MAINTENANCE MANUAL RF BOARD 19D902243G4 (403-440 MHz) 19D902243G5 (440-470 MHz) 19D902243G6 (470-512 MHz) FOR MVS

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DESCRIPTION

The RF Board for the MVS radio consists of the following circuits:

- A frequency synthesizer for generating the transmit carrier frequency and the receive circuit first mixer injection frequency.
- The transmit exciter, PA and power control stages.
- The receive circuit front end, IF, and FM detector.
- Voltage regulators.

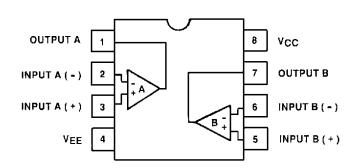
The 403-512 MHz range of UHF frequencies is covered by three groups of RF Boards:

19D902243 G4: 403-440 MHz 19D902243 G5: 440-470 MHz 19D902243 G6: 470-512 MHz The RF Board is mounted in the bottom of the frame assembly. Refer to Combination Manual for a mechanical layout of the radio. Figure 1 provides a block diagram of the receive and transmit circuits. Figure 2 provides a block diagram of the synthesizer.

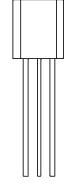
Transmit circuit adjustments for frequency, power and deviation are accessible from the topside of the board, as are IF alignment, second oscillator and audio level adjustments for the receive circuit. Chip components on the bottom of the board provide optimum RF performance, while being accessible for easy servicing by removing the "friction fit" bottom shields.

Selected use of sealed modules permits small board size as well as RF and mechanical protection for sensitive circuitry. Modules are not repairable and must be replaced if they are determined to be damaged.

OPERATIONAL AMPLIFIER 19A701789P2



VOLTAGE REGULATOR 19A704971P1





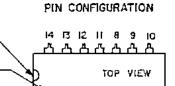
PIN 1 ADJUST PIN 2. OUTPUT PIN 3. INPUT

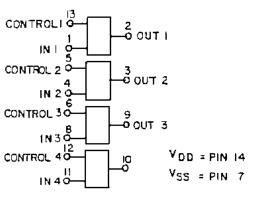
QUAD BILATERAL SWITCH (U202) 19A700029P44

INDENT

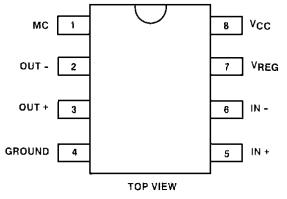
PIN "i"

LOCATOR





DIVIDER (U205) 19A704287P2



Ericsson Inc.
Private Radio Systems
Mountain View Road
Lynchburg, Virginia 24502
1-800-592-7711 (Outside USA, 804-592-7711)

CIRCUIT ANALYSIS

SYNTHESIZER CIRCUIT

The synthesizer generates all transmit and receive RF frequencies. The circuit uses a phase-locked VCO module U201 feeding a doubler circuit. While transmitting, the VCO operates at 1/2 the actual transmitter frequency (201.5-256.0 MHz to produce 403-512 MHz). While receiving, the VCO operates at 1/2 of the difference between the receiver frequency and the 45 MHz IF (179.0-233.5 MHz for 403-512 MHz).

O201 doubles the VCO output frequency with input and output filters broadly fixed tuned to allow the VCO second harmonic to pass while rejecting all other frequencies. The doubled signal is amplified by Q201 to a level of +10 dBm. This signal feeds the receiver mixer and is attenuated to +3 dBm by R202 to feed the transmitter exciter module.

The synthesizer frequency is controlled by the microprocessor on the Logic Board (A1). Frequency stability is maintained by a temperature compensated crystal controlled oscillator (TCXO) module. The oscillator has a stability of ± 5 PPM (0.0005%) over the temperature range of -30° C to $+60^{\circ}$ C and determines the overall frequency stability of the radio. An optional high stability ±2.5 PPM oscillator module is available.

