Maintenance Manual

NPC-200
Portable Radio
KRD 103 117/1 (VHF)
KRD 103 117/3 (UHF)

ERICSSON

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NOTICE!

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

NOTICE!

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.

NOTICE!

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ILLUSTRATIONS

SPECIFICATIONS*

VHF GENERAL	
Regulatory Approval	
FCC	AMWUL087
DOC	287 195 103
Channels	16
Frequency Range	146-174 MHz
Channel Spacing	30 kHz (5 kHz/6.25 kHz step programmable)
Size	144 mm (H) x 60 mm (W) x 45 mm (D)
Weight	460 grams
Operating Temperature	-30°C to +60°C
VHF TRANSMITTER	
Output Power	5.0 or 1.0 Watt (selectable)
Frequency Stability	± 3 PPM
Spurious Emission	-65 dBc
Hum and Noise	40 dB
Maximum Deviation	± 4.5 kHz (@100 mV input with CTCSS tone)
VHF RECEIVER	
Sensitivity (12 dB SINAD)	0.25 µV
Squelch Sensitivity	0.15 µV
Intermodulation Rejection	70 dB
Spurious Response	80 dB
Adjacent Channel Selectivity	73 dB
Hum and Noise	42 dB
Audio Frequency Response	+6 dB at 500 Hz, -6 dB at 2000 Hz @ 1 kHz reference
UHF GENERAL	
Regulatory Approval	
FCC	AMWUL086
DOC	287 195 102
Channels	16
Frequency Range	438-470 MHz
Channel Spacing	25 kHz (12.5 kHz step programmable)
Size	141 mm (H) x 60 mm (W) x 45 mm (D)
Weight	460 grams
Operating Temperature	-30°C to +60°C
UHF TRANSMITTER	
Output Power	4.0 or 1.0 Watt (selectable)
Frequency Stability	± 3 PPM
Spurious Emission	-65 dBc
Hum and Noise	40 dB
Maximum Deviation	± 4.5 kHz (@100 mV input with CTCSS tone)
UHF RECEIVER	
Sensitivity (12 dB SINAD)	0.25 µV
Squelch Sensitivity	0.15 µV
Intermodulation Rejection	70 dB
Spurious Response	80 dB
Adjacent Channel Selectivity	70 dB
Hum and Noise	42 dB
Audio Frequency Response	+6 dB at 500 Hz, -6 dB at 2000 Hz @ 1 kHz reference

* These specifications are intended primarily for use of the service technician. Refer to the appropriate Specifications Sheet for the complete specifications.

GENERAL

The NPC-200 VHF Portable Radio Unit operates in the 148-174 MHz frequency band with a power output of 5 or 1 watt (selectable). It has programmable features that permit a diverse range of features for the user.

The NPC-200 UHF Portable Radio Unit operates in the 438-470 MHz frequency band with a power output of 4 or 1 watt (selectable). It has programmable features that permit a diverse range of features for the user.

General operating procedures are contained in the applicable Operator's Manual.

CIRCUIT DESCRIPTION

The NPC-200 Portable Radio Unit Block Diagram is shown in Figure 1. The radio consists of the following boards.

- Main
  The receiver and transmitter sections, logic section and regulators.
- Sub
  The microphone amplifier, pre-emphasis and limiter, microphone mute circuit, low pass filter, 2-tone decoder and CTCSS bandpass filter.
- RF
  The first RF amplifier and first mixer sections of the receiver.
- VCO
  Two voltage controlled oscillators for the receiver and transmitter.
- PLL
  The phase locked loop with a prescaler, reference crystal oscillator and charge pump circuit.
- Switch
  The transmit harmonic filter and antenna switch.

SYNTHESIZER

The synthesizer produces a stable RF frequency that is the transmit frequency in the transmit mode and the receive first local frequency in the receive mode.

The synthesizer consists of a phase locked loop (PLL) with a prescaler, a reference crystal oscillator, a voltage controlled oscillator (VCO), a transmit local oscillator and a charge pump circuit.

When the operating channel of the radio is changed, the microprocessor IC601 provides PLL IC301 with channel frequency information. IC301 has three counters, a fully programmable reference counter, "N" and "A" counters. IC601-13 supplies serially 16-bit and 19-bit of data to IC301-10. IC601-14 supplies clock pulses to IC301-9. IC601-49 supplies latch enable pulse to IC301-11. The appropriate counter latch receives this data according to the last data bit (control bit) of each data string entered.

The 12.8 MHz reference oscillator frequency (X301) is divided by the reference counter. The dividing ratio is 1/2560 & 1/2048 for 5 kHz or 6.25 kHz channel step (VHF) or 1/1024 for 12.5 kHz channel step (UHF). The internal prescaler divides the VCO frequency supplied to the PLL into a kHz-order frequency. The resulting frequency is then divided by the "N" and "A" counters. The internal phase detector circuit compares the output of the reference counter to the output of the "N" and "A" counters and issues error signals at pins 15 and 16. These error signals pass through the charge pump circuitry (Q301) and force the VCO frequency higher or lower until a LOCK condition occurs.

The VCO circuit consists of Q201 for the receiver, Q204 for the transmitter and Q202 for the buffer-amplifier. Q203 enables the receive VCO in the receive mode while Q205 enables the transmit VCO in the transmit mode.

The VCO output signal enters the phase detector (pin 8 of IC301) through a buffer-amplifier Q302 and keeps it phase so no frequency changes are detected. The internal phase detector of the PLL IC senses a phase difference between the divided VCO frequency and the reference oscillator frequency. A logical low level is set at pin 7 of IC301 to indicate an out-of-lock condition of the PLL. This signal is sent to the transmit inhibit circuit through inverters Q303 and Q504. When the PLL is in the locked condition, pin 7 of IC301 is set to a logical high.

The synthesizer frequency stability over temperature is maintained within ± 5.0 PPM between -30°C and +60°C.

The transmit audio signal and the transmit sub-audible signal are applied to the variable capacitor diodes (D202 through RT202 and RT201 in the VCO section and D302 in the PLL section). RT202 adjusts the maximum deviation and RT201 adjust a balance of modulation between the VCO and the reference oscillataor. CT301 in the PLL section adjusts the oscillation frequency of X301.

In the receive mode the VCO oscillates 59.85 MHz below the receive frequency. The receive mixer circuitry produces the first IF frequency (59.85 MHz) from the received signal and the receive local frequency (VCO output).

RECEIVER

The receiver converts the received RF signal to an audio signal. The receiver contains the following:

- Antenna switch
- First RF amplifier
- First IF mixer
- First IF pre-amplifier
- IF IC
- De-emphasis
- Highpass filter
- Audio muting
- Volume controller
- Audio power amplifier
- Squelch control

The receiver is a double-conversion type with intermediate frequencies of 59.85 MHz and 455 kHz. The receiver frequency range is from 146 to 174 MHz and the bandwidth, without alignment, is 28 MHz (VHF) or 438 to 470 MHz and the bandwidth, without alignment, is 32 MHz (UHF). The filters in the receive section perform the receiver characteristics such as selectivity, image and spurious rejection and reduction of other undesirable frequencies.

Antenna Switch (FT401)

The antenna switch in the receive mode permits RF signal to pass to the receiver. In the transmit mode the circuit switches off the receiver and allows the RF signal from the transmitter to feed the antenna through the transmit harmonic filter.

First RF Amplifier (Q101)

The antenna switch sends the received signal to Q101 through the bandpass filter. The received signal is filtered to reduce undesired frequencies outside the frequency band.

Q101 amplifies the filtered signal to recover the losses of the antenna switch and the filters and to increase sensitivity. Then this amplified signal is sent to the receive mixer through a bandpass filter.

First MIxer (D101)

The received channel frequency is mixed with the first local oscillator frequency to produce the first IF frequency (59.85 MHz). The first IF signal is sent through the 59.85 MHz crystal bandpass filters (FT1 and FT2) to reduce adjacent channel undesired frequencies.

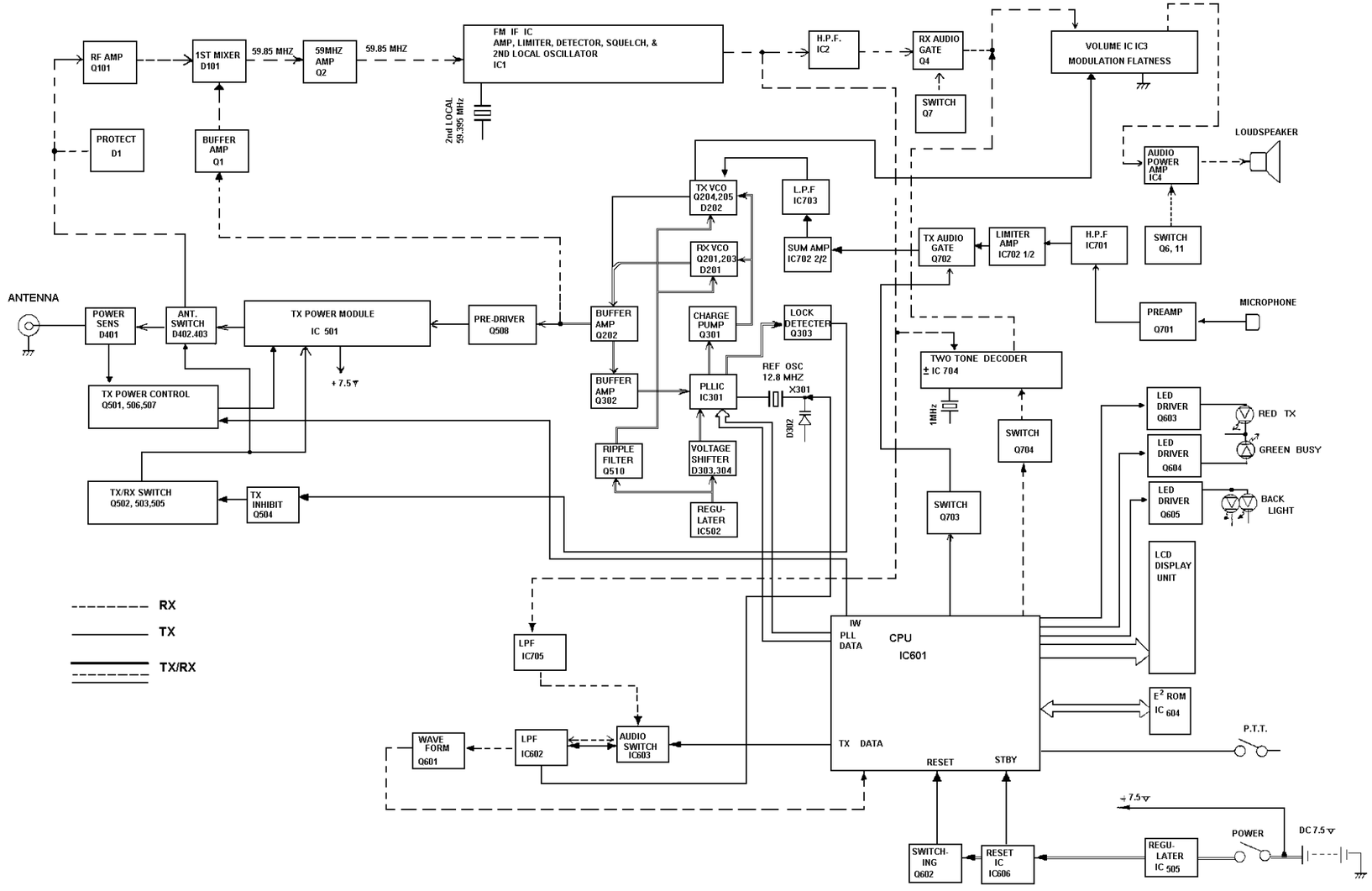


Figure 1 - Radio Block Diagram

First IF Pre-Amplifier (Q2)

The filtered IF signal is applied to the first IF pre-amplifier Q2 to recover the losses of the filters and increase the sensitivity of the received signal. Then it is sent to pin 24 of the IF IC.

IF IC (IC1)

IC1 is a bipolar monolithic integrated circuit that provides all the functions of a comprehensive FM IF system. This IC contains a second local oscillator, second IF mixer, second IF amplifier, second IF limiting amplifier and a quadrature FM detector.

The second mixer combines the first IF signal with the second local frequency (59.395 MHz) to produce the second IF signal at 455 kHz.

The second IF signal is supplied to 455 kHz ceramic filters FT3 and FT4 to reduce noise near the second IF. The signal is then applied to the second IF amplifier and limiting amplifier. The limiting amplifier limits the signal to a specific level, removing any amplitude noise by clipping the 455 kHz signal. The limited 455 kHz signal is fed to the quadrature detector and releases a demodulated audio signal at pin 15 of IC1. This signal contains CTCSS tone (or DCSS) and voice audio, or just a white noise at no rf signal input.

De-Emphasis/Highpass Filter (R21, C33 And IC2)

The output audio signal (with sub-audible data) at pin 15 of IF IC goes through de-emphasis cirucit (R21 and C33) and highpass filter IC2. The de-emphasis circuit performs a specific audio frequency response. The highpass filter attenuates the low frequency signal of CTCSS (or DCSS) contained in the demodulated signal.

RX Audio Muting (Q4 And Q7)

The audio output signal from the highpass filter is sent to the audio frequency muting circuit Q4. The microprocessor (pin 47) sends a mute control signal to Q4 through inverter Q7.

The audio signal passes through the mute circuit when the microprocessor sends a logical low level signal to the mute circuit.

Volume Controller (IC3)

The audio signal is sent to the volume controller (pin 4 of IC3). The microprocessor provides serial data to IC3 such as clock, data and enable signals to control the audio output level to the audio amplifier. Another volume controller (pin 14 of IC3) is connected to R218 of the transmit VCO and controls the modulation flatness by the microprocessor.

The microprocessor (pin 10) generates a tone to indicate radio conditions such as channel busy lockout, time out timer and switch tone. This tone is applied to the volume controller.

Audio Amplifier (IC4)

Pin 9 of IC4 receives and amplifies the audio signal from the volume controller (pin 6 of IC3). Audio power output delivered to the internal speaker is normally more than 0.5 watts at 4 ohms. Pin 3 of IC4 releases the amplitude received audio and sends it to the external speaker jack J3 then applies it to the internal speaker.

Squelch Circuit (IC1)

The IF IC also has a noise amplifier for squelch controller. RT1 adjust the input level of noise from the output of the discriminator to set the squelch threshold level. Pin 19 of IC1 sends the squelch signal to pin 56 of the microprocessor.

If the radio received a carrier, pin 19 of IC1 sends a logical low signal to the microprocessor.

TRANSMITTER

The transmitter converts an audio message to an RF signal and amplifies the RF signal to 5 watts at the antenna terminal. The transmitter frequency range is 146 to 174 MHz and the bandwidth without alignment is 28 MHz (VHF) or 438 to 470 MHz and the bandwidth, without alignment, is 32 MHz (UHF). The transmitter contains the following circuits:

- Microphone amplifier
- Pre-emphasis and limiter
- Low pass filter
- Modulation buffer
- Pre-amplifier
- FM modulator
- Pre-driver
- RF power amplifier
- RF power controller
- Transmit inhibit
- Antenna switch

When the PTT switch is pressed, the negative side of the microphone is grounded and DC bias voltage is applied to the internal microphone to activate it. The microprocessor (pin 6) detects the pressed PTT switch and switches Tx/Rx control (pin 52) to the Tx mode (a logical low).

Microphone Amplifier (Q701)

The speech audio from the microphone enters the base of Q701 and is amplified. Then it is released to the high pass filter (IC701).

High Pass Filter/Pre-Emphasis/Limiter Amplifier

The output signal of the microphone amplifier enters the pre-emphasis/pre-amplifier (C703, Q701). The high pass filter (IC701) removes any components in the sub-audible range (below 300 Hz) that would interfere with the CTCSS or DCSS tone.

The output signal of the high pass filter enters the pre-emphasis/limiter amplifier (IC702) to provide limiting modulation.

MIC Mute (Q702 And Q703)

The output of the limiter is sent to the microphone mute circuit Q702. The microprocessor (pin 48) sends a mute control signal to Q702 through an inverter Q703.

The audio signal passes through the mute circuit when the microprocessor sends a logical low level to the mute circuit.

Low Pass Filter (IC703)

The limiter output is supplied to the low pass filter IC703 through a sum-amplifier IC702. The limiter output contains high frequencies above 3 kHz. The low pass filter filters in these high frequencies and releases them to pin 1 of IC703 and then to the synthesizer.

TX Pre-Amplifier (Q508)

The output of the synthesizer is supplied to the pre-amplifier Q508. The Tx pre-amplifier increases the transmit signal to a level sufficient to drive the power module.

Power Module And Power Controller (IC501, L401, D401, Q501, Q506 And Q507)

The power amplifier circuit amplifies the output of the synthesizer to the proper output wattage (normally 5 watts at the antenna connector). The transmit power detect circuit (L401 and D401) is connected to the output of the antenna switch (D403) and monitors the transmit power.

The power control circuitry is a closed negative feedback loop system (IC501, D401, Q501, Q506, Q507, IC501). It monitors the transmit power and increases the control current to the power module (pin 3 of IC501). If the RF output power decreases, the transmit power is stabilized to the level adjusted by RT501.

In the low power transmission, the microprocessor (pin 9 of IC601) sends a logical low signal to the power control circuit (base of Q501 through R513). The threshold level of the transmit power controller changes to the low power level. The power amplifier circuit amplifies the output of the synthesizer and the transmit local oscillator to the proper output wattage (normally 1 watt at the antenna connector).

Transmit Inhibit (Q502 And Q503)

While the PLL is out of lock, pin 7 of PLL IC301 releases a logical low to the transmit inhibit circuit Q503 through inverters Q303 and Q504. Since the output of Q503 turns Q502 off, no DC power is applied to the first stage of the power amplifier and the power controller to prevent transmission on an improper frequency.

When the PLL is locked, pin 7 of IC301 becomes logical high. This signal is supplied to Q503. The base of Q503 is pulled to the transmit 5V line. The output of Q503 forces the base of Q502 to ground; then the DC power is supplied to the first stage of the power amplifier.

Antenna Switch (D402 And D403)

In the transmit mode, D402 and D403 receive the voltage, transmit battery (7.5V). The circuit switches off the receiver and allows RF signals to flow from the transmitter to the antenna, passing through the transmit harmonic filter that reduces second and third harmonic frequencies generated within the RF amplifier.

REGULATORS

Transistor Q507 and the power module (pin 6 of IC501) are directly connected to the battery through a fuse F1. When the power switch of the radio is turned off, the current drain is almost zero.

When the power switch of the radio is turned ON, IC605 supplies 5.6V to most of the sections and IC502 supplies 5.6V to the VCO and synthesizer section.

In the receive mode, pin 11 of the microprocessor releases a logical low level and turns transistor Q5 on. Q5 supplies 5.6V to the receiver section.

In the transmit mode, pin 51 of the microprocessor releases a logical low level and turns transistor Q505 on. Q505 supplies 5.6V to the transmitter section.

Components F1, D3, D4 and C50 reduce the damage to other parts in the radio should a short circuit occur within the radio or the polarity of the DC voltage is reversed.

LOGIC SECTION

The logic section contains the following:

- Microprocessor
- EEPROM memory
- Rx Tone Decoder
- 2-Tone Decoder
- Tx Tone Encoder
- Tone Generator
- Memory Back-up
- Reset Circuit

Microprocessor (IC601)

The microprocessor controls many of the transmit and receive functions. The microprocessor operates according to the software instructions stored in the internal Read Only Memory (ROM).

EEPROM (IC604)

The Electrically Erasable Programmable Read Only Memory (EEPROM) can be reprogrammed through the external microphone and speaker jacks J2 and J3.

IC604 stores the customer parameters such as channel information and function parameter. Since this device is a non-volatile memory, IC604 retains all information in the EEPROM even when power is removed.

The programming adapter is connected to the external microphone and speaker jacks J2 and J3. When the external speaker output J3 is set to a logical high for a few seconds from the programming adapter, that signal passes to pin 55 of IC601 through R37 and D2. The radio enters into external programming mode. During programming, several commands and data are exchanged through J2 between pins 19 and 20 of the microprocessor.

The microprocessor sends serial data to the EEPROM IC604 to store custormer data such as clock (pin 14), data (pin 13) and ROM enable (pin 50).

Receive Tone Decoder (IC705, IC602 And Q601)

This circuit contains switched capacitor low pass filter IC602 that is used in both transmit and receive modes. IC603 switches IC602 to function as either receive tone filter or transmit tone filter. The two op-amps in IC602 are comparators to convert the analog waveform to digital waveform.

In the receive mode, the Tx/Rx control (pin 51 of IC601) supplies a logical high signal to pins 5 and 6 of IC603. The analog switches (pins 3 and 4, 8 and 9) in IC603 turn on. The receive tone from the IF IC (pin 15 of IC1) is supplied to the band pass filter IC705 through the gate of IC603 (pins 3 and 4).

When the radio receives DCSS data, the microprocessor (pin 18 of IC601) sends a logical high to pin 13 of IC603. The gate of IC603 (pins 1 and 2) turns on. The received DCSS code is sent to the low pass filter (pin 8 of IC602).

Clock pulses from the microprocessor (pin 12) are applied to pin 10 of IC705 and pin 9 of IC602, providing the cut-off frequency of the filter as $f_c = f_{clk} \times 50$.

The output signal of IC705 enters the low pass filter (pin 8 of IC602). The low pass filter only passes the desired tone and filters out high frequencies contained in the receive data signal.

Filtered data is applied to pin 3 of IC602 and supplied to op-amp #1 (pin 13 of IC602) through the gate of IC603 (pins 8 and 9). In this op-amp, receive data is amplified to approximately 1.2 Vp-p of level at pin 14 of IC602 (adjusted by RT601). The amplified data is supplied to a comparator (pin 14 of IC602, op-amp #2).

When the voltage at pin 14 of IC602 becomes greater than that at pin 1, a logical low is released at pin 2 of IC602. When the voltage at pin 14 of IC602 decreases lower than pin 1, a logical high is released at pin 2 of IC602. Voltage at pin 1 of IC602 provides a reference level of the comparator around the center of the data waveform.

Digitized data (square wave) is released at pin 2 of IC602 and applied to the microprocessor (pin 16) for decoding.

2-Tone Decoder

The received signal is also sent to the 2-tone decoder (pin 13 of IC704). The microprocessor provides serial data to IC704 such as clock, data and enable signals to set tone information. The result of IC704 is sent to pin 38 of IC601.

Transmit CTCSS Tone Or DCSS Encoder (IC602)

In the transmit mode, the microprocessor sets the Tx/Rx control (pin 52) to a logical low to turn Q505 on. The Tx 5V is sent to pin 12 of IC603. The analog switch (pins 10 and 11) in IC603 turns on. The transmit tone or DCSS square wave signal from the microprocessor (pin 17 of IC1) is supplied to the low pass filter (pin 8 of IC602) through the gate of IC603 (pins 10 and 11).

Clock pulses from the microprocessor (pin 12) are applied to pin 9 of IC602, providing cut-off frequency of the low pass filter the same as the decoder.

Filtered CTCSS tones or DCSS signals (pin 3 of IC602) are applied to the sum-amplifier (pin 6 of IC702) through RT701 (adjusts transmit deviation of the tone).

Tone Generator (IC601)

The microprocessor generates beep tone at pin 10 and alerts the user of certain conditions in the radio. The generated tone is supplied to the volume controller (pin 4 of IC3) to monitor from the speaker and and transmit sum-amplifier (pin 6 of IC702) to modulate.

Memory Back-Up

Regulator IC605 supplies voltage to pins 72 aand 73 of the microprocessor through D601. It also charges C618 through R616.

The microprocessor retains in Random Access Memory (RAM) selected channel, deleted channels and scan status while the power switch is turned off.

When the microprocessor senses that power is turned off (pin 21 of IC601 goes low), the current drain into the microprocessor is decreased to save battery power, while the power is turned off (standby mode).

When the power switch is off, the stored charged in C618 keeps the microprocessor "alive" during the standby mode.

Reset Circuitry

IC606 contains a Schmitt-Trigger circuit that maintains the output voltage at approximately 0.7 V until the input voltage reaches approximately 4.25V. When the input voltage exceeds 4.15V, IC606 releases an output voltage of the same level after a delay of approximately 200 microseconds.

When the output voltage of IC606 is high, a positive rising pulse is supplied to Q602 through C613. Q602 then releases a short duration, low pulse that is sent to pin 25 of IC601. The microprocessor resets and normal operation begins.

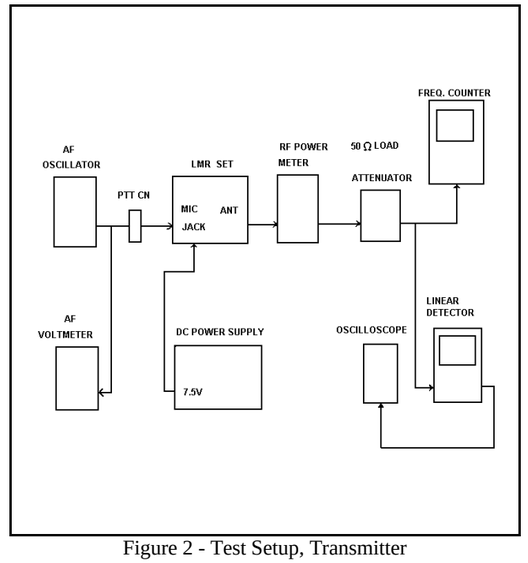


Figure 2 - Test Setup, Transmitter

ALIGNMENT OF TRANSMITTER - VHF

TEST EQUIPMENT REQUIRED

a. DC POWER SUPPLY (7.5V, more than 3A)
b. RF WATTMETER (more than 10 Watt)
c. DUMMY LOAD FOR SPEAKER (50 Ω more than 10 Watt)
d. FM LINEAR DETECTOR
e. FREQUENCY COUNTER
f. AF OSCILLATOR

ALIGNMENT CONDITION

a. CHANNEL : 1
b. MODE : TX
c. MODULATION FREQUENCY : 1 kHz
d. LOAD IMPEDANCE : 50 Ω

ALIGNMENT PROCEDURE

See Figure 2 for setup of test equipment.

STEP	TEST CONDITION	MEASUREMENT	ADJUSTMENT	REMARKS
1	NO MODULATION	RF WATTMETER	RT501	4.8 W ± 0.05 W *
2		FREQUENCY COUNTER	CT301	161.000 MHz ± 100 Hz
3	MOD : 1 kHz LEVEL : 100 mV	FM LINEAR DETECTOR HPF: OFF LPF: OFF DE-EMPHASIS: OFF	RT202	± 4.0 kHz DEV ± 0.01 kHz
4	CH6 NO MODULATION	↑	RT701	± 700 Hz DEV ± 10 Hz (Tone Freq. = 67.0 Hz)
5	CH7	↑	RT201	± 700 Hz DEV ± 10 Hz (Tone Freq. = 250.3 Hz)
6	CH6	↑	---------	If DEVIATION is not ± 700 Hz DEV ± 30 Hz back to STEP 5.
7	CH1 MOD : 1 kHz, 100 mV	↑	RT202 (CHECK)	± 4.0 kHz DEV ± 0.05 kHz
8	CH4 NO MODULATION	↑	RT701 (CHECK)	± 700 Hz DEV ± 30 Hz (Tone Freq. = 167.9 Hz)

* POWER ADJUSTMENT TIME IS LESS THAN 5 SECONDS.

ALIGNMENT OF RECEIVER - VHF

TEST EQUIPMENT REQUIRED

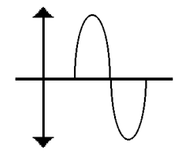
a. DC POWER SUPPLY (7.5V, MORE THAN 2A)
b. RF SIGNAL GENERATOR
c. DUMMY LOAD FOR SPEAKER (8 Ω, more than 1 Watt)
d. SINAD METER
e. AF OSCILLATOR
f. OSCILLOSCOPE

ALIGNMENT CONDITION

a. CHANNEL : 2
b. MODE : RX
c. SQUELCH (RT001 : SW. VR) : C.C.W.
d. RF SSG MODULATION : 1 kHz, ± 3 kHz DEV.
e. RF SSG FREQUENCY : 146.05 MHz
f. AUDIO SIGNAL OUTPUT LEVEL (AT SPEAKER TERMINAL) : 50 mW (0.63 Vrms)

ALIGNMENT PROCEDURE

See Figure 3 for setup of test equipment.

