680:MCR10EZH681J	R106
060-101-6Z	RESISTOR 100:MCR10EZH101J	R107
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R108
060-101-6Z	RESISTOR 100:MCR10EZH101J	R109
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R110
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R111
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R112
060-183-0Z	RESISTOR 18K:MCR10EZH183J	R113
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R114
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R115
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R116
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R117
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R118
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R119
060-393-3Z	RESISTOR 39K:MCR10EZH393J	R120
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R121
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R122
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R123
060-101-6Z	RESISTOR 100:MCR10EZH101J	R124
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R125
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R127
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R128
060-154-4Z	RESISTOR 150K:MCR10EZH154J	R150
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R151
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R152
060-392-2Z	RESISTOR 3.9K:MCR10EZH392J	R153
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R155
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R156
060-101-6Z	RESISTOR 100:MCR10EZH101J	R157

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060-101-6Z	RESISTOR 100:MCR10EZH101J	R158
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R201
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R202
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R203
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J	R204
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J	R205
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R206
060-183-0Z	RESISTOR 18K:MCR10EZH183J	R207
060-221-1Z	RESISTOR 220:MCR10EZH221J	R208
060-184-1Z	RESISTOR 180K:MCR10EZH184J	R209
060-562-9Z	RESISTOR 5.6K:MCR10EZH562J	R210
060-100-5Z	RESISTOR 10:MCR10EZH100J	R301
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R302
060-101-6Z	RESISTOR 100:MCR10EZH101J	R303
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J	R304
060-220-0Z	RESISTOR 22:MCR10EZH220J	R305
060-151-1Z	RESISTOR 150:MCR10EZH151J (HIGH)	R306
060-151-1Z	RESISTOR 150:MCR10EZH151J (MID)	R306
060-221-1Z	RESISTOR 220:MCR10EZH221J (LOW)	R306
060-101-6Z	RESISTOR 100:MCR10EZH101J	R307
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R308
060-101-6Z	RESISTOR 100:MCR10EZH101J	R309
060-221-1Z	RESISTOR 220:MCR10EZH221J (HIGH)	R310
060-221-1Z	RESISTOR 220:MCR10EZH221J (MID)	R310
060-331-7Z	RESISTOR 330:MCR10EZH331J (LOW)	R310
060-684-6Z	RESISTOR 680K:MCR10EZH684J	R401
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R402
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R403
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R404
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R405
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R406
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R407
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R408
060-154-4Z	RESISTOR 150K:MCR10EZH154J	R409
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R410
060-274-9Z	RESISTOR 270K:MCR10EZH274J	R411
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R412
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R413
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R414
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R415
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R416
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R417
060-561-8Z	RESISTOR 560:MCR10EZH561J	R418
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R419
060-334-0Z	RESISTOR 330K:MCR10EZH334J	R420
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R421

ELECTRICAL PARTS LIST

060-683-5Z	RESISTOR 68K:MCR10EZH683J	R422
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R423
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R424
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R425
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R426
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R427
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R428
060-563-0Z	RESISTOR 56K:MCR10EZH563J	R429
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R430
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R431
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R432
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R433
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R434
060-682-4Z	RESISTOR 6.8K:MCR10EZH682J	R435
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R436
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R437
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R438
060-302-1Z	RESISTOR 3K:MCR10EZH302J	R439
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R440
060-362-5Z	RESISTOR 3.6K:MCR10EZH362J	R441
060-273-8Z	RESISTOR 27K:MCR10EZH273J	R442
060-242-0	RESISTOR 2.4K OHM 1/10W +-5%	R443
060-823-5Z	RESISTOR 82K:MCR10EZH823J	R444
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R445
060-821-3Z	RESISTOR 820:MCR10EZH821J	R446
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R447
060-123-6Z	RESISTOR 12K:MCR10EZH123J	R448
060-203-5Z	RESISTOR CHIP 20K:MCR10EZH203J	R449
060-333-9Z	RESISTOR 33K:MCR10EZH333J	R450
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R451
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R452
060-105-0Z	RESISTOR 1M:MCR10EZH105J	R453
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R454
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R455
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R456
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R457
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R458
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R459
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R460
060-105-0Z	RESISTOR 1M:MCR10EZH105J	R461
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R462
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R463
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R464
060-184-1Z	RESISTOR 180K:MCR10EZH184J	R465
060-184-1Z	RESISTOR 180K:MCR10EZH184J	R466
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R467

ELECTRICAL PARTS LIST

060-473-2Z	RESISTOR 47K:MCR10EZH473J	R468
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R469
060-303-2Z	RESISTOR 30K:MCR10EZH303J	R470
060-303-2Z	RESISTOR 30K:MCR10EZH303J	R471
060-363-6Z	RESISTOR 36K:MCR10EZH363J	R472
060-433-6Z	RESISTOR 43K:MCR10EZH433J	R473
060-433-6Z	RESISTOR 43K:MCR10EZH433J	R474
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R475
060-364-7	RESISTOR 360K OHM 1/10W +-5%	R476
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R477
060-393-3Z	RESISTOR 39K:MCR10EZH393J	R478
060-203-5Z	RESISTOR CHIP 20K:MCR10EZH203J	R479
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R480
060-229-9Z	RESISTOR 2.2:MCR10EZH2R2J	R481
060-470-9Z	RESISTOR 47:MCR10EZH470J	R482
060-152-2Z	RESISTOR 1.5K:MCR10EZH152J	R483
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R484
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R485
060-183-0Z	RESISTOR 18K:MCR10EZH183J	R486
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R487
059-000-0Z	RESISTOR 0:MCR18EZH0R0J	R488
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R489
480-050-3	POTENTIOMETER NRV630HF01 B5KOHM	RV401
480-045-9	TRIMMER POT.METER NRV630HF01 B20K	RV402
480-051-4	POTENTIOMETER NRV630HF01 B50KOHM	RV403
432-063-7	SW PUSH SPPH221BP011	SW151
436-030-0	SW TACT SKHUPF	SW401
436-030-0	SW TACT SKHUPF	SW402
310-570-4	COIL MOLDED 150MHZ 4.5T RX (MID)	T1
310-570-4	COIL MOLDED 150MHZ 4.5T RX (HIGH)	T1
310-571-5	COIL MOLDED 140MHZ 5.5T RX (LOW)	T1
310-570-4	COIL MOLDED 150MHZ 4.5T RX (MID)	T2
310-570-4	COIL MOLDED 150MHZ 4.5T RX (HIGH)	T2
310-571-5	COIL MOLDED 140MHZ 5.5T RX (LOW)	T2
310-570-4	COIL MOLDED 150MHZ 4.5T RX (MID)	T3
310-570-4	COIL MOLDED 150MHZ 4.5T RX (HIGH)	T3
310-571-5	COIL MOLDED 140MHZ 5.5T RX (LOW)	T3
310-570-4	COIL MOLDED 150MHZ 4.5T RX (MID)	T4
310-570-4	COIL MOLDED 150MHZ 4.5T RX (HIGH)	T4
310-571-5	COIL MOLDED 140MHZ 5.5T RX (LOW)	T4
310-571-5	COIL MOLDED 140MHZ 5.5T RX (MID)	T5
310-571-5	COIL MOLDED 140MHZ 5.5T RX (HIGH)	T5
310-572-6	COIL MOLDED 130MHZ 6.5T RX (LOW)	T5
310-571-5	COIL MOLDED 140MHZ 5.5T RX (MID)	T6
310-571-5	COIL MOLDED 140MHZ 5.5T RX (HIGH)	T6
310-572-6	COIL MOLDED 130MHZ 6.5T RX (LOW)	T6

ELECTRICAL PARTS LIST

320-597-2	COIL 21.4MHZ RX MIXER	T7
320-232-2	COIL 455KHZ DETECTOR	T8
320-858-8Z	COIL D/D CONVERTER LKW-01-397	T150
172-013-4	CAPACITOR TRIMMER 20PF:ECR-LA020A12	TC1
098-252-8	THERMISTOR 2.5K OHM +-15%:KTD5-225	TH1
099-303-6	THERMISTOR 30K OHM +-15%:KC5D330L	TH2
098-252-8	THERMISTOR 2.5K OHM+-15%:KTD5-225	TH3
098-333-8	THERMISTOR CHIP 33K OHM:NTCCS32163SH333KC	TH201
071-223-1	RESISTOR SEMIFIXED 22KB:RH0651C100223	VR1
071-472-9	RESISTOR SEMIFIXED 4.7KB:RH0651C100472	VR2
450-512-5	VR 20K:V12M4-1(6X5)(PVB)S(SJ)1	VR153
263-039-1	CRYSTAL CL20P 10.240MHZ 5PPM	X1
261-923-9Z	CRYSTAL HC-49T 20.945MHZ 30PPM	X2
271-002-0	FILTER CRYSTAL 21M 15BU	XF1
262-775-7	CRYSTAL CHIP CP12A 3.579545MHZ	X401

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ELECTRICAL PARTS LIST
UHF SCANNING

NOTE

Only those items indicated by shading will be stocked by After Market Services. All other items are for reference only.

When ordering parts for your Monogram Series radio, precede all part numbers with the prefix "R29/"

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
130-171-1Z	CHIP CAP. 0.001UF :CM316X7R102K100AT	C1
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C2
133-010-4Z	CAP. CERAMIC 30PF:CM21CG300J50AT	C3
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C4
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C5
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C6
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C7
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C8
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C9
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C11
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C12
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C13
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C14
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C15
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C16
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C17
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C18
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C19
130-327-6Z	CAP. CERAMIC 0.039UF:CM21X7R393K50AT	C20
130-331-9	CERAMIC MONO 0.039UF:GRM40X7R393J25	C21
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C22
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C23
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C24
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C25
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C26
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C28
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C29
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C30
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C31
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C32
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C33
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C34
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C35
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C37
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C38
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C39
132-026-4Z	CAP. CERAMIC 2PF:CM316CG020C200AT (BAND E)	C40
133-014-8Z	CAP. CERAMIC 3PF:CM21CG030C50AT (BAND D)	C40
136-015-4Z	CAP. CERAMIC 6PF:CM316CG060D200AT (BAND A, B)	C40
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C41
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C42
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C43
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C44
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C45

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C46
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C47
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C48
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C49
134-301-1Z	CAP. CERAMIC 43PF:CM21CG430J50AT	C50
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C51
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C52
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C53
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C54
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C55
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C56
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C57
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C58
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C59
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C60
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C61
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C62
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C63
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C64
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C65
131-816-6Z	CAP. CERAMIC 18PF:CM21CG180J50AT (BAND A, C)	C66
132-216-9Z	CAP. CERAMIC 22PF:CM21CG220J50AT (BAND B)	C66
132-407-5Z	CAP. CERAMIC 24PF:CM21CG240J50AT (BAND E	C66
133-321-5Z	CAP. CERAMIC 3.3PF:CM21CG3R03C50AT (BAND E)	C67
133-014-8Z	CAP. CERAMIC 3PF:CM21CG030C50AT (BAND D)	C67
135-010-4Z	CAP. CERAMIC 5PF:CM21CG050C50AT (BAND A, B)	C67
136-005-5Z	CAP. CERAMIC 6PF:CM21CG060D50AT (BAND C)	C67
133-932-7Z	CAP. CERAMIC 39PF:CM21CG390J50AT (BAND E)	C68
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT (BAND A, B, C, D)	C68
132-407-5Z	CAP. CERAMIC 24PF:CM21CG240J50AT	C69
13A-001-1Z	CAP. CERAMIC 1PF:CM316CG010C200AT (BAND C, D, E)	C70
132-026-4Z	CAP. CERAMIC 2PF:CM316CG020C200AT (BAND A)	C70
135-019-3Z	CAP. CERAMIC 5PF:CM316CG050C200AT (BAND B)	C70
131-029-2Z	CAP. CERAMIC 10PF:CM316CG100J200AT (BAND C)	C71
131-106-8Z	CAP. CERAMIC 11PF:CM316CG110J200AT (BAND C)	C71
131-212-0Z	CAP. CERAMIC 12PF:CM316CG120J200AT (BAND D)	C71
131-303-9Z	CAP. CERAMIC 13PF:CM316CG130J200AT (BAND B)	C71
131-829-8Z	CAP. CERAMIC 18PF:CM316CG180J200AT (BAND A)	C71
131-029-2Z	CAP. CERAMIC 10PF:CM316CG100J200AT (BAND B, C)	C72
131-212-0Z	CAP. CERAMIC 12PF:CM316CG120J200AT (BAND A)	C72
137-011-5Z	CAP. CERAMIC 7PF:CM316CG070D200AT (BAND E)	C72
138-230-1Z	CAP. CERAMIC 8PF:CM316CG080D200AT (BAND D)	C72
131-518-7Z	CAP. CERAMIC 15PF:CM316CG150J200AT (BAND D)	C73
131-829-8Z	CAP. CERAMIC 18PF:CM316CG180J200AT (BAND A, B)	C73

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
13A-001-1Z	CAP. CERAMIC 1PF:CM316CG010C200AT (BAND C)	C73
139-006-1Z	CAP. CERAMIC 9PF:CM316CG090D200AT (BAND E)	C73
131-029-2Z	CAP. CERAMIC 10PF:CM316CG100J200AT (BAND E)	C74
131-518-7Z	CAP. CERAMIC 15PF:CM316CG150J200AT (BAND A)	C74
132-026-4Z	CAP. CERAMIC 2PF:CM316CG020C200AT (BAND D, C)	C74
133-104-6Z	CAP. CERAMIC 3PF:CM316CG030C200AT (BAND B)	C74
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND A, B, C, E)	C75
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND D)	C75
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C76
132-714-2Z	CAP. CERAMIC 27PF:CM21CG270J50AT (BAND B)	C76
133-306-2Z	CAP. CERAMIC 33PF:CM21CG330J50AT (BAND C, D)	C76
133-932-7Z	CAP. CERAMIC 39PF:CM21CG390J50AT (BAND E)	C76
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C77
132-714-2Z	CAP. CERAMIC 27PF:CM21CG270J50AT (BAND C, D)	C77
133-306-2Z	CAP. CERAMIC 33PF:CM21CG330J50AT (BAND B)	C77
133-932-7Z	CAP. CERAMIC 39PF:CM21CG390J50AT (BAND E)	C77
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND B, C)	C78
132-714-2Z	CAP. CERAMIC 27PF:CM21CG270J50AT (BAND A)	C78
133-010-4Z	CAP. CERAMIC 30PF:CM21CG300J50AT (BAND D, E)	C78
132-012-1Z	CAP. CERAMIC 20PF :CM21CG200J50AT (BAND B, C)	C79
132-714-2Z	CAP. CERAMIC 27PF:CM21CG270J50AT (BAND A)	C79
133-010-4Z	CAP. CERAMIC 30PF:CM21CG300J50AT (BAND D, E)	C79
131-103-5Z	CAP. CERAMIC 11PF:CM21CG110J50AT (BAND C)	C80
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND B)	C80
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND D)	C80
131-404-7Z	CAP. CERAMIC 14PF:CM21CG140J50AT (BAND E)	C80
132-012-1Z	CAP. CERAMIC 20PF :CM21CG200J50AT (BAND A)	C80
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT (BAND C, E)	C81
133-339-2Z	CAP. CERAMIC 330PF:CM21CG331J50AT (BAND A, B)	C81
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT (BAND D)	C81
130-171-1Z	CHIP CAP. 0.001UF :CM316X7R102K100AT	C82
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND A, B, C, E)	C83
137-005-0	CERAMIC MONO 7PF:GRM40COG070D50 (BAND D)	C83
134-007-7Z	CAP. CERAMIC 4PF:CM21CG040C50AT (BAND E)	C84
135-010-4Z	CAP. CERAMIC 5PF:CM21CG050C50AT (BAND A, E)	C84
136-005-5Z	CAP. CERAMIC 6PF:CM21CG060D50AT (BAND D, C)	C84
138-004-4Z	CAP. CERAMIC 8PF:CM21CG080D50AT (BAND B)	C84
131-027-0Z	CAP. CERAMIC 100PF:CM21CG101J50AT (BAND E)	C85
139-101-3	CERAMIC MONO 91PF:GRM40COG910J50V (BAND A, B, C, D)	C85
134-007-7Z	CAP. CERAMIC 4PF:CM21CG040C50AT (BAND C, E)	C86
135-010-4Z	CAP. CERAMIC 5PF:CM21CG050C50AT (BAND A, B, D)	C86
131-027-0Z	CAP. CERAMIC 100PF:CM21CG101J50AT (BAND E)	C87
139-101-3	CERAMIC MONO 91PF:GRM40COG910J50V (BAND A, B, C, D)	C87
131-027-0Z	CAP. CERAMIC 100PF:CM21CG101J50AT (BAND E	C88