The VCO output is also buffered by Q204 to feed the divide by 128/129 dual modulus prescaler U205. The prescaler feeds the FIN input of the PLL U206. Within U206, the prescaled signal is further divided down to 6.25 kHz to be compared with a reference signal. This reference signal is derived from the 12.8 MHz TCXO module U204. U206 divides the 12.8 MHz TCXO down to the 6.25 kHz reference frequency.

Divider circuits in U206 are programmed by three inputs from the Logic Board (A 1), which are buffered and inverted by transistors Q208, Q209, and Q2I0. The S ENABLE pulse (5 milliseconds) activates switch U202 to allow more rapid channel acquisition during channel changes.

A LOCK DET signal from the PLL goes to the microprocessor for processing to prevent transmission when the VCO is not on frequency and to provide an error message to the user. During receive, an unlocked synthesizer is indicated by E0 (Error 0) in the LCD and by a quickly pulsed alert tone. The microprocessor will continually try to reload the frequency information into the PLL until the synthesizer locks. During transmit, only a slower pulsed alert tone will be heard.

Once unlocked in transmit, the synthesizer will not be reloaded. The transmitter PTT must be unkeyed and then rekeyed to attempt to relock.

Audio modulation from Audio Board A3 is applied to the VCO module through DEVIATION ADJUST potentiometer R226. VCO TUNE potentiometer R218 adjusts the operating frequency range of the VCO by varying a negative bias from D202 and D203.

TRANSMITTER CIRCUIT

The transmitter consists of a fixed-tuned exciter module, a 10 Watt PA module, a pin diode switch, a low pass filter, a directional coupler, a power control circuit, and a transmit voltage switch.

Exciter Module

Figure 1 shows the synthesizer driving the receiver mixer at +10 dBm and is attenuated by R202 to +3 dBm for driving the exciter input. The exciter module A102 operates from a switched 8 volt supply. A different exciter module is required for each of the three band splits. No tuning is required. Both input and output ports operate at 50 ohms impedance. The exciter module provides typically 20 dB of gain and 200 mW of output power to drive the power amplifier module.

Power Amplifier Module

The PA module U101 requires a drive of 200 mW from the exciter module to deliver up to 10 Watts power output. The module is mounted to the rear heatsink. The PA module output drives the 25 Watt PA Board through J103. The power control circuit controls the PA module output power.

Pin Diode Switch, Low Pass Filter, and **Directional Coupler**

The output from the 25 Watt PA Board feeds transmit pin diode switch D104 through J102. In transmit, switched 8 volts is applied through L102, turning on pin diodes D104 and D401. The DC path is completed through R401 and R402 with the bias current set at about 40 mA. D 104 couples the PA Board power from J102 to low pass filter A101. D401 provides a RF path to ground to protect the receiver input.

The low pass filter reduces the harmonic output from the transmitter. The low pass filter feeds the directional coupler, W101 and W102. The directional coupler provides a sample of transmitter power for the power control circuit. The coupler output feeds the antenna jack J101.

Power Control Circuit

The power control circuit samples the output power to the antenna to maintain a constant power level across the band. Also, a thermistor senses the heatsink temperature to throttle the power level down above 70°C. The circuit controls the supply voltage to one of the amplifier stages in the PA module U101.

The directional coupler (Wl01 and W102) provides a sample of transmitter power to diode D101. D101, R106, and Cl04 produce a positive DC voltage proportional to the transmitter output power level. This DC level feeds the (-) input of amplifier U103-B. Power set pot R111 and thermistor R118 determine the DC level to the (+) input of U103-B. U103 -B amplifies the difference between the (-) and (+) inputs, forcing the output power level to equal the power set level by varying the drive to Q102 and Q101. Q101 supplies the control voltage to the PA module U101. For example, if the output power level begins to drop below the power set level, the output of U103-B increases positively, causing Q102 to conduct less. The base of Q101 rises, increasing the control voltage to the PA module, which increases the output power level back to the desired set level.

Q104, C123, and R105 improve the transient stability of the power control loop when the transmitter is keyed.

Transmit Switch

During transmit, the Logic Board (A1) microprocessor pulls the DPTT line low causing the output of U103-A to go low. Q103 turns on to supply SW 8V to the exciter module, the power control circuit and the pin diode switch. During receive, the output of U103-A supplies 12 volts to the receiver RF pre-amp O401.