STEP	TEST CONDITION	MEASUREMENT	ADJUSTMENT	REMARKS
1	RF SSG LEVEL :0.10 uV	OSCILLOSCOPE (AUDIO OUTPUT)	RT001	ADJUST RT001 TO THE POINT WHERE AUDIO OUTPUT WAVE-FORM WILL APPEAR
2	CHANNEL: 4 RF SSG LEVEL: 1 mV MOD: 167.90 Hz DEV: ± 700 Hz	TP601	RT601	ADJUST RT601 TO 0.9Vp-p  0.9Vp-p *RED LED FLASHING DURING ADJUST

ALIGNMENT PROCEDURE

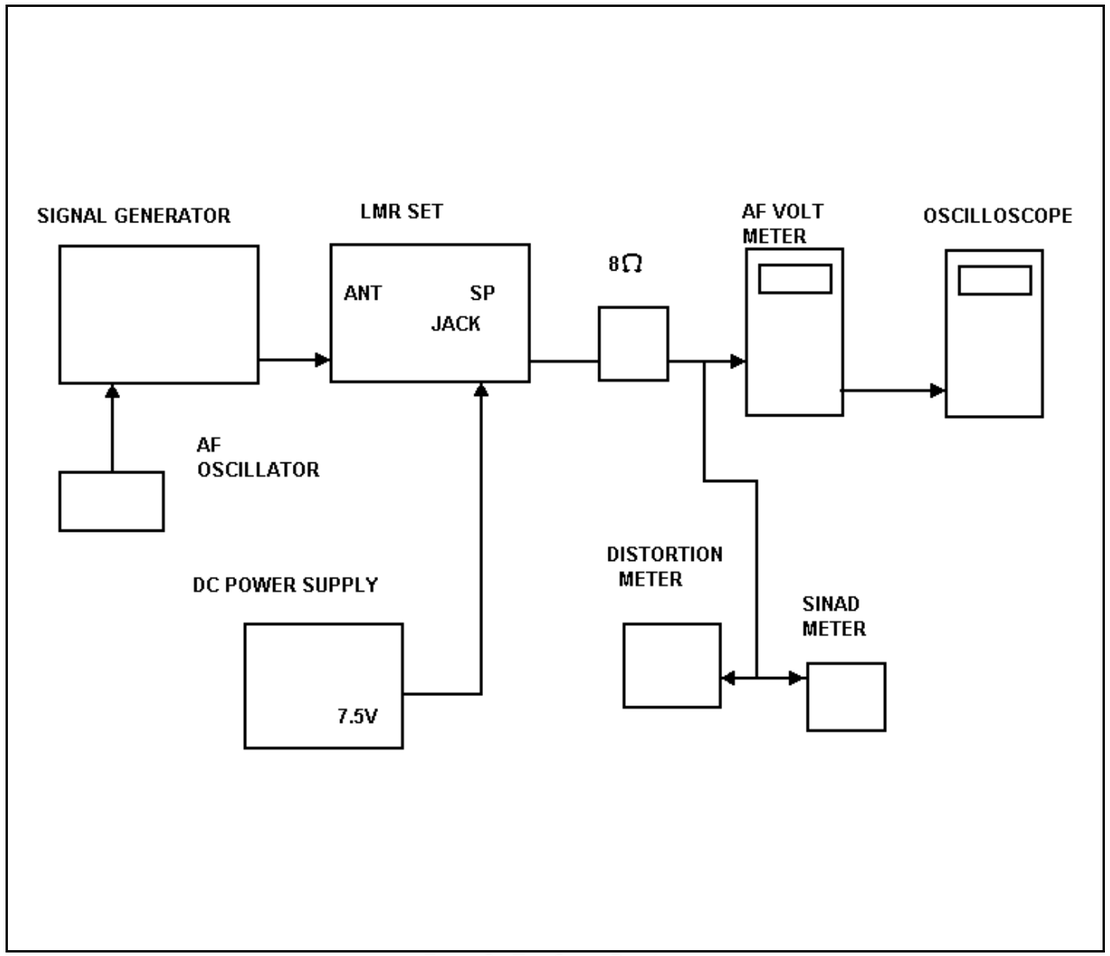


Figure 3 - Test Setup, Receiver

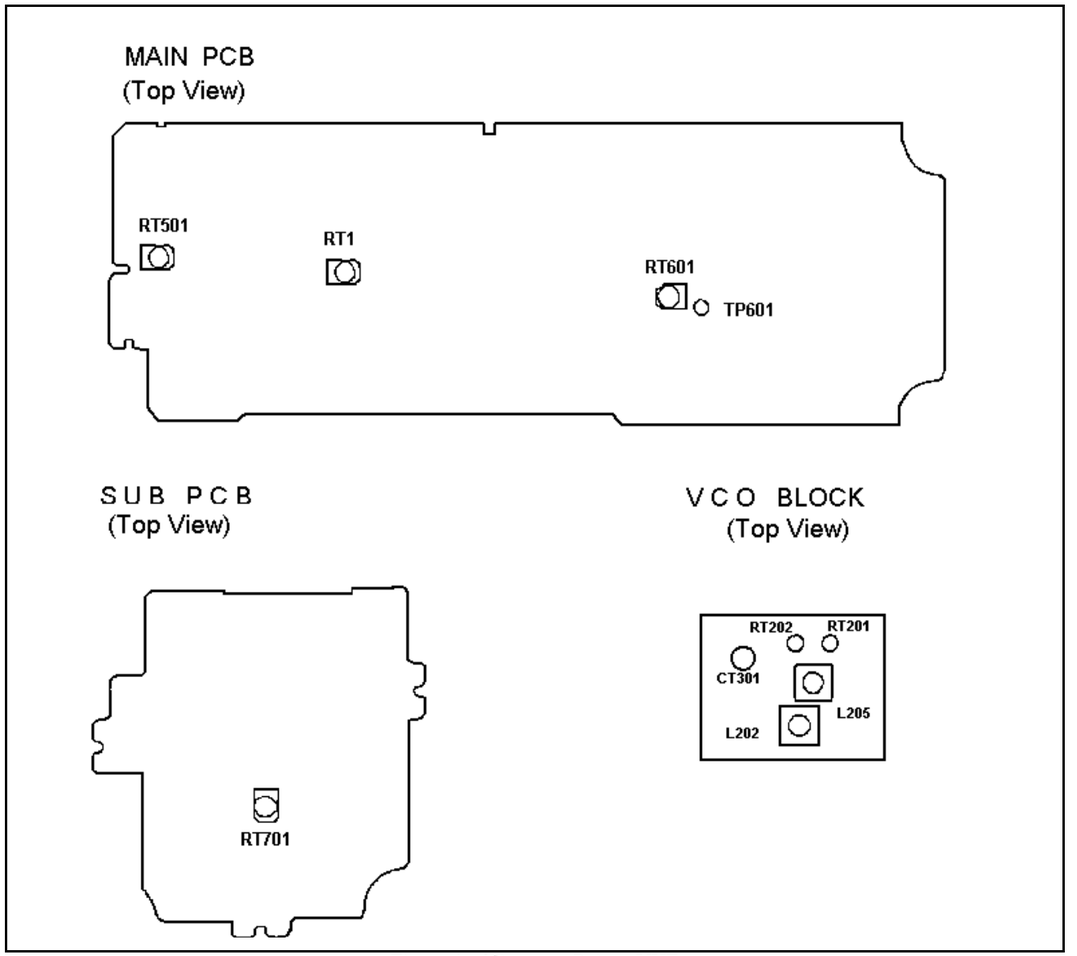


Figure 4 - Alignment Points, VHF

TEST MODE (VHF)

DETAIL OF TEST MODE ROM

CH	RX		TX			2-TONE	VOX	USES
	FREQ. (MHz)	CTCSS/DCS (Hz) (-)	FREQ. (MHz)	CTCSS/DCS (Hz) (-)	PWR			
1	160.0500	- - - - - - - - - - - - -	161.0000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
2	146.0500	- - - - - - - - - - - - -	146.5000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
3	173.9500	- - - - - - - - - - - - -	173.5000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
4	160.0500	CTCSS 167.9	161.0000	CTCSS 167.9	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
5	160.0500	DCS CODE 172	161.0000	DCS CODE 172	HI	- - - - - - -	OFF	ALIGNMENT OF DCS
6	160.0500	CTCSS 67.0	161.0000	CTCSS 67.0	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
7	160.0500	CTCSS 250.3	161.0000	CTCSS 250.3	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
8	160.0500	- - - - - - - - - - - - -	161.0000	- - - - - - - - - - - - -	LO	288.5 1433.4	ON	CONFIRM OF 2-TONE TX LOW
9	146.0500	- - - - - - - - - - - - -	146.5000	- - - - - - - - - - - - -	LO	- - - - - - -	ON	TX LOW
10	173.9500	- - - - - - - - - - - - -	173.5000	- - - - - - - - - - - - -	LO	- - - - - - -	ON	TX LOW
11	146.0500	CTCSS 67.0	146.5000	CTCSS 67.0	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
12	146.0500	CTCSS 250.3	146.5000	CTCSS 250.3	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
13	173.9500	CTCSS 67.0	173.5000	CTCSS 67.0	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
14	173.9500	CTCSS 250.3	173.5000	CTCSS 250.3	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
15	150.0500	CTCSS 67.0	150.0500	CTCSS 67.0	HI	- - - - - - -	OFF	FIELD TEST
16	150.5000	CTCSS 250.3	150.5000	CTCSS 250.3	HI	- - - - - - -	OFF	FIELD TEST

PC PROGRAMMING

TIME OUT TIMER	OFF
PRIORITY CHANNEL	CH 1
DROP OUT DELAY	1 SEC
SCAN	ON
BUSY CHANNEL LOCKOUT	OFF

TRANSISTOR VOLTAGE CHART (VHF)

Q PIN NO.		RX [V]	TX [V]	REMARKS
Q001	C	5.0	0.0	
	B	0.7	0.0	
	E	0.0	0.0	
Q002	C	1.0	0.0	
	B	0.7	0.0	
	E	0.0	0.0	
Q004	S	2.8	0.6	
	G	0.0	0.0	
	D	0.9	0.6	
Q005	C	5.5	0.0	
	B	4.9	5.6	
	E	5.6	5.6	
Q006	C	0.9	0.9	
	B	7.5	7.1	
	E	7.5	7.2	
Q007	C	0.0	0.0	
	B	5.0	5.0	
	E	0.0	0.0	
Q011	C	7.5	7.1	
	B	0.0	0.0	
	E	0.0	0.0	
Q501	C1	0.0	0.6	
	C2	0.0	0.0	
	B1	0.0	4.5	
	B2	0.0	4.5	
	E	0.0	5.0	
Q502	C	0.0	7.2	
	B	7.5	6.4	
	E	7.5	7.2	
Q503	C	7.5	6.4	
	B	0.0	4.6	
	E	0.0	3.9	
Q504	C	0.0	4.6	
	B	0.0	0.0	
	E	0.0	0.0	
Q505	C	0.0	5.6	
	B	5.5	5.0	
	E	5.6	5.6	
Q506	C	7.0	6.4	
	B	0.0	0.6	
	E	0.0	0.0	

Q PIN NO.		RX [V]	TX [V]	REMARKS
Q507	C	0.0	3.0	
	B	7.0	6.6	
	E	7.5	7.2	
Q508	C	0.0	4.9	
	B	0.0	0.7	
	E	0.0	0.0	
Q510	C	5.6	5.6	
	B	5.5	5.5	
	E	4.8	4.8	
Q601	C1	0.0	0.0	
	C2	5.2	5.2	
	B1	2.3	2.6	
	B2	2.3	2.6	
	E	2.3	2.6	
Q602	C	5.0	5.0	
	B	0.0	0.0	
	E	0.0	0.0	
Q603	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q604	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q605	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q701	C	1.6	1.6	
	B	0.7	0.7	
	E	0.1	0.1	
Q702	S	3.2	3.2	
	G	0.0	0.0	
	D	3.2	3.2	
Q704	C	1.8	1.8	
	B	5.2	5.2	
	E	5.6	5.6	

VOLTAGE CHART - (VHF)

IC001 PIN NO.		RX [V]	TX [V]	REMARKS
1		5.4	0.0	
2		4.7	0.0	
3		5.5	0.0	
4		4.2	0.0	
5		5.5	0.0	
6		5.0	0.0	
7		5.0	0.0	
8		4.4	0.0	
9		5.5	0.0	
10		5.5	0.0	
11		5.1	0.0	
12		0.0	0.0	
13		4.6	0.0	
14		5.5	0.0	
15		0.9	0.0	
16		1.0	0.0	
17		0.7	0.0	
18		0.7	0.0	
19		5.4	0.0	
20		NC	0.0	
21		0.2	0.0	
22		5.5	0.0	
23		0.0	0.0	
24		1.0	0.0	

IC002 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.0	0.6	
2		3.0	0.4	
3		3.0	0.2	
4		0.0	0.0	
5		3.0	0.2	
6		3.0	0.6	
7		2.8	0.6	
8		5.6	0.6	

IC003 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		NC	NC	
3		NC	NC	
4		0.0	0.0	
5		0.0	0.0	
6		0.0	0.0	
7		NC	NC	
8		0.0	0.0	
9		0.0	0.0	
10		0.0	0.0	
11		0.0	0.0	
12		NC	NC	
13		NC	NC	
14		0.0	0.0	
15		0.0	0.0	
16		0.0	0.0	
17		NC	NC	
18		NC	NC	
19		NC	NC	
20		5.6	5.6	

IC004 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.9	0.9	
2		0.0	0.0	
3		0.6	0.6	
4		0.0	0.0	
5		0.8	0.8	
6		0.8	0.8	
7		0.0	0.0	
8		0.6	0.6	
9		0.0	0.0	

IC501 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	1.2	INPUT
2		0.0	7.3	Vs1
3		0.0	3.6	Vcontrol
4		0.0	7.3	Vs2
5		7.5	7.5	Vs3
6		0.0	0.0	OUTPUT

VOLTAGE CHART - (VHF)

IC502 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		7.5	7.2	
3		5.6	5.6	

IC502 PIN NO.		RX [V]	TX [V]	REMARKS
1		2.3	2.6	
2		- -	- -	DATA LINE
3		2.1	2.3	
4		2.3	2.6	
5		2.3	2.6	
6		5.2	5.2	
7		2.3	2.6	
8		2.3	2.6	
9		- -	- -	CLOCK LINE
10		0.0	0.0	
11		NC	NC	
12		0.0	0.0	
13		2.3	2.6	
14		2.3	2.6	

IC603 PIN NO.		RX [V]	TX [V]	REMARKS
1		2.3	2.6	
2		2.3	2.5	
3		2.3	2.5	
4		2.3	2.3	
5		5.0	0.0	
6		5.0	0.0	
7		0.0	0.0	
8		2.1	2.3	
9		2.1	2.4	
10		2.3	2.6	
11		1.6	2.6	
12		0.0	5.6	
13		0.0	5.0	
14		5.2	5.2	

IC604 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		- -	- -	CLOCK LINE
3		- -	- -	DATA LINE
4		- -	- -	COMMON PIN3
5		0.0	0.0	
6		NC	NC	
7		NC	NC	
8		5.2	5.2	

IC605 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		7.5	7.2	
3		5.6	5.6	

IC606 PIN NO.		RX [V]	TX [V]	REMARKS
1		5.2	5.2	
2		0.0	0.0	
3		5.1	5.1	

IC701 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.1	3.1	
4		0.0	0.0	
5		3.1	3.1	
6		3.2	3.2	
7		3.2	3.2	
8		5.6	5.6	

IC702 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.2	3.2	
4		0.0	0.0	
5		3.2	3.2	
6		3.2	3.2	
7		3.2	3.2	
8		5.6	5.6	

VOLTAGE CHART - (VHF)

IC703 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.1	3.1	
4		0.0	0.0	
5		3.1	3.1	
6		3.2	3.2	
7		3.1	3.1	
8		5.6	5.6	

PCB:SWITCH PIN NAME		RX [V]	TX [V]	REMARKS
GND		0.0	0.0	
DET		0.0	4.6	ADJUSTABLE
GND		0.0	0.0	
RX		0.0	0.8	
TX7.5V		0.0	7.2	
GND		0.0	0.0	
TX		0.0	0.0	

PCB:RF PIN NAME		RX [V]	TX [V]	REMARKS
GND		0.0	0.0	
IN		0.0	0.0	
GND		0.0	0.0	
RX5.6V		5.5	0.0	
LOCAL		0.0	0.0	
GND		0.0	0.0	
IF OUT		0.0	0.0	
GND		0.0	0.0	

PCB:RF PIN NAME		RX [V]	TX [V]	REMARKS
OUT		0.0	0.0	
GND		0.0	0.0	
GND		0.0	0.0	
MOD		0.0	0.0	
BAL		- -	- -	NOT ON MAIN PCB
UNLOCK		0.0	0.0	
CLOCK		- -	- -	CLOCK LINE
DATA		- -	- -	DATA LINE
PLL_EN		0.3	0.3	
5V		5.0	5.0	
Tx5		0.0	5.6	
Rx5		5.5	0.0	
VCO5		4.8	4.8	

VOLTAGE CHART - (VHF)

REF NO.	POLARITY	RX [V]	TX [V]	REMARKS
C23	+	5.5	0.0	
C37	+	3.0	0.6	
C53	+	0.0	0.0	
C54	+ –	0.6 0.0	0.6 0.0	
C55	+	9.0	0.9	
C63	+	0.6	0.6	
C64	+	0.8	0.8	
C65	+ –	0.8 0.6	0.8 0.6	
C507	+	0.0	0.6	
C515	+	0.0	7.1	
C530	+	5.5	5.5	
C532	+	5.6	5.6	
C602	+	7.5	7.2	
C603	+	5.6	5.6	
C608	+	2.3	2.6	
C610	+	2.3	2.6	
C618	+	5.1	5.1	
C619	+	5.2	5.2	
C623	+	5.2	5.2	
C633	+	5.2	5.2	
C702	+	5.2	5.2	
C707	+	4.4	4.4	
C716	+	3.3	3.3	
C717	+	3.2	3.2	
C718	+ –	3.2 3.2	3.2 3.2	
C729	+ –	3.3 2.3	3.3 2.3	
C731	+ –	3.1 0.0	3.1 0.0	
C732	+ –	3.3 2.0	3.3 2.3	
C738	+	7.5	7.4	
C752	+	1.8	1.8	
C755	+	0.9	0.9	
C758	+	5.6	5.6	
C765	+	5.6	5.6	
C768	+	3.0	3.0	

ALIGNMENT OF TRANSMITTER - (UHF)

TEST EQUIPMENT REQUIRED

a. DC POWER SUPPLY (7.5V, more than 3A)
b. RF WATTMETER (more than 10 Watt)
c. DUMMY LOAD FOR SPEAKER (50 Ω more than 10 Watt)
d. FM LINEAR DETECTOR
e. FREQUENCY COUNTER
f. AF OSCILLATOR

ALIGNMENT CONDITION

a. CHANNEL : 1
b. MODE : TX
c. MODULATION FREQUENCY : 1 kHz
d. LOAD IMPEDANCE : 50 Ω

ALIGNMENT PROCEDURE

See Figure 2 for setup of test equipment.

STEP	TEST CONDITION	MEASUREMENT	ADJUSTMENT	REMARKS
1	NO MODULATION	RF WATTMETER	RT501	3.8W ± 0.05W *
2		FREQUENCY COUNTER	CT301	461.000 MHz ± 100 Hz
3	MOD : 1 kHz LEVEL : 100 mV	FM LINEAR DETECTOR HPF: OFF LPF: OFF DE-EMPHASIS: OFF	RT202	± 4.0 kHz DEV ± 0.01 kHz
4	CH6 NO MODULATION	↑	RT701	± 700 Hz DEV ± 10 Hz (Tone Freq. = 67.0 Hz)
5	CH7	↑	RT201	± 700 Hz DEV ± 10 Hz (Tone Freq. = 250.3 Hz)
6	CH6	↑	---------	If DEVIATION is not ± 700 Hz DEV ± 30 Hz back to STEP 5.
7	CH1 MOD : 1 kHz, 100 mV	↑	RT202 (CHECK)	± 4.0 kHz DEV ± 0.05 kHz
8	CH4 NO MODULATION	↑	RT701 (CHECK)	± 700 Hz DEV ± 30 Hz (Tone Freq. = 167.9 Hz)

* POWER ADJUSTMENT TIME IS LESS THAN 5 SECONDS.

ALIGNMENT OF RECEIVER - (UHF)

TEST EQUIPMENT REQUIRED

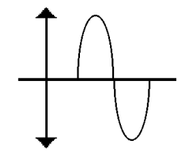
a. DC POWER SUPPLY (7.5V, more than 2A)
b. RF SIGNAL GENERATOR
c. DUMMY LOAD FOR SPEAKER (8 Ω, more than 1 Watt)
d. SINAD METER
e. AF OSCILLATOR

ALIGNMENT CONDITION

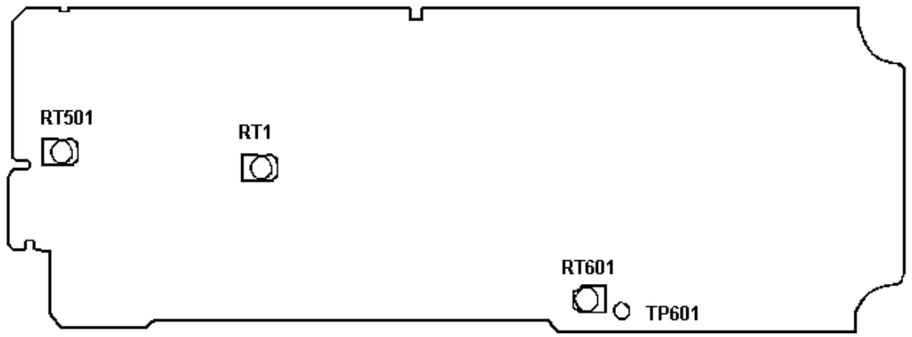
a. CHANNEL : 2
b. MODE : RX
c. SQUELCH (RT001 : SQ. VR) : C.C.W.
d. RF SSG MODULATION : 1 kHz, ± 3 kHz DEV.
e. RF SSG FREQUENCY : 438.05 MHz
f. AUDIO SIGNAL OUTPUT LEVEL (AT SPEAKER TERMINAL) : 50 mW (0.63 Vrms)

ALIGNMENT PROCEDURE

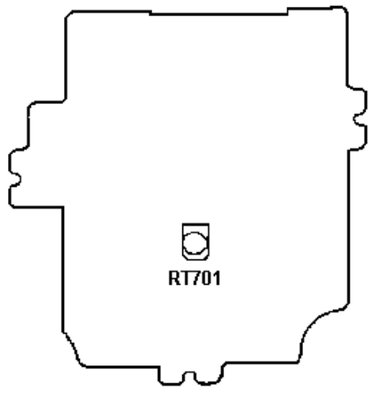
See Figure 3 for setup of test equipment.

STEP	TEST CONDITION	MEASUREMENT	ADJUSTMENT	REMARKS
1	RF SSG LEVEL :0.15 uV	OSCILLOSCOPE (AUDIO OUTPUT)	RT001	ADJUST RT001 TO THE POINT WHERE AUDIO OUTPUT WAVE-FORM WILL APPEAR
2	CHANNEL: 4 RF SSG LEVEL: 1 mV MOD: 167.90 Hz DEV: ± 700 Hz	TP601	RT601	ADJUST RT601 TO 0.9Vp-p  0.9Vp-p

MAIN PCB
(Top View)



SUB PCB
(Top View)



VCO BLOCK
(Top View)

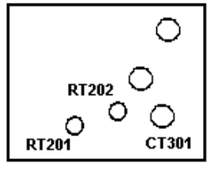


Figure 5 - Alignement Points, UHF

TEST MODE (UHF)

DETAIL OF TEST MODE ROM

CH	RX		TX			2-TONE	VOX	USES
	FREQ. (MHz)	**CTCSS/DCS (Hz) (-)**	**FREQ. (MHz)**	CTCSS/DCS (Hz) (-)	P W R			
1	460.0500	- - - - - - - - - - - - -	461.0000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
2	438.0500	- - - - - - - - - - - - -	438.5000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
3	469.9500	- - - - - - - - - - - - -	469.5000	- - - - - - - - - - - - -	HI	- - - - - - -	OFF	ALIGNMENT OF TX/RX
4	460. 0500	CTCSS 167.9	461.0000	CTCSS 167.9	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
5	460.0500	DCS CODE 172	461.0000	DCS CODE 172	HI	- - - - - - -	OFF	ALIGNMENT OF DCS
6	460.0500	CTCSS 67.0	461.0000	CTCSS 67.0	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
7	460.0500	CTCSS 250.3	461.0000	CTCSS 250.3	HI	- - - - - - -	OFF	ALIGNMENT OF CTCSS
8	460.0500	- - - - - - - - - - - - -	461.0000	- - - - - - - - - - - - -	LO	288.5 1433.4	ON	CONFIRM OF 2-TONE TX LOW
9	438. 0500	- - - - - - - - - - - - -	438.5000	- - - - - - - - - - - - -	LO	- - - - - - -	ON	TX LOW
10	469.9500	- - - - - - - - - - - - -	469.5000	- - - - - - - - - - - - -	LO	- - - - - - -	ON	TX LOW
11	438.0500	CTCSS 67.0	438.5000	CTCSS 67.0	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
12	438.0500	CTCSS 250.3	438.5000	CTCSS 250.3	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
13	469.9500	CTCSS 67.0	469.5000	CTCSS 67.0	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
14	469.9500	CTCSS 250.3	469.5000	CTCSS 250.3	HI	- - - - - - -	OFF	- - - - - - - - - - - - -
15	450.0500	CTCSS 67.0	450.0500	CTCSS 67.0	HI	- - - - - - -	OFF	FIELD TEST
16	450.5000	CTCSS 250.3	450.5000	CTCSS 250.3	HI	- - - - - - -	OFF	FIELD TEST

PC PROGRAMMING

TIME OUT TIMER	OFF
PRIORITY CHANNEL	CH 1
DROP OUT DELAY	1 SEC
SCAN	ON
BUSY CHANNEL LOCKOUT	OFF

TRANSISTOR VOLTAGE CHART (UHF)

Q PIN NO.		RX [V]	TX [V]	REMARKS
Q001	C	5.0	0.0	
	B	0.7	0.0	
	E	0.0	0.0	
Q002	C	1.0	0.0	
	B	0.7	0.0	
	E	0.0	0.0	
Q004	S	2.8	0.6	
	G	0.0	0.0	
	D	0.9	0.6	
Q005	C	5.5	0.0	
	B	4.9	5.6	
	E	5.6	5.6	
Q006	C	0.9	0.9	
	B	7.5	7.1	
	E	7.5	7.2	
Q007	C	0.0	0.0	
	B	5.0	5.0	
	E	0.0	0.0	
Q011	C	7.5	7.1	
	B	0.0	0.0	
	E	0.0	0.0	
Q501	C1	0.0	0.6	
	C2	0.0	0.0	
	B1	0.0	4.5	
	B2	0.0	4.5	
	E	0.0	5.0	
Q502	C	0.0	7.2	
	B	7.5	6.4	
	E	7.5	7.2	
Q503	C	7.5	6.4	
	B	0.0	4.6	
	E	0.0	3.9	
Q504	C	0.0	4.6	
	B	0.0	0.0	
	E	0.0	0.0	
Q505	C	0.0	5.6	
	B	5.5	5.0	
	E	5.6	5.6	
Q506	C	7.0	6.4	
	B	0.0	0.6	
	E	0.0	0.0	

Q PIN NO.		RX [V]	TX [V]	REMARKS
Q507	C	0.0	3.0	
	B	7.0	6.6	
	E	7.5	7.2	
Q508	C	0.0	4.9	
	B	0.0	0.7	
	E	0.0	0.0	
Q510	C	5.6	5.6	
	B	5.5	5.5	
	E	4.8	4.8	
Q601	C1	0.0	0.0	
	C2	5.2	5.2	
	B1	2.3	2.6	
	B2	2.3	2.6	
	E	2.3	2.6	
Q602	C	5.0	5.0	
	B	0.0	0.0	
	E	0.0	0.0	
Q603	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q604	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q605	C	7.5	7.5	
	B	0.0	0.0	
	E	0.0	0.0	
Q701	C	1.6	1.6	
	B	0.7	0.7	
	E	0.1	0.1	
Q702	S	3.2	3.2	
	G	0.0	0.0	
	D	3.2	3.2	
Q704	C	1.8	1.8	
	B	5.2	5.2	
	E	5.6	5.6	