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
139-101-3	CERAMIC MONO 91PF:GRM40COG910J50V (BAND A, B, C, D)	C88
141-012-9Z	TANTALUM DIP 10UF 16V :489D106X0016C1	C89
131-103-5Z	CAP. CERAMIC 11PF:CM21CG110J50AT (BAND C, D)	C90
131-404-7Z	CAP. CERAMIC 14PF:CM21CG140J50AT (BAND B)	C90
132-012-1Z	CAP. CERAMIC 20PF :CM21CG200J50AT (BAND A)	C90
136-005-5Z	CAP. CERAMIC 6PF:CM21CG060D50AT (BAND E)	C90
133-925-1Z	CAP. CERAMIC 390PF:CM21CG391J50AT	C91
101-043-5	CAP. ELECT 10UF 16V SRA(M):4X7	C92
136-816-5Z	CAP. CERAMIC 68PF:CM21CG680J50AT	C93
101-007-3	CAP. ELECT 1.0UF 50V SRA(M):4X7	C94
138-004-4Z	CAP. CERAMIC 8PF:CM21CG080D50AT	C95
104-739-6	CAP. ELECT 47UF 16V SRA:(M) 6.3X7	C96
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C97
102-275-3	CAP. ELECT 220UF 10WV:6.3X7.5	C98
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C99
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND E)	C100
135-010-4Z	CAP. CERAMIC 5PF:CM21CG050C50AT (BAND D)	C100
137-005-0	CERAMIC MONO 7PF:GRM40COG070D50 (BAND A)	C100
136-816-5Z	CAP. CERAMIC 68PF:CM21CG680J50AT	C101
133-932-7Z	CAP. CERAMIC 39PF:CM21CG390J50AT	C102
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND A)	C103
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND B)	C103
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND D, E)	C103
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND C)	C103
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C104
130-305-6Y	CAP. CERAMIC 0.033UF:GRM40X7R333K50VM	C105
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND E)	C106
132-012-1Z	CAP. CERAMIC 20PF :CM21CG200J50AT (BAND C , D)	C106
132-407-5Z	CAP. CERAMIC 24PF:CM21CG240J50AT (BAND A, B)	C106
132-725-2Z	CAP. CERAMIC 2.7PF:CM21CG2R7C50AT (BAND D)	C107
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND E)	C107
133-321-5Z	CAP. CERAMIC 3.3PF:CM21CG3R03C50AT(BAND A, B, C)	C107
101-043-5	CAP. ELECT 10UF 16V SRA(M):4X7	C108
141-012-9Z	TANTALUM DIP 10UF 16V :489D106X0016C1	C109
140-103-3Z	TANTALUM DIP 0.1UF 35V :489D104X0035A1	C110
140-103-3Z	TANTALUM DIP 0.1UF 35V :489D104X0035A1	C111
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C112
141-012-9Z	TANTALUM DIP 10UF 16V :489D106X0016C1	C113
132-714-2Z	CAP. CERAMIC 27PF:CM21CG270J50AT (BAND D, E)	C114
132-012-1Z	CAP. CERAMIC 20PF:CM21CG200J50AT (BAND A, B, C)	C114
132-012-1Z	CAP. CERAMIC 20PF:CM21CG200J50AT (BAND A, B, C)	C115
133-010-4Z	CAP. CERAMIC 30PF:CM21CG300J50AT (BAND D, E)	C115
131-027-0Z	CAP. CERAMIC 100PF:CM21CG101J50AT	C116
141-008-6Z	TANTALUM DIP 1UF 25V :489D105X0025A1	C117

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
101-043-5	CAP. ELECT 10UF 16V SRA(M):4X7	C119
141-008-6Z	TANTALUM DIP 1UF 25V :489D105X0025A1	C120
130-424-0Z	CAP. CERAMIC 0.047UF:CM21X7R473K50AT	C121
141-012-9Z	TANTALUM DIP 10UF 16V :489D106X0016C1	C122
132-725-2Z	CAP. CERAMIC 2.7PF:CM21CG2R7C50AT (BAND B)	C130
130-A44-0Z	CAP. CERAMIC 0.015UF:CM21X7R153K50AT	C133
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C134
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C134
130-A44-0Z	CAP. CERAMIC 0.015UF:CM21X7R153K50AT	C135
130-305-6Y	CAP. CERAMIC 0.033UF:GRM40X7R333K50VM	C136
130-305-6Y	CAP. CERAMIC 0.033UF:GRM40X7R333K50VM	C137
131-303-9Z	CAP. CERAMIC 13PF:CM316CG130J200AT	C139
132-217-0Z	CAP. CERAMIC 22PF:CM316CG220J200AT	C139
139-006-1Z	CAP. CERAMIC 9PF:CM316CG090D200AT	C139
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C142
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C145
101-050-1	CAP. ELECT 100UF 10V SRA(M):6.3X7	C148
104-765-9	CAP. ELECT 47UF 6.3V SRE:(M) 5X5	C149
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C150
130-A17-6Z	CAP. CERAMIC .001UF	C152
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C158
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C159
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C160
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C161
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C162
102-275-3	CAP. ELECT 220UF 10WV:6.3X7.5	C163
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C164
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C165
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C167
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C168
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C169
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C170
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C171
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C201
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C202
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C203
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C204
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C205
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C206
140-103-3Z	TANTALUM DIP 0.1UF 35V :489D104X0035A1	C207
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C208
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C300
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C301
131-103-5Z	CAP. CERAMIC 11PF:CM21CG110J50AT (BAND E)	C302

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND C, D)	C302
131-404-7Z	CAP. CERAMIC 14PF:CM21CG140J50AT (BAND B)	C302
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C302
131-404-7Z	CAP. CERAMIC 14PF:CM21CG140J50AT (BAND E)	C304
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C304
136-005-5Z	CAP. CERAMIC 6PF:CM21CG060D50AT (BAND E)	C304
137-007-1Z	CAP. CERAMIC 7PF:CM21CG070D50AT (BAND D)	C304
139-003-8Z	CAP. CERAMIC 9PF:CM21CG090D50AT (BAND C)	C304
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND C)	C305
131-208-7Z	CAP. CERAMIC 12PF:CM21CG120J50AT (BAND B)	C305
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C305
138-004-4Z	CAP. CERAMIC 8PF:CM21CG080D50AT (BAND D, E)	C305
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C306
139-101-3	CERAMIC MONO 91PF:GRM40COG910J50V	C307
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND C)	C308
131-103-5Z	CAP. CERAMIC 11PF:CM21CG110J50AT (BAND B)	C308
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT (BAND A)	C308
135-627-2Z	CAP. CERAMIC 5.6PF:CM21CG5R6C50AT (BAND E, D)	C308
131-039-1Z	CAP. CERAMIC 10PF:CM21CG100J50AT (BAND B)	C310
131-404-7Z	CAP. CERAMIC 14PF:CM21CG140J50AT (BAND A)	C310
137-007-1Z	CAP. CERAMIC 7PF:CM21CG070D50AT (BAND D)	C310
138-004-4Z	CAP. CERAMIC 8PF:CM21CG080D50AT (BAND C)	C310
131-559-4Z	CAP. CERAMIC 1.5PF:CM21CG1R5C50AT(BAND D)	C312
131-030-2Z	CAP. CERAMIC 1PF:CM21CG010C50AT (BAND B, C, E)	C312
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND A)	C312
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C313
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C314
131-559-4Z	CAP. CERAMIC 1.5PF:CM21CG1R5C50AT (BAND D, E)	C317
132-725-2Z	CAP. CERAMIC 2.7PF:CM21CG2R7C50AT (BAND A)	C317
133-321-5Z	CAP. CERAMIC 3.3PF:CM21CG3R03C50AT (BAND B)	C317
132-266-4Z	CAP. CERAMIC 2.2PF:CM21CG2R2C50AT (BAND C)	C317
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C318
131-559-4Z	CAP. CERAMIC 1.5PF:CM21CG1R5C50AT(BAND E)	C319
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND D)	C319
133-321-5Z	CAP. CERAMIC 3.3PF:CM21CG3R03C50AT (BAND A, B)	C319
131-030-2Z	CAP. CERAMIC 1PF:CM21CG010C50AT (BAND B, C, D)	C320
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND A)	C320
132-011-0Z	CAP. CERAMIC 2PF:CM21CG020C50AT (BAND E)	C320
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C321
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C322
136-005-5Z	CAP. CERAMIC 6PF:CM21CG060D50AT	C323
130-504-9Z	CAP. CERAMIC 0.5PF:CM21CG0R5C50AT	C324
131-030-2Z	CAP. CERAMIC 1PF:CM21CG010C50AT	C325
136-816-5Z	CAP. CERAMIC 68PF:CM21CG680J50AT	C326

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PART NO.	DESCRIPTION	REF.#
136-816-5Z	CAP. CERAMIC 68PF:CM21CG680J50AT	C327
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C328
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C330
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C331
142-223-8Z	TANTALUM CHIP 2.2UF 16V:293D225X0016B2T	C334
130-A17-6Z	CAP. CERAMIC 0.001UF:CM21X7R102K50AT	C401
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C402
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C403
130-424-0Z	CAP. CERAMIC 0.047UF:CM21X7R473K50AT	C404
140-204-1Z	TANTALUM CHIP 0.22UF 35V:293D224X0035A2T	C405
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C406
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C407
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C408
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C409
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C410
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C411
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C412
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C413
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C414
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C415
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C416
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C417
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C418
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C419
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C420
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C421
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C422
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C423
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C424
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C425
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C427
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C428
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C429
141-046-0Z	TANTALUM CHIP 10UF 10V:293D106X0010B2T	C431
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C432
141-044-8Z	TANTALUM CHIP 10UF 4V :293D106X0004A2T	C434
130-A60-4Y	CAP. CERAMIC 0.1UF:GRM40X7R104K25VM	C435
130-263-1Z	CAP. CERAMIC 0.022UF:CM21X7R223K50AT	C436
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C437
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C438
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C439
130-A22-0Z	CAP. CERAMIC 0.0018UF:CM21X7R182K50AT	C441
130-263-1Z	CAP. CERAMIC 0.022UF:CM21X7R223K50AT	C442
134-719-7Z	CAP. CERAMIC 0.0047UF:CM21X7R472K50AT	C443

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PART NO.	DESCRIPTION	REF.#
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C444
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C446
130-263-1Z	CAP. CERAMIC 0.022UF:CM21X7R223K50AT	C447
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C448
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C449
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C450
134-761-4Z	CAP. CERAMIC 470PF:CM21CG471J50AT	C451
130-A60-4Y	CAP. CERAMIC 0.1UF:GRM40X7R104K25VM	C452
130-315-6Z	CAP. CERAMIC 0.0033UF:CM21X7R332K50AT	C453
130-624-4	CERAMIC MONO 0.68UF:GRM40Y5V684Z16PT	C454
101-A35-8	CAP. 0.082UF:GRM40X7R823K50	C455
131-107-9Z	CAP. CERAMIC 120PF:CM21CG121J50AT	C456
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C457
130-A60-4Y	CAP. CERAMIC 0.1UF:GRM40X7R104K25VM	C458
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT	C460
131-511-0Z	CAP. CERAMIC 15PF:CM21CG150J50AT	C461
130-424-0Z	CAP. CERAMIC 0.047UF:CM21X7R473K50AT	C462
130-424-0Z	CAP. CERAMIC 0.047UF:CM21X7R473K50AT	C463
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C464
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C465
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C466
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C467
130-314-5Z	CAP. CERAMIC 0.033UF:CM21X7R333K50AT	C468
130-424-0Z	CAP. CERAMIC 0.047UF:CM21X7R473K50AT	C469
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C470
130-A60-4Y	CAP. CERAMIC 0.1UF:GRM40X7R104K25VM	C471
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C472
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C473
141-036-1Z	TANTALUM CHIP 1UF 16V:293D105X0016A2T	C474
130-172-2Z	CAP. CERAMIC 0.01UF:CM21X7R103K50AT	C476
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C601
134-722-1Z	CAP. CERAMIC 47PF:CM21CG470J50AT	C602
132-220-2Z	CAP. CERAMIC 220PF:CM21CG221J50AT	C603
130-A17-6Y	CAP. CERAMIC 0.001UF :GRM40X7R102K50V	C604
130-170-0Z	CAP. CERAMIC 0.1UF:CM21Y5V104Z25AT	C605
270-009-2Z	FILTER CERAMIC LT455EW	CF1
271-002-0	FILTER CRYSTAL 21M 15BU	XF1
422-367-2	HEADER PIN CONNECTORGDH2-6DBC	CON151
422-709-8	TDH CONNECTOR TDH2-6SG	CON152
421-648-1	CONNECTOR HR10A-7R-6SB	CON153
422-340-7	HEADER PIN CONNECTORGDH2-4SBC(6)	CON201
421-619-5	CONNECTOR 00-6200-167-012-800:ZIF	CON401
421-619-5	CONNECTOR 00-6200-167-012-800:ZIF	CON402
422-689-3	TDH CONNECTOR TDH2-8SG	CON403

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PART NO.	DESCRIPTION	REF.#
422-746-1	CONNECTOR 52231-1417	CON404
421-618-4	CONNECTOR 00-6200-057-012-800:ZIF	CON405
422-470-1	CONNECTOR WAFFER 53048-0410 1.25W/B	CON406
504-916	4P HOUSING ASS'Y 4P UL1061 AWG#28	CON9
245-009-8Z	DIODE RECT IN4003T/R	D1
245-009-8Z	DIODE RECT IN4003T/R	D2
243-026-3	DIODE SILICON SCHOTT1SS97	D3
243-012-0	DIODE MMBV3401LT1	D4
243-012-0	DIODE MMBV3401LT1	D5
243-012-0	DIODE MMBV3401LT1	D6
243-012-0	DIODE MMBV3401LT1	D7
243-051-5	DIODE SI KDS184S	D8
243-051-5	DIODE SI KDS184S	D9
243-063-6	DIODE SWITCHING KDS181S A3	D10
243-054-8	DIODE SI TUNING BB619A	D13
241-198-5	DIODE ZENER Z02W15(Y)	D152
251-148-1	LED LAMP SEF33G2TT	D153
244-003-7	DIODE GE 0A90 (BAND A, B, C, D)	D201
243-052-6	DIODE SI KDS193 (BAND E)	D201
244-003-7	DIODE GE 0A90	D202
243-049-4	DIODE SI KDS226	D204
243-050-4	DIODE VARACTOR 1SV153	D301
242-010-3	DIODE VARICAP MMBV105G	D302
243-063-6	DIODE SWITCHING KDS181S A3	D401
243-063-6	DIODE SWITCHING KDS181S A3	D402
243-052-6	DIODE SI KDS193	D403
243-051-5	DIODE SI KDS184S	D404
320-253-1	COIL FC 3X2 CORE BEAD	FB1
320-253-1	COIL FC 3X2 CORE BEAD	FB2
320-253-1	COIL FC 3X2 CORE BEAD	FB3
320-253-1	COIL FC 3X2 CORE BEAD	FB4
320-723-1	COIL HELICAL 5HW-3945A-410:2POLE	FL1
320-903-5	COIL HERICAL 430MHZ 2POLE:F367PN-K5012A	FL1
320-877-5	COIL HERICAL 460MHZ-2POLE	FL1
320-901-3	COIL HERICAL 500MHZ 2POLE	FL1
320-899-5	COIL HERICAL 410MHZ 2POLE	FL2
320-900-2	COIL HERICAL 430MHZ 2POLE	FL2
320-893-9	COIL HERICAL 460MHZ 2POLE:F367 PN-K5005A	FL2
320-877-5	COIL HERICAL 460MHZ-2POLE	FL2
320-592-7	COIL HELICAL 440MHZ:2POLE	FL3
320-723-1	COIL HELICAL 5HW-3945A-410:2POLE	FL3
320-907-9	COIL HERICAL 390MHZ 2POLE:F367PN-K5010A	FL3
320-902-4	COIL HERICAL 500MHZ 2POLE	FL3
280-109-6	4 AMP FUSE	FUSE

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
223-319-2	I.C MC145156DW2	IC1
223-313-6	I.C MC12022BD(S008)	IC2
223-116-5	I.C MC3361DR2	IC3
231-008-4	I.C LM386(803-N-3)	IC4
220-159-9	I.C(REGULATOR) TK11680NT	IC5
223-119-8	I.C KA78L05	IC6
223-224-9	I.C MC14066BDR2:SO14	IC401
223-224-9	I.C MC14066BDR2:SO14	IC402
223-320-2	I.C MC14504BDR2	IC403
222-018-5	I.C KIA324F	IC404
222-018-5	I.C KIA324F	IC405
222-018-5	I.C KIA324F	IC406
231-073-3	I.C MF6CWM-100	IC407
229-463-8A	I.C EEPROM AT93C56-10SI	IC408
220-130-2	I.C HD4074818H(FP-80A.QFP)	IC409
222-018-5	I.C KIA324F	IC410
223-261-2	I.C MC14053BD	IC411
310-549-6	COIL SPRING 2.8&X0.6%X1(1/2T)R (BAND E)	L1
310-672-3	COIL SPRING 3.2DIAX0.6DIAX1.5T(R) (BAND A, B, C, D)	L1
310-619-6	COIL SPRING 2.8DIAX0.6DIAX1.5T:(L) (BAND E)	L2
310-618-5	COIL SPRING 3.6DIAX0.6DIAX1.5T:(R) (BAND C, D)	L2
310-674-5	COIL SPRING 4.0DIAX0.6DIAX1.5T(R) (BAND A, B)	L2
310-619-6	COIL SPRING 2.8DIAX0.6DIAX1.5T:(L) (BAND E)	L3
310-673-4	COIL SPRING 3.2DIAX0.6DIAX1.5T(L) (BAND A, B, C, D)	L3
310-551-7	COIL SPRING 2.4&X0.4&X6(1/2T)R	L4
310-551-7	COIL SPRING 2.4&X0.4&X6(1/2T)R	L5
310-550-6	COIL SPRING 2.4&X0.4&X4(1/2T)R	L6
310-615-2	COIL SPRING 1.8DIAX0.4DIAX1.5T:(L)	L7
310-616-3	COIL SPRING 1.8DIAX0.4DIAX2.5T:(L)	L8
310-615-2	COIL SPRING 1.8DIAX0.4DIAX1.5T:(L)	L9
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L10
310-532-0	COIL SPRING 0.4DIAX4TX1KOHM 1/4W	L11
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L12
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L13
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L14
310-381-0	COIL AXIAL 1MH:LAL03TB102K	L15
310-218-7	COIL CHOKE 0.3DIAX7T 1KOHM RESISTOR TY (BAND A, B)	L16
310-532-0	COIL SPRING 0.4DIAX4TX1KOHM 1/4W (BAND C, D, E)	L16
310-380-9	COIL AXIAL 100UH:LAL03TB101K	L17
310-576-0	COIL AXIAL 100UH:LAL02TB101K	L18
310-399-7	COIL AXIAL 0.68UH:LAL02TBR68K	L19
310-399-7	COIL AXIAL 0.68UH:LAL02TBR68K	L20
310-399-7	COIL AXIAL 0.68UH:LAL02TBR68K	L21
310-380-9	COIL AXIAL 100UH:LAL03TB101K	L22