RECEIVER CIRCUIT

The dual conversion receiver circuit consists of a front end section, a 45 MHz first IF, and a 455 kHz second IF with an FM detector. All audio processing and squelch functions are accomplished on the Audio Board (A3).

Front End Section

RF is coupled from antenna jack J101 through the directional coupler and the low pass filter to pin diode D401. In transmit, SW 8V is applied through L102, turning on pin diodes D104 and D401, with the DC path completed through R401 and R402. D401 provides a RF path to ground for the receiver input while in transmit. In receive, D401 is off allowing RF to pass by D401 unattenuated.

Receiver front end filtering is provided by RF filters Z401 and Z402. Both filters are fixed tuned 3-pole helical filters with 20 MHz bandwidths. These filters do not require tuning unless a different 20 MHz segment of the band split is required. RF amplifier transistor Q401 is a common emitter A circuit with 15 dB gain. Inductor L402 and capacitors C405 and C406 provide a broadband match from Z401 to the transistor input. Diode D402 protects the amplifier from high input signal levels. Inductors L403 and L404 plus the associated capacitors provide a broadband impedance match from the amplifier output to RF filter Z402.

Test point TP401 is a 50-ohm point for measuring front end gain or to align the receiver to another 20 MHz segment of the band split. The front end gain from antenna jack J101 to TP401 is typically 10 dB.

The mixer, Z403, is a doubly balanced diode mixer. This mixer is driven by a local oscillator signal of +10 dBm or greater to provide good inter-modulation performance, spurious performance, and local oscillator isolation. The mixer conversion loss is typically about 6 dB.

45 MHz IF

The first 45 MHz 1F amplifier transistor Q501 is a junction FET operated in the common gate mode. This configuration offers a typical input impedance of 75 ohms. The output circuitry is tuned by L504 and loaded to provide the proper source termination for the four pole crystal filter which follows.

The output of the crystal filter is matched by second IF amplifier transistor Q502. This port is also tuned by L506 and loaded to provide the proper filter termination. Transistor Q502 is a dual gate FET operating at a bias current of about 10 milliamps. The output of O502 is tuned by L507 for maximum gain at 45 MHz and is loaded by the 2nd mixer in the U501 chip. This Q502 stage has a relatively high input and output impedance and provides high isolation within the active device.