VOLTAGE CHART - (UHF)

IC001 PIN NO.		RX [V]	TX [V]	REMARKS
1		5.4	0.0	
2		4.7	0.0	
3		5.5	0.0	
4		4.2	0.0	
5		5.5	0.0	
6		5.0	0.0	
7		5.0	0.0	
8		4.4	0.0	
9		5.5	0.0	
10		5.5	0.0	
11		5.1	0.0	
12		0.0	0.0	
13		4.6	0.0	
14		5.5	0.0	
15		0.9	0.0	
16		1.0	0.0	
17		0.7	0.0	
18		0.7	0.0	
19		5.4	0.0	
20		NC	0.0	
21		0.2	0.0	
22		5.5	0.0	
23		0.0	0.0	
24		1.0	0.0	

IC002 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.0	0.6	
2		3.0	0.4	
3		3.0	0.2	
4		0.0	0.0	
5		3.0	0.2	
6		3.0	0.6	
7		2.8	0.6	
8		5.6	5.6	

IC003 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		NC	NC	
3		NC	NC	
4		0.0	0.0	
5		0.0	0.0	
6		0.0	0.0	
7		NC	NC	
8		0.0	0.0	
9		0.0	0.0	
10		0.0	0.0	
11		0.0	0.0	
12		NC	NC	
13		NC	NC	
14		0.0	0.0	
15		0.0	0.0	
16		0.0	0.0	
17		NC	NC	
18		NC	NC	
19		NC	NC	
20		5.6	5.6	

IC004 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.9	0.9	
2		0.0	0.0	
3		0.6	0.6	
4		0.0	0.0	
5		0.8	0.8	
6		0.8	0.8	
7		0.0	0.0	
8		0.6	0.6	
9		0.0	0.0	

IC501 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	2.4	
2		0.0	7.1	
3		0.0	3.0	
4		0.0	7.1	
5		7.5	7.2	
6		7.5	7.2	
7		0.0	0.0	

VOLTAGE CHART - (UHF)

IC502 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		7.5	7.2	
3		5.6	5.6	

IC502 PIN NO.		RX [V]	TX [V]	REMARKS
1		2.3	2.6	
2		- -	- -	DATA LINE
3		2.1	2.3	
4		2.3	2.6	
5		2.3	2.6	
6		5.2	5.2	
7		2.3	2.6	
8		2.3	2.6	
9		- -	- -	CLOCK LINE
10		0.0	0.0	
11		NC	NC	
12		0.0	0.0	
13		2.3	2.6	
14		2.3	2.6	

IC603 PIN NO.		RX [V]	TX [V]	REMARKS
1		2.3	2.6	
2		2.3	2.5	
3		2.3	2.5	
4		2.3	2.3	
5		5.0	0.0	
6		5.0	0.0	
7		0.0	0.0	
8		2.1	2.3	
9		2.1	2.4	
10		2.3	2.6	
11		1.6	2.6	
12		0.0	5.6	
13		0.0	5.0	
14		5.2	5.2	

IC604 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		- -	- -	CLOCK LINE
3		- -	- -	DATA LINE
4		- -	- -	COMMON PIN3
5		0.0	0.0	
6		NC	NC	
7		NC	NC	
8		5.2	5.2	

IC605 PIN NO.		RX [V]	TX [V]	REMARKS
1		0.0	0.0	
2		7.5	7.2	
3		5.6	5.6	

IC606 PIN NO.		RX [V]	TX [V]	REMARKS
1		5.2	5.2	
2		0.0	0.0	
3		5.1	5.1	

IC701 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.1	3.1	
4		0.0	0.0	
5		3.1	3.1	
6		3.2	3.2	
7		3.2	3.2	
8		5.6	5.6	

IC702 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.2	3.2	
4		0.0	0.0	
5		3.2	3.2	
6		3.2	3.2	
7		3.2	3.2	
8		5.6	5.6	

IC703 PIN NO.		RX [V]	TX [V]	REMARKS
1		3.2	3.2	
2		3.2	3.2	
3		3.1	3.1	
4		0.0	0.0	
5		3.1	3.1	
6		3.2	3.2	
7		3.1	3.1	
8		5.6	5.6	

PCB:SWITCH PIN NAME		RX [V]	TX [V]	REMARKS
GND		0.0	0.0	
DET		0.0	4.6	ADJUSTABLE
GND		0.0	0.0	
RX		0.0	0.8	
TX7.5V		0.0	7.2	
GND		0.0	0.0	
TX		0.0	0.0	

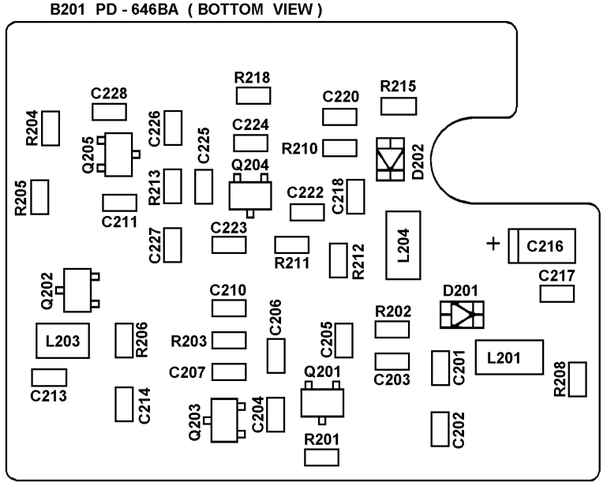
PCB:RF PIN NAME		RX [V]	TX [V]	REMARKS
GND		0.0	0.0	
IN		0.0	0.0	
GND		0.0	0.0	
RX5.6V		5.5	0.0	
LOCAL		0.0	0.0	
GND		0.0	0.0	
IF OUT		0.0	0.0	
GND		0.0	0.0	

SYNTHE. UNIT PIN NAME		RX [V]	TX [V]	REMARKS
OUT		0.0	0.0	
GND		0.0	0.0	
GND		0.0	0.0	
MOD		0.0	0.0	
BAL		- -	- -	NOT ON MAIN PCB
UNLOCK		0.0	0.0	
CLOCK		- -	- -	CLOCK LINE
DATA		- -	- -	DATA LINE
PLL_EN		0.3	0.3	
5V		5.0	5.0	
Tx5		0.0	5.6	
Rx5		5.5	0.0	
VCO5		4.8	4.8	

VOLTAGE CHART - (UHF)

REF NO.	POLARITY	RX [V]	TX [V]	REMARKS
C23	+	5.5	0.0	
C37	+	3.0	0.6	
C53	+	0.0	0.0	
C54	+ –	0.6 0.0	0.6 0.0	
C55	+	9.0	0.9	
C63	+	0.6	0.6	
C64	+	0.8	0.8	
C65	+ –	0.8 0.6	0.8 0.6	
C507	+	0.0	0.6	
C515	+	0.0	7.1	
C530	+	5.5	5.5	
C532	+	5.6	5.6	
C602	+	7.5	7.2	
C603	+	5.6	5.6	
C608	+	2.3	2.6	
C610	+	2.3	2.6	
C618	+	5.1	5.1	
C619	+	5.2	5.2	
C623	+	5.2	5.2	
C633	+	5.2	5.2	
C702	+	5.2	5.2	
C707	+	4.4	4.4	
C716	+	3.3	3.3	
C717	+	3.2	3.2	
C718	+ –	3.2 3.2	3.2 3.2	
C729	+ –	3.3 2.3	3.3 2.3	
C731	+ –	3.1 0.0	3.1 0.0	
C732	+ –	3.3 2.0	3.3 2.3	
C738	+	7.5	7.4	
C752	+	1.8	1.8	
C755	+	0.9	0.9	
C758	+	5.6	5.6	
C765	+	5.6	5.6	
C768	+	3.0	3.0	

B201 PD - 646BA (BOTTOM VIEW)



NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

C201	15P / CH
C202	3P / CJ
C203	3P / CJ
C204	0.001 / B
C205	10P / CH
C206	10P / CH
C207	0.001 / B
C210	2P / CK
C211	330P / CH
C213	330P / CH
C214	12P / CH
C216	35V0.1 (T) C-227
C217	330P / CH
C218	15P / CH
C220	330P / CH
C222	4P / CH
C223	0.001 / B
C224	12P / CH
C225	10P / CH
C226	0.001 / B
C227	2P / CK
C228	330P / CH

D201	HVU350
D202	HVU350

R201	3.9K
R202	4.7K
R203	330
R204	100
R205	220
R206	47K
R208	1K
R210	100
R211	3.9K
R212	4.7K
R213	330
R215	47K
R218	1K

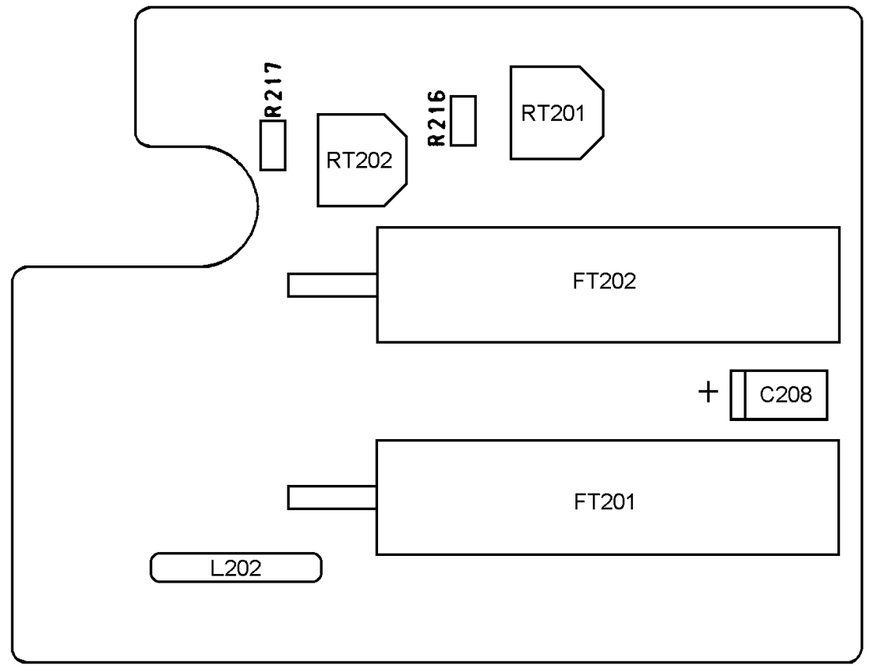
Q201	2SC4226 - R24
Q202	2SC4226 - R24
Q203	DTC124XU
Q204	2SC4226 - R24
Q205	DTC124XU

L201	0.1uH LZ - 116
L203	0.018uH LZ - 087
L204	0.1uH LZ - 116

VCO BOARD (UHF)
BOTTOM VIEW

(E24-12155, Sh. 1, Rev. 1)

B201 PD - 646BA (TOP VIEW)



C208	7V10 (T) C - 241

R216	10K
R217	22K

RT201	47KB RT - 550
RT202	47KB RT - 550

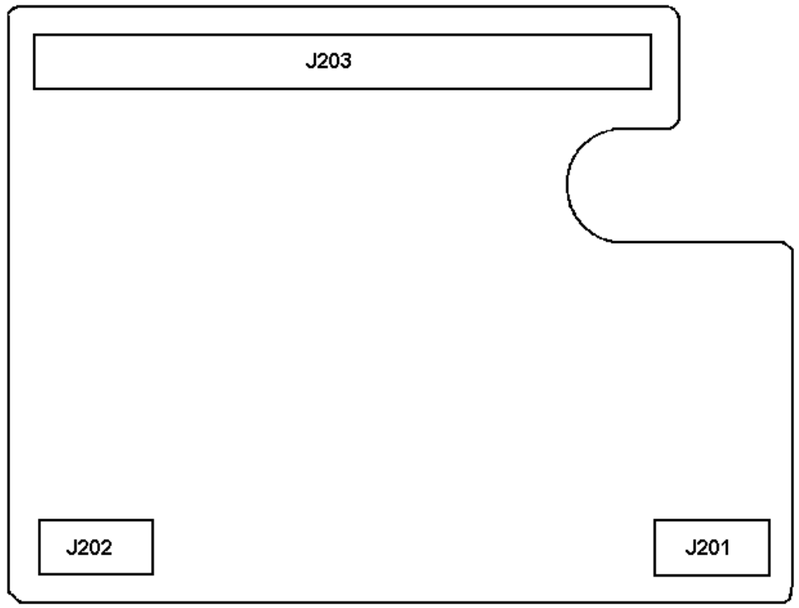
FT201	FK - 049
FT202	FK - 049
L202	LE - 351 1/2T

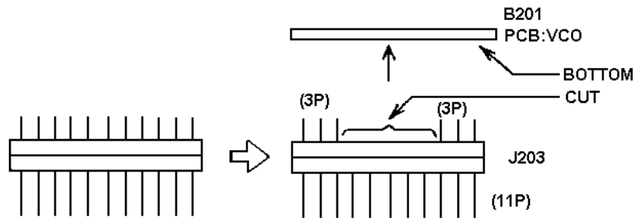
NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM. M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS.

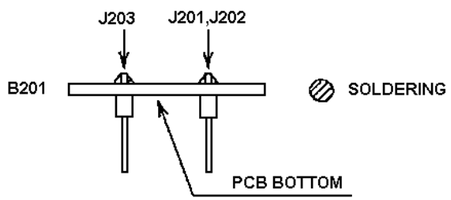
VCO BOARD (UHF)
TOP VIEW

(E24-12157, Sh. 1, Rev. 0)

B201 PD - 646BA (BOTTOM VIEW





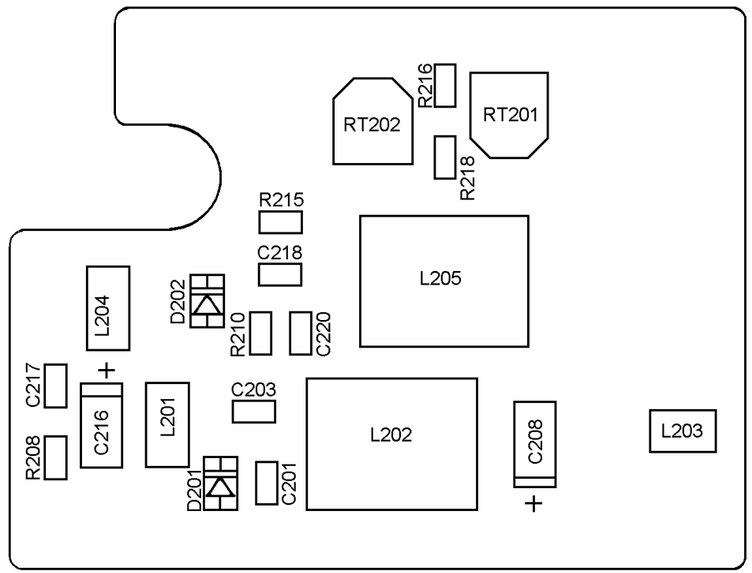


J201	PG - 156 2P
J202	PG - 156 2P
J203	PG - 156 11P

VCO BOARD (UHF)
BOTTOM VIEW

(E24-12154, Sh. 2, Rev. 0)

B201 PD - 646CA (TOP VIEW)



C201	18P / CH
C203	5P / CH
C208	7V10 (T) C - 241
C216	35V0.1 (T) C-227
C217	330P / CH
C218	100P / CH
C220	330P / CH

D201	MA376
D202	MA366

R208	1K
R210	100
R215	33K
R216	0
R218	5.6K

L201	0.75uH LZ - 140
L202	LF - 257
L203	0.068uH LZ - 087
L204	0.75uH LZ - 140
L205	LF - 258

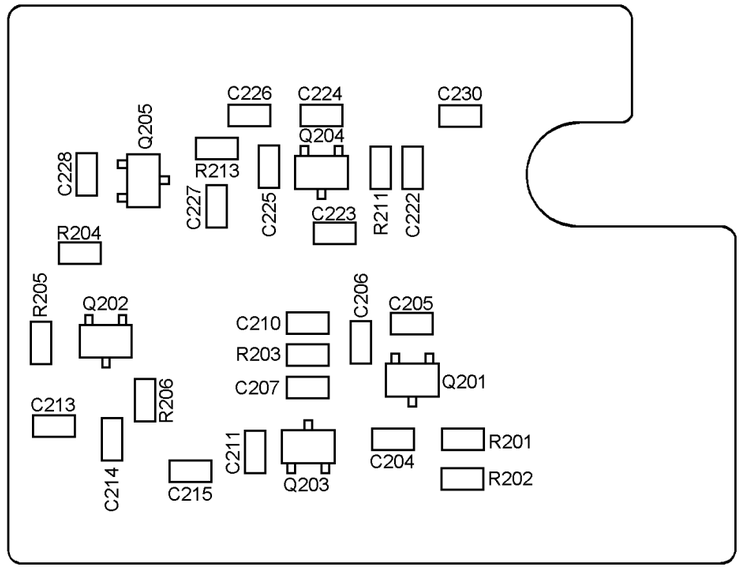
RT201	47KB RT - 550
RT202	47KB RT - 550

NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

VCO BOARD (UHF)
TOP VIEW

(E24-12267, Rev. 1)

B201 PD - 646CA (BOTTOM VIEW)



C204	0.001 / B
C205	27P / CH
C206	15P / CH
C207	0.001 / B
C210	5P / CH
C211	330P / CH
C213	330P / CH
C214	22P / CH
C215	18P / CH
C222	10P / CH
C223	0.001 / B
C224	27P / CH
C225	15P / CH
C226	0.001 / B
C227	5P / CH
C228	330P / CH
C230	0.001 / B

Q201	2SC4226 - R24
Q202	2SC4226 - R24
Q203	DTC124XU
Q204	2SC4226 - R24
Q205	DTC124XU

NOTES:

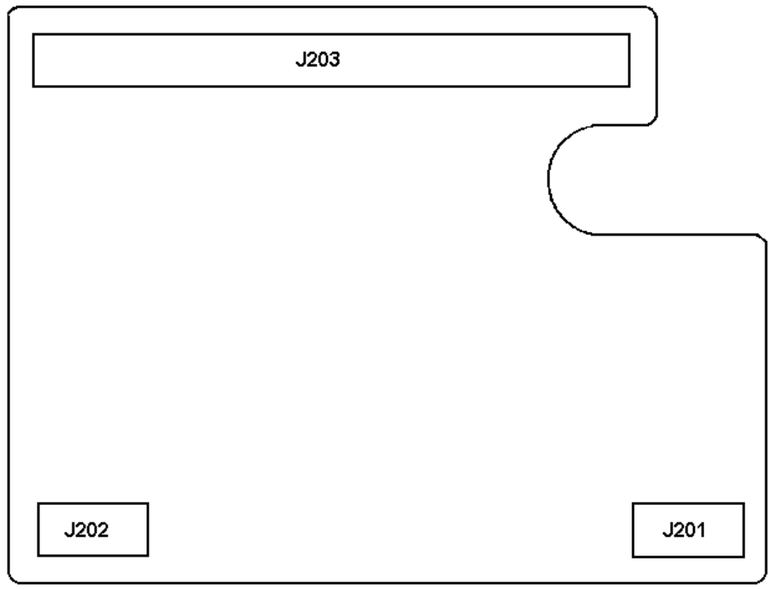
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

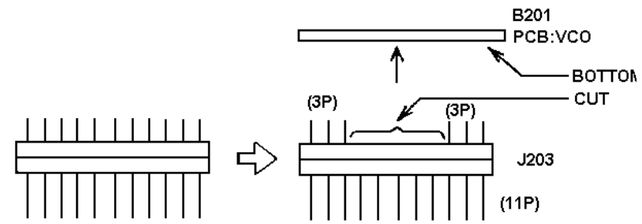
R201	2.2K
R202	3.9K
R203	1K
R204	33
R205	220
R206	47K
R211	10K
R213	1K

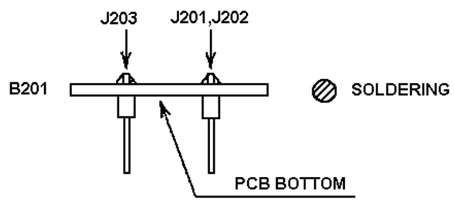
VCO BOARD (VHF)
BOTTOM VIEW

(E24-12268, Sh. 1, Rev. 1)

B201 PD - 646CA (BOTTOM VIEW





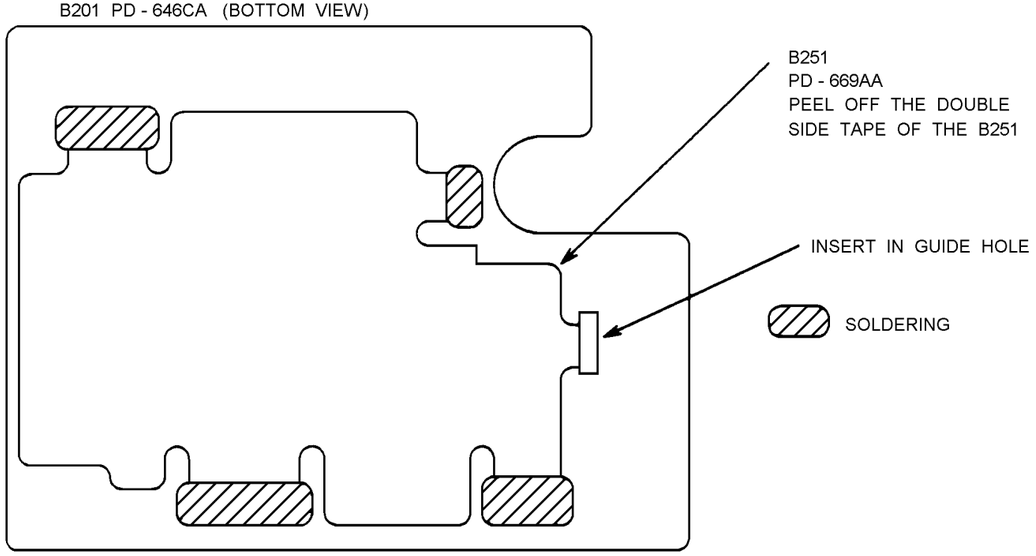


J201	PG - 156 2P
J202	PG - 156 2P
J203	PG - 156 11P

VCO BOARD (VHF)
BOTTOM VIEW

(E24-12269, Sh. 2, Rev. 0)

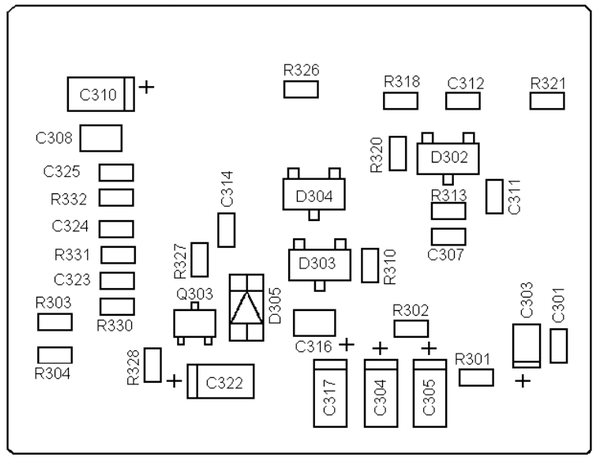
B201 PD - 646CA (BOTTOM VIEW)



VCO BOARD (VHF)
BOTTOM VIEW

(E24-12270, Sh. 3, Rev. 1)

B301 PD-652BA (BOTTOM VIEW)



NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM. M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16 W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

C301	0.001 / B
C303	35V0.33 (T) C-227
C304	7V15 (T) C - 284
C305	35V0.1 (T) C-227
C307	0.01 / B
C308	0.1 / B (2125) 25V
C310	7V4.7 (T) C - 228
C311	0.001 / B
C312	0.001 / B
C314	0.001 / B
C316	0.1 / B (2125) 25V
C317	7V4.7 (T) C - 228
C322	7V4.7 (T) C - 228
C323	47P / CH
C324	47P / CH
C325	47P / CH

Q303	2SC4177 - L6

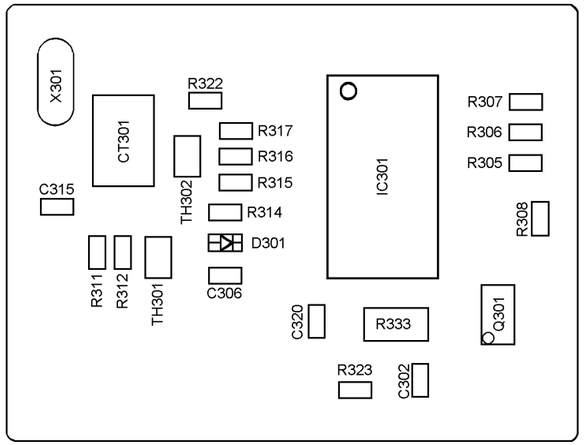
R301	680
R302	180
R303	330
R304	330
R310	10K - F
R313	10K
R318	100K
R320	10K
R321	10K
R326	0
R327	3.9K
R328	2.2K
R330	33K
R331	33K
R332	33K

D302	KV1430
D303	1SS226
D304	1SS226
D305	RLS4148

PLL BOARD (UHF)
BOTTOM VIEW

(E24-12151, Rev. 1)

B301 PD - 652BA (TOP VIEW)



NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM. M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16 W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

C302	5P / CH
C306	47P / CH
C315	68P / CH
C320	10P / CH

Q301	XN4601

D301	MA2S111

IC301	MB1501PF

CT301	CT - 087 25P

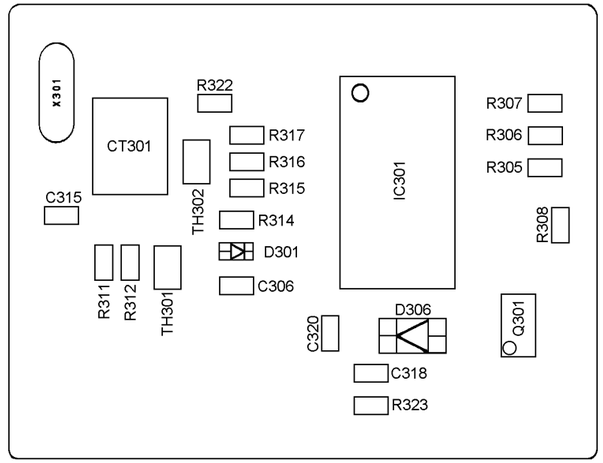
R305	10K
R306	12K
R307	12K
R308	10K
R311	220K - F
R312	27K - F
R314	18K - F
R315	27K - F
R316	82K - F
R317	39K - F
R322	1K
R323	220
R333	0 1/8W

TH301	DF - 060 2K
TH302	DF - 060 2K
X301	QX - 513 12.8 MHz

PLL BOARD (UHF)
TOP VIEW

(E24-12153, Sh. 1, Rev. 1)

B301 PD - 652BA (TOP VIEW)



NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

R305	10K
R306	12K
R307	12K
R308	10K
R311	220K - F
R312	27K - F
R314	18K - F
R315	27K - F
R316	82K - F
R317	39K - F
R322	1K
R323	220