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
310-380-9	COIL AXIAL 100UH:LAL03TB101K	L23
310-289-1	COIL AXIAL 2.2UH:LAL03TB2R2M	L24
310-617-4	COIL SPRING 1.8DIAX0.4DIAX4.5T:(R)	L26
310-614-1	COIL SPRING 1.2DIAX0.4DIAX4.5T:(R)	L27
420-205-9	MIC CONDENSER WM034CY	MIC
203-046-9	TRANSISTOR SRF1886	Q1
203-055-7	TRANSISTOR MRF581	Q2
200-003-5	TRANSISTOR BFR92A REEL	Q3
218-042-4	TRANSISTOR KSR2102(T)	Q4
218-042-4	TRANSISTOR KSR2102(T)	Q5
218-042-4	TRANSISTOR KSR2102(T)	Q6
218-042-4	TRANSISTOR KSR2102(T)	Q7
200-001-3	TRANSISTOR BC848C SOT-23	Q8
200-001-3	TRANSISTOR BC848C SOT-23	Q9
200-001-3	TRANSISTOR BC848C SOT-23	Q10
203-111-4	TRANSISTOR BCX-18LT1	Q11
203-116-9	TRANSISTOR MMBFJ310LT1	Q12
200-003-5	TRANSISTOR BFR92A REEL	Q13
200-002-4	TRANSISTOR BC858B SOT-23	Q14
218-038-0	TRANSISTOR KSR1102(T)	Q15
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q16
202-082-6	TRANSISTOR KTA1504ST1(G)	Q17
202-082-6	TRANSISTOR KTA1504ST1(G)	Q18
200-001-3	TRANSISTOR BC848C SOT-23	Q19
218-042-4	TRANSISTOR KSR2102(T)	Q20
202-097-0	TRANSISTOR KTN2369S	Q21
202-095-8Z	TRANSISTOR KRC104SND	Q22
200-001-3	TRANSISTOR BC848C SOT-23 (BAND A, B, C)	Q201
202-113-1	TRANSISTOR KTC3875S(BL) (BAND D, E)	Q201
200-001-3	TRANSISTOR BC848C SOT-23 (BAND A, B, C)	Q202
202-113-1	TRANSISTOR KTC3875S(BL) (BAND D, E)	Q202
200-001-3	TRANSISTOR BC848C SOT-23	Q301
203-104-8	TRANSISTOR MRF5711LT1	Q302
200-003-5	TRANSISTOR BFR92A REEL	Q303
200-003-5	TRANSISTOR BFR92A REEL	Q304
203-096-4	TRANSISTOR MMBC1321Q4LT1	Q305
202-092-5	BRT KRA110S PK	Q401
209-039-3Z	TRANSISTOR KRC101S	Q402
202-095-8Z	TRANSISTOR KRC104SND	Q403
202-095-8Z	TRANSISTOR KRC104SND	Q404
202-095-8Z	TRANSISTOR KRC104SND	Q405
202-089-3	BRT KRA102S PB	Q406
202-089-3	BRT KRA102S PB	Q407
202-095-8Z	TRANSISTOR KRC104SND	Q408

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
202-091-4	BRT KRA104S PD	Q409
202-091-4	BRT KRA104S PD	Q410
202-095-8Z	TRANSISTOR KRC104SND	Q411
207-006-3	FET 2SK 1579-TMOS	Q412
009-220-7Z	RESISTOR 22 1/4W:J "S"	R1
002-272-9Z	RESISTOR 2.7K 1/8W:J "S" (BAND C)	R2
002-821-5Z	RESISTOR 820 1/8W:J "S" (BAND A, B, D, E)	R2
060-221-1Z	RESISTOR 220:MCR10EZH221J	R3
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J (BAND B)	R4
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J (BAND A, C, D, E)	R4
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R5
060-471-0Z	RESISTOR 470:MCR10EZH471J	R6
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R7
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J	R8
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R9
060-393-3Z	RESISTOR 39K:MCR10EZH393J	R10
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R11
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R12
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R13
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R14
060-101-6Z	RESISTOR 100:MCR10EZH101J	R15
060-471-0Z	RESISTOR 470:MCR10EZH471J	R16
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R17
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R18
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J	R19
060-101-6Z	RESISTOR 100:MCR10EZH101J	R20
060-390-8Z	RESISTOR 39:MCR10EZH390J	R21
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R22
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J (BAND C, D)	R23
060-152-2Z	RESISTOR 1.5K:MCR10EZH152J (BAND A, B, E)	R23
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R24
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R25
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R26
060-221-1Z	RESISTOR 220:MCR10EZH221J	R27
060-563-0Z	RESISTOR 56K:MCR10EZH563J	R28
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R29
060-101-6Z	RESISTOR 100:MCR10EZH101J	R30
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R31
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R32
060-471-0Z	RESISTOR 470:MCR10EZH471J	R33
060-471-0Z	RESISTOR 470:MCR10EZH471J	R34
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R35
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R36
060-471-0Z	RESISTOR 470:MCR10EZH471J (BAND B)	R37

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R38
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J (BAND B, C, D, E)	R39
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J (BAND A)	R39
060-000-8Z	RESISTOR 0 :MCR10EZH0R0J	R40
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J (BAND B, C)	R41
060-680-2Z	RESISTOR 68:MCR10EZH680J (BAND A, D, E)	R41
060-392-2Z	RESISTOR 3.9K:MCR10EZH392J (BAND A)	R42
060-392-2Z	RESISTOR 3.9K:MCR10EZH392J (BAND D, E)	R42
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J (BAND B, C)	R42
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J	R43
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J	R44
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R45
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R46
060-153-3Z	RESISTOR 15K:MCR10EZH153J	R47
060-154-4Z	RESISTOR 150K:MCR10EZH154J	R49
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J (BAND A, D, E)	R50
060-392-2Z	RESISTOR 3.9K:MCR10EZH392J (BAND B, C)	R50
060-512-4Z	RESISTOR 5.1K:MCR10EZH512J (BAND A, D, E)	R51
060-682-4Z	RESISTOR 6.8K:MCR10EZH682J (BAND B, C)	R51
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R53
060-153-3Z	RESISTOR 15K:MCR10EZH153J	R54
060-152-2Z	RESISTOR 1.5K:MCR10EZH152J	R55
060-211-1Z	RESISTOR 220:MCR10EZH221J	R56
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R57
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R58
060-102-7Z	RESISTOR 1K:MCR10EZH102J	R59
060-101-6Z	RESISTOR 100:MCR10EZH101J	R60
060-181-8Z	RESISTOR 180:MCR10EZH181J	R61
060-273-8Z	RESISTOR 27K:MCR10EZH273J (BAND A, E)	R119
060-303-2Z	RESISTOR 30K:MCR10EZH303J (BAND D)	R119
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R121
060-152-2Z	RESISTOR 1.5K:MCR10EZH152J	R149
060-202-4Z	RESISTOR 2K:MCR10EZH202J	R153
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R155
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R156
060-101-6Z	RESISTOR 100:MCR10EZH101J	R157
060-101-6Z	RESISTOR 100:MCR10EZH101J	R158
060-123-6Z	RESISTOR 12K:MCR10EZH123J (BAND B, C)	R201
060-223-3Z	RESISTOR 22K:MCR10EZH223J (BAND A, D, E)	R201
060-223-3Z	RESISTOR 22K:MCR10EZH223J (BAND A, D, E)	R202
060-471-0Z	RESISTOR 470:MCR10EZH471J (BAND B, C)	R202
060-223-3Z	RESISTOR 22K:MCR10EZH223J (BAND A, D, E)	R203
060-393-3Z	RESISTOR 39K:MCR10EZH393J (BAND B, C)	R203
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J (BAND A, D, E)	R204

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J (BAND B, C)	R204
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J	R205
060-563-0Z	RESISTOR 56K:MCR10EZH563J	R206
060-103-8Z	RESISTOR 10K:MCR10EZH103J (BAND A, D, E)	R207
060-563-0Z	RESISTOR 56K:MCR10EZH563J (BAND B, C)	R207
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J (BAND B, C)	R208
060-221-1Z	RESISTOR 220:MCR10EZH221J (BAND A, D, E)	R208
060-272-7Z	RESISTOR 2.7K:MCR10EZH272J (BAND B, C)	R209
060-393-3Z	RESISTOR 39K:MCR10EZH393J (BAND A, D, E)	R209
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R210
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R211
060-153-3Z	RESISTOR 15K:MCR10EZH153J	R212
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R213
060-100-5Z	RESISTOR 10:MCR10EZH100J	R301
060-562-9Z	RESISTOR 5.6K:MCR10EZH562J	R302
060-122-5Z	RESISTOR 1.2K:MCR10EZH122J	R303
060-182-9Z	RESISTOR 1.8K:MCR10EZH182J	R303
060-221-1Z	RESISTOR 220:MCR10EZH221J	R304
060-182-9Z	RESISTOR 1.8K:MCR10EZH182J	R305
060-221-1Z	RESISTOR 220:MCR10EZH221J	R306
060-123-6Z	RESISTOR 12K:MCR10EZH123J	R307
060-220-0Z	RESISTOR 22:MCR10EZH220J	R308
060-182-9Z	RESISTOR 1.8K:MCR10EZH182J	R309
060-220-0Z	RESISTOR 22:MCR10EZH220J	R310
060-683-5Z	RESISTOR 68K:MCR10EZH683J	R311
060-220-0Z	RESISTOR 22:MCR10EZH220J	R312
060-823-5Z	RESISTOR 82K:MCR10EZH823J	R313
060-684-6Z	RESISTOR 680K:MCR10EZH684J	R401
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R402
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R403
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R404
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R405
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R406
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R407
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R408
060-154-4Z	RESISTOR 150K:MCR10EZH154J	R409
060-332-8Z	RESISTOR 3.3K:MCR10EZH332J	R410
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R411
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R412
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R413
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R414
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R415
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R416
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R417

ELECTRICAL PARTS LIST

PART NO.	DESCRIPTION	REF.#
060-561-8Z	RESISTOR 560:MCR10EZH561J	R418
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R419
060-334-0Z	RESISTOR 330K:MCR10EZH334J	R420
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R421
060-683-5Z	RESISTOR 68K:MCR10EZH683J	R422
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R423
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R424
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R425
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R426
060-104-9Z	RESISTOR 100K:MCR10EZH104J	R427
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R428
060-563-0Z	RESISTOR 56K:MCR10EZH563J	R429
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R430
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R431
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R432
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R433
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R434
060-682-4Z	RESISTOR 6.8K:MCR10EZH682J	R435
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R436
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R437
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R438
060-302-1Z	RESISTOR 3K:MCR10EZH302J	R439
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R440
060-362-5Z	RESISTOR 3.6K:MCR10EZH362J	R441
060-273-8Z	RESISTOR 27K:MCR10EZH273J	R442
060-242-0	RESISTOR 2.4K OHM 1/10W +-5%	R443
060-823-5Z	RESISTOR 82K:MCR10EZH823J	R444
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R445
060-821-3Z	RESISTOR 820:MCR10EZH821J	R446
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R447
060-123-6Z	RESISTOR 12K:MCR10EZH123J	R448
060-203-5Z	QESISTOR CHIP 20K:MCR10EZH203J	R449
060-333-9Z	RESISTOR 33K:MCR10EZH333J	R450
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R451
060-222-2Z	RESISTOR 2.2K:MCR10EZH222J	R452
060-105-0Z	RESISTOR 1M:MCR10EZH105J	R453
060-223-3Z	RESISTOR 22K:MCR10EZH223J	R454
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R455
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R456
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R457
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R458
060-822-4Z	RESISTOR 8.2K:MCR10EZH822J	R459
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R460
060-105-0Z	RESISTOR 1M:MCR10EZH105J	R461

ELECTRICAL PARTS LIST

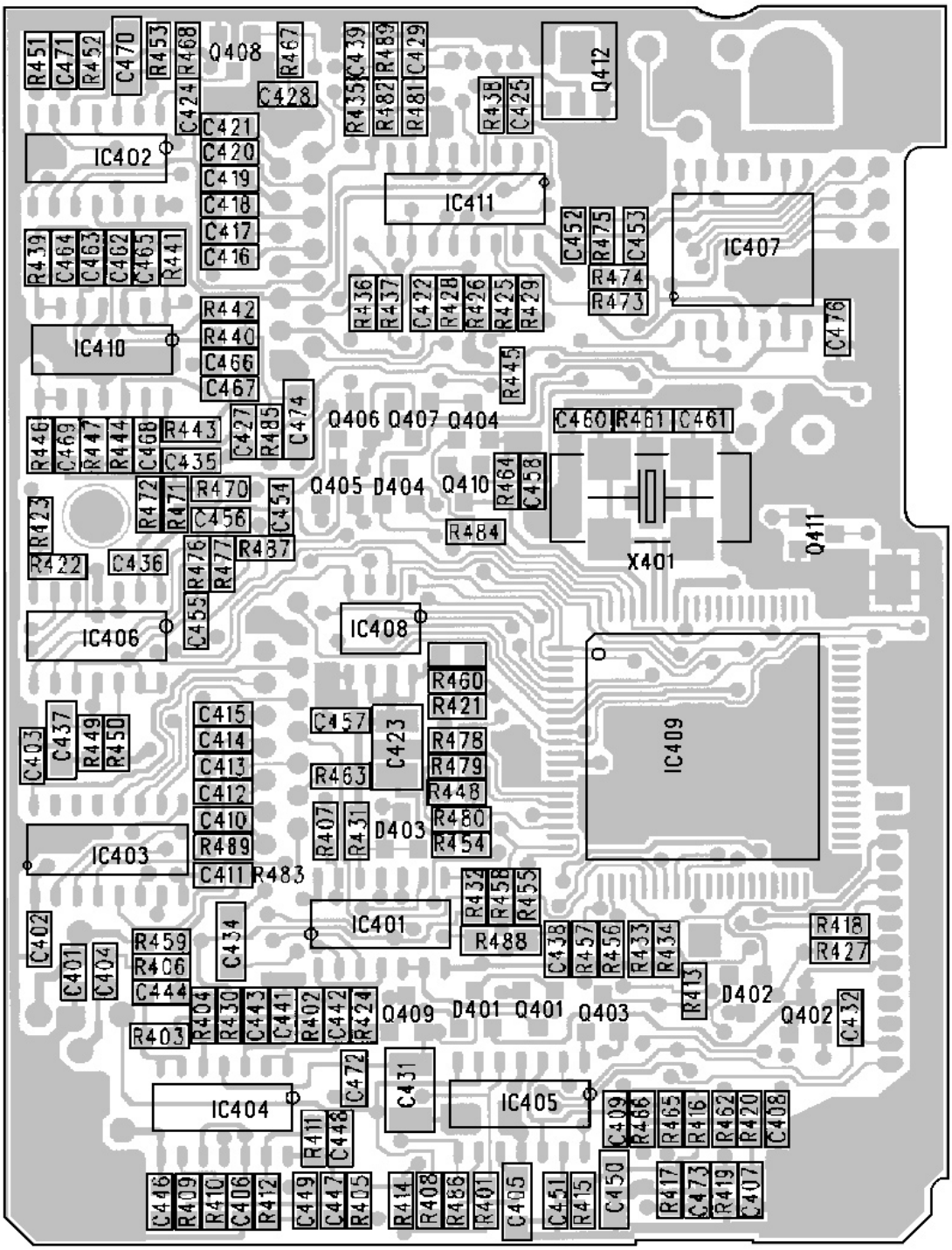
PART NO.	DESCRIPTION	REF.#
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R462
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R463
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R464
060-184-1Z	RESISTOR 180K:MCR10EZH184J	R465
060-184-1Z	RESISTOR 180K:MCR10EZH184J	R466
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R467
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R468
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R469
060-303-2Z	RESISTOR 30K:MCR10EZH303J	R470
060-303-2Z	RESISTOR 30K:MCR10EZH303J	R471
060-363-6Z	RESISTOR 36K:MCR10EZH363J	R472
060-433-6Z	RESISTOR 43K:MCR10EZH433J	R473
060-433-6Z	RESISTOR 43K:MCR10EZH433J	R474
060-473-2Z	RESISTOR 47K:MCR10EZH473J	R475
060-364-7	RESISTOR 360K OHM 1/10W +-5%	R476
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R477
060-393-3Z	RESISTOR 39K:MCR10EZH393J	R478
060-203-5Z	RESISTOR CHIP 20K:MCR10EZH203J	R479
060-103-8Z	RESISTOR 10K:MCR10EZH103J	R480
060-229-9Z	RESISTOR 2.2:MCR10EZH2R2J	R481
060-470-9Z	RESISTOR 47:MCR10EZH470J	R482
060-152-2Z	RESISTOR 1.5K:MCR10EZH152J	R483
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R484
060-224-4Z	RESISTOR 220K:MCR10EZH224J	R485
060-103-8Z	RESISTOR 10K:MCR10EZH103J (BAND C)	R486
060-562-9Z	RESISTOR 5.6K:MCR10EZH562J (BAND B, D)	R486
060-752-4Z	RESISTOR 7.5K:MCR10EZH752J (BAND E)	R486
060-124-6Z	RESISTOR 120K:MCR10EZH124J	R487
059-000-0Z	RESISTOR 0:MCR18EZH0R0J	R488
060-472-1Z	RESISTOR 4.7K:MCR10EZH472J	R489.
060-474-3Z	RESISTOR 470K:MCR10EZH474J	R700
480-050-3	POTENTIOMETER NRV630HF01 B5KOHM	RV401
480-045-9	TRIMMER POT.METER NRV630HF01 B20K	RV402
480-051-4	POTENTIOMETER NRV630HF01 B50KOHM	RV403
420-116-A	SPEAKER 45-8B-04S	SPKR
432-063-7	SW PUSH SPPH221BP011	SW151
436-030-0	SW TACT SKHUPF	SW401
436-030-0	SW TACT SKHUPF	SW402
320-905-7	COIL IFT 21.4MHZ:25KHZ	T4
320-232-2	COIL 455KHZ DETECTOR	T5
172-019-0	CAP. TRIMMER 20PF:ECR-LA020E52V (BAND A)	TC3
176-014-5	CAP. TRIMMER 6PF:ECR-LA006A52V (BAND B, C, D, E)	TC3
176-014-5	CAP. TRIMMER 6PF:ECR-LA006A52V	TC4
171-501-3	CAP. TRIMMER TSW-3-P-180	TC301