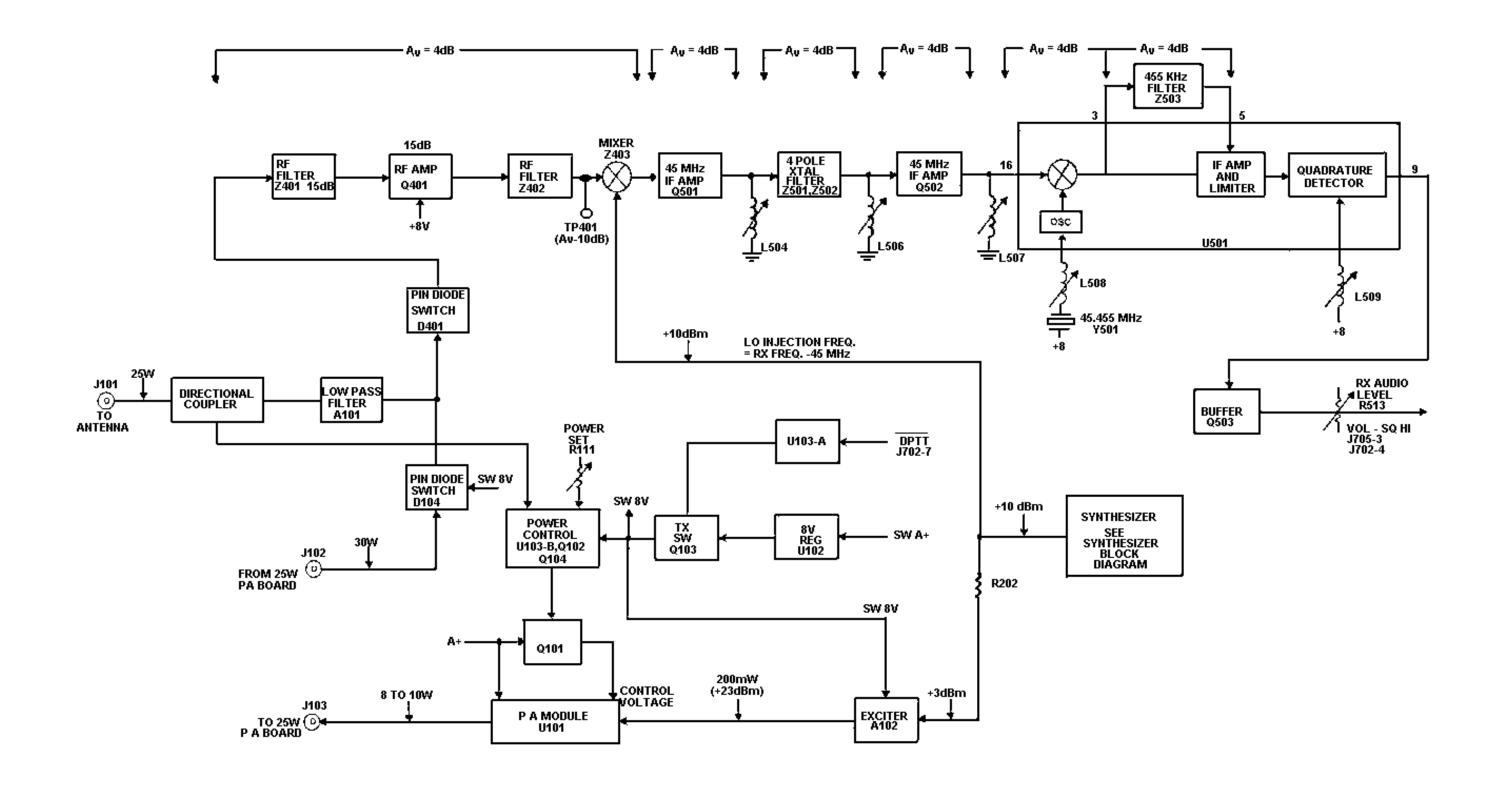


Figure 1 - TX And RX Block Diagram

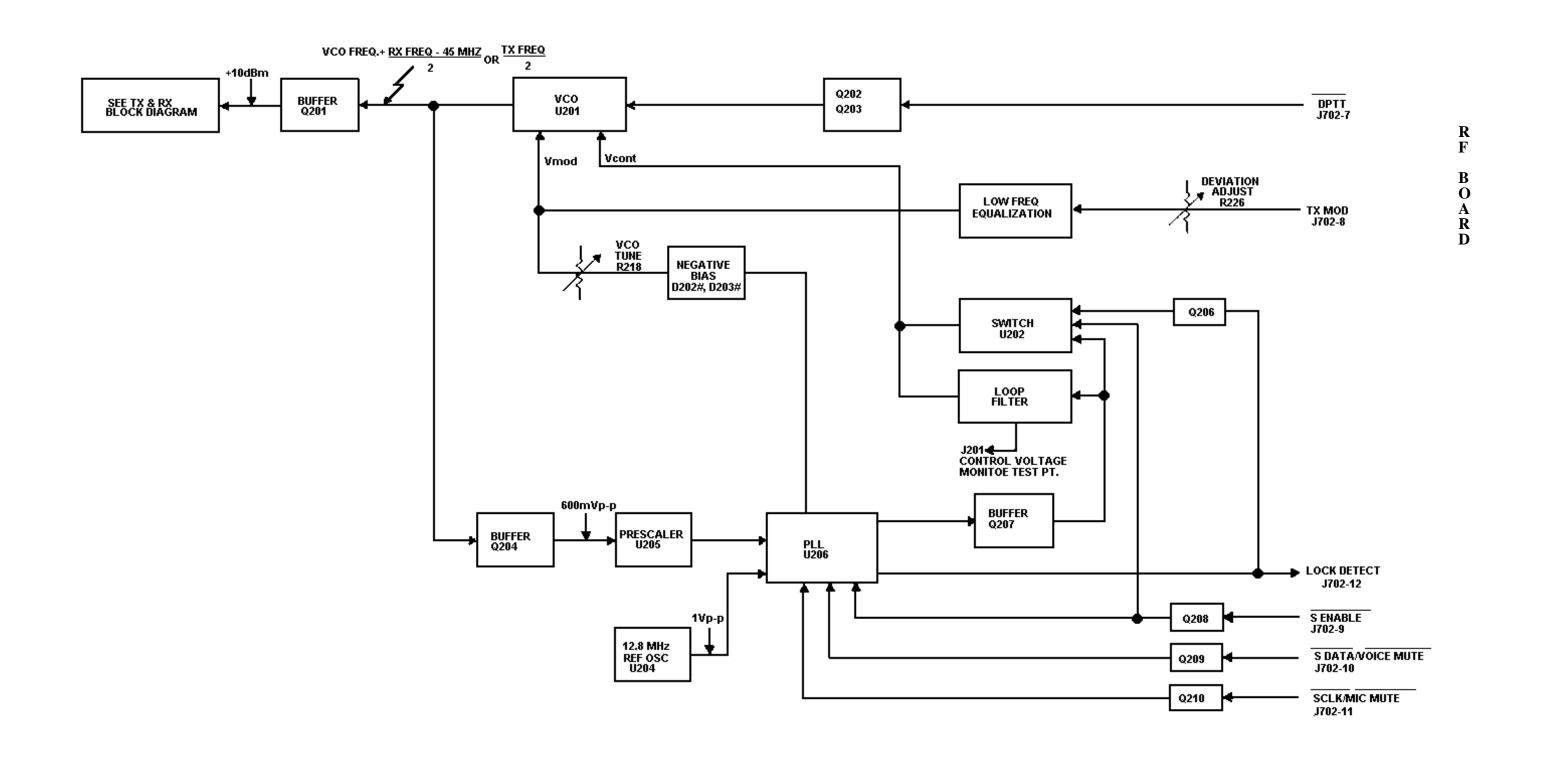


Figure 2 - Frequency Synthesizer Block Diagram

Converter/IF/Detector IC

IF IC U501 pins 1 and 2 connect to an internally biased oscillator transistor. The external circuitry of this oscillator transistor includes crystal Y501 and forms an oscillator circuit operating at 45.455 MHz. The frequency of this third mode oscillator is adjusted by inductor L508. The oscillator drives the internal balanced mixer. The 45 MHz IF signal is translated to 455 kHz and appears at Pin 3 of U501. This IF signal is filtered by 6 pole ceramic filter Z503 and drives the internal 455 kHz amplifier and limiter. The limited 455 kHz in turn drives an internal quadrature detector. The phase shift network needed by the quadrature detector is provided by inductor L509. The audio output port is Pin 9 on U501. Inductor L509 is adjusted for maximum audio output level. The audio signal at Pin 9 is filtered by resistor R512 and capacitor C519 to reduce IF feedthrough. Buffer amplifier Q503, drives audio potentiometer R513. This allows a VOL/SQ H1 signal whose amplitude may be set for proper system operation using R513.

Power Distribution

Unswitched 13.8 Volts (A+) is supplied to the RF Board through connector J704 and feeds the power control transistor Q101, the PA module U101, and 20V transient suppressor Dl05. D105 protects the radio from noise spikes and other overvoltage transients appearing on the input power cable.

Switched 13.6 Volts (SW A+) is supplied to the RF Board through J702 and J705 and feeds regulators U102, U207, and U502. U102 supplies 8 Volts to the transmitter switch, the synthesizer 5 Volt regulator U203, and the Logic Board (Al) through J702. U207 supplies 8.3 Volts to the synthesizer. U502 supplies 8 Volts to the receiver.

SERVICE NOTES

TRANSMITTER CIRCUIT

Most transmitter circuit problems can be isolated by checking the TX power gains shown in Figure 1 - RX and TX Block Diagram. The 25 watt PA Board may be bypassed by placing a jumper cable between J103 and J102 on the RF Board. The PA module U101 is capable of producing 10 watts output.