TH301	DF - 060 2K
TH302	DF - 060 2K

C306	47P / CH
C315	68P / CH
C318	10P / CH
C320	10P / CH

Q301	XN4601

D301	MA2S111
D306	RLS4148

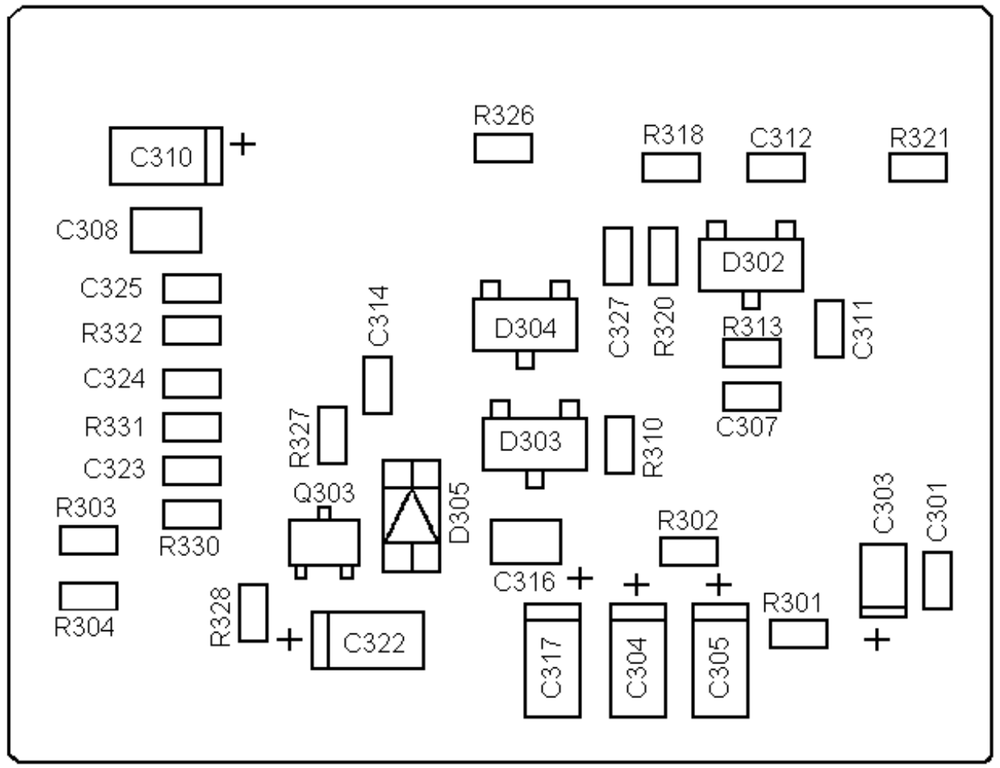
IC301	MB1504LPF

CT301	CT - 087 25P
X301	QX - 513 12.8MHz

PLL BOARD (VHF)
TOP VIEW

(E24-12271, Sh. 1, Rev. 1)

B301 PD-652BA (BOTTOM VIEW)



R301	680
R302	270
R303	330
R304	330
R310	10K - F
R313	10K
R318	100K
R320	10K
R321	10K
R326	0
R327	3.9K
R328	2.2K
R330	33K
R331	33K
R332	33K

Q303	2SC4177 - L6

C301	0.001 / B
C303	35V0.33 (T) C-227
C304	7V15 (T) C-284
C305	35V0.15 (T) C-227
C307	0.001 / B
C308	0.1 / B (2125) 25V
C310	7V4.7 (T) C-228
C311	0.001 / B
C312	0.001 / B
C314	0.001 / B
C316	0.1 / B (2125) 25V
C317	7V4.7 (T) C-228
C322	16V2.2 (T) C-228
C323	47P / CH
C324	47P / CH
C325	47P / CH
C327	0.001 / B

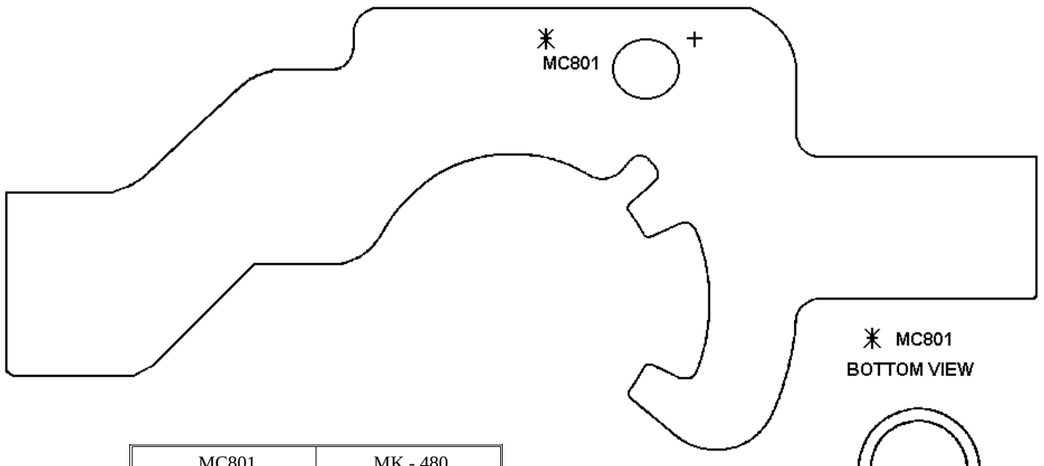
D302	KV1430
D303	1SS226
D304	1SS226
D305	RLS4148

NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

PLL BOARD (VHF) BOTTOM VIEW

(E24-12273, Rev. 1)

B801 PD-664AA (TOP VIEW)

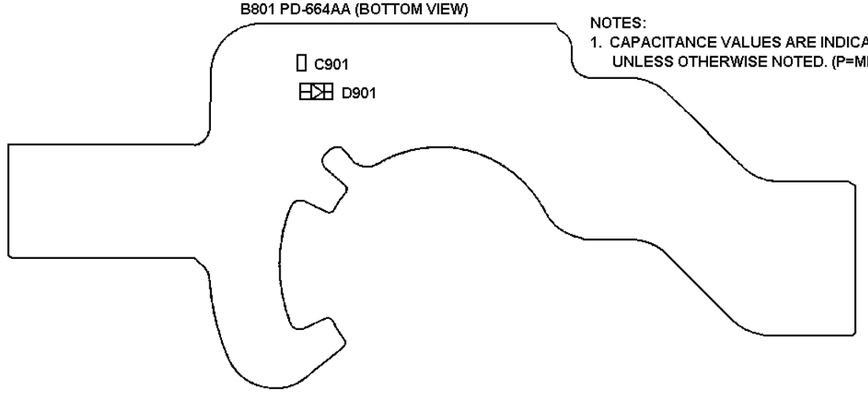


MC801	MK - 480

JUMPER BOARD (VHF)
TOP VIEW

(E24-12279, Rev. 0)

B801 PD-664AA (BOTTOM VIEW)



NOTES:
1. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)

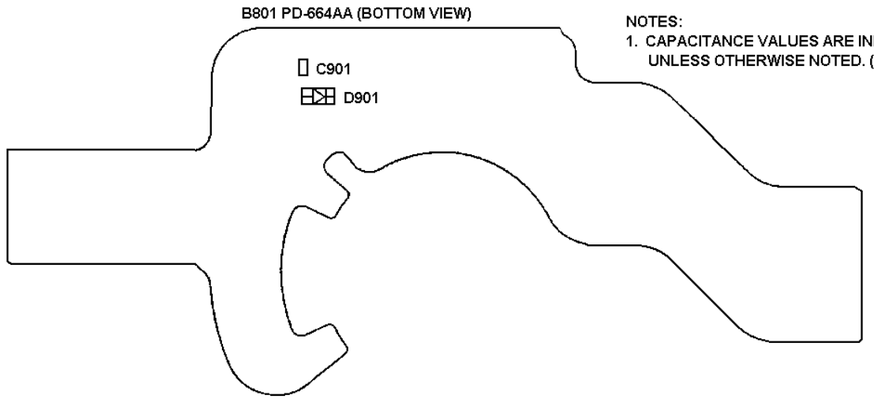
D901	HZK6C

C901	330P / CH (1608)

JUMPER BOARD (UHF)
BOTTOM VIEW

(E24-12144, Rev. 0)

B801 PD-664AA (BOTTOM VIEW)



NOTES:
1. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)

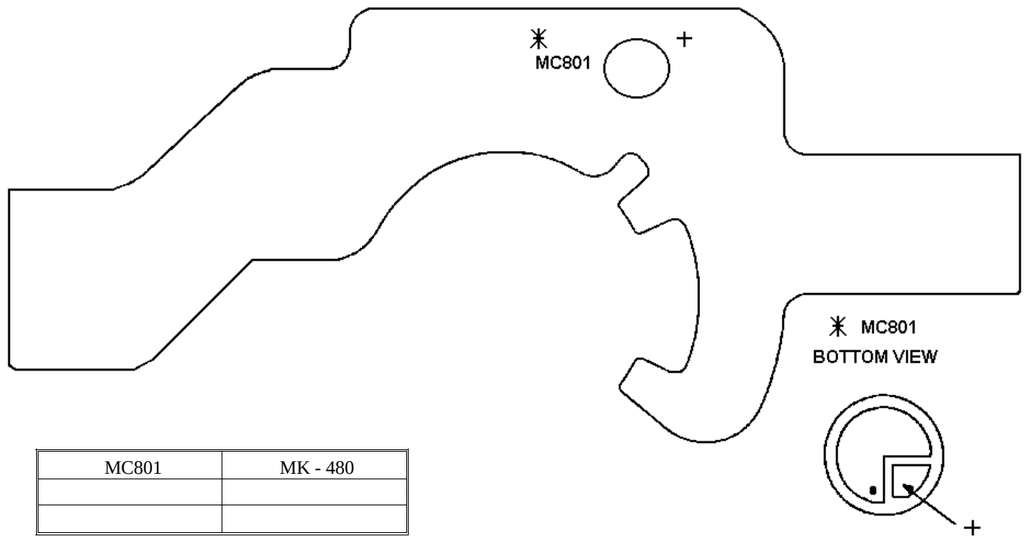
C901	330P / CH (1608)

D901	HZK6C

JUMPER BOARD (VHF)
BOTTOM VIEW

(E24-12280, Rev. 0)

B801 PD-664AA (TOP VIEW)

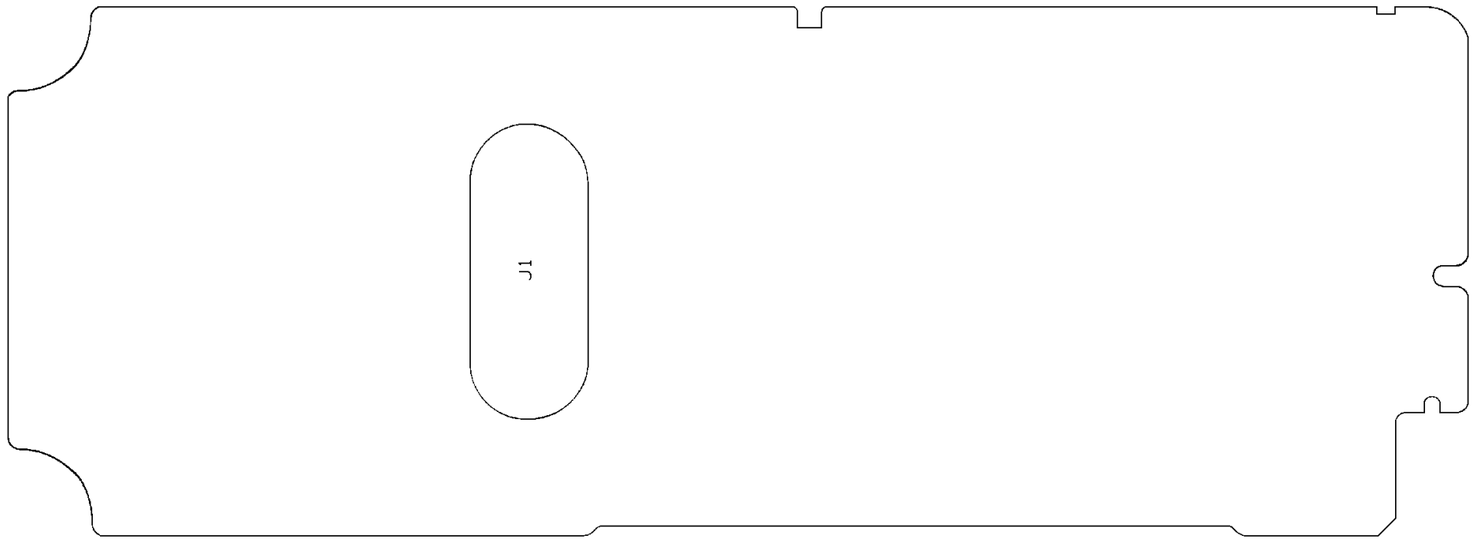


MC801	MK - 480

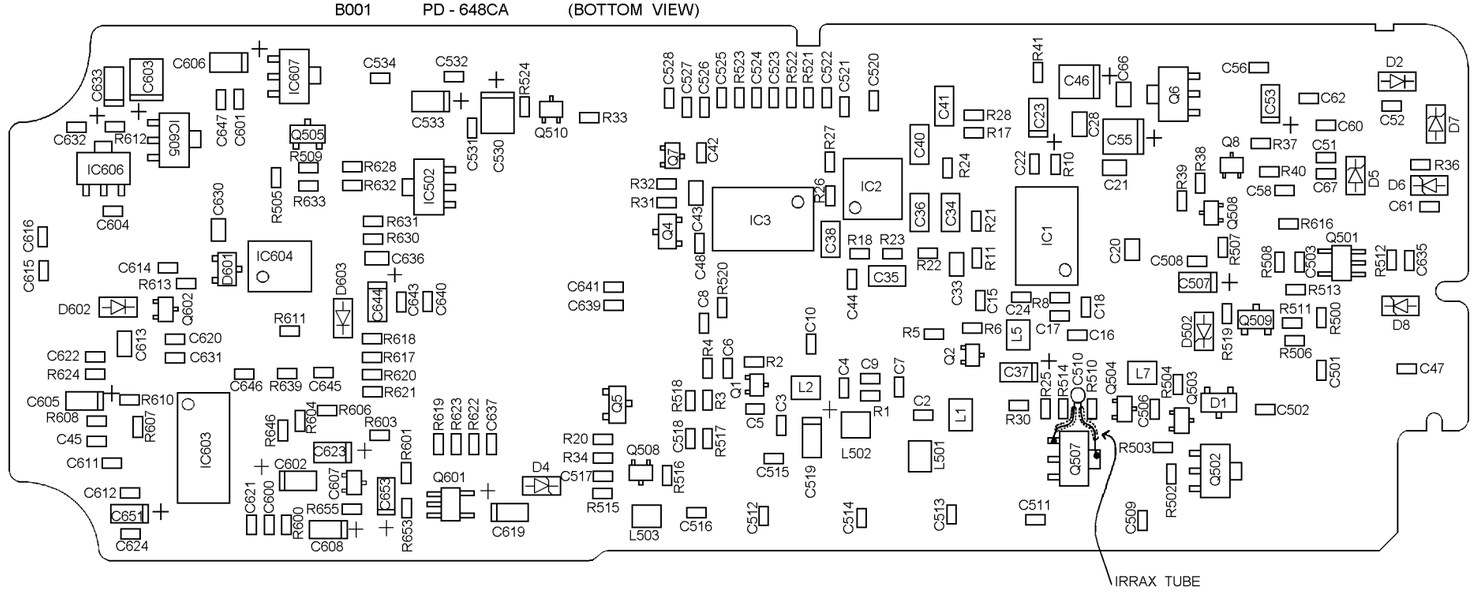
JUMPER BOARD (UHF)
TOP VIEW

(E24-12145, Rev. 0)

B001 PD - 648CA (BOTTOM VIEW)



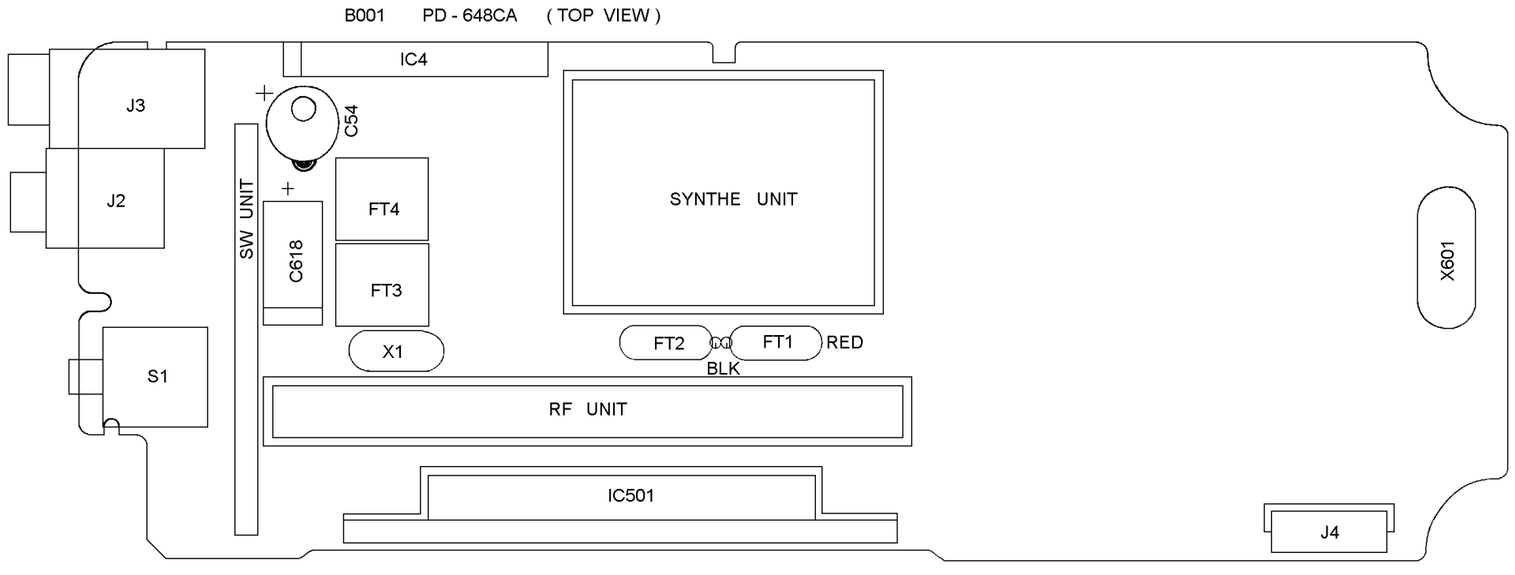
B001 PD - 648CA (BOTTOM VIEW)



MAIN BOARD (VHF)
BOTTOM VIEW

(E23-12263, Rev. 1)

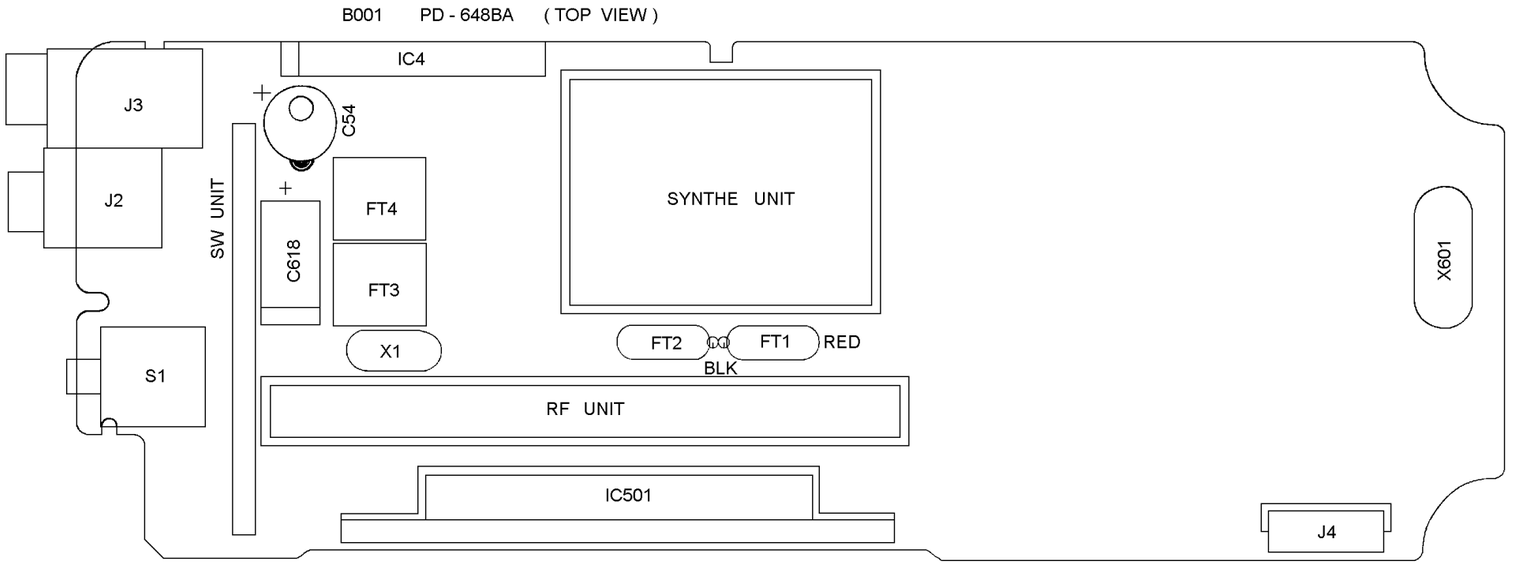
(E22-12264, Rev. 1)

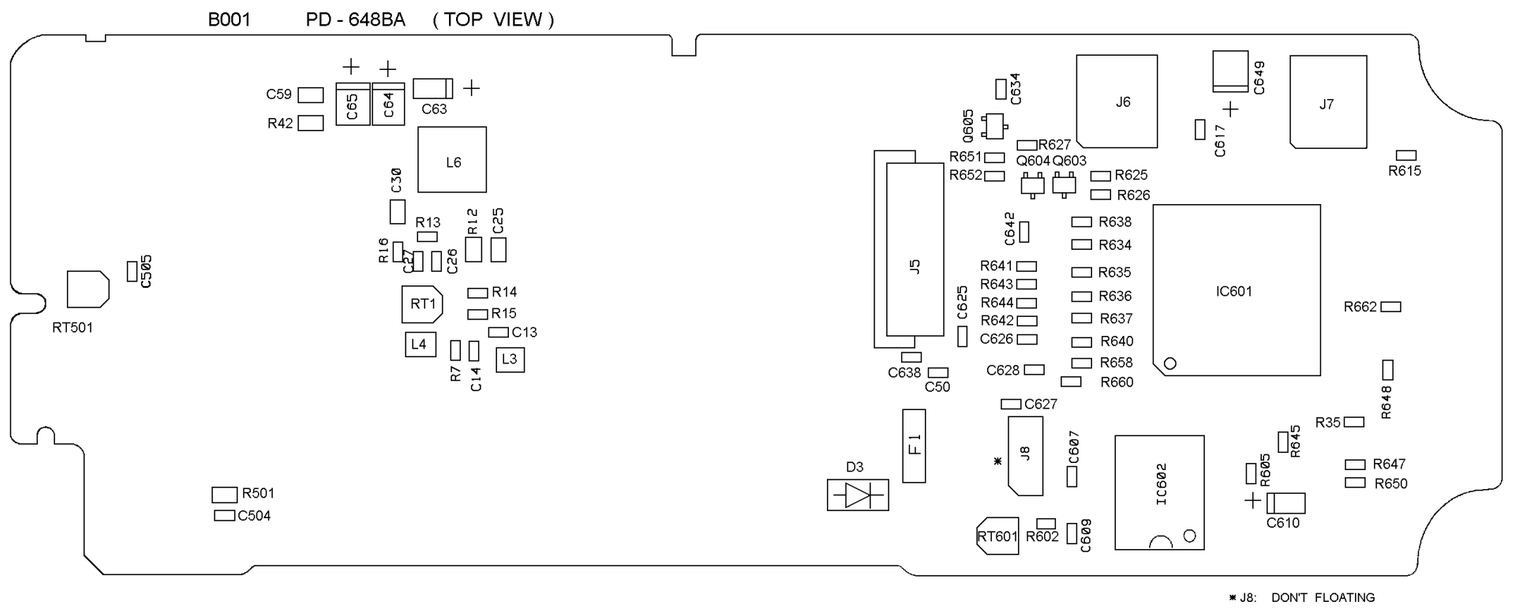


MAIN BOARD (VHF)
TOP VIEW

(E23-12263, Rev. 1)

(E22-12264, Rev. 1)



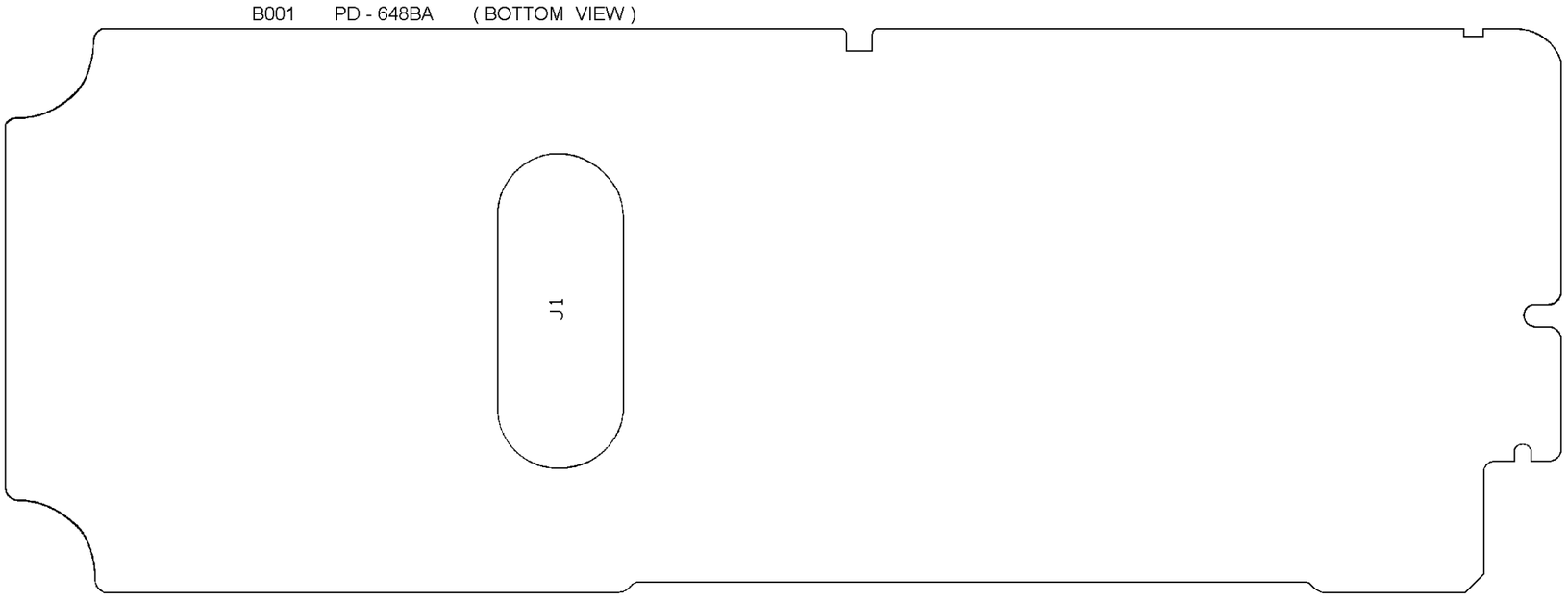


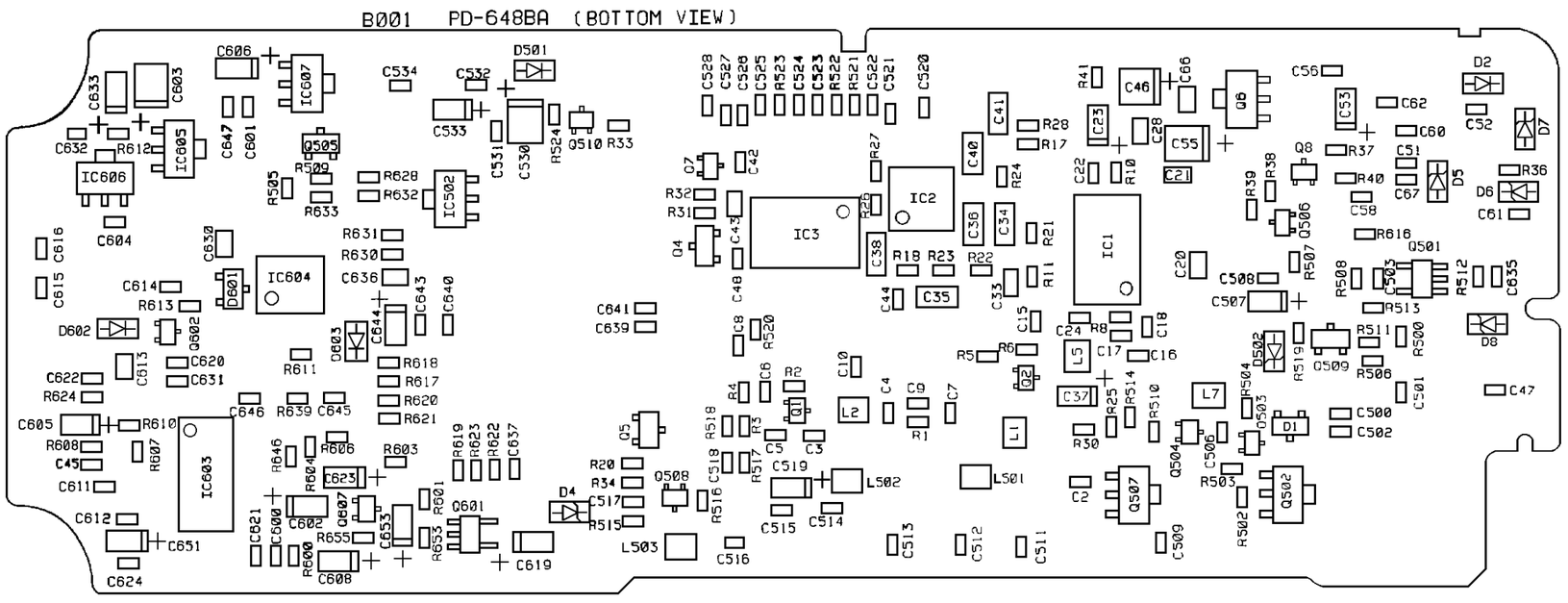
✱ J8: DON'T FLOATING

MAIN BOARD (UHF)
TOP VIEW

(E22-12167, Rev. 1)