ELECTRICAL PARTS LIST

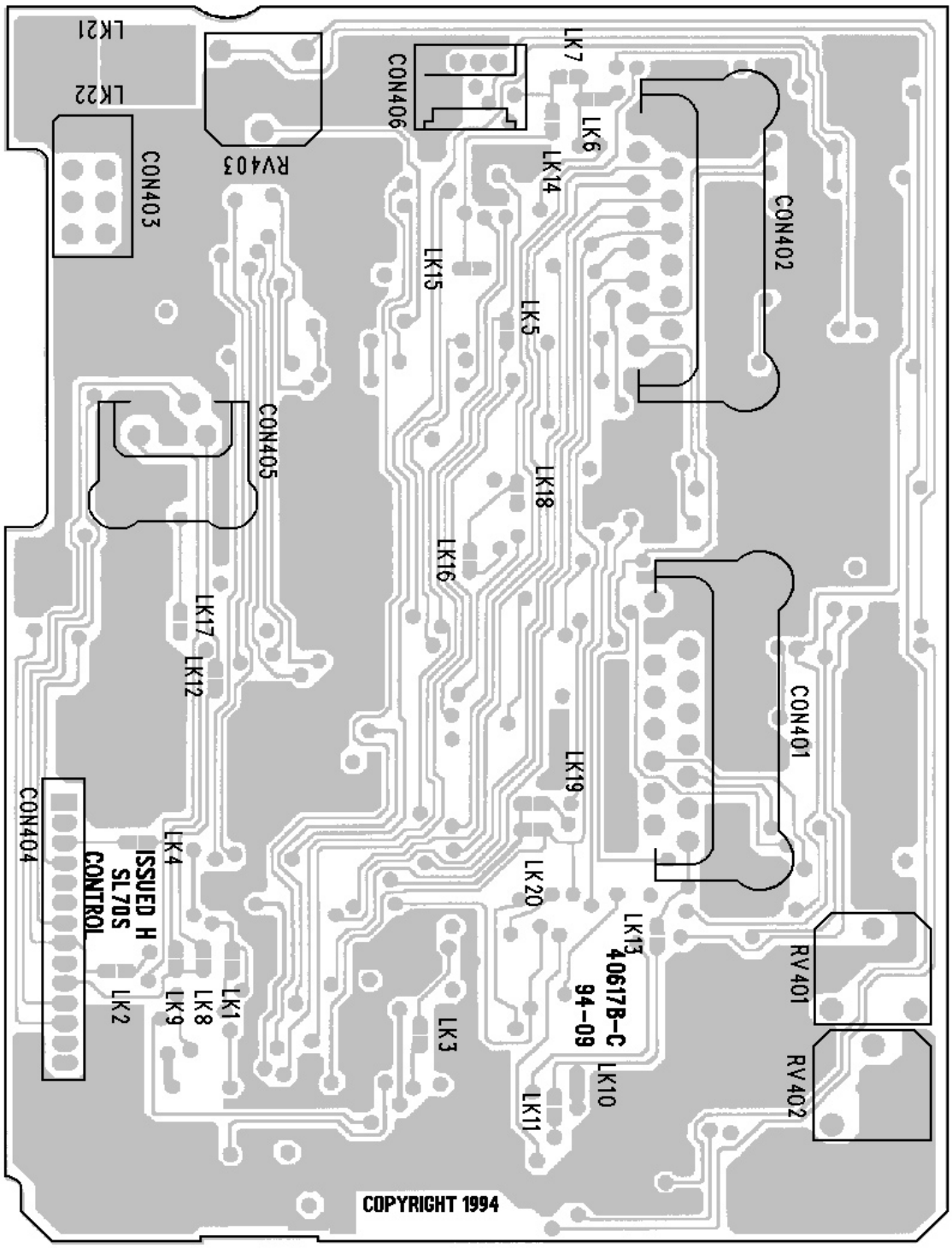
PART NO.	DESCRIPTION	REF.#
099-303-6	THERMISTOR 30K OHM +-15%:KC5D330L	TH1
098-252-8	THERMISTOR 2.5K OHM +-15%:KTD5-225	TH2
098-252-8	THERMISTOR 2.5K OHM+-15%:KTD5-225	TH3
097-474-8	THERMISTOR CHIP 470K:B57621-C474M	TH4
097-103-3	THERMISTOR 10K OHM +-10%:YTD5-310	TH201
071-472-9	RESISTOR SEMIFIXED 4.7KB:RH0651C100472	VR1
071-103-6	RESISTOR SEMIFIXED 10KB:RH0651C100103	VR2
450-512-5	VR 20K:V12M4-1(6X5)(PVB)S(SJ)1	VR153
480-045-9	TRIMMER POT.METER NRV630HF01 B20K	VR201
263-040-2	CRYSTAL CL20P 12.800MHZ 5PPM	X1
262-052-7Z	CRYSTAL NR-18T 20.945MHZ 15PPM	X2
262-775-7	CRYSTAL CHIP CP12A 3.579545MHZ	X401
271-002-0	FILTER CRYSTAL 21M 15BU	XF1