Transmitter DC measurements

1. First ensure that DPTT is low when the mic PTT is keyed low.

- 2. Check for approximately 8 volts at L105 feeding the Exciter Module. If not present, troubleshoot the TX switch circuitry, Q103 and U103.
- 3. Check for approximately 7 volts across resistors R401 and R402. If not present, check the pin diodes D104 and D401 and the conduction path from R401 to the TX switch Q103.
- 4. Check for an adjustable voltage of 0 to 12 volts on pin 2 of the PA module U101. At maximum power, with Power Set adjustment R111 fully clockwise, pin 2 should be at I2 volts. If not present, check the power control circuitry: U103, Q101, Q102, and QI04.
- 5. Check for 13.6 volts on pins 3 and 4 of the PA module U101, and ensure a good mechanical and electrical ground from the PA module to the bracket and casting.

RECEIVER CIRCUIT

To isolate a receiver circuit problem refer to the Receiver Circuit Symptoms and Checks chart.

RECEIVER FRONT END TUNING

Each receiver front end has been preset to a fixed 20 MHz segment of each split. To adjust the front end for another 20 MHz segment of the split, a sweep tuning procedure will be required to maintain the necessary bandwidth.

- 1. Apply a sweep signal generator (or tracking generator) with markers set for the desired 20 MHz bandwidth at the antenna jack J101.
- 2. Measure the RF signal at TP401 with a high impedance RF probe. A 50-ohm RF probe may be used at TP401 if coupling capacitor C415 is removed (if damaged, C415 may be replaced by a short piece of hookup wire).
- 3. Connect the RF sweep detector/display (or spectrum analyzer) to the RF probe.
- 4. Tune the slugs of Z401 and Z402 for the required 20 MHz bandwidth. Ripple will be 1 dB to 2 dB typical. Reduce the RF input level, if necessary, to keep Q401 out of saturation and protection diode D402 off. The filter response will not change at lower RF input levels if the front end has been tuned up correctly.

SYNTHESIZER CIRCUIT

Synthesizer troubleshooting consists of first checking for the proper DC levels, then determining if the proper waveforms are present and checking individual modules.

RECEIVER CIRCUIT SYMPTOMS AND CHECKS

SYMPTOMS	CHECKS
No Audio	 U502 regulator The level and frequency of the first mixer injection frequency The level and frequency of the second mixer injection frequency Quadrature detector circuit Quadrature detector coil tuning
Poor SINAD	 Consult Figure 1 - RX and TX Block Diagram for RX stage gains and troubleshoot. NOTE: Use high a impedance RF probe when measuring gain at TP401. A 50-ohm probe may be used if C415 is removed. DO NOT adjust Z401 or Z402 without sweep equipment or the 20 MHz sensitivity bandwidth will be sharply reduced. Input cable PIN Diode switch is shorted
Distorted Audio	 Both mixer injection frequencies Quadrature detector coil tuning Crystal filter source and load tuning Z503-455 kHz ceramic filter

DC Analysis

8.3 Vdc is supplied by regulator U207 and serves as the biasing voltage for transistor circuits Q204, Q206, Q207, Q208, Q209, and Q210. Resistor R207 decouples the 8.3 volts for use in the VCO module U201. The 10 milliamp current drain of this module results in approximately 6.5 volts DC on Pin 4. Transistor Q20l also draws approximately 25 milliamps, resulting in a collector voltage of 3.7 volts DC at the junction of resistor R204 and capacitor C201. Lack of VCO RF output will modify this voltage.

Regulator U203 uses the 8 volts from transmitter regulator U102 to generate 5 volts for U204 and U205.

Waveforms

Waveforms associated with the synthesizer were measured with a 10 megohm, 30 pF probe. Use DC coupling (see Figures 3-8).

Module Isolation

Reference Oscillator U204:

Look for a waveform similar to the reference (Figure 3) on Pin 2. If waveform is not present, the oscillator module is probably defective.