(E22-12166, Rev. 1)

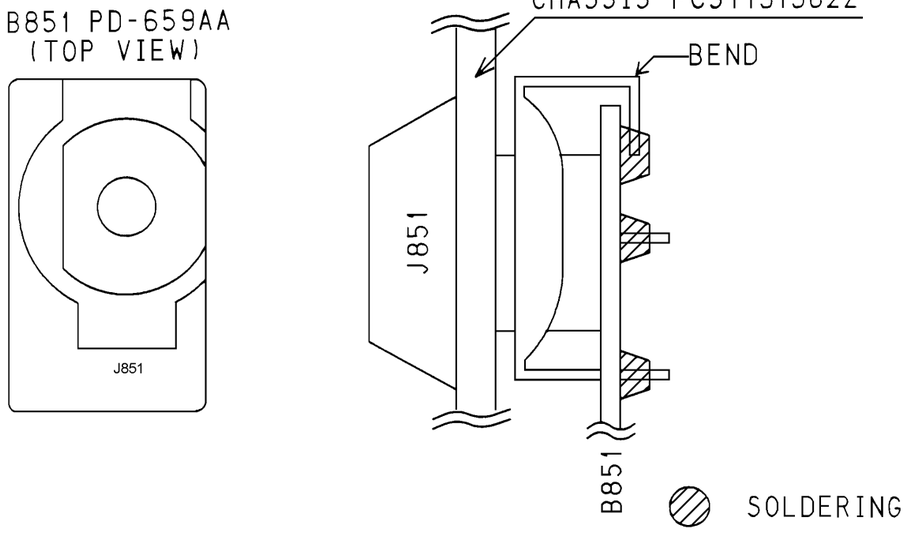




MAIN BOARD (UHF)
BOTTOM VIEW

(E22-12165, Rev. 1)

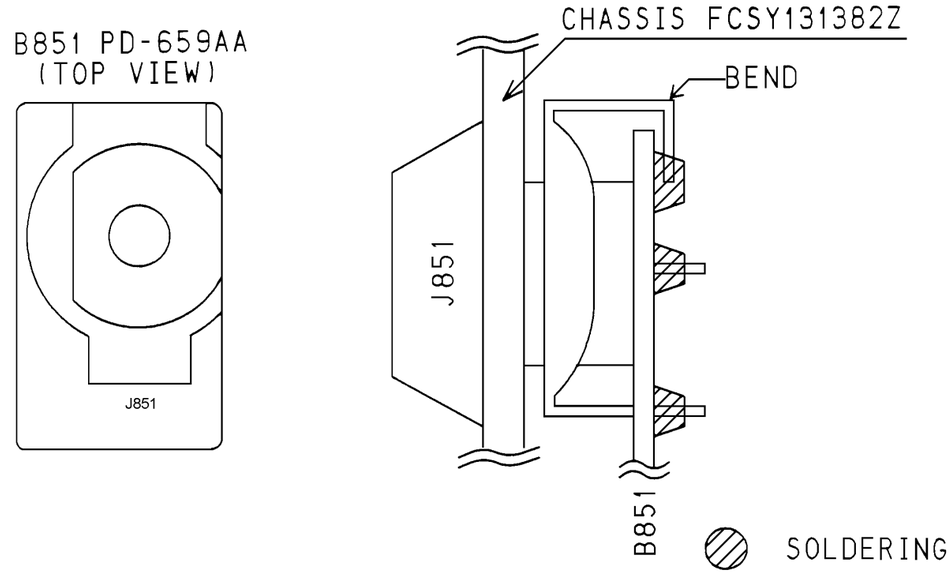
(E22-12163, Rev. 1)



J851	JK - 848

ANT BOARD (UHF)
TOP VIEW

(E24-12143, Rev. 1)

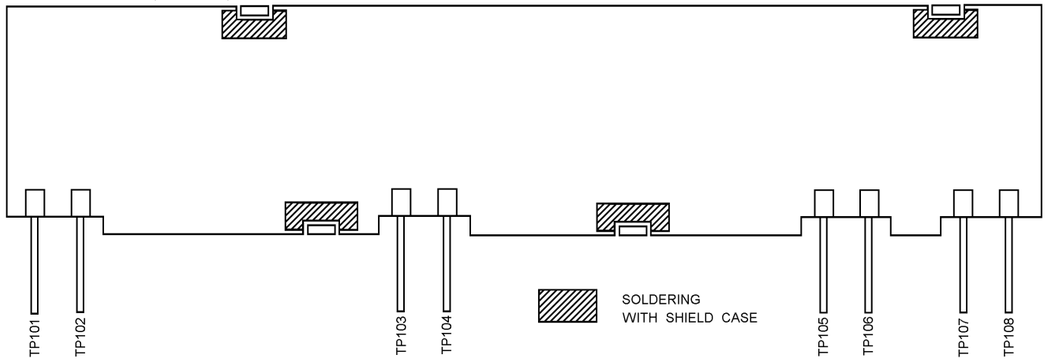


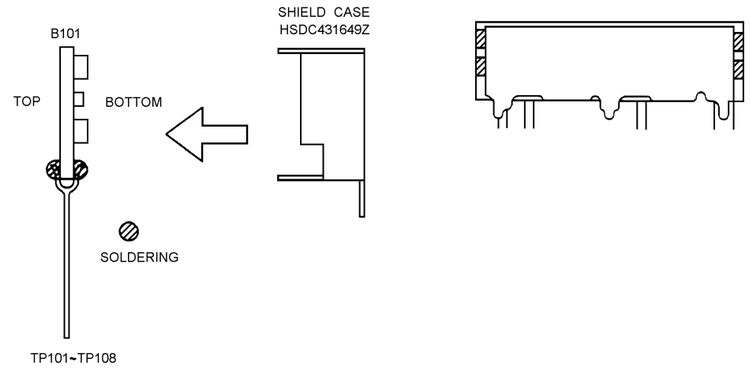
J851	JK - 848

ANT BOARD (VHF)
TOP VIEW

(E24-12281, Rev. 1)

B101 PD - 644BA (TOP VIEW)



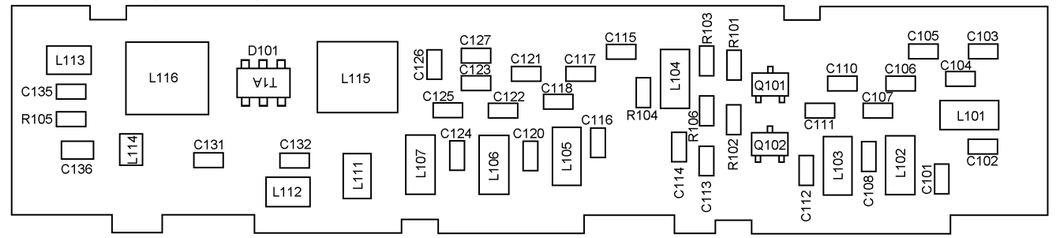


TP101	TP - 119
TP102	TP - 119
TP103	TP - 119
TP104	TP - 119
TP105	TP - 119
TP106	TP - 119
TP107	TP - 119
TP108	TP - 119

RF BOARD (UHF)
TOP VIEW

(E24-12159, Rev. 1)

B101 PD - 644BA (BOTTOM VIEW)



R101	18K
R102	5.6K
R103	220
R104	220
R105	56
R106	47

L101	0.0088uH LZ - 116
L102	0.0147uH LZ - 116
L103	0.0088uH LZ - 116
L104	0.0147uH LZ - 116
L105	0.0088uH LZ - 116
L106	0.0147uH LZ - 116
L107	0.0088uH LZ - 116
L111	0.33uH LZ - 087
L112	0.018uH LZ - 087
L113	0.15uH LZ - 087
L114	0.27uH LZ - 087
L115	LD - 295
L116	LD - 295

Q101	2SC4227 - R34
Q102	2SC4227 - R34

D101	ND487C1T

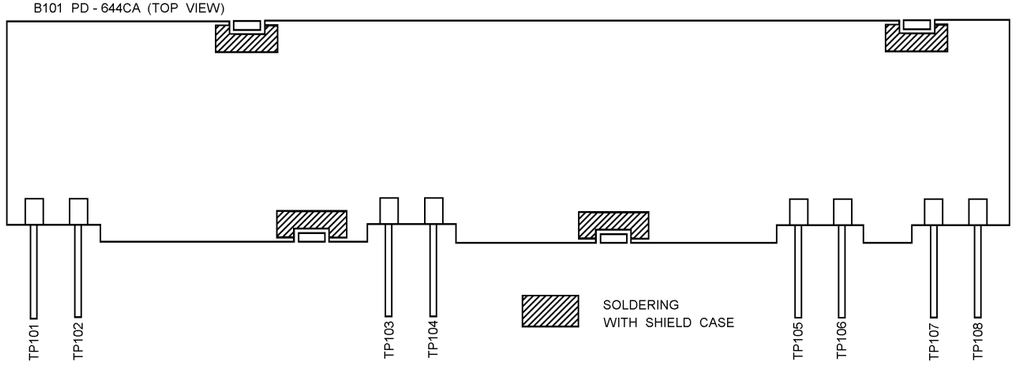
NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

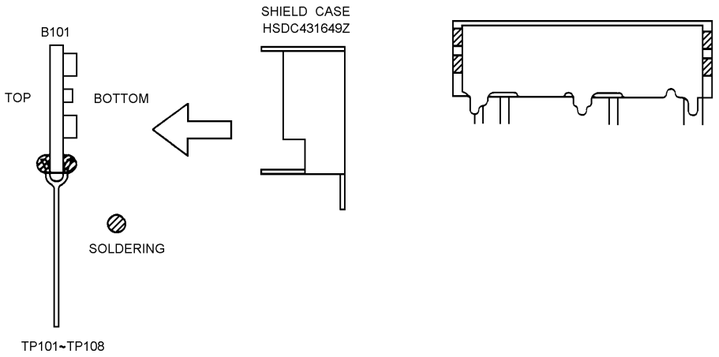
C101	8P / CH
C102	27P / CH
C103	7P / CH
C104	15P / CH
C105	18P / CH
C106	12P / CH
C107	33P / CH
C108	9P / CH
C110	4P / CH
C111	18P / CH
C112	12P / CH
C113	220P / CH
C114	220P / CH
C115	7P / CH
C116	10P / CH
C117	4P / CH
C118	15P / CH
C120	15P / CH
C121	7P / CH
C122	12P / CH
C123	27P / CH
C124	15P / CH
C125	5P / CH
C126	15P / CH
C127	15P / CH
C131	6P / CH
C132	6P / CH
C135	47P / CH
C136	22P / CH (2125)

RF BOARD (UHF)
BOTTOM VIEW

(E24-12158, Rev. 1)

B101 PD - 644CA (TOP VIEW)



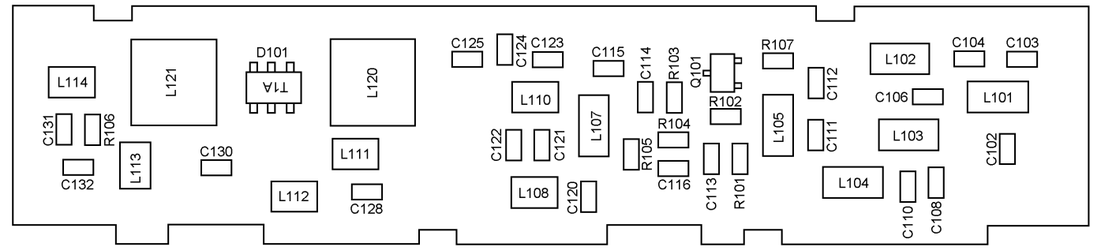


TP101	TP - 119
TP102	TP - 119
TP103	TP - 119
TP104	TP - 119
TP105	TP - 119
TP106	TP - 119
TP107	TP - 119
TP108	TP - 119

RF BOARD (VHF)
TOP VIEW

(E24-12265, Rev. 1)

B101 PD - 644CA (BOTTOM VIEW)



R101	2.2K
R102	68K
R103	220
R104	10
R105	18
R106	56
R107	5.6

L101	0.056uH LZ - 116
L102	0.064uH LZ - 116
L103	0.064uH LZ - 116
L104	0.056uH LZ - 116
L105	0.033uH LZ - 116
L107	0.064uH LZ - 116
L108	0.068uH LZ - 087
L110	0.068uH LZ - 087
L111	0.68uH LZ - 087
L112	0.033uH LZ - 087
L113	0.27uH LZ - 087
L114	0.15uH LZ - 087
L120	LD - 295
L121	LD - 295

Q101	2SC4226 - R24

D101	ND487C1T

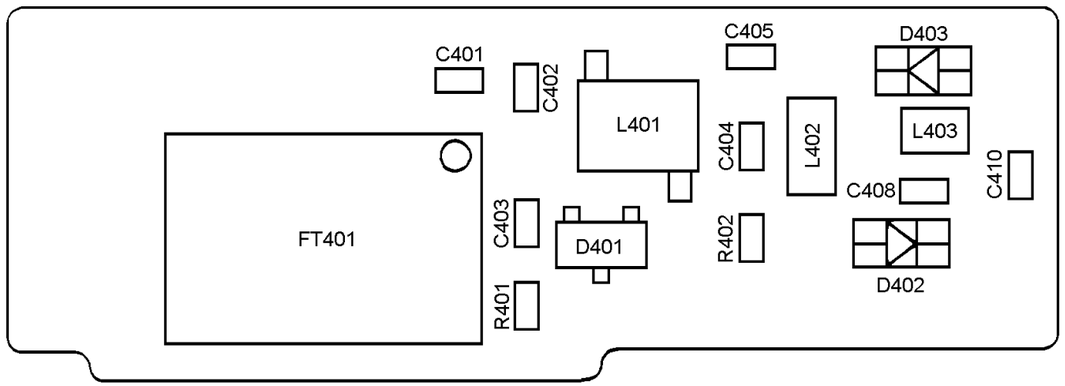
NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

C102	56P / CH
C103	27P / CH
C104	27P / CH
C106	5P / CH
C108	18P / CH
C110	39P / CH
C111	68P / CH
C112	22P / CH
C113	470P / CH
C114	330P / CH
C115	10P / CH
C116	0.001 / B
C120	39P / CH
C121	39P / CH
C122	39P / CH
C123	33P / CH
C124	18P / CH
C125	47P / CH
C128	12P / CH
C130	12P / CH
C131	47P / CH
C132	22P / CH

RF BOARD (VHF)
BOTTOM VIEW

(E24-12266, Rev. 1)

B401 PD - 645BA (BOTTOM VIEW)



NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

R401	12K
R402	8.2K

L401	15.3nH LZ - 128
L402	0.027uH LZ - 116
L403	0.33uH LZ - 087

D401	HSM88WK
D402	RLS135
D403	RLS135

FT401	FL - 664 GLP402

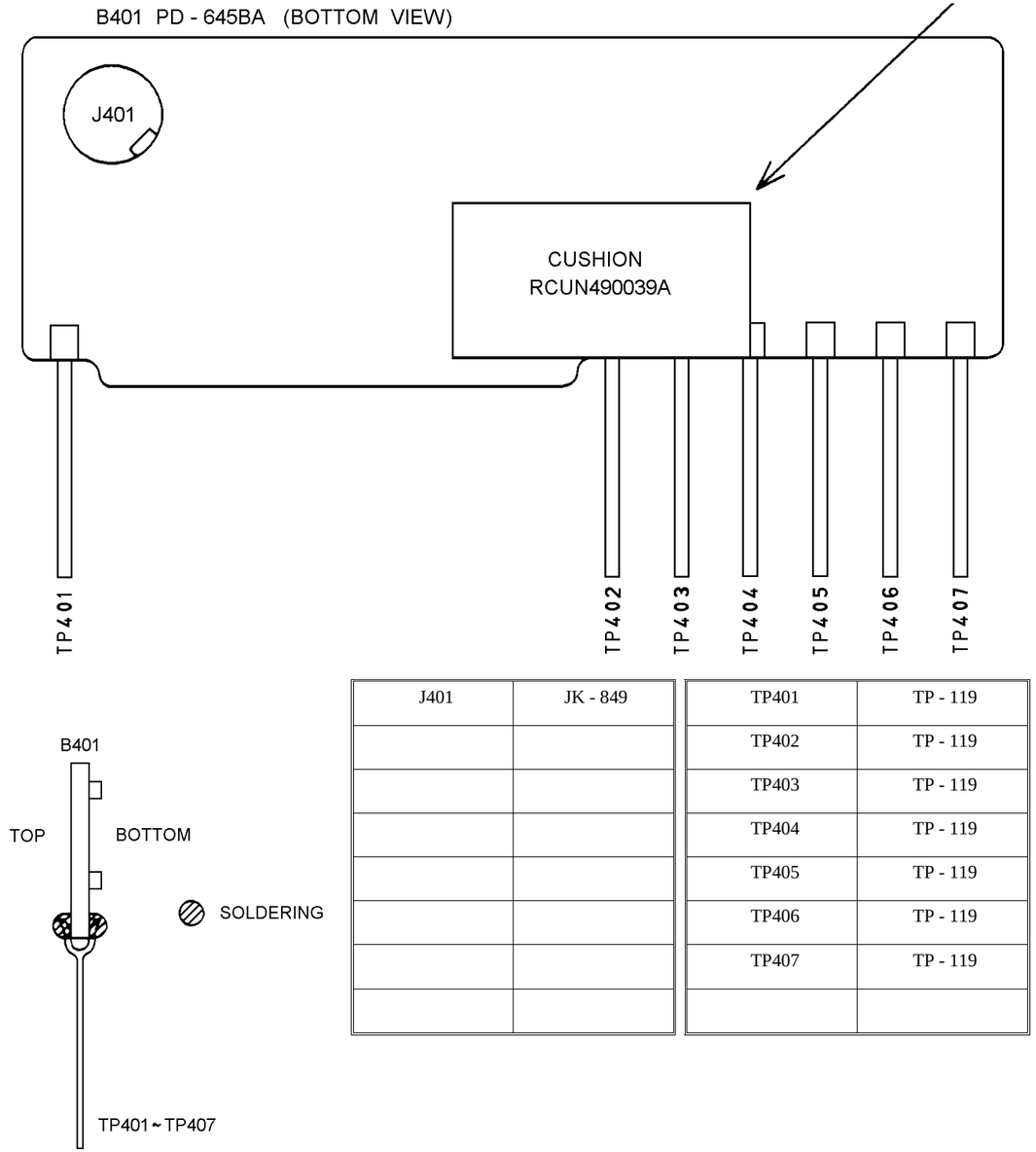
C401	0.001 / B
C402	3P / CJ
C403	0.5P / CK
C404	0.5P / CK
C405	5P / CH
C408	0.001 / B
C410	0.001 / B

SWITCH BOARD (UHF)
BOTTOM VIEW

(E24-12149, Sh. 1, Rev. 1)

PEEL OFF THE DOUBLE SIDE TAPE OF CUSHION

B401 PD - 645BA (BOTTOM VIEW)

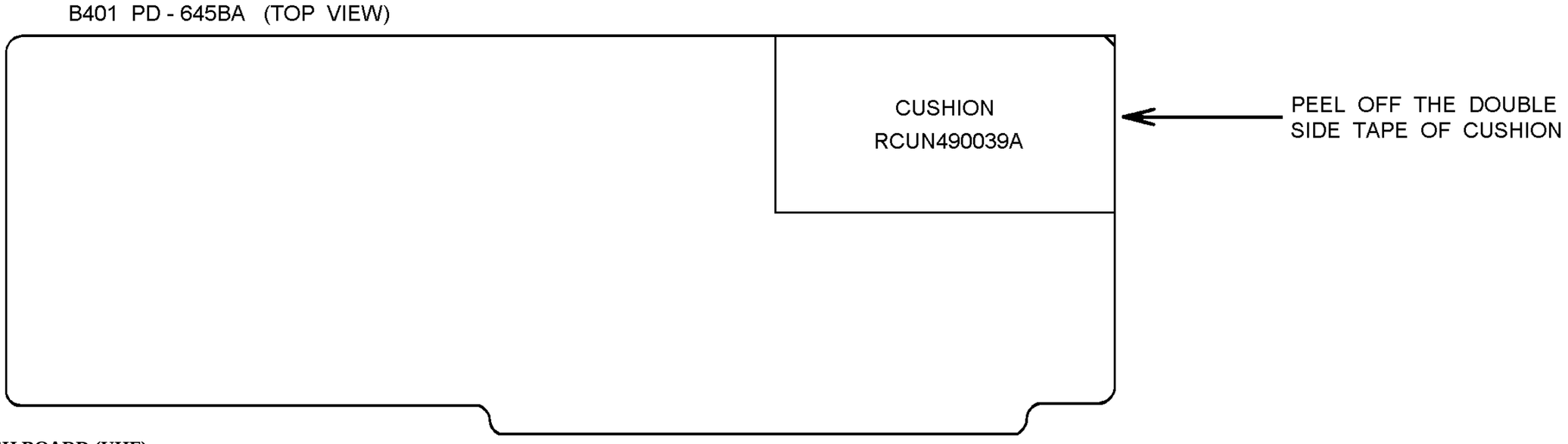


J401	JK - 849

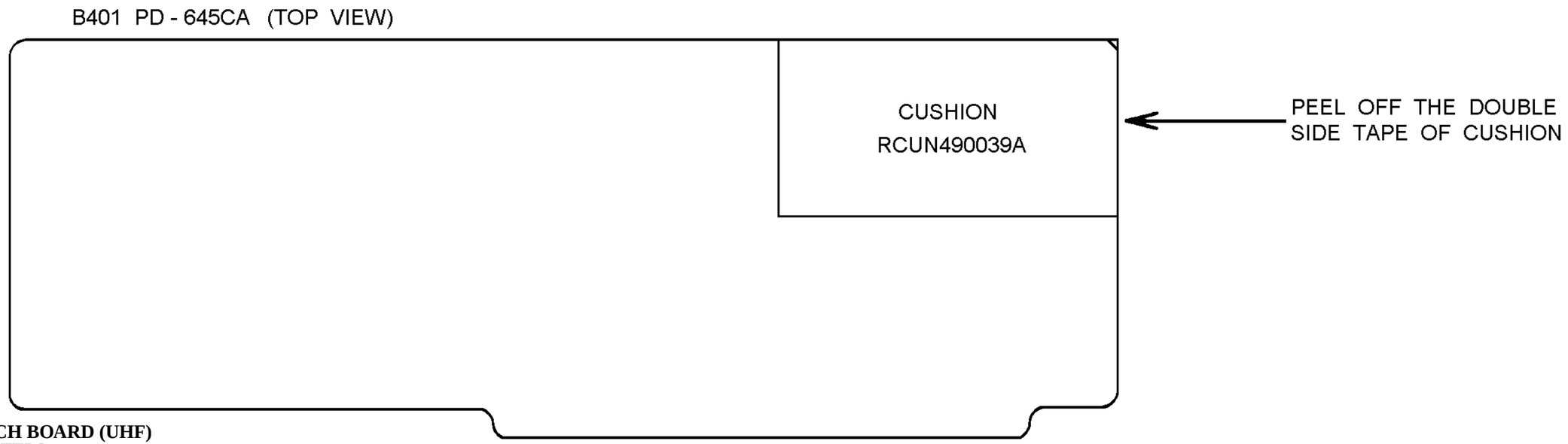
TP401	TP - 119
TP402	TP - 119
TP403	TP - 119
TP404	TP - 119
TP405	TP - 119
TP406	TP - 119
TP407	TP - 119

SWITCH BOARD (UHF)
BOTTOM VIEW

(E24-12148, Sh. 2, Rev. 1)

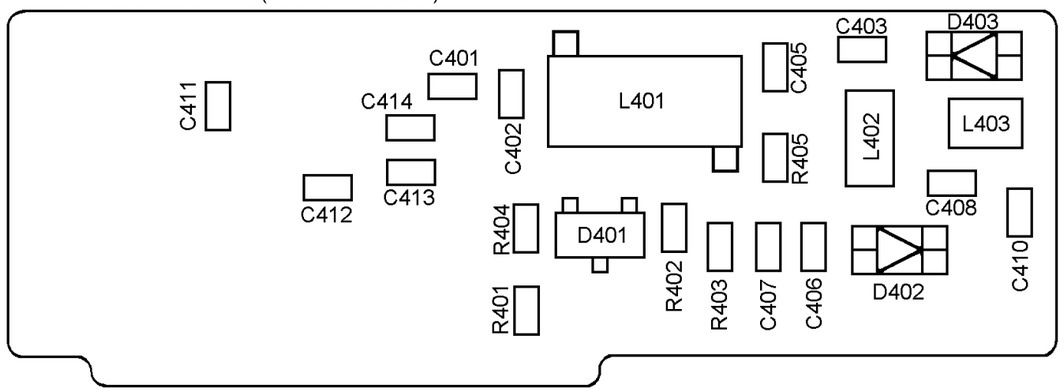


SWITCH BOARD (UHF)
TOP VIEW
(E24-12150, Rev. 1)



SWITCH BOARD (UHF)
TOP VIEW
(E24-12274, Rev. 1)

B401 PD - 645CA (BOTTOM VIEW)



NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM. M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

R401	1.5K
R402	1.5K
R403	10K
R404	4.7K
R405	4.7

L401	49.8nH LZ - 134
L402	0.064uH LZ - 116
L403	0.68uH LZ - 087

D401	HSM88WK
D402	RLS135
D403	RLS135

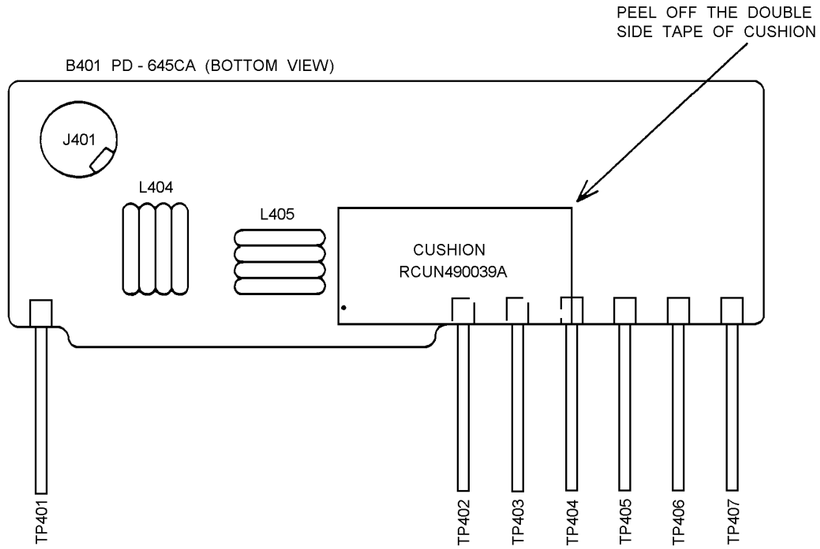
C401	330P / CH
C402	15P / CH
C403	330P / CH
C405	27P / CH
C406	330P / CH
C407	10P / CH
C408	0.001 / B
C410	330P / CH
C411	7P / CH
C412	18P / CH
C413	9P / CH
C414	6P / CH

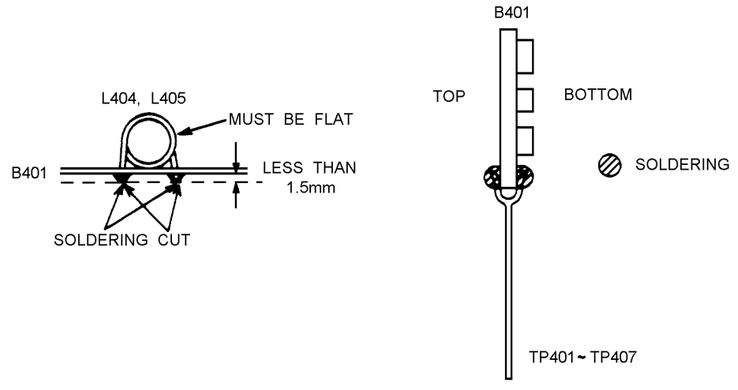
SWITCH BOARD (VHF)
BOTTOM VIEW

(E24-12275, Sh. 1, Rev. 1)