PRINTED CIRCUIT BOARD LAYOUT

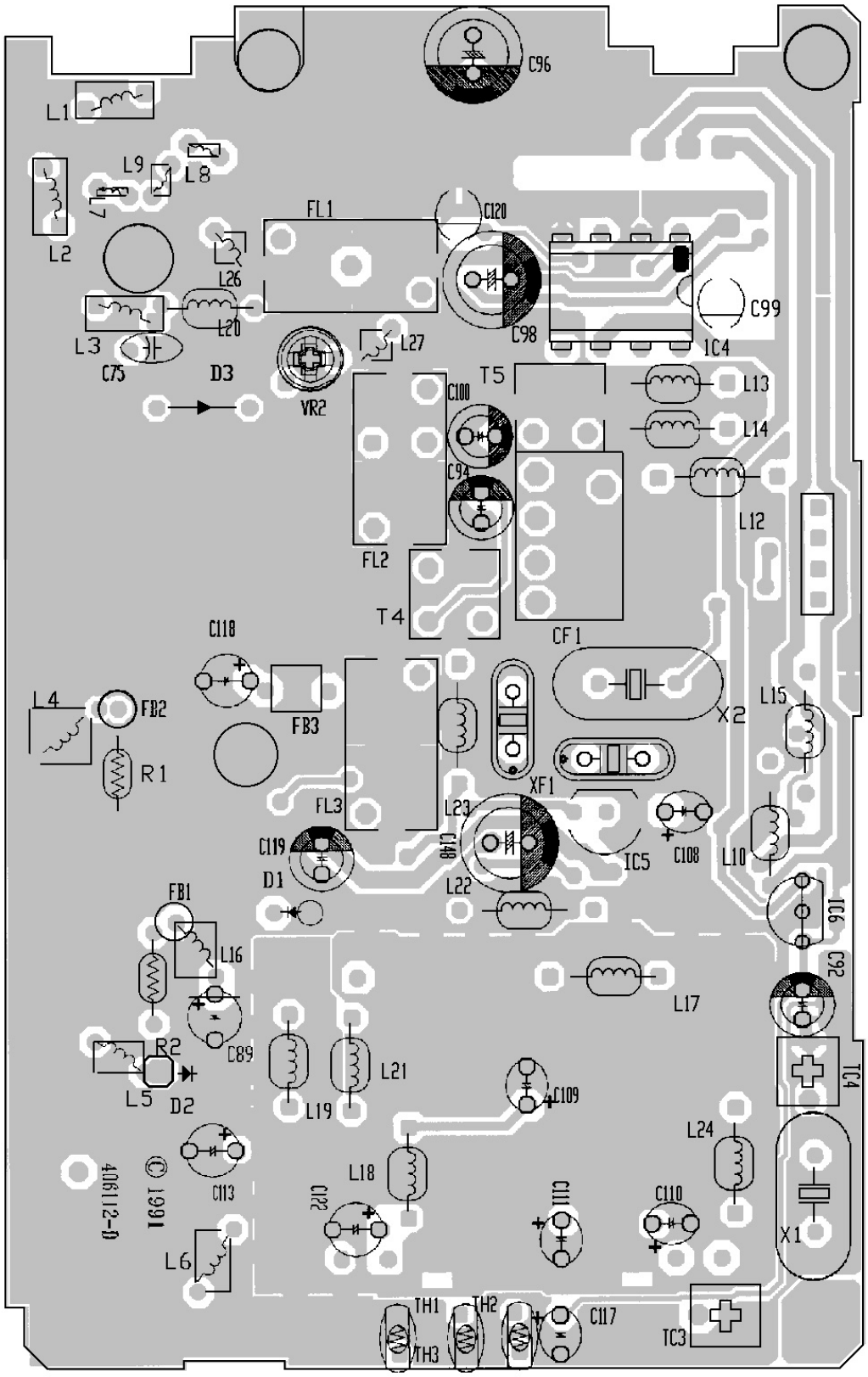
406-178 DIGITAL TOP



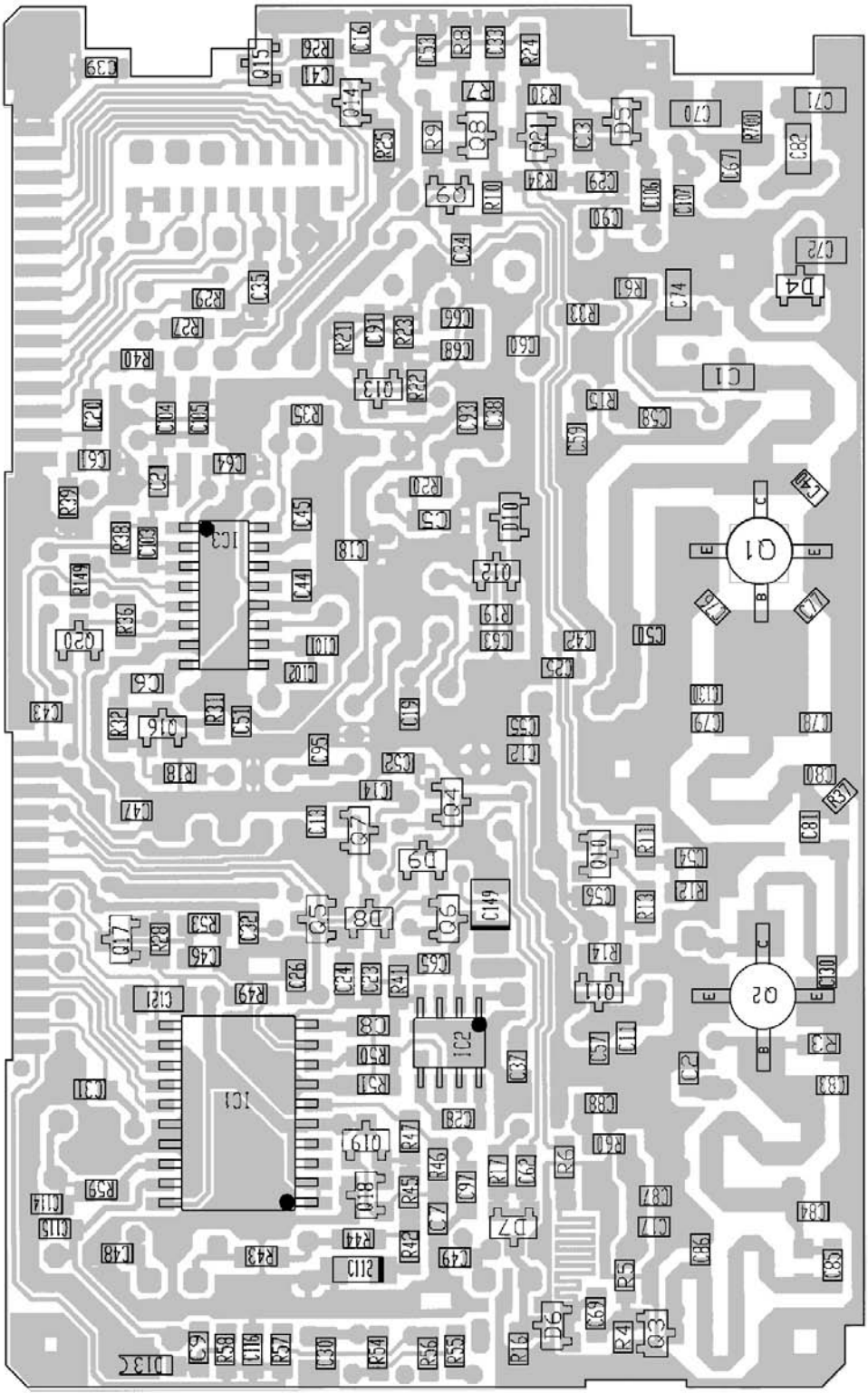
406-178 DIGITAL BOTTOM



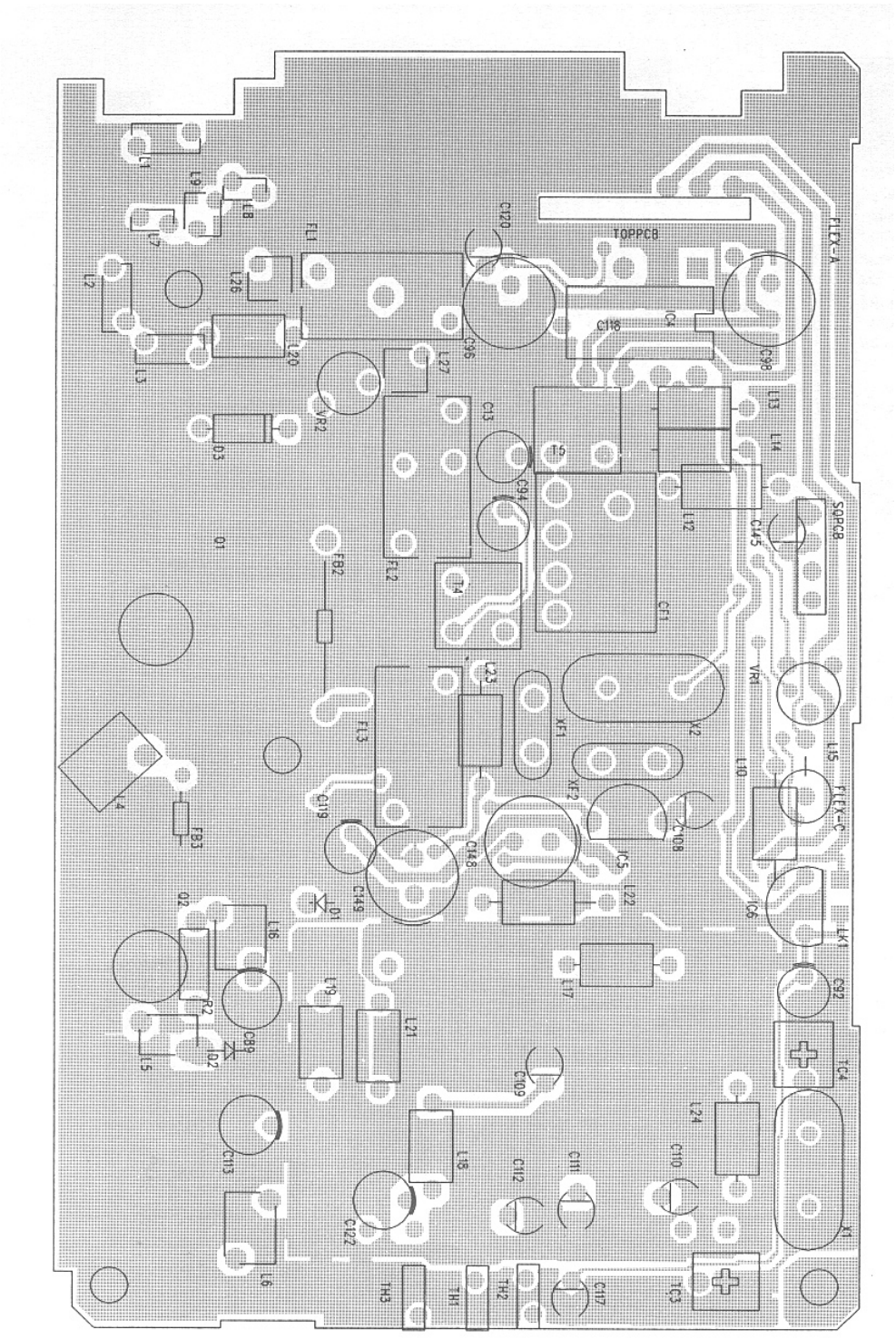
406-112-D RF TOP



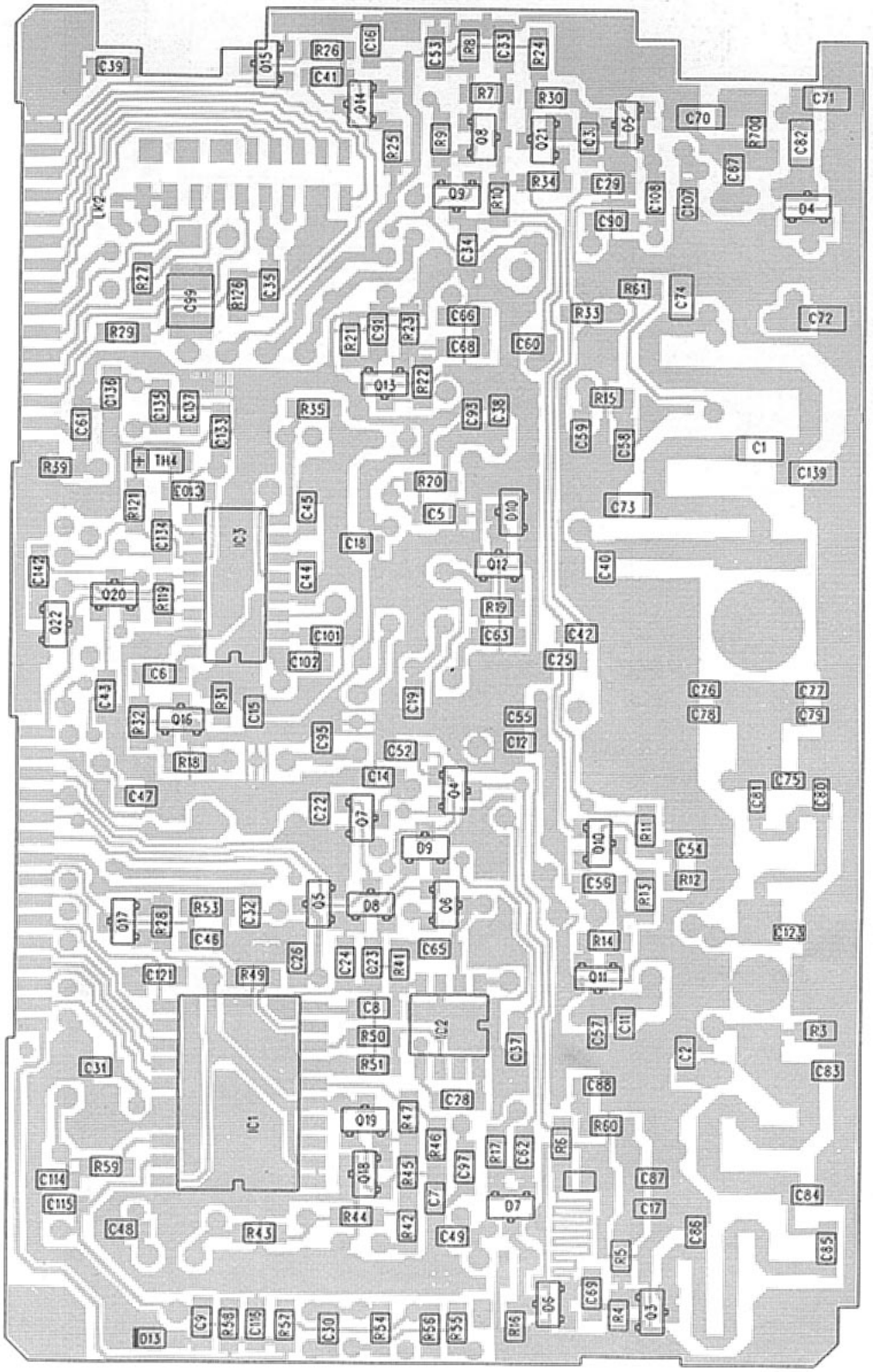
406-112-D RF BOTTOM



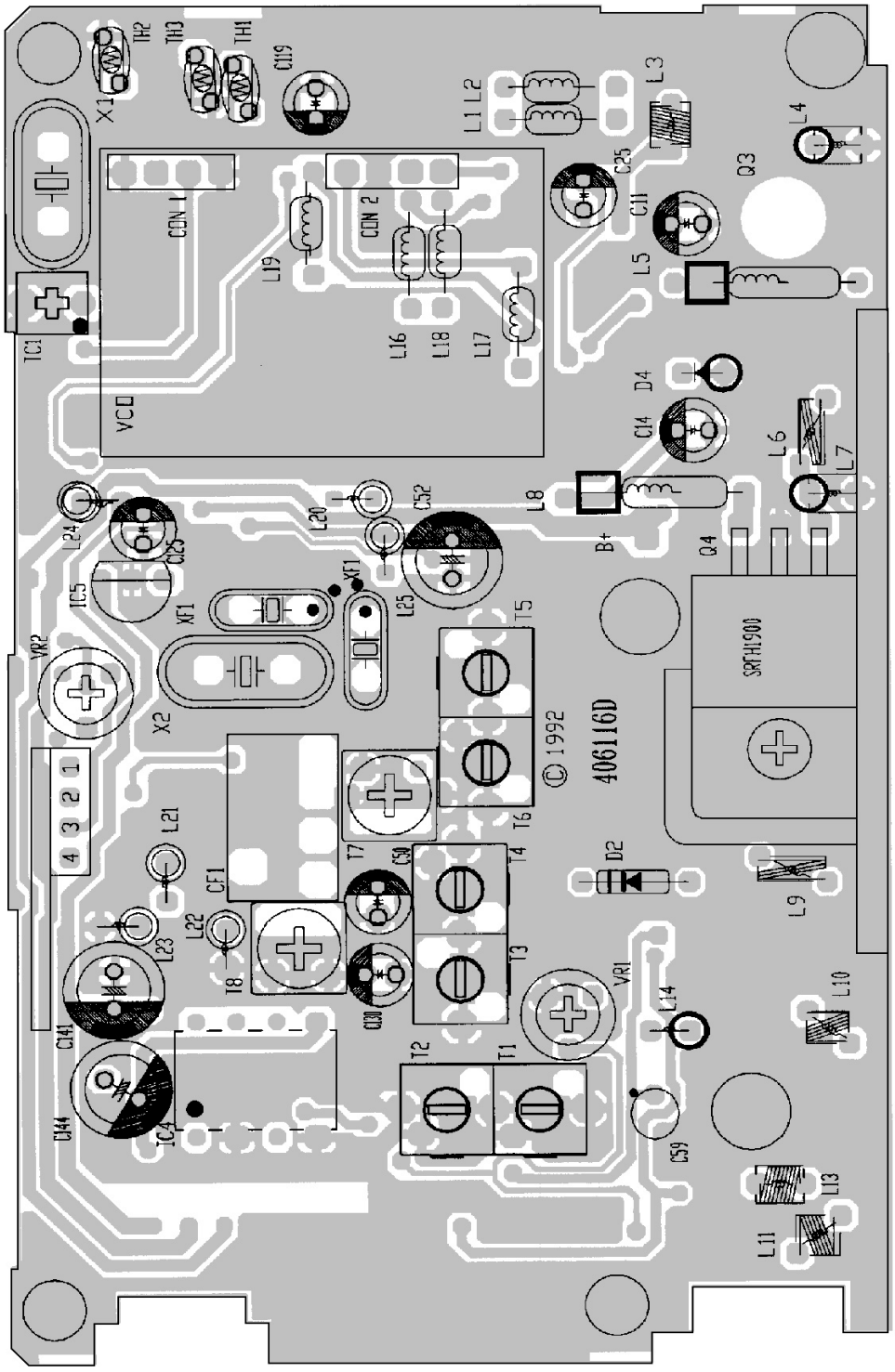
406-112-H RF TOP



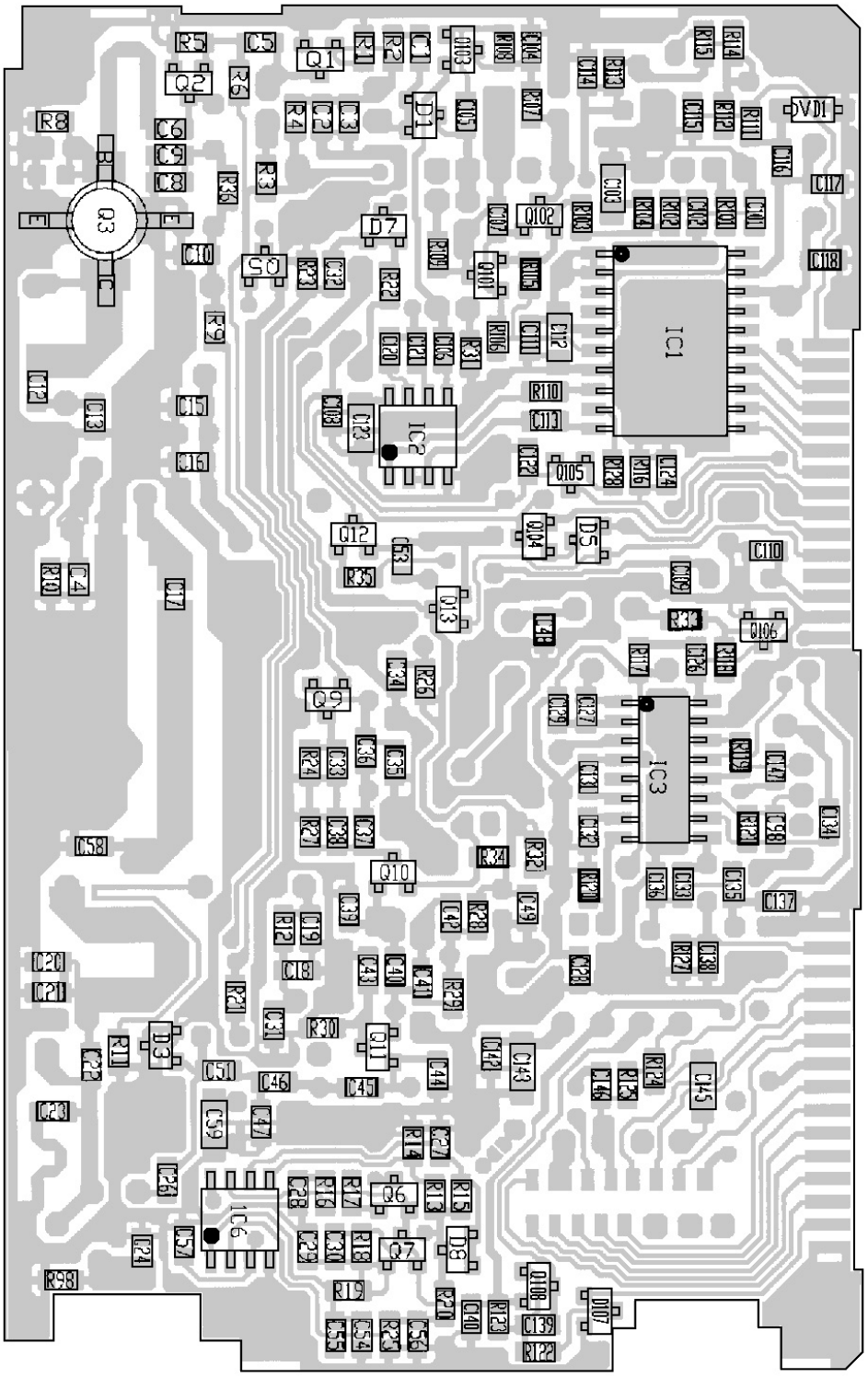
406-112-H RF BOTTOM



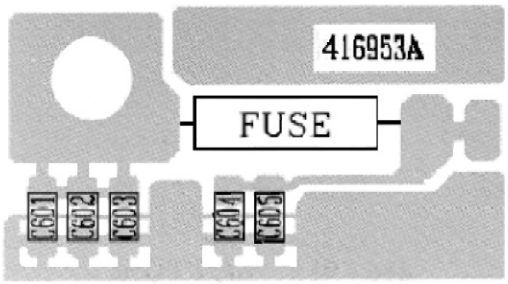
406-116 RF TOP



406-116 RF BOTTOM

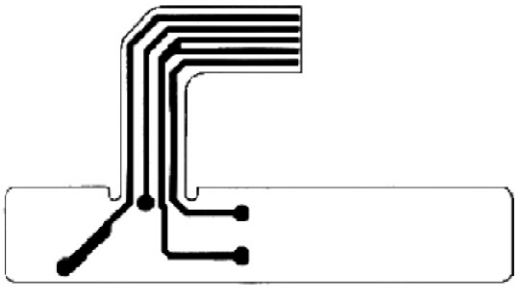


MISC. PCB

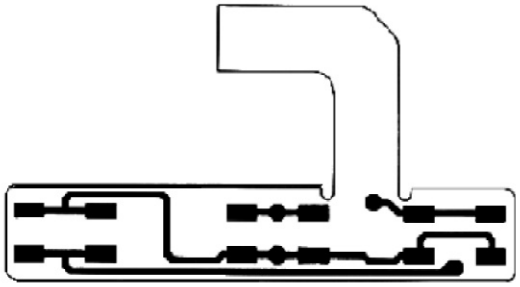


416 - 953 TOP

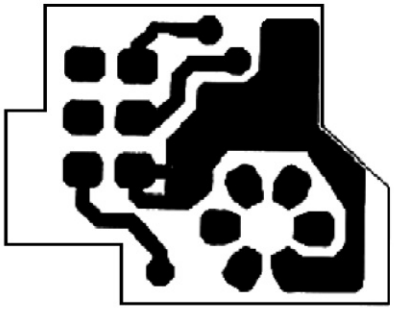
416 - 953 BOTTOM



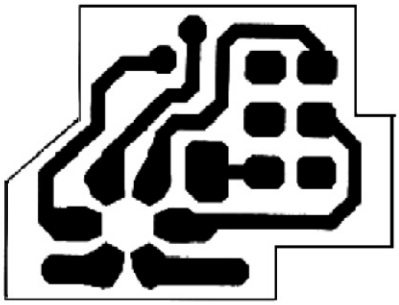
416 - 954 TOP



416 - 954 BOTTOM

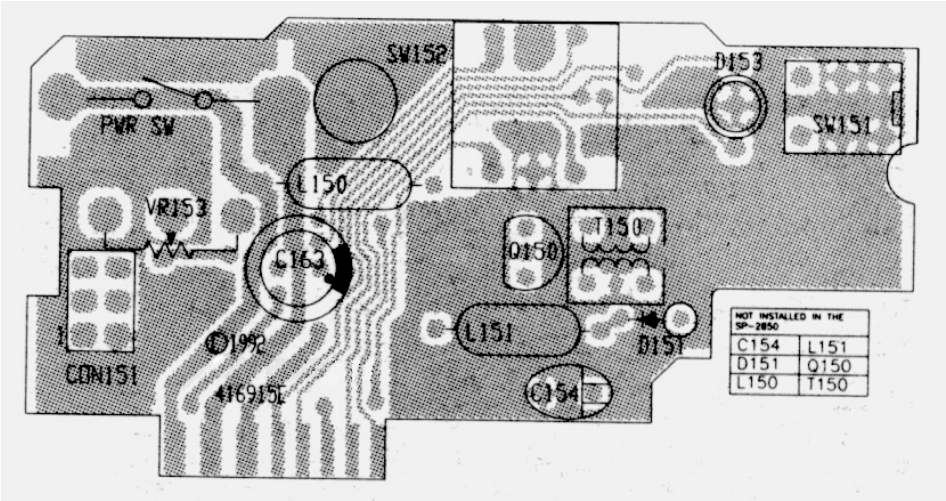


416 - 961 TOP

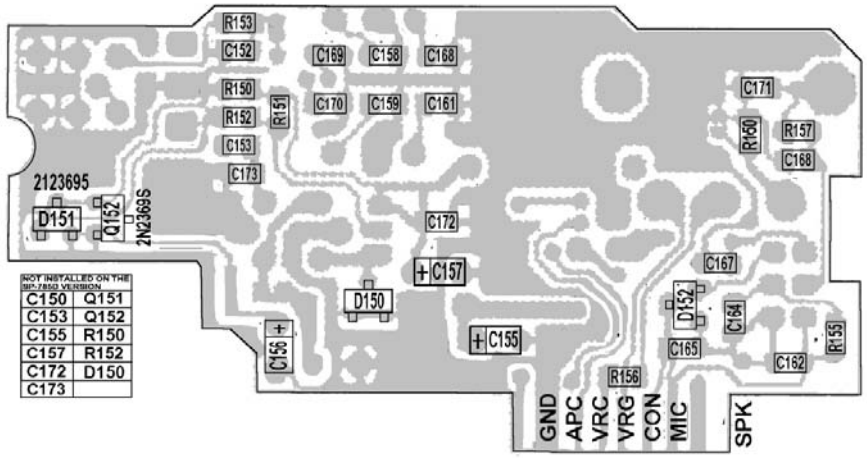


416 - 961 BOTTOM

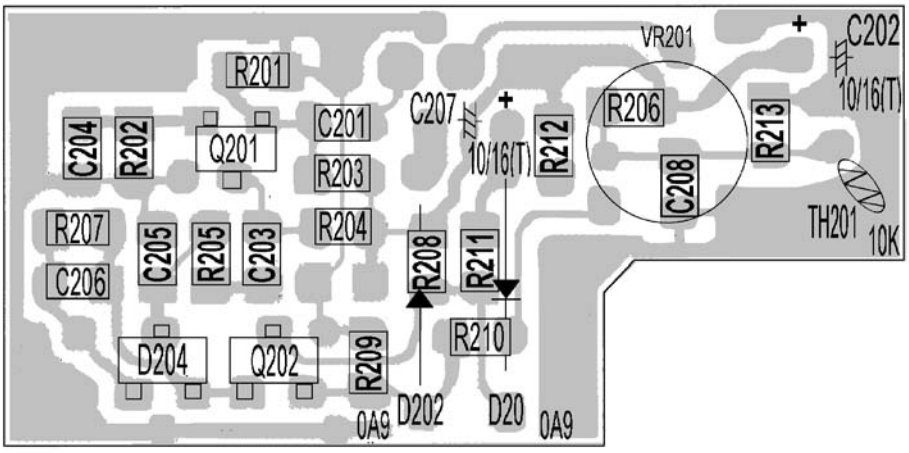
MISC. PCB



416-915 TOP

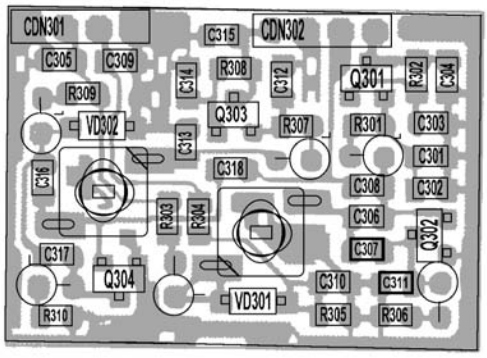


416-915 BOTTOM

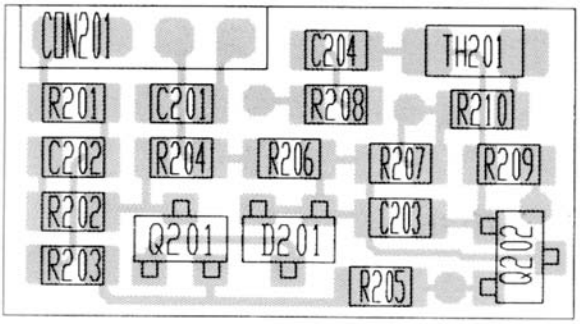


416-917 TOP

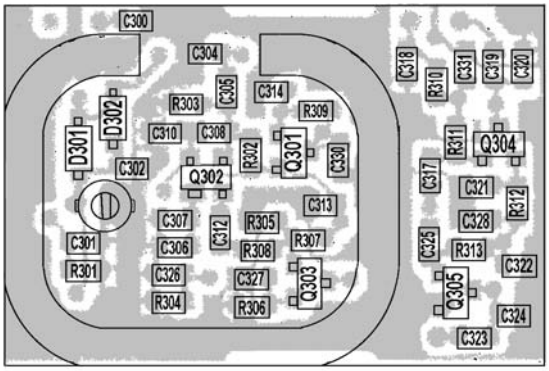
MISC. PCB



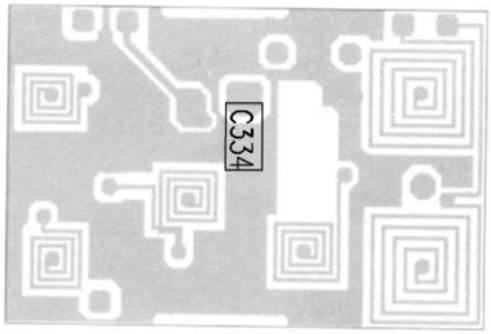
416-902 TOP



416-903 TOP



416-914 TOP



416-914 BOTTOM

EXPLODED VIEW PARTS LIST

NOTE

Only those items indicated by shading will be stocked by After Market Services. All other items are for reference only.

When ordering parts for your Monogram Series radio, precede all part numbers with the prefix "R29/"

MONOGRAM UHF EXPLODED VIEW PARTS LIST

Identifier	Part Name and Description	Part No.
B2	(+)MACHINE SCREW(FH)2.6X6 SUS BLK	611-380
B3	CVR BOTM ALDC12 DRK CHRCOAL SPRY	718-153-AA
B4	PROTECTOR"A" NEOPRENE RUBBER BLK	894-566
B5	PROTECTOR"B" NEOPRENE RUBBER BLK	894-567
B6	LABL FCC NO. AL FOIL 48X8	959-647-BB
B7	POST BSBM NI-PLAT M2.6	852-991-A
B8	POST BSBM HEX4.5X17.2 NI-PLAT	852-950
B9	MACHINE SCREW(FH) 2-56X6 SUS NI-PLAT	600-727-A
B10	LATCH PLATE SK5 T0.5 NI-PLAT	771-885
B11	SPRING(LATCH) SUS304 T0.35	881-476
B12	LATCH NYLON12 BLK	826-093
B13	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
B14	FELT 80X20XT0.2 PVC CLEAR	906-406
B15	(+)MACHINE SCREW(PH)#2-56X7 NI-PLAT	600-765
BH1	HLDR CONTACT NO-CONDUCTIVE SPRY	732-729-B
BH2	TERMINAL(-) SPC T0.6 NI-PLAT	752-651
BH3	P.C.B BATTERY 22X13X1.0T FR4 1/1	416-953-B
BH4	BUSHING BSBM SN-PLAT	853-042
BH5	INSULATOR SILICON RUBBER HS50' BLK	895-000
BH6	CONTACT(BATT.) PBS 1/2H T0.25 NI-PLAT	881-477
BH7	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
D1	RUBBER CAP SILICN RUBBER HS50' GRY	894-785
D2	RUBBER HLDR SILICN RUBBER HS50' GRY	894-787
D3	P.C.B DIGITAL 73.4X56.5X1.6T FR4 2/S	406-178-C
D4	SHIELD PLATE NSP T0.3	772-094
P1	"E" RING &1.5 BLK	665-018
P2	BRACKET SUS304 DRK CHRCOAL SPRY	723-670-A
P3	BELT CLIP LEXAN141-2032	752-483-B
P4	SPRING(BELT CLIP) SWP &0.8	881-496-A
P5	PIN BSBM &3.5X30 NI-PLAT	860-110
PT1	PTT PAD SILICN RUBBER BLK HS40'	894-848
PT2	INSERT PLATE SUS304 T0.2	772-061
PT3	TENSION PLATE P.C T0.2(CLEAR)	795-540-A
PT4	SW TACT SKHUPF	436-030-0
PT5	P.C.B FLEX PTT 47.8X25.4X1MIL 1/1	416-954-A
PT6	PLATE PTT SPC T1 NI-PLAT	772-050
R1-A	P.C.B RF MAIN 89X55.5X1.6T FR4 1/1 (BAND-A,B,C)	406-112-D
R1-B	P.C.B RF MAIN 89X55.5X1.6T FR4 1/1 (BAND-D,E)	406-112-H
R2	P.C.B FLEX1 28.125X45X1MILL FLEX	416-909-D
R3	P.C.B FLEX3 44X20.25X1MILL FLEX	416-916-E
R4	TRANSISTOR SRF1886	203-046-9
R5	NUT UNC NOB 32 NI PLAT	650-047
R6	SHIELD PLATE SPTE T0.2	722-070
R7	RUBBER CAP SILICN RUBBER HS50' GRY	894-785
R8	RUBBER HLDR SILICN RUBBER HS50' GRY	894-787
R9	P.C.B SQ 18.5X10X1.0T FR4 1/1	416-903-B
R10	RUBBER CAP SILICN RUBBER HS50' GRY	894-786
R11	RUBBER HLDR SILICN RUBBER HS50' GRY	894-788
R12	HEAT SINK ALB A5056E WHT	761-705-CA
R13	SHIELD PLATE SPTE T0.3	771-954-B
R14	WASHER M4 NI PLAT	662-410
T1	PANEL TOP ALDC12 SPRY	702-359-A
T2	P.C.B TOP 53.6X27.6X1.2T FR 1/1	416-915-E
T3	SW PUSH SPPH221BP011	432-063-7

MONOGRAM UHF EXPLODED VIEW PARTS LIST

T4-A	STOPPER ASMBLY 4 CHANNEL	508-773-A
T4-B	STOPPER ASMBLY 16 CHANNEL	508-130-A
T5	"E"RING &2.5 NI-PLAT	665-060
T6	LED LAMP SEF33G2TT	251-148-1
T7	HLDR(ANT) BSBM NI-PLAT(1/4"-32)	732-535
T8	WASHER(ANT) SPTE T0.3	660-985
T9	BUSHING(ANT) P.C CLEAR	852-761
T10	WASHER(GROUND) SPTE T0.3	660-985
T11-A	OVERLAY(04CH) LEXAN 57.8X15XT0.5	795-085-AA