VCO U201:

Connect a DC power supply to Pin 3. With 2.5 volts DC on pin 3, the output of U201 (pin 5) should be approximately 197 MHz. With 6.5 volts DC on pin 3, the output should be approximately 212 MHz. These values are correct for the 440-470 MHz split, with the ranges 179-197 MHz and 212-233 MHz being correct for the lower and upper split, respectively.

Power output of the VCO can be measured by connecting a coax directly to the module, between pin 5 and ground. The output should be approximately 0 dBm with C237 still connected in the circuit. In transmit, a negative bias should exist on pin 1. If not present, check Q202, Q203, and C206 before removing the VCO.

Prescaler U205:

Connect pin 3 of the VCO to 4.5 volts DC. With the radio in receive, monitor the frequencies of the VCO at the connection of capacitor C210 and resistor R211. DC short pin 1 of U205 to ground to cause divide by I29 to occur. The frequency output at pin 3 should be the VCO frequency divided by 129. Tie pin I to pin 7 (5 volts) to cause divide by 128 to occur. Check pin 3 to verify that this occurs. Improper division may indicate a defective prescaler.

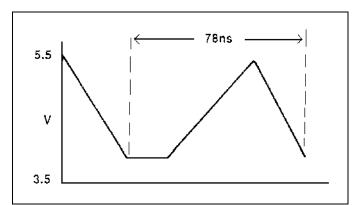


Figure 3 - REFERENCE OSCILLATOR (Input to U206, Pin 2)

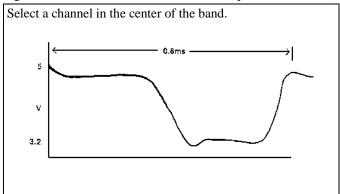


Figure 4 - F_{IN} (input to U206, Pin 10)

The top of the ramp is approximately 0.8 Volt DC greater than the control voltage on PD out, Pin 17. A channel in the center of the band is shown.

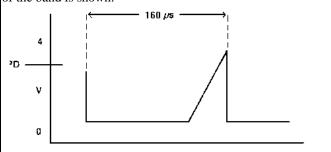


Figure 5 - RAMP (Generated in U206 and appears on Pin 15)

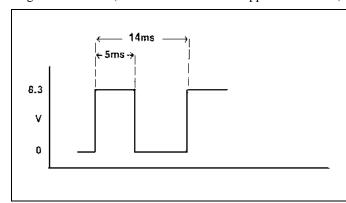


Figure 6 - S ENABLE (Input to U206, Pin 13) (Radio in

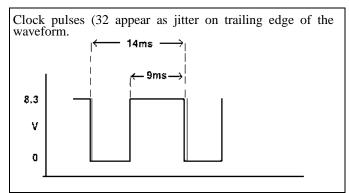


Figure 7 - S CLOCK (Input to U206, Pin 11) (Radio in SCAN on a single channel)

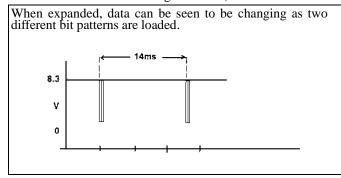


Figure 8 - S DATA (Input to U206, Pin 12) (Radio in SCAN on a single channel)

Bilateral Switch U202:

The bilateral switch is used to short around parts of the loop filter during channel scan. A shorted (to ground or adjacent gate) gate may be isolated by comparing voltages through the loop filter to those of a functioning radio. Defective gates might be suspected when the radio does not change frequency quickly enough.

Phase-Lock-Loop U206:

There are no other specific checks which aid in evaluation of U206. Usually, it is suspected only if all other checks are OK. Before changing, inspect chip components for mechanical damage and check resistances through the loop filter.

Transistor Q201:

After checking for proper DC operation, measure the frequency and gain from the VCO, pin 5 to R202/C203. The gain should be approximately 10 dB at 2 times the VCO frequency.