PEEL OFF THE DOUBLE SIDE TAPE OF CUSHION

B401 PD - 645CA (BOTTOM VIEW)





TP401	TP - 119
TP402	TP - 119
TP403	TP - 119
TP404	TP - 119
TP405	TP - 119
TP406	TP - 119
TP407	TP - 119

J401	JK - 849
L404	LE - 259 4 1/2T
L405	LE - 201 3 1/2T

SWITCH BOARD (VHF)
BOTTOM VIEW

(E24-12276, Sh. 2, Rev. 1)

R7	1.5K
R12	1.8W 1/10W
R13	220K
R14	1.5K
R15	330K
R16	2.2K
R35	47K
R42	2.2 1/10W
R501	560 1/10W
R602	0
R605	10K
R615	220K
R625	4.7K
R626	4.7K
R627	4.7K
R634	4.7K
R635	4.7K
R636	4.7K
R637	4.7K
R638	4.7K
R640	4.7K
R641	4.7K
R642	4.7K
R643	4.7K
R644	4.7K
R645	22K
R647	10K
R648	220K
R650	220K
R651	470
R652	470
R658	1K
R660	1K
R661	100K
R662	1K
R663	330K
R664	5.6K

IC601*	
UL - 087A	UC1797 M38223M4
UL - 087B	UC1828 M38223M

IC601	*
IC602	WF6CWW - 50

J5	JK - 0850 22P
J6	JK - 0853 12P
J7	JK - 0853 12P
J8	JK - 0877 4P

L3	0.12uH LZ - 0087
L4	0.33uH LZ - 0087
L6	LF - 0223

Q603	2SC4177 - L6
Q604	2SC4177 - L6
Q605	2SC4177 - L6
Q606	2SC2714 - Y

RT1	10KB RT - 0550
RT501	47KB RT - 0550
RT601	470KB RT - 0550

C13	39P / CH
C14	0.01 / B
C25	0.01 / B 25V (2125)
C26	270P / CH
C27	270P / CH
C30	0.0033 / B (2125)
C50	0.001 / B
C59	0.01 / B 25V (2125)
C63	7V 4.7 (T) C - 0228
C64	10V 22 (T) C - 0241
C65	7V 33 (T) C - 0241
C504	330P / CH
C505	330P / CH
C607	100P / CH
C609	0.0022 / B
C610	7V 10 (T) C - 0241
C617	330P / CH
C625	330P / CH
C626	330P / CH
C627	330P / CH
C628	330P / CH
C634	330P / CH
C638	330P / CH
C642	330P / CH
C649	7V 22 (T) C - 0241
C652	27P / CH

D3	DSW10C

F1	FS - 0306

C54	10V 220 CZ - 0185
C618	5.5V 0.047F C - 282

FT1	FL - 0665
FT2	FL - 0665
FT3	FL - 0343
FT4	FL - 0343

IC4	AN7141
IC501	MHW607 - 2

J2	JK - 0423
J3	JK - 0424
J4	JK - 0851 6P

S1	SW - 0604

X1	59.3957MHz QX - 0505
X601	4.9152MHz QX - 0611

MAIN BOARD (VHF)

(E22-12262, Rev. 0)

(E22-12261, Rev. 1)

D1	1SS226
D2	RLS4148
D4	HZK118
D5	HZK6C
D6	HZK6C
D7	HZK6C
D8	HZK6C
D502	HZK58LL
D601	HSM88WA
D602	RLS4148
D603	RLS4148

Q1	2SC4226 - R24
Q2	2SC4226 - R24
Q4	2SK323
Q5	2S8815 - 87
Q6	2S81115 - YL
Q7	DTC144EU
Q8	2SC4177 - L6
Q501	FHS1A
Q502	2S81115 - YL
Q503	2SC4177 - L6
Q504	DTC144EU
Q505	DS8815 - 87
Q506	2SC4177 - L6
Q507	2S81115 YL
Q508	2SC4226 - R24
Q509	2SA1179 M6
Q510	2SC4177 - L6
Q601	FWY1
Q602	DTC144EU
Q607	DTC144EU

L1	0.33uH LZ - 0087
L2	0.33uH LZ - 0087
L5	100uH LZ - 0087
L7	0.68uH LZ - 0087
L501	0.68uH LZ - 0087
L502	0.68uH LZ - 0087
L503	0.68uH LZ - 0087

C2	330P / CH
C3	22P / CH
C4	330P / CH
C5	15P / CH
C6	33P / CH
C7	330P / CH
C8	4P / CH
C9	0.01 / B
C10	12P / CH
C15	0.001 / B
C16	22P / CH
C17	33P / CH
C18	0.0033 / B
C20	0.01 / B 25V (2125)
C21	0.01 / B 25V (2125)
C22	33P / UJ
C23	7V 4.7 (T) C - 0228
C24	0.001 / B
C28	0.1 / B 25V (2125)
C33	0.1 / B 25V (2125)
C34	0.0082 / UJ (3216)
C35	0.0082 / UJ (3216)
C36	0.0082 / UJ (3216)
C37	7V 4.7 (T) C - 0228
C38	0.0082 / UJ (3216)
C40	0.0082 / UJ (3216)
C41	0.0056 / UJ (3216)
C42	0.01 / B
C43	0.1 / B 25V (2125)
C44	0.001 / B
C45	330P / CH
C46	10V 22 (T) C - 0241
C47	330P / CH
C48	0.0015 / B
C51	330P / CH
C52	100P / CH
C53	7V 10 (T) C - 0241
C55	10V 22 (T) C - 0241
C56	0.022 / B 25V
C58	0.022 / B 25V
C60	330P / CH
C61	330P / CH
C62	330P / CH
C66	0.047 / B (2125)
C67	33P / CH
C501	330P / CH
C502	0.001 / B
C503	330P / CH
C506	0.001 / B
C507	7V 4.7 (T) C - 0228
C508	330P / CH
C509	4P / CH
C511	330P / CH
C512	18P / CH
C513	330P / CH
C514	330P / CH
C515	330P / CH

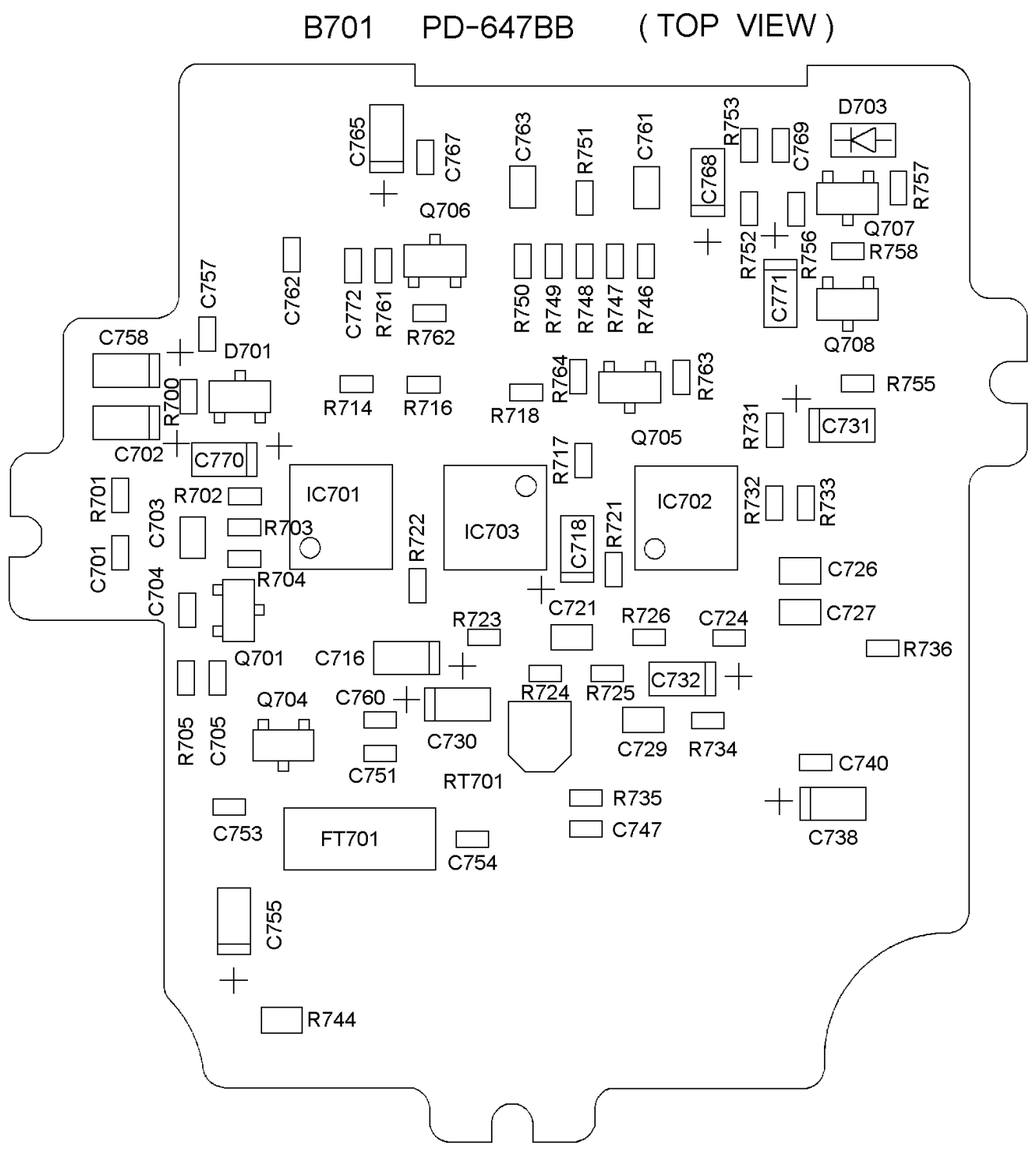
C516	18P / CH
C517	330P / CH
C518	33P / CH
C519	16V 2.2 (T) C - 0228
C520	100P / CH
C521	330P / CH
C522	330P / CH
C523	330P / CH
C524	330P / CH
C525	330P / CH
C526	330P / CH
C527	330P / CH
C528	330P / CH
C530	7V 22 (T) C - 0241
C531	330P / CH
C532	0.047 / B 16V
C533	7V 4.7 (T) C - 0228
C534	0.001 / B
C600	0.01 / B
C601	0.001 / B
C602	16V 2.2 (T) C - 0228
C603	7V 22 (T) C - 0241
C604	0.001 / B
C605	7V 4.7 (T) C - 0228
C606	16V 2.2 (T) C - 0228
C608	16V 1 (T) C - 0227
C611	0.047 / B 16V
C612	330P / CH
C613	0.1 / B 25V (2125)
C614	0.001 / B
C615	1P / CK
C616	68P / CH
C619	7V 10 (T) C - 0241
C620	330P / CH
C621	330P / CH
C622	330P / CH
C623	16V 2.2 (T) C - 0228
C624	330P / CH
C630	0.1 / B 25V (2125)
C631	330P / CH
C632	0.001 / B
C633	7V 10 (T) C - 0241
C635	330P / CH
C636	0.1 / B 25V (2125)
C637	330P / CH
C639	330P / CH
C640	330P / CH
C641	330P / CH
C643	0.001 / B
C644	7V 10 (T) C - 0241
C645	0.001 / B
C646	0.001 / B
C647	0.001 / B
C651	16V 1 (T) C - 0227
C653	16V 1 (T) C - 0227
C510	0.0047 / YF

R1	100
R2	120K
R3	330
R4	68
R5	270
R6	220K
R8	33K
R10	39K
R11	33K
R17	33K F
R18	82K F
R20	10K
R21	10K
R22	39K
R23	15K
R24	470K F
R25	120K
R26	33K F
R27	10K F
R28	680K F
R30	100K
R31	27K
R32	1W
R33	1K
R34	22K
R36	33K
R37	1K
R38	270
R39	390
R40	1K
R41	10K
R500	0
R502	10K
R503	100
R504	10K
R505	22K
R506	100K
R507	100
R508	220K
R509	10K
R510	22K
R511	22K

R512	4.7K
R513	10K
R514	1K
R515	220
R516	68K
R517	330
R518	68
R519	330
R520	150
R521	22K
R522	22K
R523	22K
R524	3.3K
R600	1K
R601	1K
R603	15K
R604	100K
R606	10K
R607	10K
R608	82K
R610	100K
R611	1K
R612	3.3K
R613	47K
R616	47
R617	470K
R618	39K
R619	390K F
R620	470K
R621	470K
R622	33K F
R623	33K F
R624	220K
R628	100K
R630	820K
R631	22K
R632	47K
R633	47K
R639	1K
R646	10K
R653	1W
R655	1W

MAIN BOARD (VHF)

(E22-12264, Rev. 1)



SUB BOARD TOP VIEW

(E23-12277, Rev. 2)

NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

R700	1K
R701	3.3K
R702	1K
R703	2.2K
R704	150K
R705	47
R714	33K / F
R716	10K
R717	27K
R718	270K
R721	68K
R722	100K
R723	39K
R724	220K / F
R725	220K / F
R726	220K / F
R731	2.2K
R732	12K / F
R733	10K / F
R734	100K
R735	15K
R736	68K
R744	1.8M 1/10W
R746	27K
R747	10K
R748	56K
R749	10K
R750	22K
R751	47K
R752	5.6K
R753	6.8K
R755	100
R756	100K
R757	220K
R758	4.7K
R761	33K
R762	33K
R763	33K
R764	100K

RT701	RT - 550 100KB

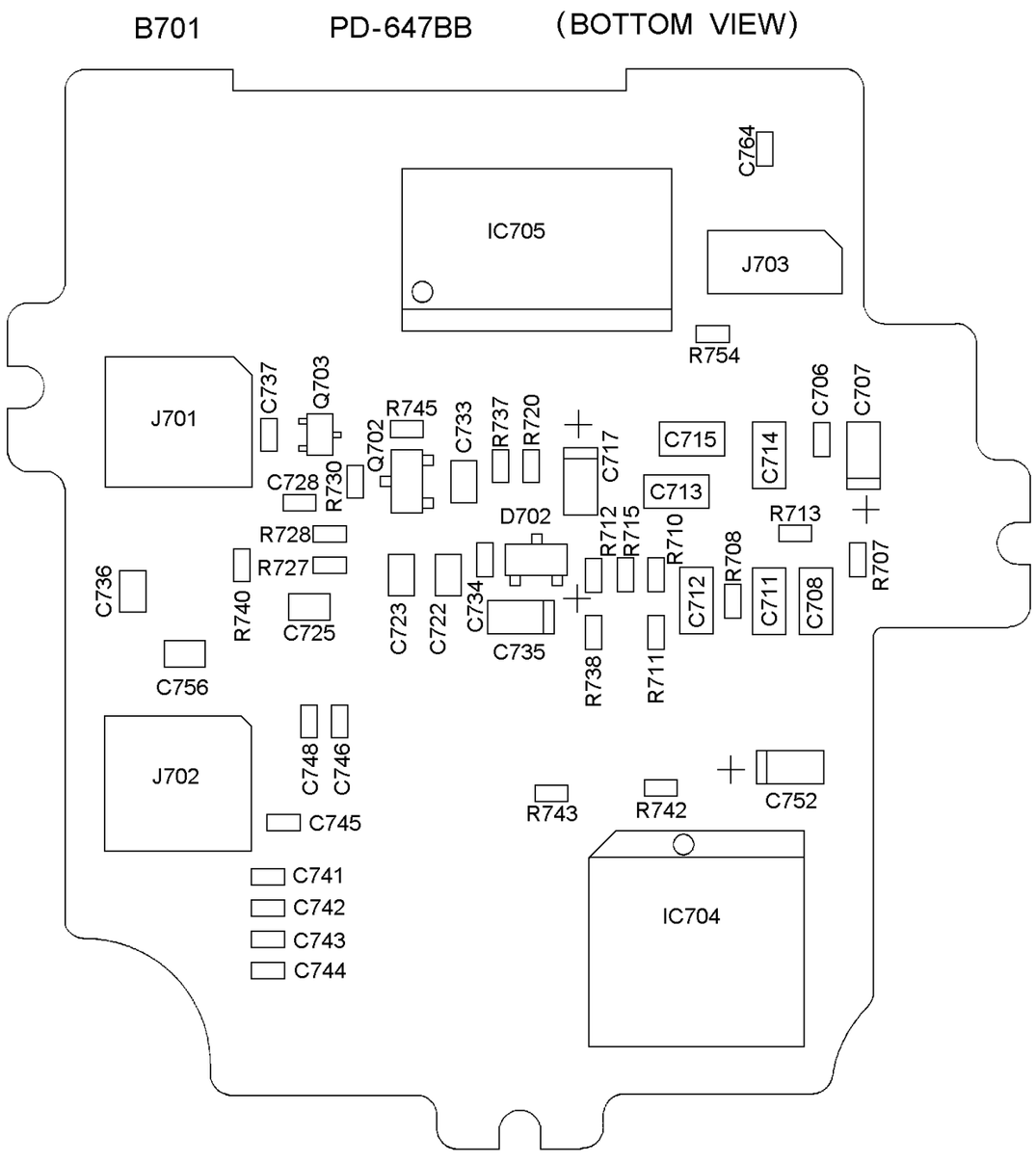
FT701	YY - 1255

D701	1SS226
D703	RLS4148

C701	150P / CH
C702	7V 10 (T) C - 0241
C703	0.0033 / SL (2125)
C704	100P / CH
C705	33P / CH
C716	7V 4.7 (T) C - 0228
C718	16V 1 (T) C - 0227
C721	430P / CH (2125)
C724	22P / CH
C726	820P / CH (2125)
C727	0.001 / CH (2125)
C729	0.1 / B 25V (2125)
C730	7V 15 (T) C - 0284
C731	7V 15 (T) C - 0284
C732	7V 15 (T) C - 0284
C738	16V 2.2 (T)
C740	330P / CH
C747	330P / CH
C751	330P / CH
C753	15P / CH
C754	15P / CH
C755	7V 4.7 (T) C - 0228
C757	330P / CH
C758	7V 4.7 (T) C - 0228
C760	330P / CH
C761	0.047 / B (2125)
C762	330P / CH
C763	0.1 / B 25V (2125)
C765	7V 10 (T) C - 0241
C767	330P / CH
C768	35V 0.47 (T) C - 0228
C769	330P / CH
C770	7V 10 (T) C - 0241
C771	16V 1 (T) C - 0227
C772	330P / CH

Q701	2SC2712 - Y
Q704	DTA114YK
Q705	2SA1179 - M6
Q706	2SA1179 - M6
Q707	2SA1179 - M6
Q708	2SC2712 - Y

IC701	NJM022M
IC702	NJM4558M
IC703	NJM022M



R707	100K / F
R708	39K / F
R710	560K / F
R711	33K / F
R712	33K / F
R713	82K / F
R715	560K / F
R720	12K
R727	220K / F
R728	220K / F
R730	220K / F
R737	10K
R738	220K
R740	1K
R742	1M
R743	1K
R745	1M
R754	22K

D702	1SS226

IC704	MX803ALH
IC705	LMF100CIWMX

J701	JK - 852 12P
J702	JK - 852 12P
J703	JK - 878 4P

C706	330P / CH
C707	7V 10 (T) C - 0241
C708	0.0047 / CH (3216)
C711	0.0047 / CH (3216)
C712	0.0047 / CH (3216)
C713	0.0047 / CH (3216)
C714	0.0047 / CH (3216)
C715	0.0047 / CH (3216)
C717	7V 4.7 (T) C - 0228
C722	820P / CH (2125)
C723	0.001P / CH (2125)
C725	430P / CH (2125)
C728	22P / CH
C733	0.1 / B 25V (2125)
C734	100P / CH
C735	16V 1 (T) C - 0227
C736	0.1 / B 25V (2125)
C737	330P / CH
C741	330P / CH
C742	330P / CH
C743	330P / CH
C744	330P / CH
C745	330P / CH
C746	330P / CH
C748	330P / CH
C752	7V 4.7 (T) C - 0228
C756	0.1 / B 25V (2125)
C764	330P / CH

Q702	2SK323
Q703	DTC144EU

NOTES:

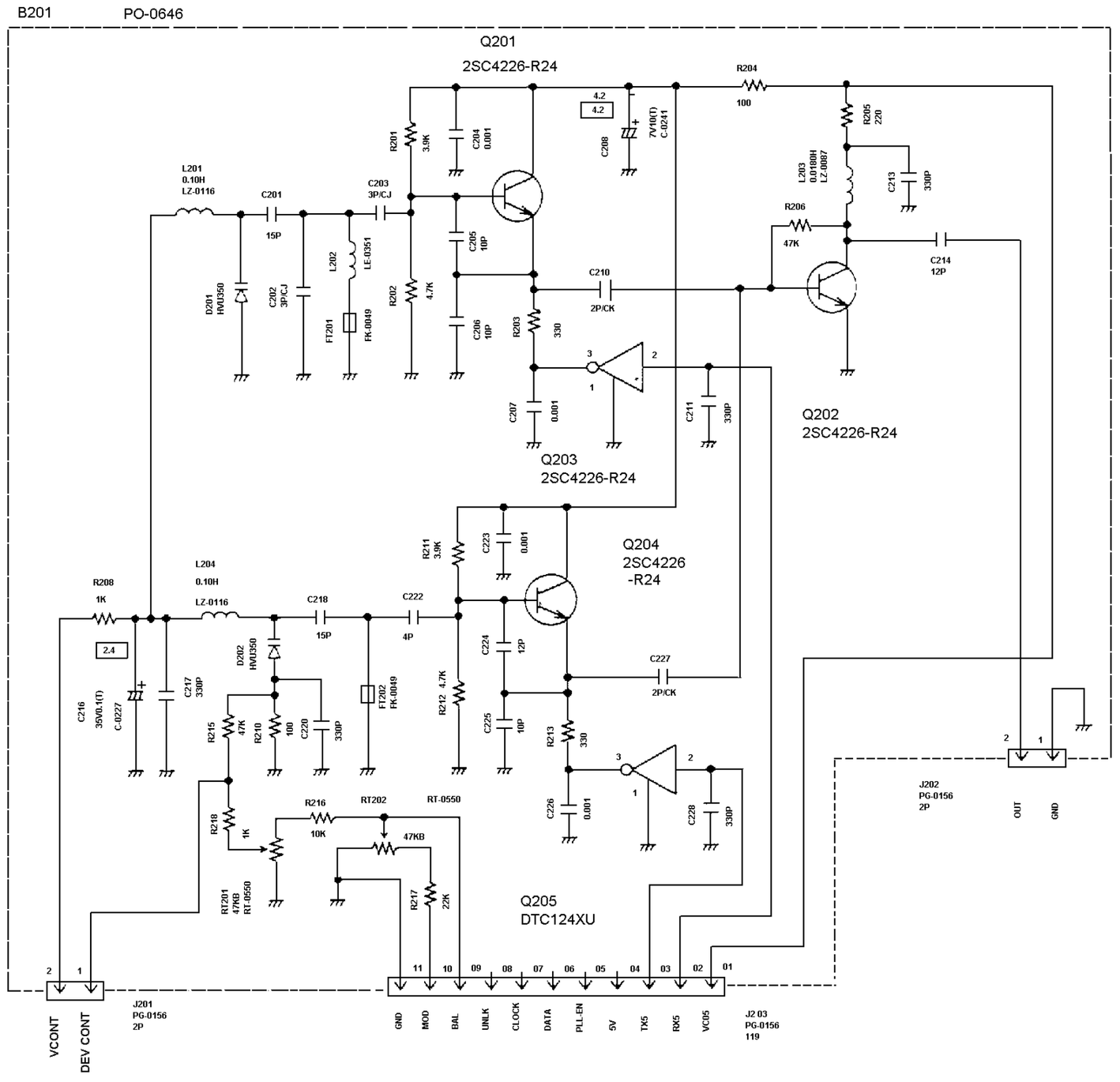
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE 1/16W UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
5. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.

SUB BOARD BOTTOM VIEW

(E23-12278, Rev. 2)

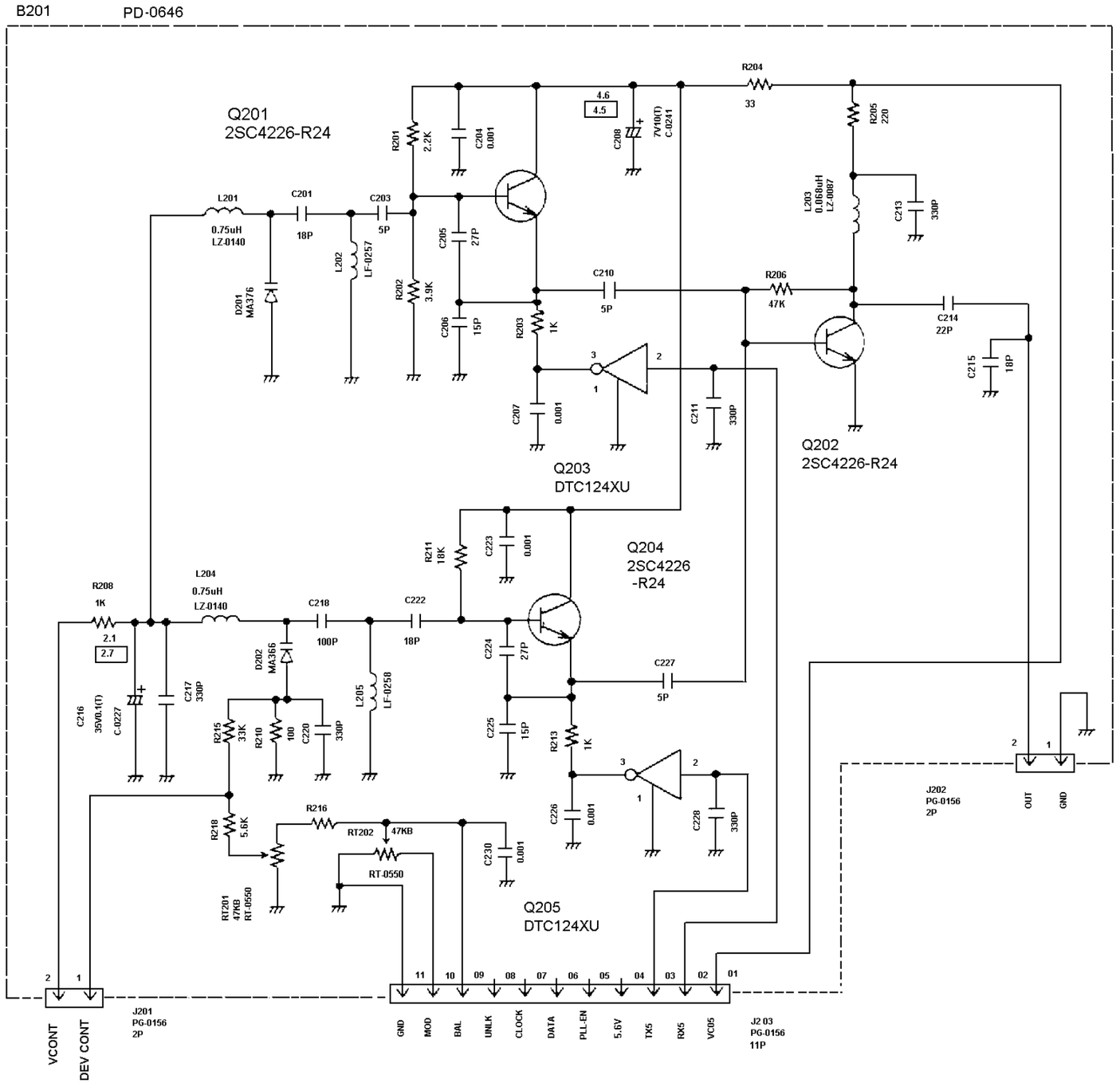
NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.