T11-B	OVERLAY(16CH) LEXAN 57.8X15XT0.5	795-380
T12	(+)MACHINE SCREW(PH)1.7X4 NI-PLAT	617-120
T13	KNOB(CH.) AL A5056E BLK	825-646
T14	CAP NEOP.RUBB.BLK HS70'	830-872
T15	VR 20K:V12M4-1(6X5)(PVB)S(SJ)1	450-512-5
T16	NUT BSBM M6XP:0.75 &8.3	650-345
T17	CAP DUST NYLON12 BLK	830-992-BA
T18	"O"RING &6.6X&4.8X&0.9 SILI.RUBB.BL	894-547
T19	KNOB(CONT.) AL A5056E BLK	825-647
T20	CONNECTOR HR10A-7R-6SB	421-648-1
T21	GASKET SILI.RUBB. BLK HS40'	894-549
T22	INSULATOR PVC T0.3 BLACK	906-381-A
T23	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
T24	RING(ANT MTG) BSBM &13.8 NI-PLAT	852-765
T25	WASHER(ANT) &8(7)X&11.5XT1 P.C CLR	905-481
T26	NUT BSBM M8XP:0.5 &10	650-344
T27	NUT(ANT) BSBM &10.6 NI-PLAT	650-295
T28-A	ANTENNA UHF STUBBY	CA-2502
T28-B	ANTENNA UHF	CA-5506
T29	P.C.B TOP SUB 14.8X11X1.0T FR4 1/1	416-961-B
T30	(+)MACHINE SCREW(PH)2X3 ZN-PLAT	612-287
T31	BRACKET SPTE T0.5	723-688
T32	KEY PAD SILI.RUBB. BLK HS40'	894-544
U1	(+)TAPPING SCREW(PH)2.6X7-1S NI-PLAT	621-053
U2	NOT USED	N/A
U3	BEZEL NORYL N190-7001 BLK SPRAY	831-121
U4	BRACKET(SPK) SK5 T0.4 NI-PLAT	723-668
U5	HLDR(MIC) &9.8X&11.4XT7 RUBB.BLK	892-890
U6	MIC CONDENSER WM034CY	420-205-9
U7	GASKET SILI.RUBB. &1 BLK	894-600
U8	DBL TAPE 3X52XT0.63 3M4930	906-214-A
U9	DBL TAPE 3X59XT0.63 DBL STIC.3M4930	906-215
U10	FELT BLK &41XT0.2	904-610
U11	SPEAKER 45-8B-04S	420-116-A
U12	CVR UPPER ALDC12 DRK CHRCOAL SPRY	718-154-B
U13	FELT BLK REAR OF SPEAKER	906-262
U14	FOUR PIN CONNECTOR AWG#28	504-916
V1	SHIELD CAN BSP T0.4 SN-PLAT	771-951
V2	P.C.B VCO 27.3X19.3X1T FR4 1/1	416-914-C
USED ON T2	SW DIP ROTAR/DIGITALKDR-16	430-047-6
USED ON T2	SW DIP ROTAR.DIGITALKDR-10	430-048-7
USED FOR R13	TERMINAL (FOR TOP) PANSPTE 3.6X11XT0.3	751-350
USED FOR T19	KNOB CONT. SPRING CURVE SUS304 &6.8X&4.8XT0.3	881-576
USED FOR T1	GSKT RNG &10X&6XT1 EVA SPNG DBL T	894-986-A

MONOGRAM VHF EXPLODED VIEW PARTS LIST

Identifier	Part Name and Description	Part No.
B1	(+)MACHINE SCREW(FH)2.6X10 SUS BLK	611-379
B2	(+)MACHINE SCREW(FH)2.6X6 SUS BLK	611-380
B3	CVR BOTM ALDC12 DRK CHRCOAL SPRY	718-153-AA
B4	PROTECTOR"A" NEOPRENE RUBBER BLK	894-566
B5	PROTECTOR"B" NEOPRENE RUBBER BLK	894-567
B6	LABL FCC NO. AL FOIL 48X8	959-647-BB
B7	POST BSBM NI-PLAT M2.6	852-991-A
B8	POST BSBM HEX4.5X17.2 NI-PLAT	852-950
B9	MACHINE SCREW(FH) 2-56X6 SUS NI-PLAT	600-727-A
B10	LATCH PLATE SK5 T0.5 NI-PLAT	771-885
B11	SPRING(LATCH) SUS304 T0.35	881-476
B12	LATCH NYLON12 BLK	826-093
B13	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
B14	PVC CLEAR 80X20XT0.2	906-406
B15	(+)MACHINE SCREW(PH)#2-56X7 NI-PLAT	600-726
BH1	HLDR CONTACT NO-CONDUCTIVE SPRY	732-729-B
BH2	TERMINAL(-) SPC T0.6 NI-PLAT	752-651
BH3	P.C.B BATTERY 22X13X1.0T FR4 1/1	416-953-B
BH4	BUSHING BSBM SN-PLAT	853-042
BH5	CUSHION SILICON BLK	895-000
BH6	CONTACT(BATT.) PBS 1/2H T0.25 NI-PLAT	881-477
BH7	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
D1	RUBBER CAP SILICN RUBBER HS50' GRY	894-785
D2	RUBBER HLDR SILICN RUBBER HS50' GRY	894-787
D3	P.C.B DIGITAL 73.4X56.5X1.6T FR4 2/S	406-178-C
D4	SHIELD PLATE NSP T0.3	772-094
P1	"E" RING &1.5 BLK	665-018
P2	BRACKET SUS304 DRK CHRCOAL SPRY	723-670-A
P3	BELT CLIP LEXAN141-2032	752-483-B
P4	SPRING(BELT CLIP) SWP &0.8	881-496-A
P5	PIN BSBM &3.5X30 NI-PLAT	860-110
PT1	PTT PAD SILICN RUBBER BLK HS40'	894-848
PT2	INSERT PLATE SUS304 T0.2	772-061
PT3	TENSION PLATE P.C T0.2(CLEAR)	795-540-A
PT4	SW TACT SKHUPF	436-030-0
PT5	P.C.B FLEX PTT 47.8X25.4X1MIL 1/1	416-954-A
PT6	PLATE PTT SPC T1 NI-PLAT	772-050
R1	P.C.B RF MAIN 89X55.5X1.6T FR4 1/1	406-116-D
R2	BUSHING BSBM SNP	825-994
R3	HEAT SINK ALB A5056E WHT	761-705-B
R4	TRANSISTOR SRFH1900	203-043-6
R5	WASHER CUP 9.8X6X1.5T CP-220S	660-730
R6	(+)MACHINE SCREW(PH)2.6X8 NI-PLAT	611-077
R7	RUBBER CAP SILICN RUBBER HS50' GRY	894-785
R8	RUBBER HLDR SILICN RUBBER HS50' GRY	894-787
R9	P.C.B SQ 18.5X10X1.0T FR4 1/1	416-903-B
R10	RUBBER CAP SILICN RUBBER HS50' GRY	894-786
R11	RUBBER HLDR SILICN RUBBER HS50' GRY	894-788
R12	P.C.B FLEX3 44X20.25X1MILL FLEX	416-916-E
R13	SHIELD PLATE SPTE T0.3	771-955-B
R14	P.C.B FLEX1 28.125X45X1MILL FLEX	416-909-D
T1	PANEL TOP ALDC12 SPRY	702-359-A
T2	P.C.B TOP 53.6X27.6X1.2T FR 1/1	416-915-E
T3	SW PUSH SPPH221BP011	432-063-7
T4-A	STOPPER ASMBLY 4 CHANNEL	508-773-A
T4-B	STOPPER ASMBLY 16 CHANNEL	508-130-A

MONOGRAM VHF EXPLODED VIEW PARTS LIST

T5	"E"RING &2.5 NI-PLAT	665-060
T6	LED LAMP SEF33G2TT	251-148-1
T7	HLDR(ANT) BSBM NI-PLAT(1/4"-32)	732-535
T8	WASHER(ANT) SPTE T0.3	660-985
T9	BUSHING(ANT) P.C CLEAR	852-761
T10	WASHER(GROUND) SPTE T0.3	660-986
T11-A	OVERLAY(04CH) LEXAN 57.8X15XT0.5	795-085-AA
T11-B	OVERLAY(16CH) LEXAN 57.8X15XT0.5	795-380
T12	(+)MACHINE SCREW(PH)1.7X4 NI-PLAT	617-120
T13	KNOB(CH.) AL A5056E BLK	825-646
T14	CAP NEOP.RUBB.BLK HS70'	830-872
T15	VR 20K:V12M4-1(6X5)(PVB)S(SJ)1	450-512-5
T16	NUT BSBM M6XP:0.75 &8.3	650-345
T17	CAP DUST NYLON12 BLK	830-992-BA
T18	"O"RING &6.6X&4.8X&0.9 SILI.RUBB.BL	894-547
T19	KNOB(CONT.) AL A5056E BLK	825-647
T20	CONNECTOR HR10A-7R-6SB	421-648-1
T21	GASKET SILI.RUBB. BLK HS40'	894-549
T22	INSULATOR PVC T0.3 BLACK	906-381-A
T23	(+)MACHINE SCREW(PH)#2-56X5 NI-PLATE	600-747
T24	RING(ANT MTG) BSBM &13.8 NI-PLAT	852-765
T25	WASHER(ANT) &8(7)X&11.5XT1 P.C CLR	905-481
T26	NUT BSBM M8XP:0.5 &10	650-344
T27	NUT(ANT) BSBM &10.6 NI-PLAT	650-295
T28-A	ANTENNA VHF STUBBY	CA-2503
T28-B	ANTENNA VHF	CA-2506
T29	P.C.B TOP SUB 14.8X11X1.0T FR4 1/1	416-961-B
T30	(+)MACHINE SCREW(PH)2X3 ZN-PLAT	612-287
T31	BRACKET SPTE T0.5	723-688
T32	KEY PAD SILI.RUBB. BLK HS40'	894-544
U1	(+)TAPPING SCREW(PH)2.6X7-1S NI-PLAT	621-053
U2	NOT USED	N/A
U3	BEZEL NORYL N190-7001 BLK SPRAY	831-121
U4	BRACKET(SPK) SK5 T0.4 NI-PLAT	723-668
U5	HLDR(MIC) &9.8X&11.4XT7 RUBB.BLK	892-890
U6	MIC CONDENSER WM034CY	420-205-9
U7	GASKET SILI.RUBB. &1 BLK	894-600
U8	DBL TAPE 3X52XT0.63 3M4930	906-214-A
U9	DBL TAPE 3X59XT0.63 DBL STIC.3M4930	906-215
U10	FELT BLK FRONT OF SPEAKER	904-610
U11	SPEAKER 45-8B-04S	420-116-A
U12	CVR UPPER ALDC12 DRK CHRCOAL SPRY	718-154-B
U13	FELT BLK REAR OF SPEAKER	906-262
U14	FOUR PIN CONNECTOR AWG#28	504-916
V1	SHIELD CAN BSP T0.4 SN-PLAT	771-950
V2	FELT T0.5 BLK STICKER	906-316
V3	P.C.B VCO 27.3X19.3X1T FR4 1/1	416-902-A
USED ON T2	SW DIP ROTAR/DIGITALKDR-16	430-047-6
USED ON T2	SW DIP ROTAR.DIGITALKDR-10	430-048-7
USED FOR R13	TERMINAL (FOR TOP) PANSPTE 3.6X11XT0.3	751-350
USED FOR T19	SPRING CURVE SUS304 &6.8X&4.8XT0.3	881-576
USED FOR T1	GSKT RNG &10X&6XT1 EVA SPNG DBL T	894-986-A

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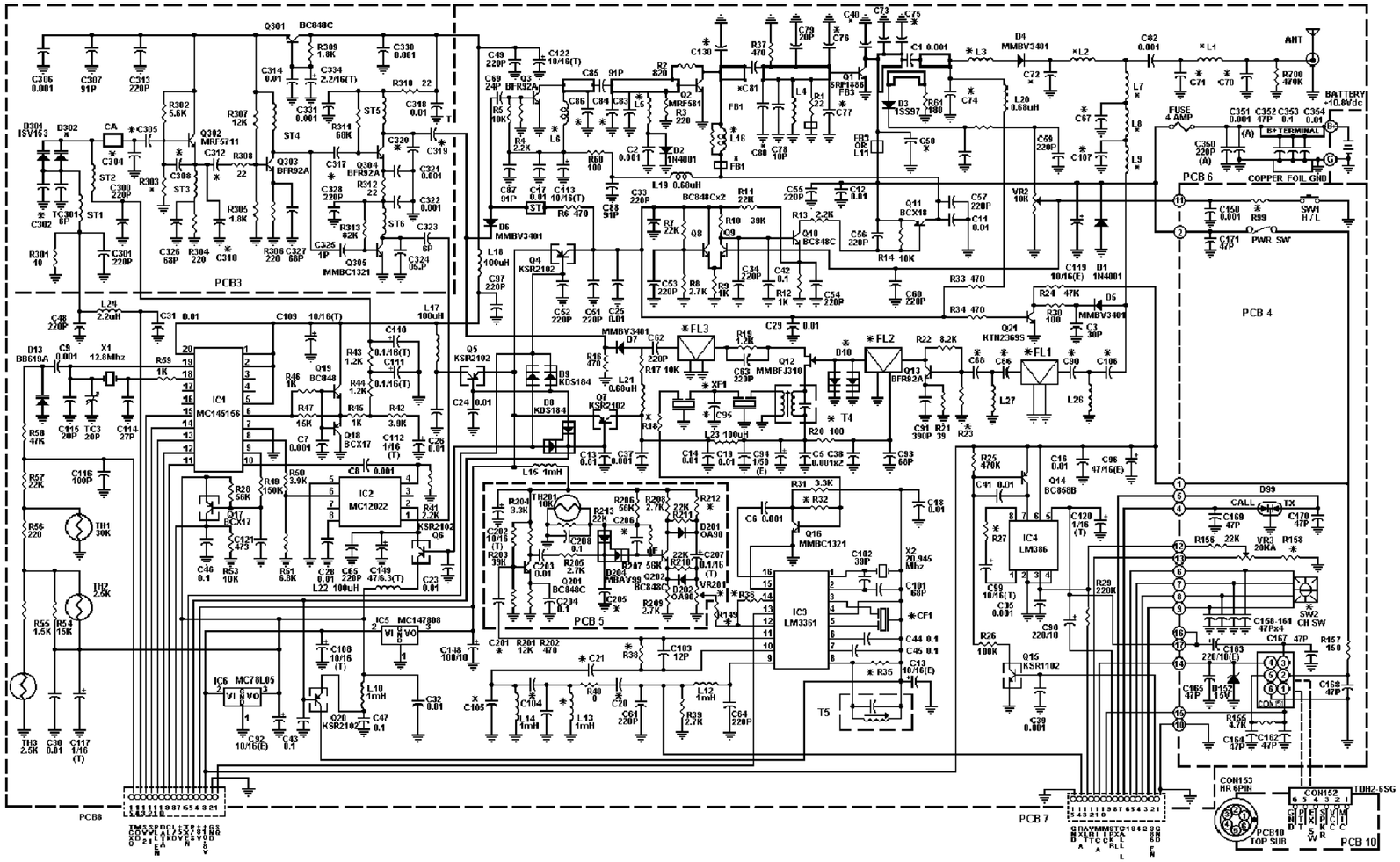
EXPLODED VIEW
AND
SCHEMATICS

Ericsson Inc.
Private Radio Systems
Mountain View Road
Lynchburg,Virginia 24502
1-800-528-7711 (Outside USA, 804-528-7711)

Printed in USA



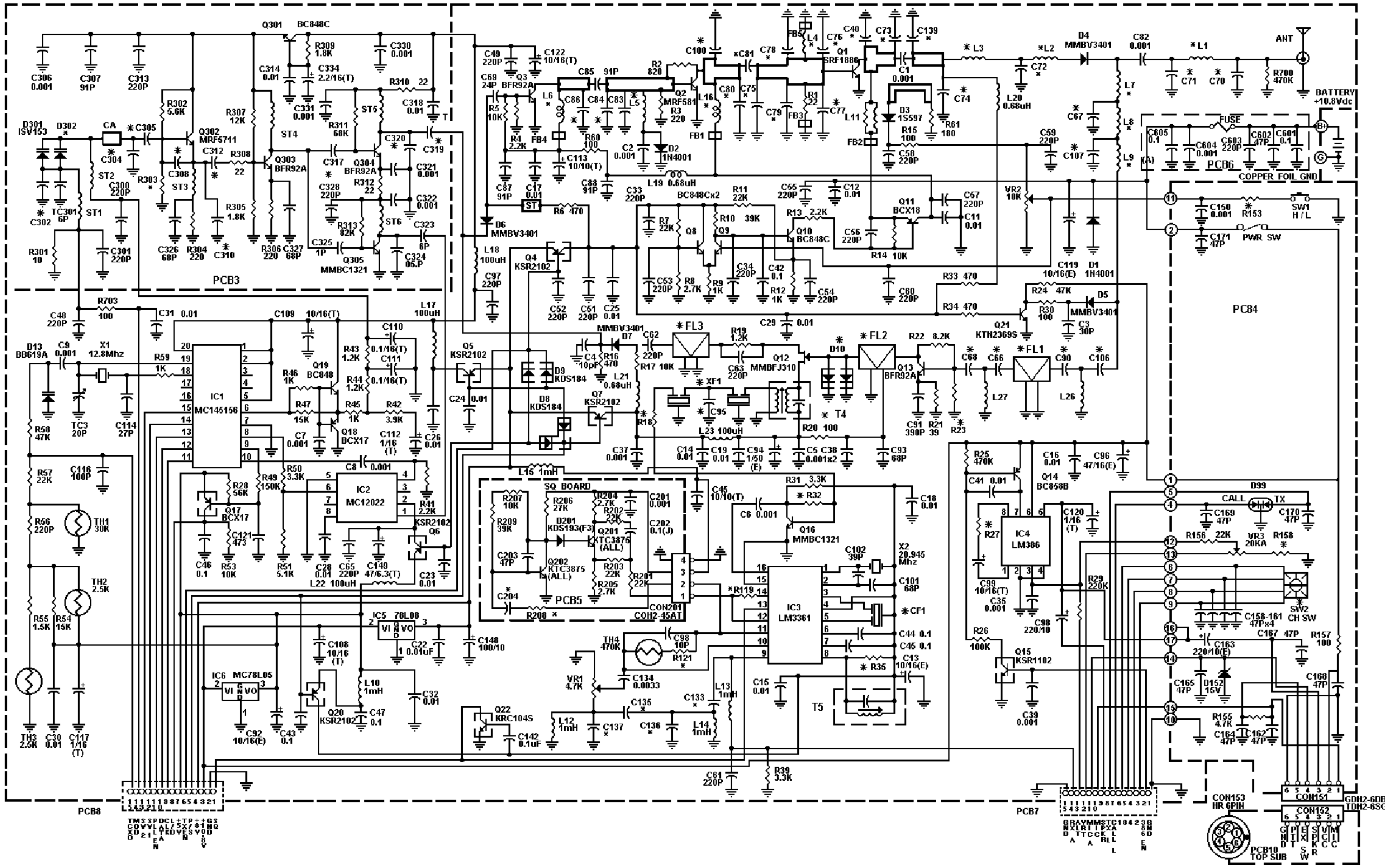
REF NO / BAND OPTION	C70	C71	C72	C50	C74	C75	C76	C80	C83	C84	C86	C67	C107	C106	C90	C66	C68	R23	L1	L2	L3	L6	L16	FB1	FL1	FL2	FL3	C302	C304	C305	C308	C310	C319	C312	C317	C320	C130	C77	C40	C81	R303	FB2	L11	PCB VERSION
A BAND (400 - 420)																																													
B BAND (420 - 440)	2P	13P	10P	51P	3P	10P N	43P	12P	2P	8P	4P	5P	3.3P	24P	14P	22P	47P	1.5K	3.2x0.6 x1.5 R	4.0x0.6 x1.5 R	3.2x0.6 x1.5 L	2.4x0.4 x4.5 R	1uH	FB	320 9035	320 9002	320 7231	14P	14P	12P	11P	10P	3.3P	1P	3.3P	1P		43P		20P	1.8K	FB2	NONE	D
C BAND (450 - 470)	1P	11P	10P	43P	2P	10P N	33P	11P	2P	6P	4P	6P	3.3P	20P	11P	18P	47P	1.2K	2.8x0.6 x1.5 R	3.6x0.6 x1.5 R	2.8x0.6 x1.5 L	2.4x0.4 x4.5 R	0.3x7T x 1K	FB	320 8775	320 8939	320 5927	12P	9P	10P	10P	8P	3.3P	1P	2.2P	1P	2P	33P	2P	220P	1.2K	FB2	NONE	D
D BAND (470 - 490)																																												
E BAND (488 - 512)																																												

REF NO / BAND OPTION	R18	R27	R32	R35	R36	R38	R149	C95	C20 C21	C105	C104	T4	CF1	XF1	D10	C700	C201	C205	C206	R212	VR201	L150,1	Q150	T150	C154	R150	R151	R152	C153 C172	C173	C156 C157	C155	Q150,152	D151	D150
W BAND (25Khz)	1K	220K	470K	100K	39K	10K	1.5K	8P	0.039	0.033 (J)	0.01	320 9057	CFW 455E	21M15B	*	*	0.001uF	470pF	0.033uF	15K	20K	100uH	LSP966	320 8588	47/10 (T)	150K	47K	8.2K	0.001uF	220pF	1/16 (T)	4.7/10 (T)	KTN2369S	5.6V	BAR43
N BAND (12.5Khz)	470	390	33K	68K	120K	100K	56K	18P	0.022uF	0.1uF	0.0022uF	320 9068	CFW 455H1	21M08BU	MMBD2835	0.1uF	0.022uF	*	0.1uF	47K	50K													

BUYER OPTION

REF NO / BUYER	SW2	R99	R158			
CT01 (USA)	10CH	2.2K	0			
CT02 (UK)	16CH	NONE	100			
CT03 (HK)	16CH	2.2K	0			
CT09 (KOR)	16CH		0			
CT36 (SAP)	16CH	2.2K	0			

RF BOARD (UHF)
406-112D



REF NO / BAND OPTION	C70	C71	C72	C73	C74	C75	C76 C77	C78 C79	C80	C83	C84	C86	C67	C107	C106	C90	C66	C68	R23	L1	L2
A BAND (400 - 420)	2P	18P	12P	18P	15P		15P	27P	20P	2P	5P	5P	5P	3.3P	24P	20P	18P	47P	1.5K	3.2x0.6 x1.5 R	4.0x0.6 x1.5 R
B BAND (420 - 440)																					
C BAND (450 - 470)																					
D BAND (470 - 490)	1P	12P	8P	15P	2P	12P	33P/27P	30P	12P	7P	6P	3P	3P	2.7P	20P	11P	18P	47P	1.2K	3.2x0.6 x1.5 R	3.6x0.6 x1.5 R
E BAND (488 - 512)	1P	10P	7P	9P	10P	10P	39P	20P	14P	2P	5P	4P	3.3P	2P	15P	6P	24P	39P	1.5K	2.8x0.6 x1 R	2.7x0.6 x1.5 R

REF NO / BAND OPTION	L3	L6	L16	L11	FL1	FL2	FL3	C302	C304	C305	C308	C310	C319	C312	C317	C320	C81	C100	C139	C40	L7,8,9	D302	C69	D10	R303
A BAND (400 - 420)	3.2x0.6 x1.5 R	2.4x0.4 x4 R	0.3x4T x1 K	0.4x7.5T x1 K	320 7231	320 8995	320 9079	15P	15P	15P	15P	14P	3.3	2P	2.7P	2P	330P	7P	22P	6P	310 6152	ISV153	39P		1.8K
B BAND (420 - 440)																						MMBV105			1.8K
C BAND (450 - 470)																						MMBV105			1.2K
D BAND (470 - 490)	3.2x0.6 x1.5 L	2.4x0.4 x4.5 R	0.4x4T x1 K	0.4x4T x1 K	320 8775	320 8939	320 5927	12P	7P	8P		7P	1.5P	1.5P	1.5P	1P	470	5P	9P	3P		MMBV105	24P		1.8K
E BAND (488 - 512)	2.8x0.6 x1.5 L	2.4x0.4 x4 R	0.4x4T x1 K	0.4x4T x1 K	320 9013	320 9013	320 8775	11P	6P	8P	5.6P	6P	1.5P	1P	1.5P	2P	220P	2P	13P	2P		MMBV105	24P	KDS181S	1.8K