VCO BOARD (UHF)

(E14-4447, Rev. 1)

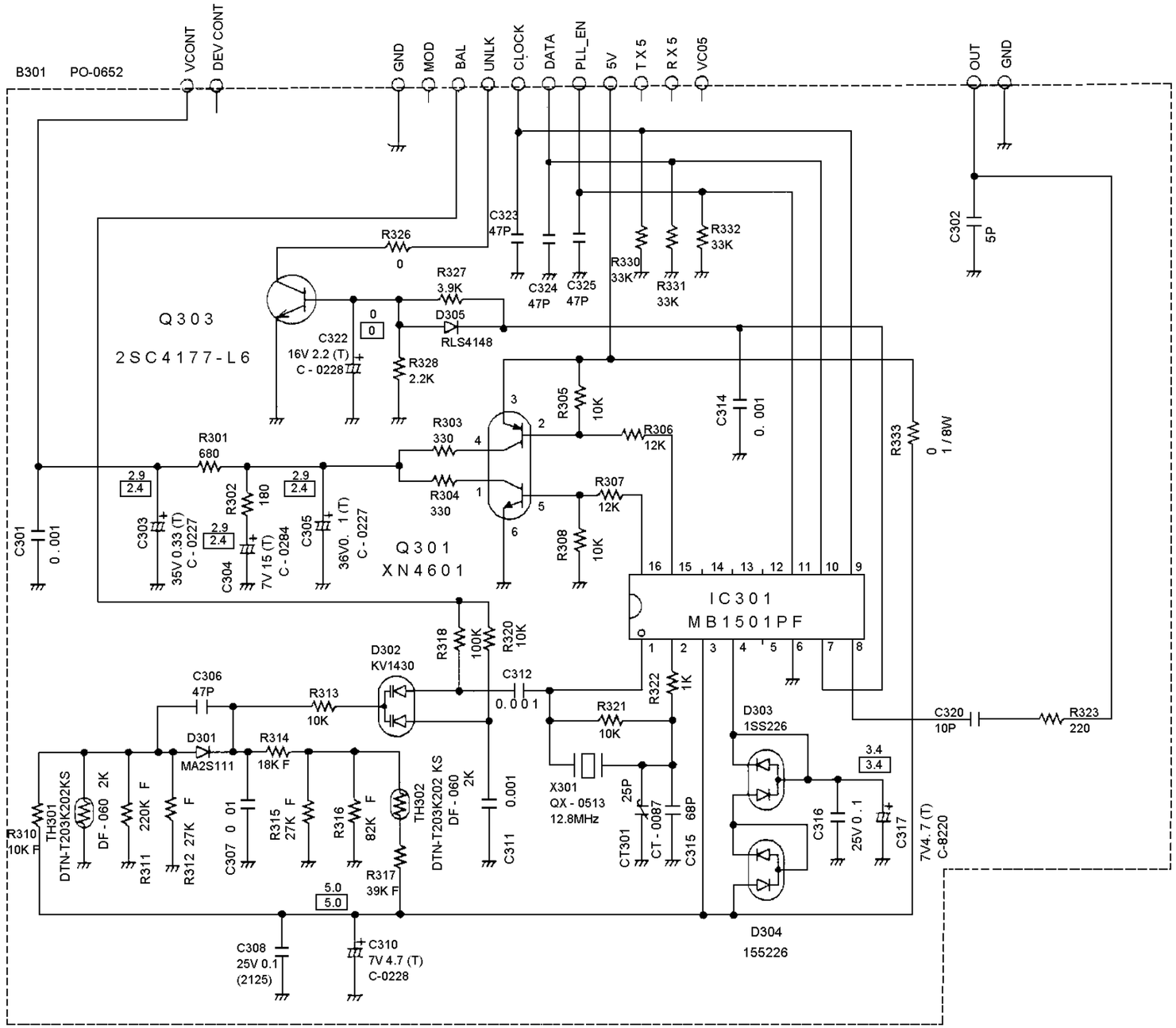


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

VCO BOARD (VHF)

(E14-4494, Rev. 1)

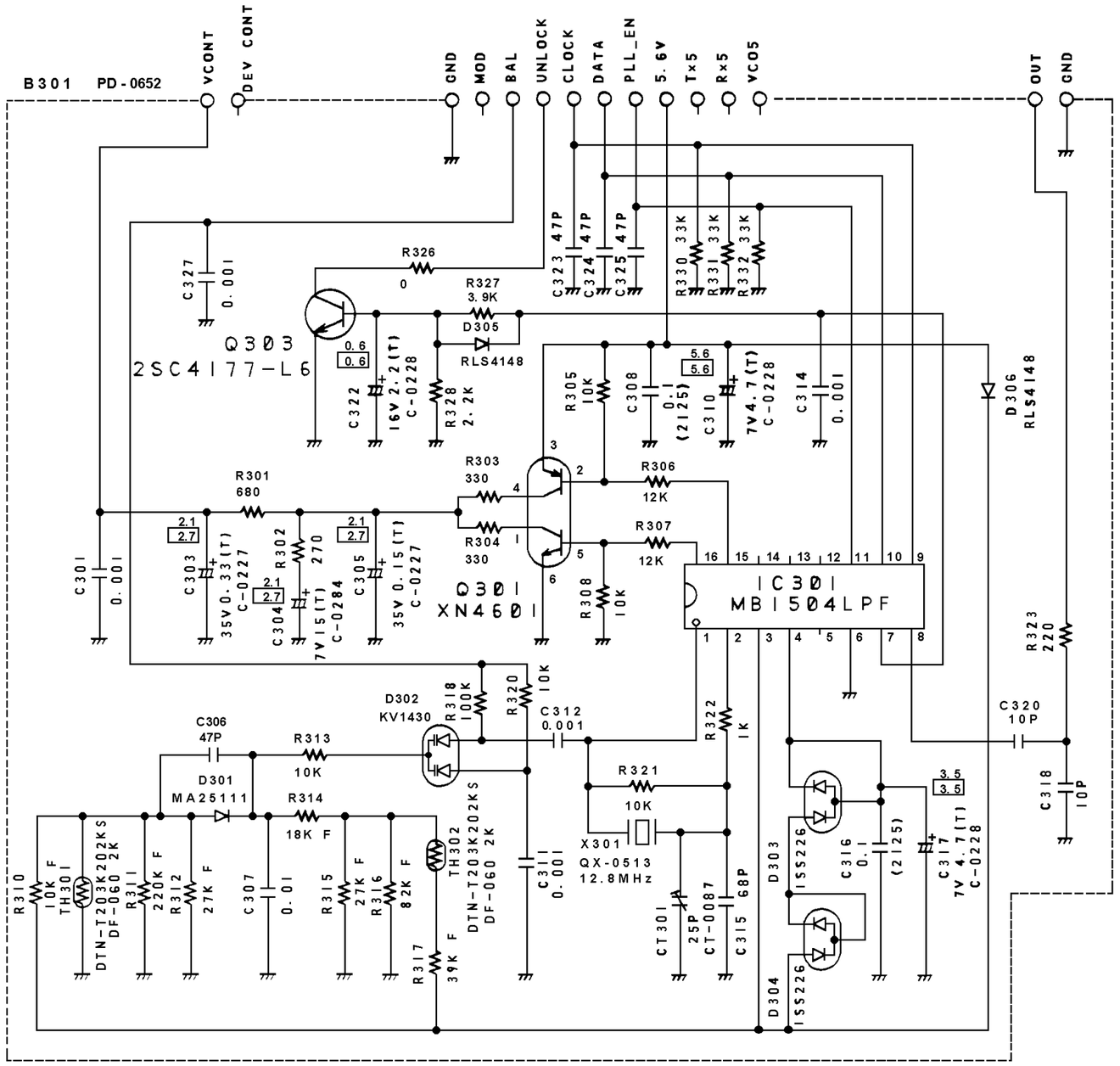


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

PLL BOARD (UHF)

(E14-4448, Rev. 1)

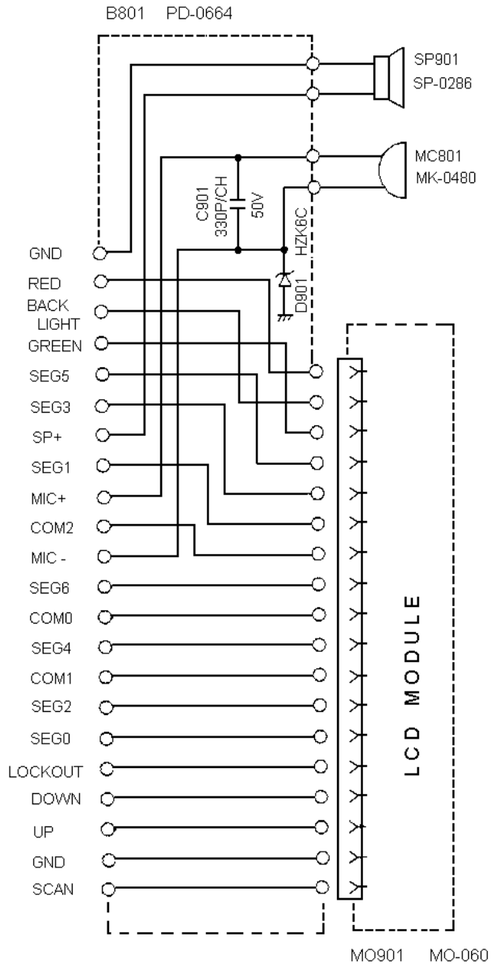


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILO OHM, M=MEG OHM)
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P=MICRO-MICRO FARAD)
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE ALL 1608 UNLESS OTHERWISE NOTED.
6. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

PLL BOARD (VHF)

(E14-4495, Rev. 1)

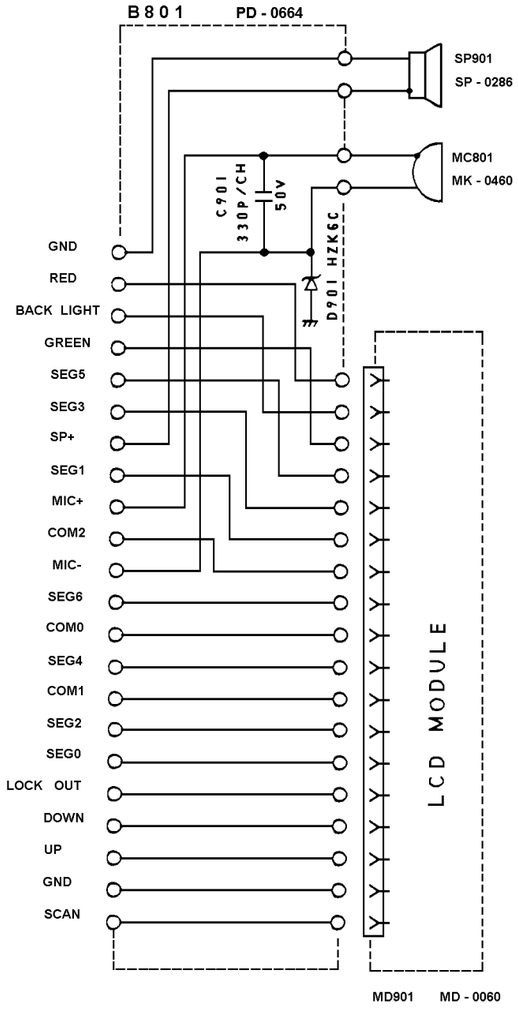


NOTES:

1. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
2. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
3. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

JUMPER BOARD (UHF)

(E14-4450, Rev. 1)

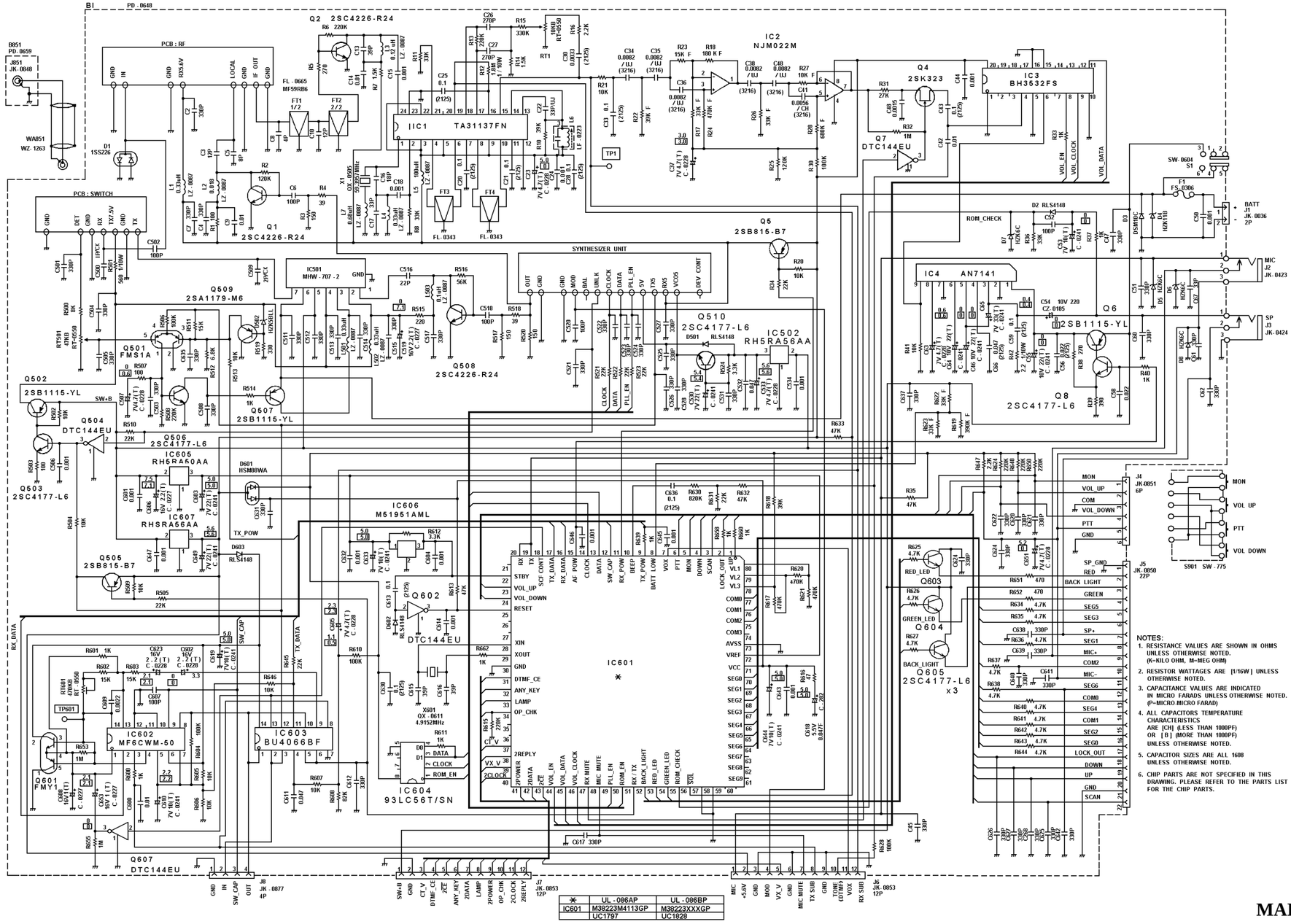


NOTES:

1. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
2. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
3. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

JUMPER BOARD (VHF)

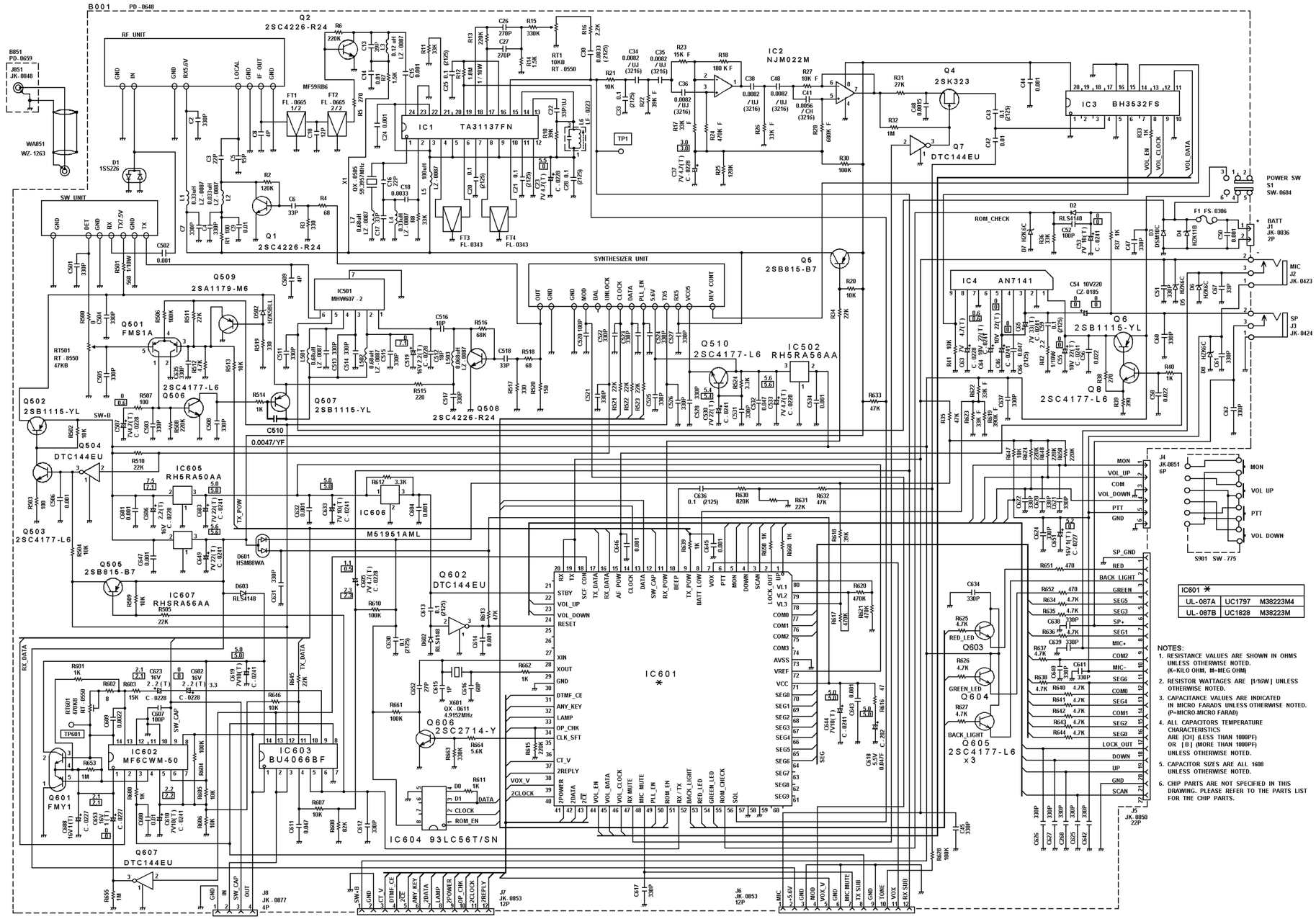
(E14-4498, Rev. 1)



*	UL-086AP	UL-086BP
IC601	M38223M4113GP	M38223XXXGP
	UC1797	UC1628

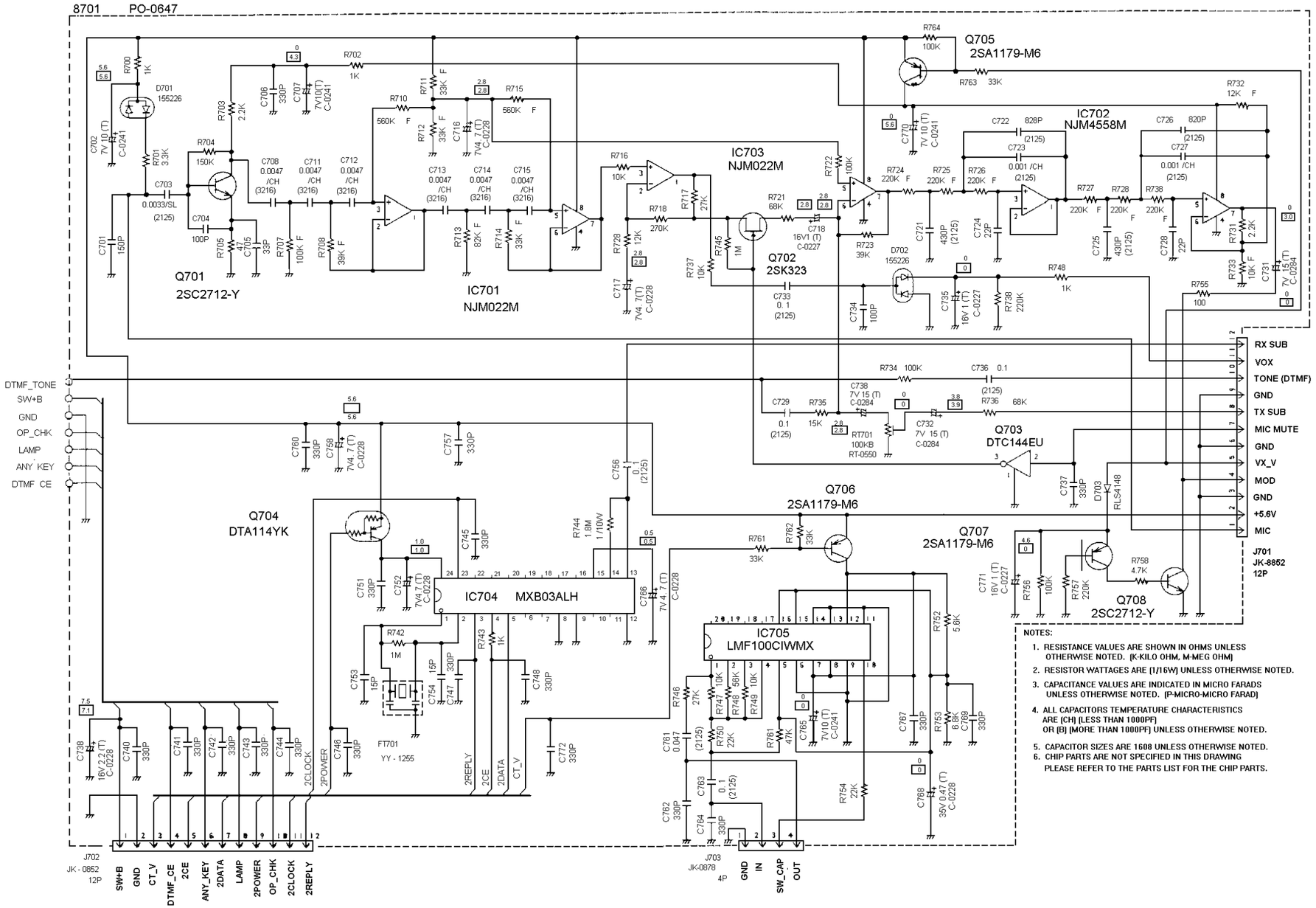
MAIN BOARD (UHF)

(E12-4452, Rev. 0)



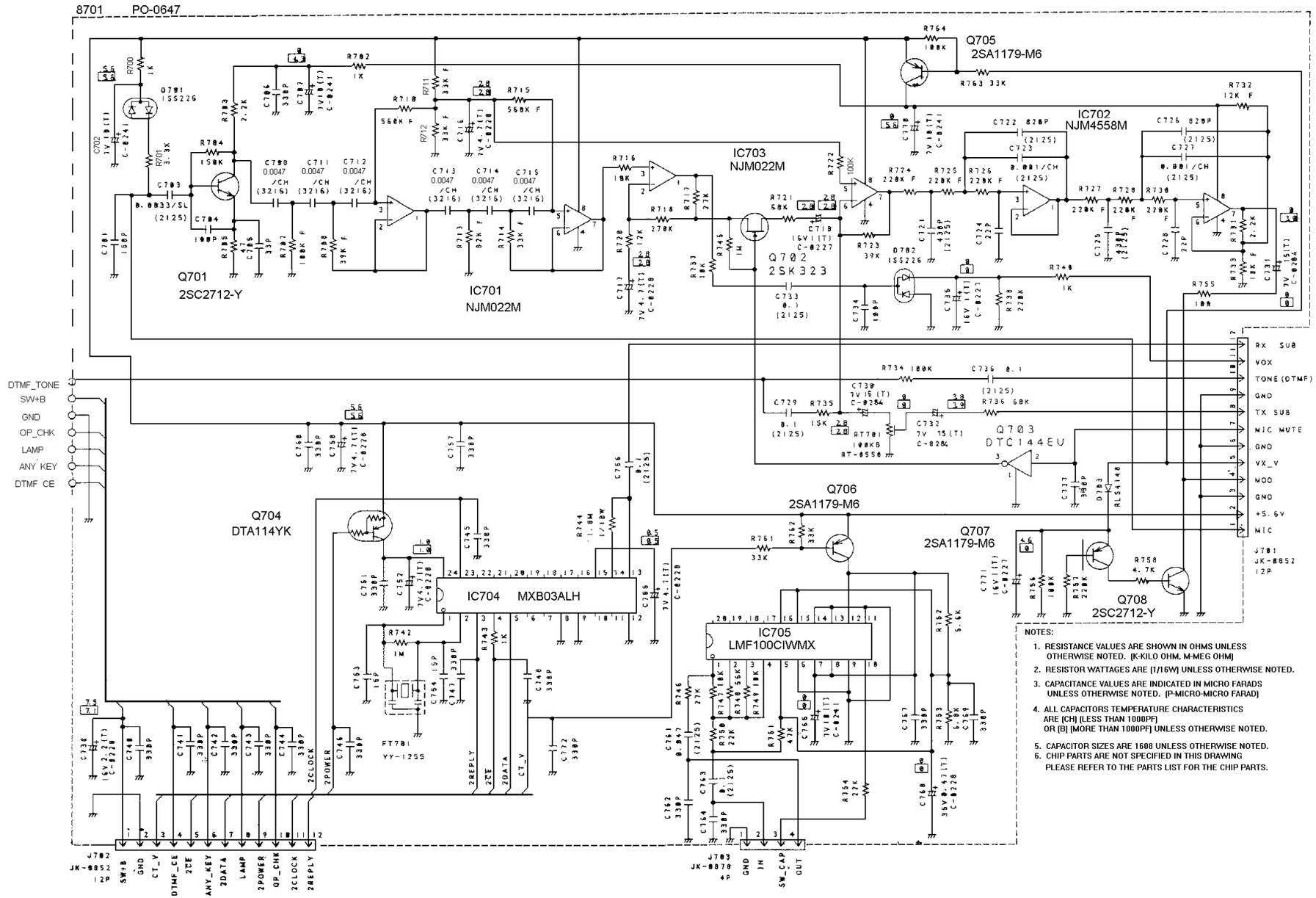
MAIN BOARD (VHF)

(E12-4492, Rev. 0)



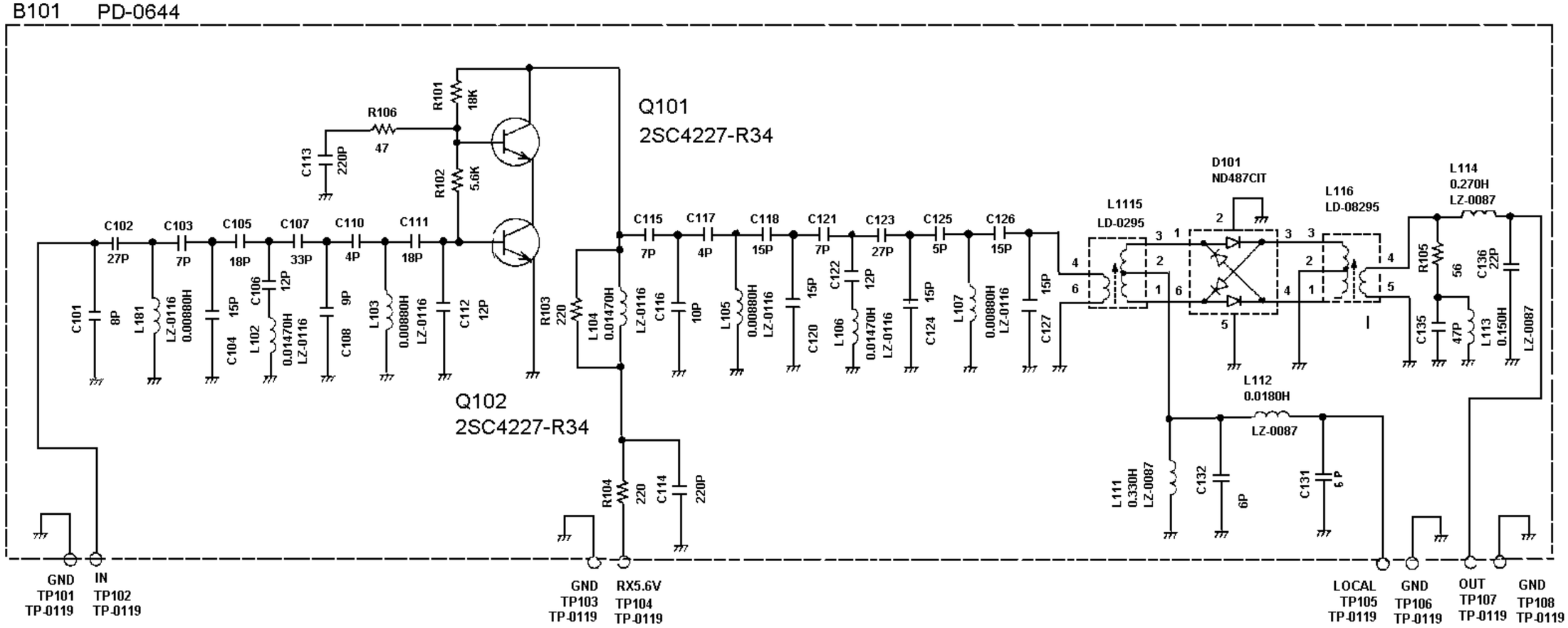
SUB BOARD (UHF)