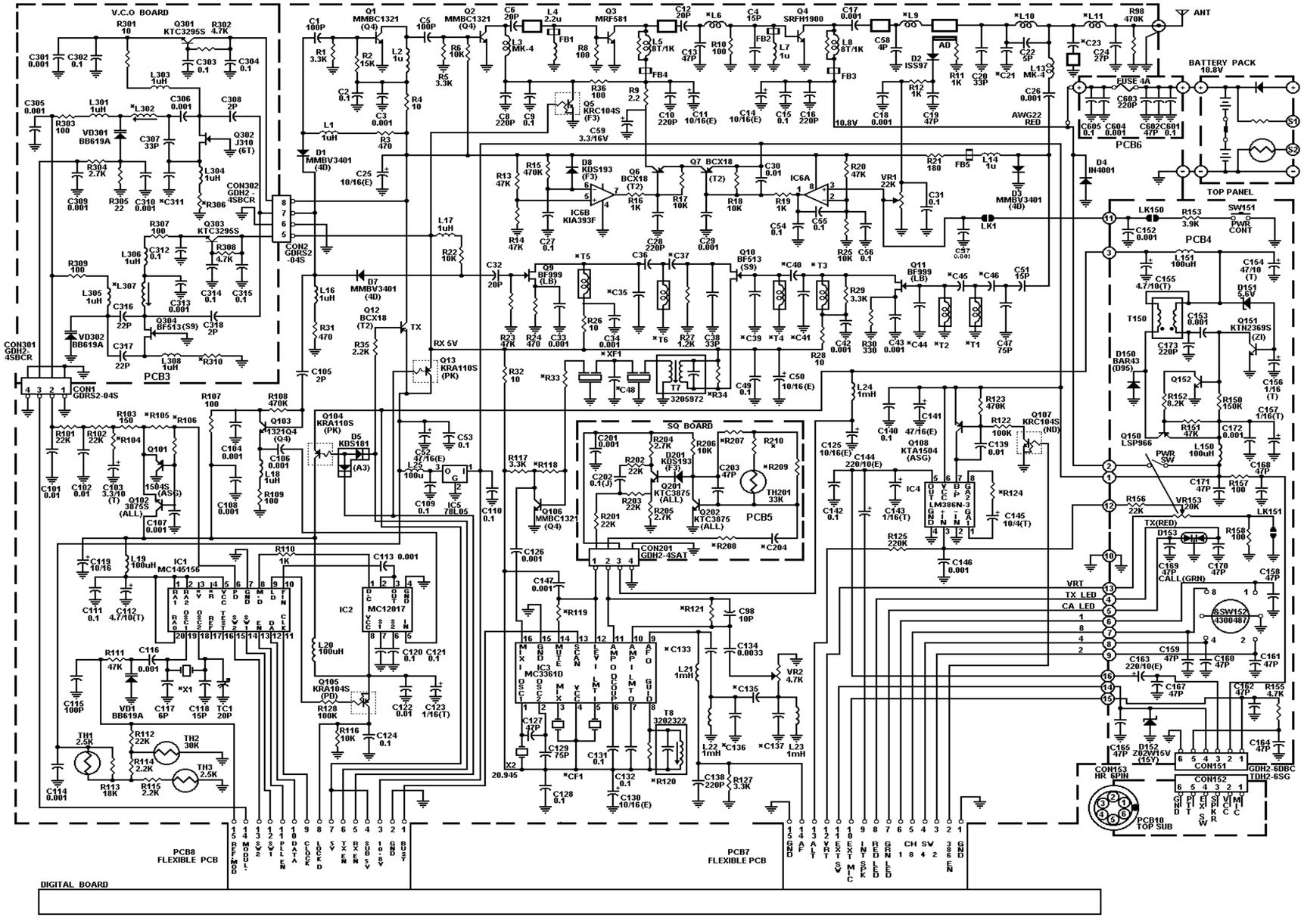
CH SPACE

REF NO / BAND OPTION	R18	R27	R32	R35	R121	R119	C95	C133/135	C136/137	C134	T4	CF1	XF1	D10	R208	C204			
W BAND (25Khz)	1K	390	470K	39K	100K	39K	8P	153	333	102	320 9057	CFW 455E	21M15B	*	220	472			
N BAND (12.5Khz)	470	390	33K	68K	470K	33K	18P	333	683	332	320 9068	CFW 455HT	21M08BU	MMBD2835	1K	103			

BUYER OPTION

REF NO / BUYER	SW2	R153	R158			
CT01 (USA)	10CH	1.8K				
CT02 (UK)	16CH		100			
CT03 (HK)	16CH	1.8K				
CT09 (KOR)	16CH					
CT36 (SAP)	16CH	1.8K				

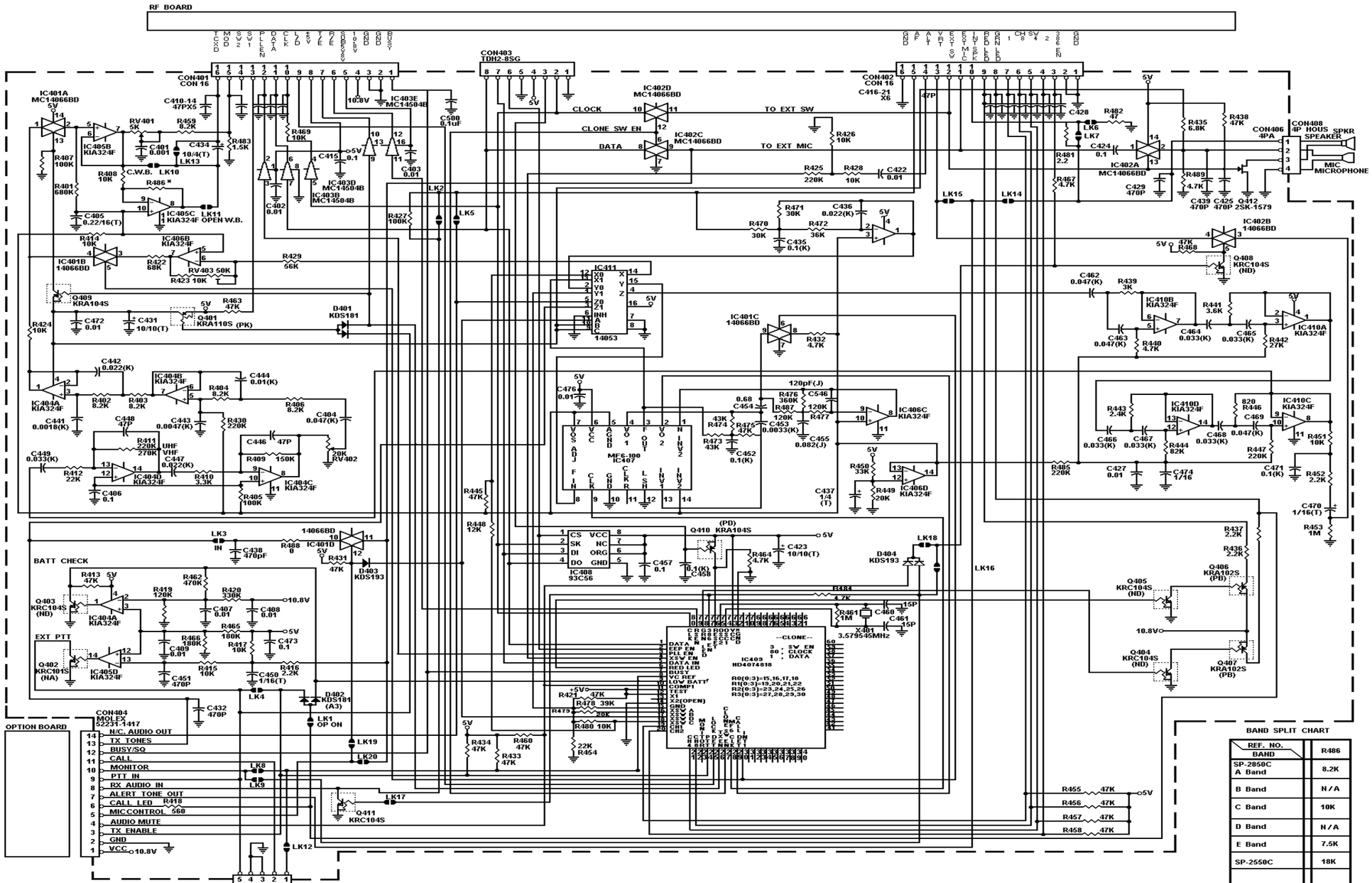
RF BOARD (UHF)
406-112H



BAND CHANGE L.M.H. *REFERENCE VALUE CHIP CAP. ALL NPO TYPE

REF NO. / FREQ. BAND	V.C.O L302,307	C311	R306	R310		RECEIVER T1,2,3,4	T5,6	C35	C36,45	C37	C39,41,44	C40	C46		TRANSMITTER L6,9	L10	L11	C21	C23	
L : 136 - 150MHz	6.5T 3208401	33P	220	330		5.5T 3105715	6.5T 3105726	15P	1.5P	33P	15P	1P	20P		1.5T	4.5T	5.5T	33P	68P	
M : 148 - 162MHz	5.5T 3208331	33P	150	220		4.5T 3105704	5.5T 3105715	15P	1.5P	33P	15P	1P	20P		1.5T	4.5T	5.5T	33P	68P	
H : 160 - 174MHz	4.5T 3208599	33P	150	220		4.5T 3105704	5.5T 3105715	12P	1P	27P	13P	0.75P	18P		0.5T	3.5T	4.5T	24P	56P	

RF BOARD (VHF)
406-116D



REF. NO. / BAND	R486
SP-2850C	
A Band	8.2K
B Band	N/A
C Band	10K
D Band	N/A
E Band	7.5K
SP-2550C	18K

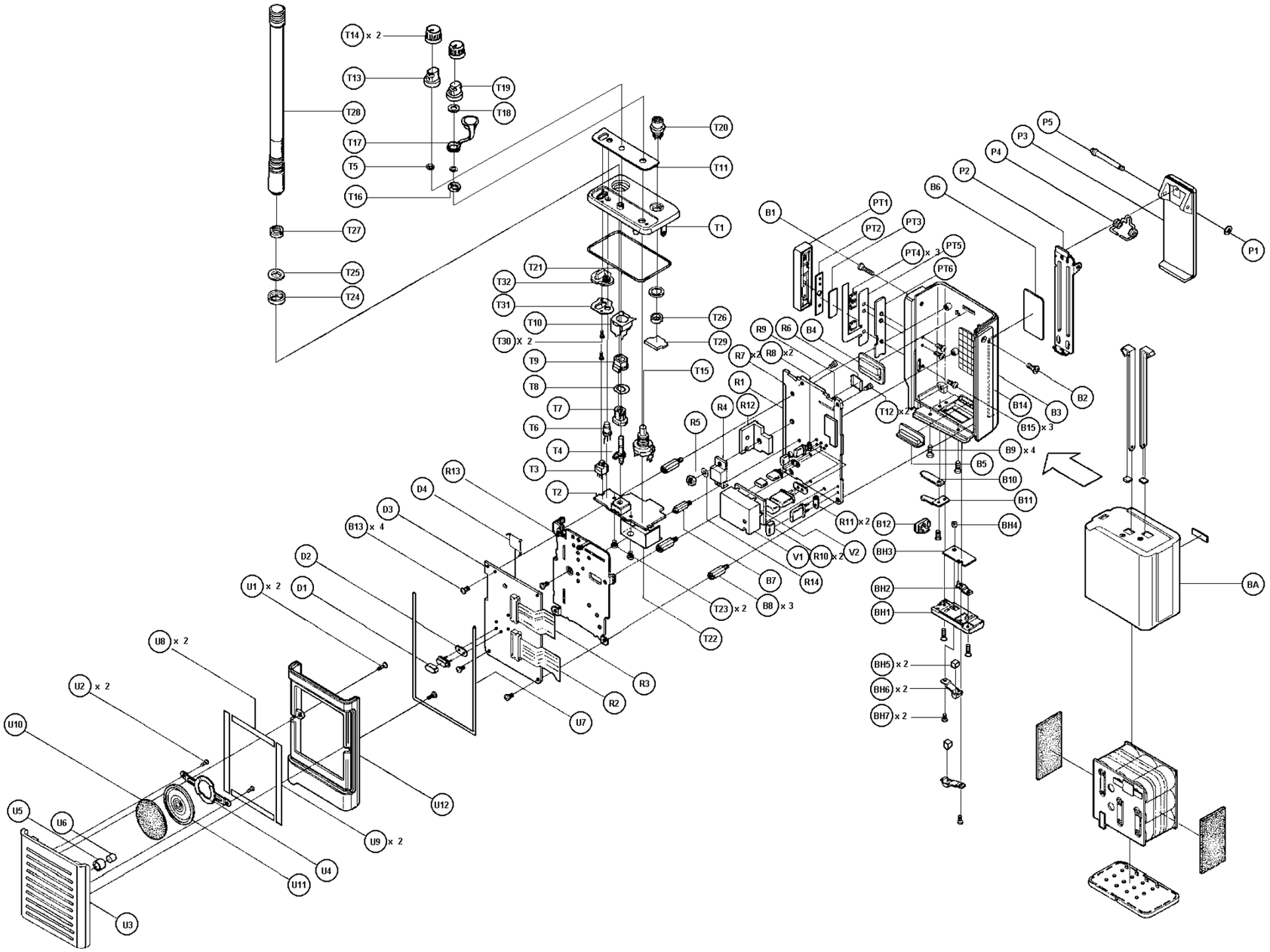
LINK OPTION

REF. NO. / CONDITION	LK1	LK2	LK3	LK4	LK5	LK6	LK7	LK8	LK9	LK10	LK11	LK12	LK13	LK14	LK15	LK16	LK17	LK18	LK19	LK20
NORMAL	N/F	FIT	FIT	FIT	FIT	N/F	N/F	N/F	N/F	N/F	FIT	FIT	N/F	N/F	N/F	FIT	N/F	N/F	N/F	FIT
CA-1133	FIT	N/F	FIT	N/F	FIT	FIT	FIT	FIT	N/F	N/F	FIT	FIT	N/F	N/F	N/F	N/F	FIT	FIT	N/F	FIT
ID BOARD	N/F	N/F	FIT	N/F	FIT	N/F	N/F	FIT	N/F	N/F	FIT	FIT	N/F	N/F	N/F	FIT	N/F	N/F	N/F	FIT
MIDIAN								N/F	FIT	N/F	FIT	FIT	N/F	N/F	FIT	FIT				

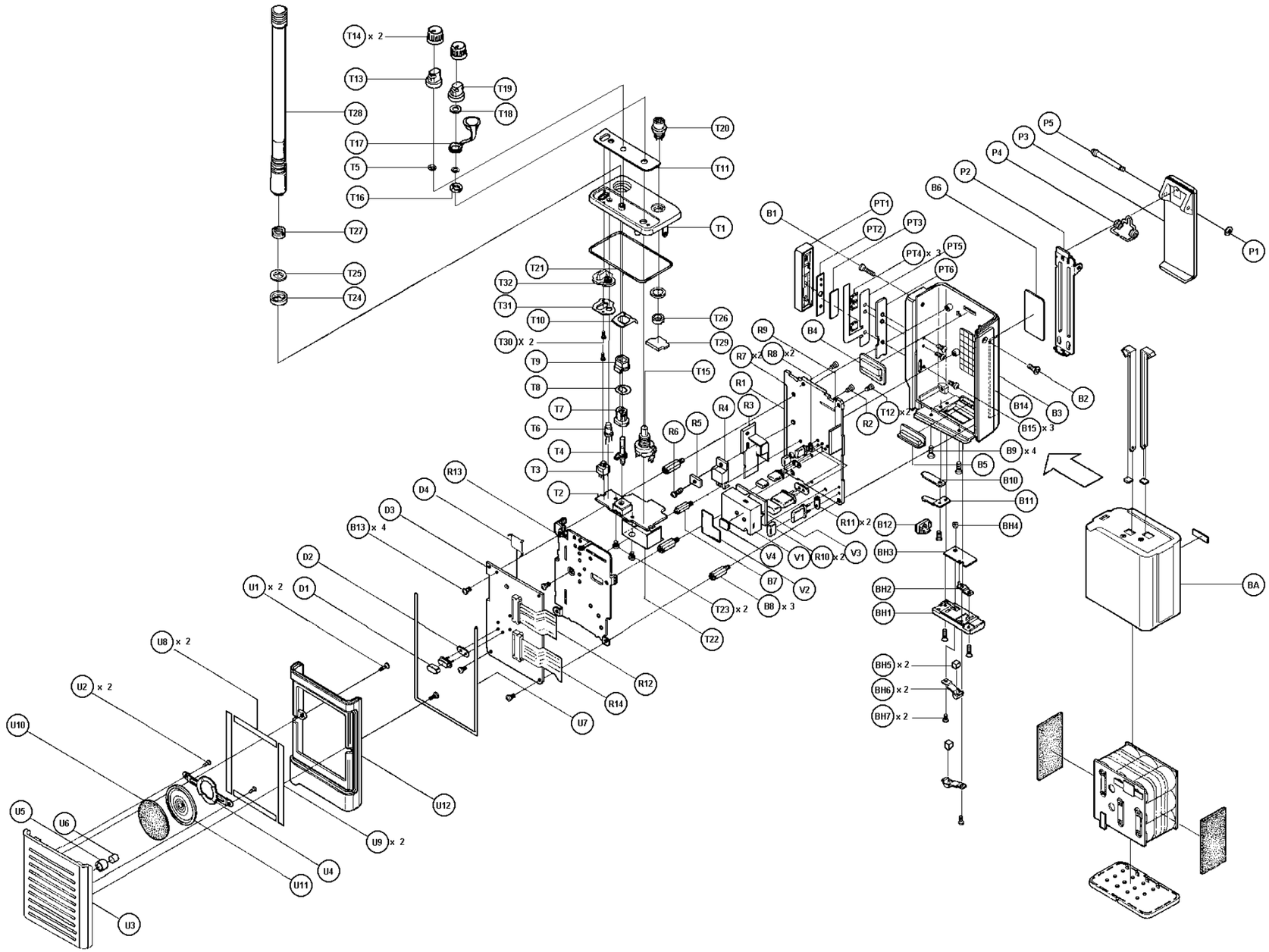
PTT OPTION

COUNTRY / REF. NO.	CT01	CT02	CT03	CT09	CT36
SW3	NO	YES	NO	NO	NO

DIGITAL BOARD
406-178C



UHF SCANNING HANDHELD



VHF SCANNING HANDHELD