(E13-4451, Rev. 1)



SUB BOARD (VHF)

(E13-4497, Rev. 1)

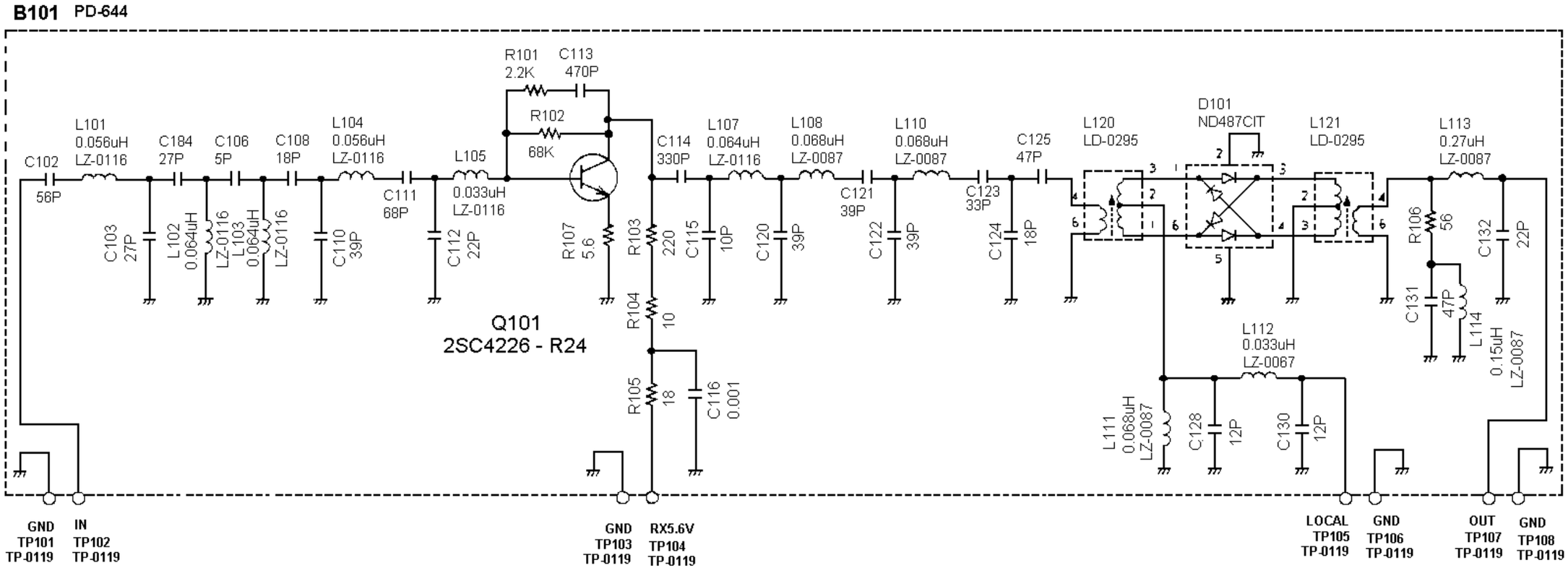


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

RF BOARD (UHF)

(E14-4446, Rev. 1)

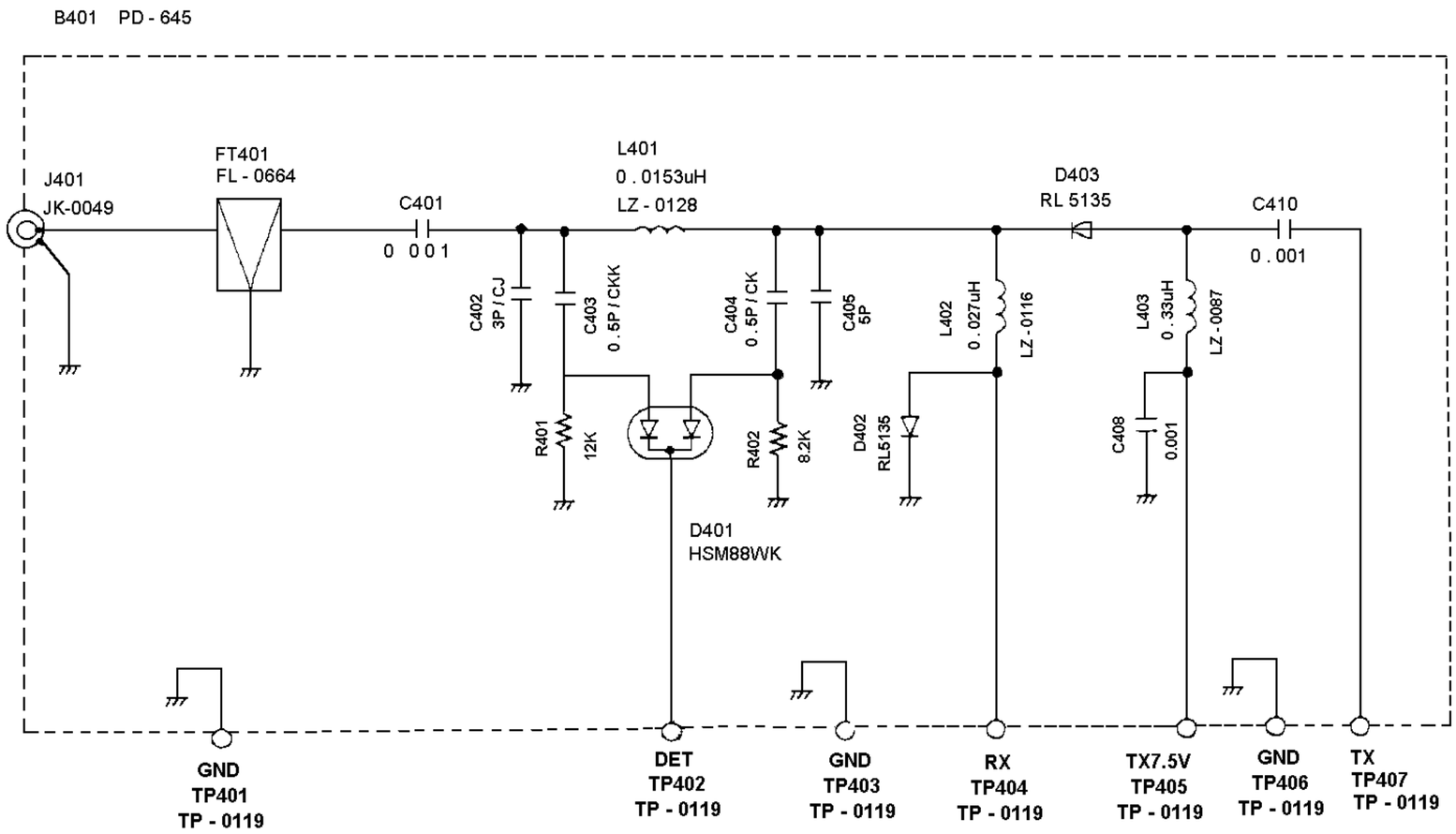


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

RF BOARD (VHF)

(E14-4493, Rev. 1)

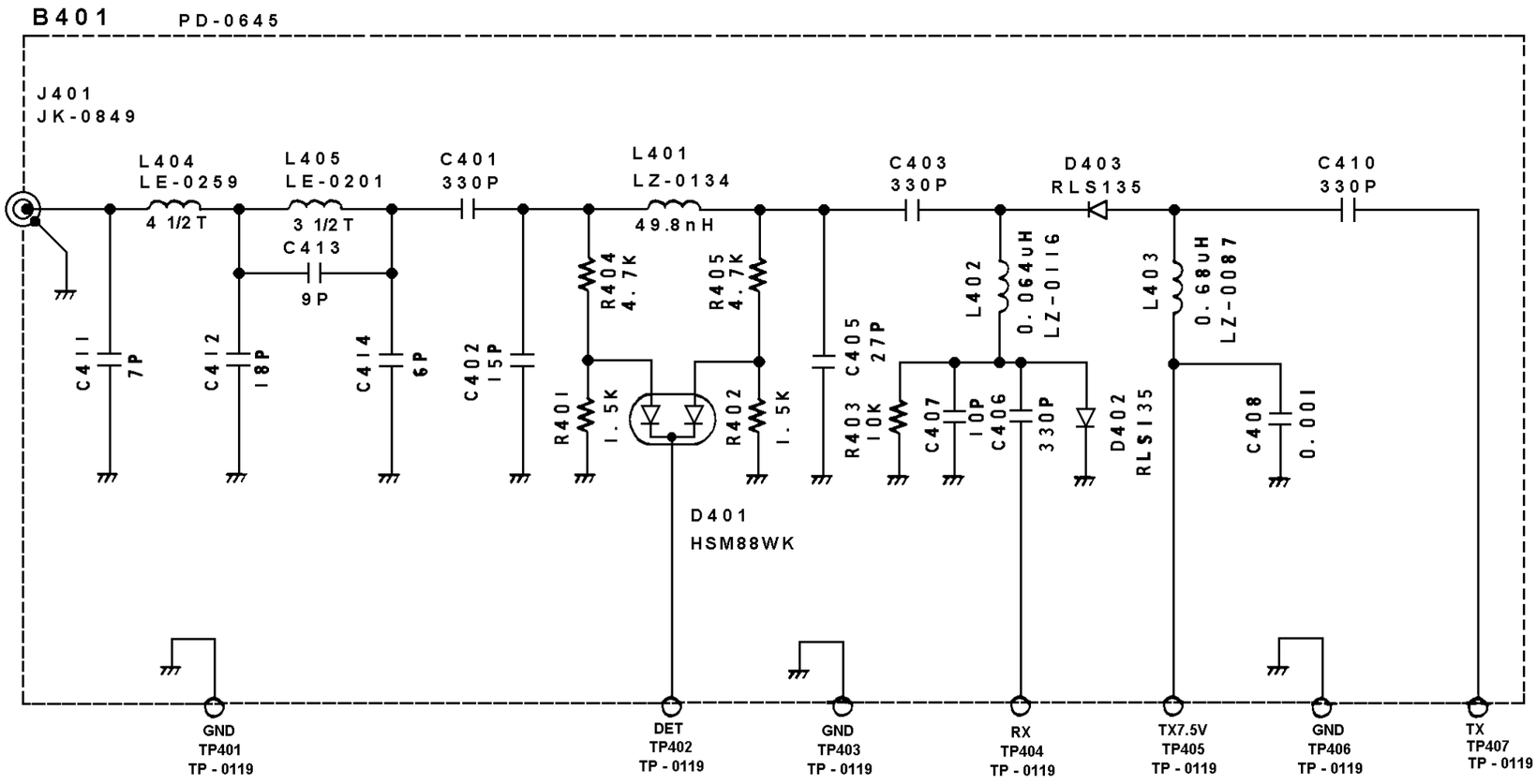


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

SWITCH BOARD (UHF)

(E14-4449, Rev. 1)

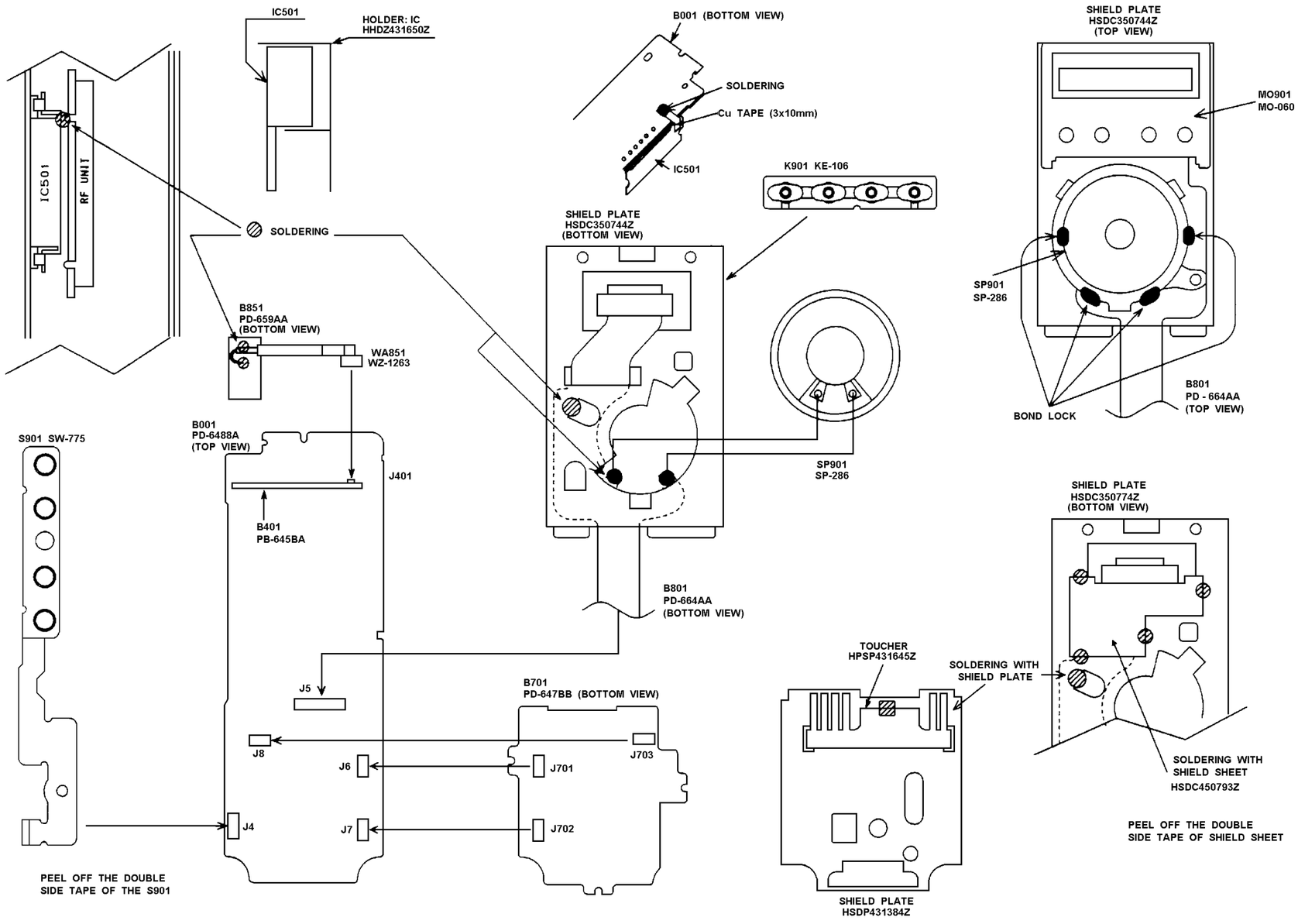


NOTES:

1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K = KILO OHM, M = MEG OHM).
2. RESISTOR WATTAGES ARE [1/16W] UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE INDICATED IN MICRO FARADS UNLESS OTHERWISE NOTED. (P = MICRO-MICRO-FARAD).
4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE [CH] (LESS THAN 1000PF) OR [B] (MORE THAN 1000PF) UNLESS OTHERWISE NOTED.
5. CAPACITOR SIZES ARE 1608 UNLESS OTHERWISE NOTED.
6. ALL CAPACITORS ARE RATED 50V UNLESS OTHERWISE NOTED.
7. CHIP PARTS ARE NOT SPECIFIED IN THIS DRAWING. PLEASE REFER TO THE PARTS LIST FOR THE CHIP PARTS.

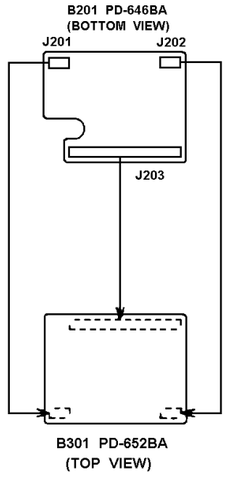
SWITCH BOARD (VHF)

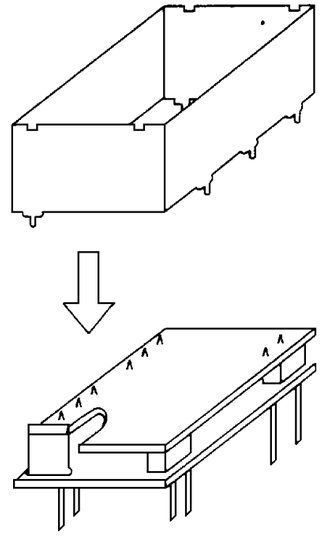
(E14-4496, Rev. 1)

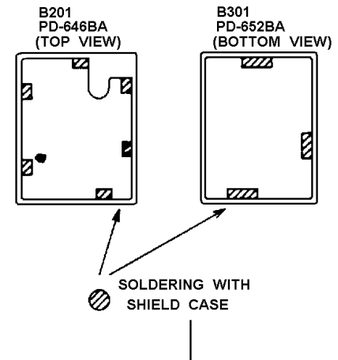


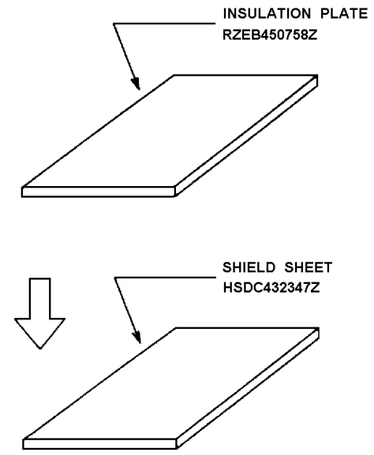
(UHF)

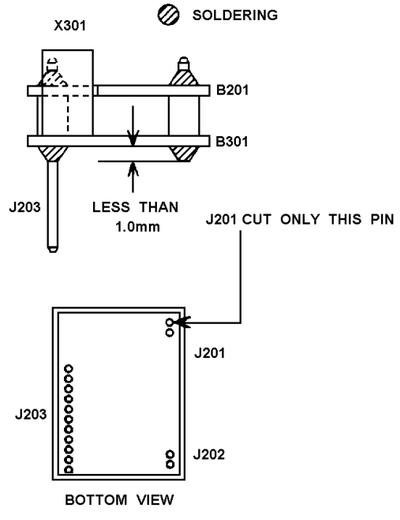
(E33-3698, Rev. 1)

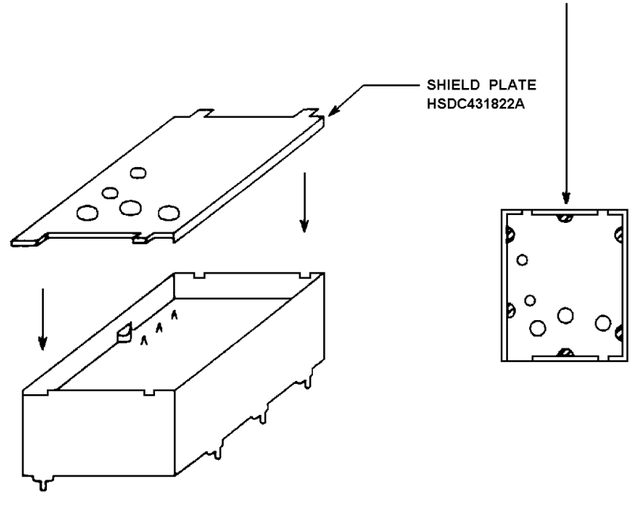


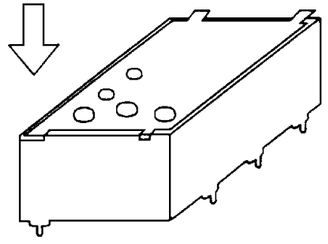






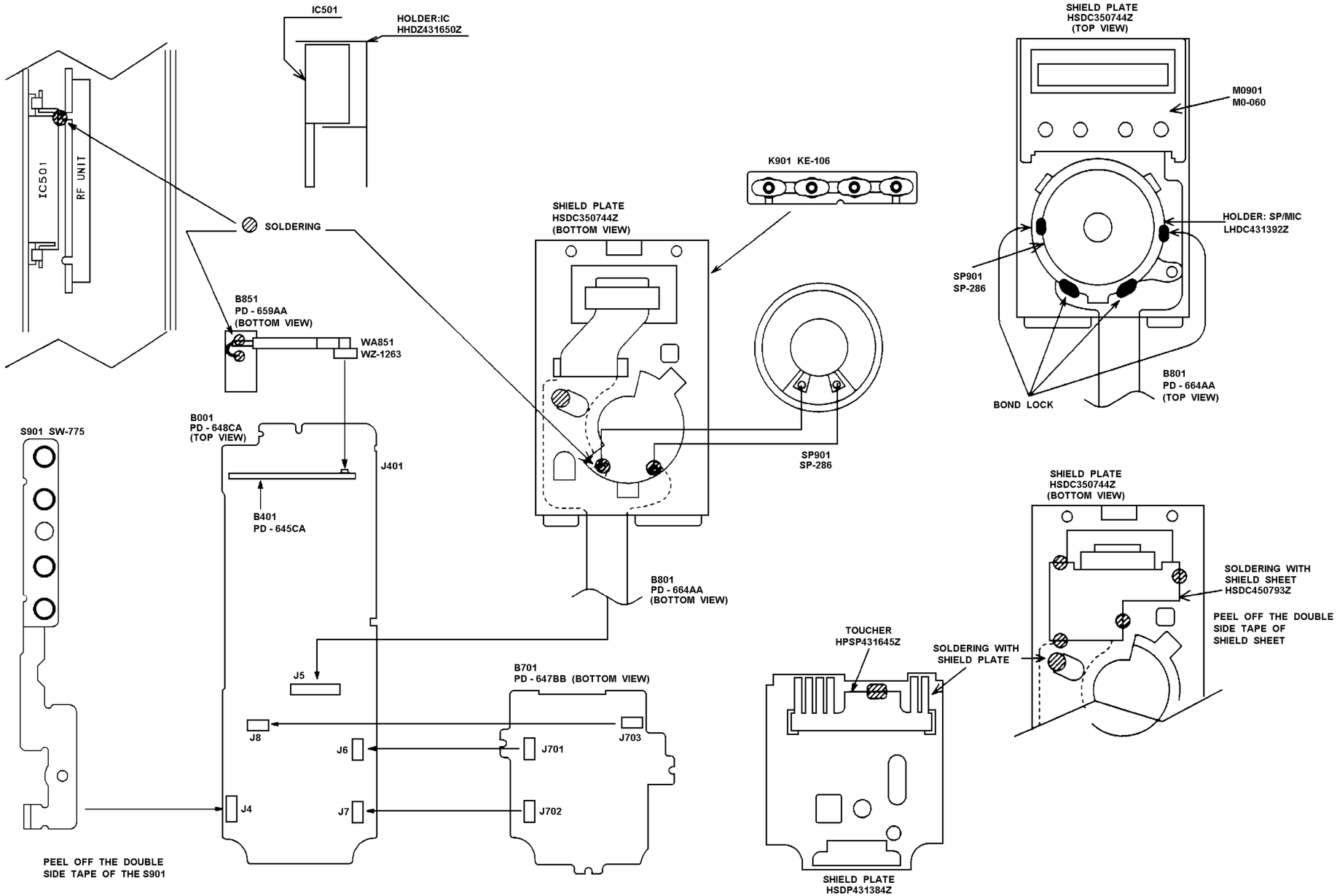






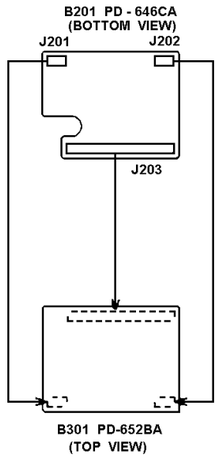
(UHF)
SYNTHESIZER

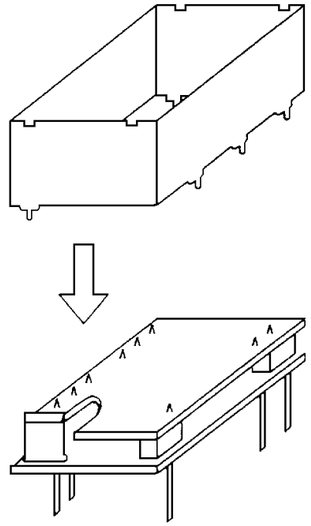
(E33-3697, Rev. 1)

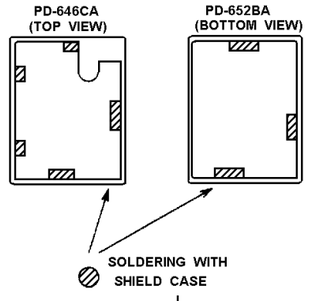


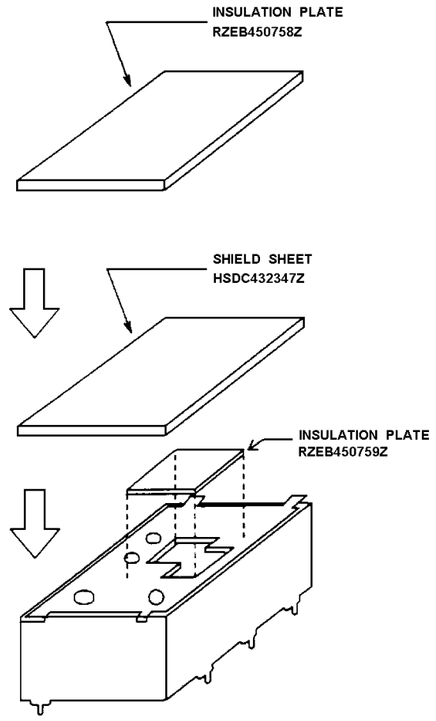
(VHF)

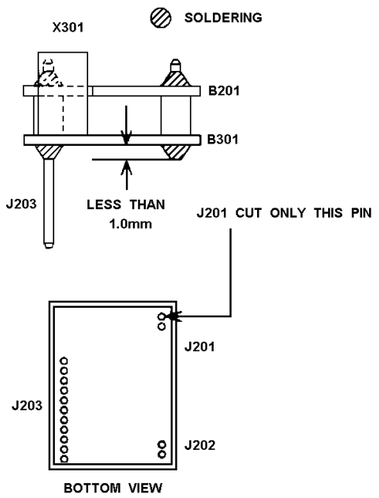
(E33-3712, Rev. 1)

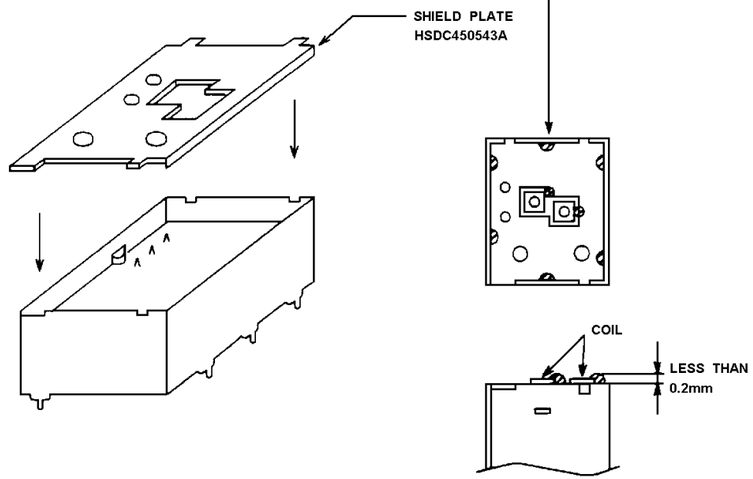












(VHF) SYNTHESIZER

(E33-3711, Rev. 1)

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