PA MODULE REPLACEMENT

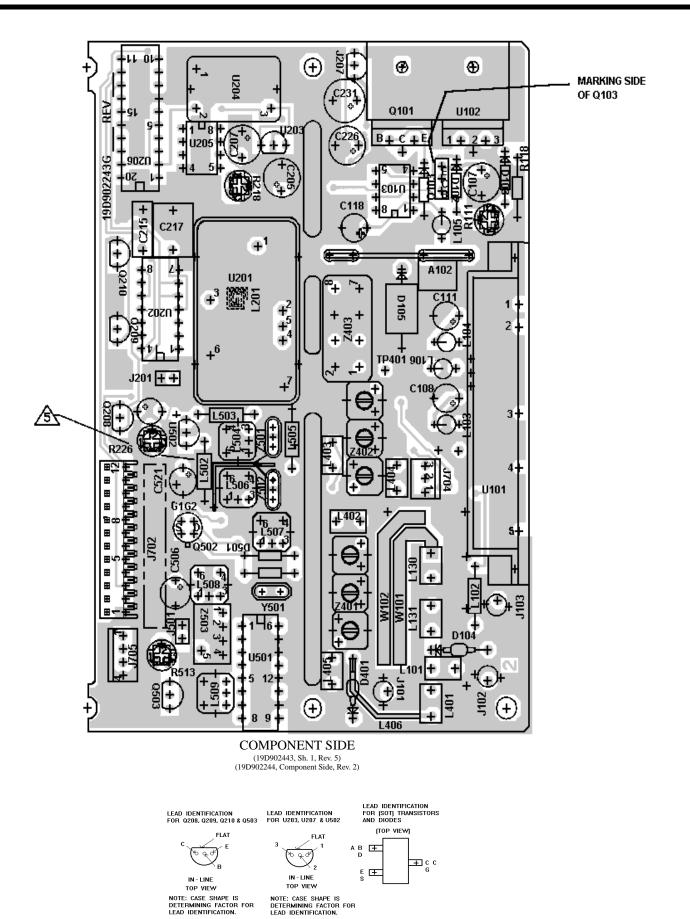
To Remove PA Module U101

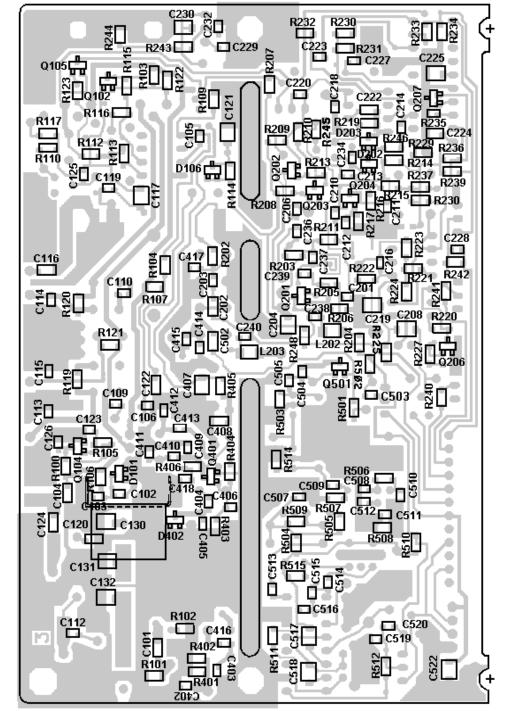
- 1. Unsolder the five leads from U101, using either solder removal braid, or a mechanical de-soldering tool. These leads are fragile and can be bent very easily. Do NOT unsolder the shield that wraps around the module.
- Remove the RF Board from the radio chassis assembly. Refer to the disassembly procedure provided in the Service Section. Carefully slide the module out of the shield, and away from the board.

To install PA Module U101

- 1. Apply some silicone grease to the metal side of the replacement module.
- 2. Carefully insert the five leads from the module into the five corresponding PWB holes, and slide the module into the shield. Do NOT solder the leads yet.
- 3. Slide the RF Board assembly back into the radio frame. Reinstall all hardware, harnesses, cables, etc. Replace all screws.
- 4. Install the two PA bracket screws before soldering the four module leads. Trim excess wire.

R F B O A R D LBI-38258E OUTLINE DIAGRAM



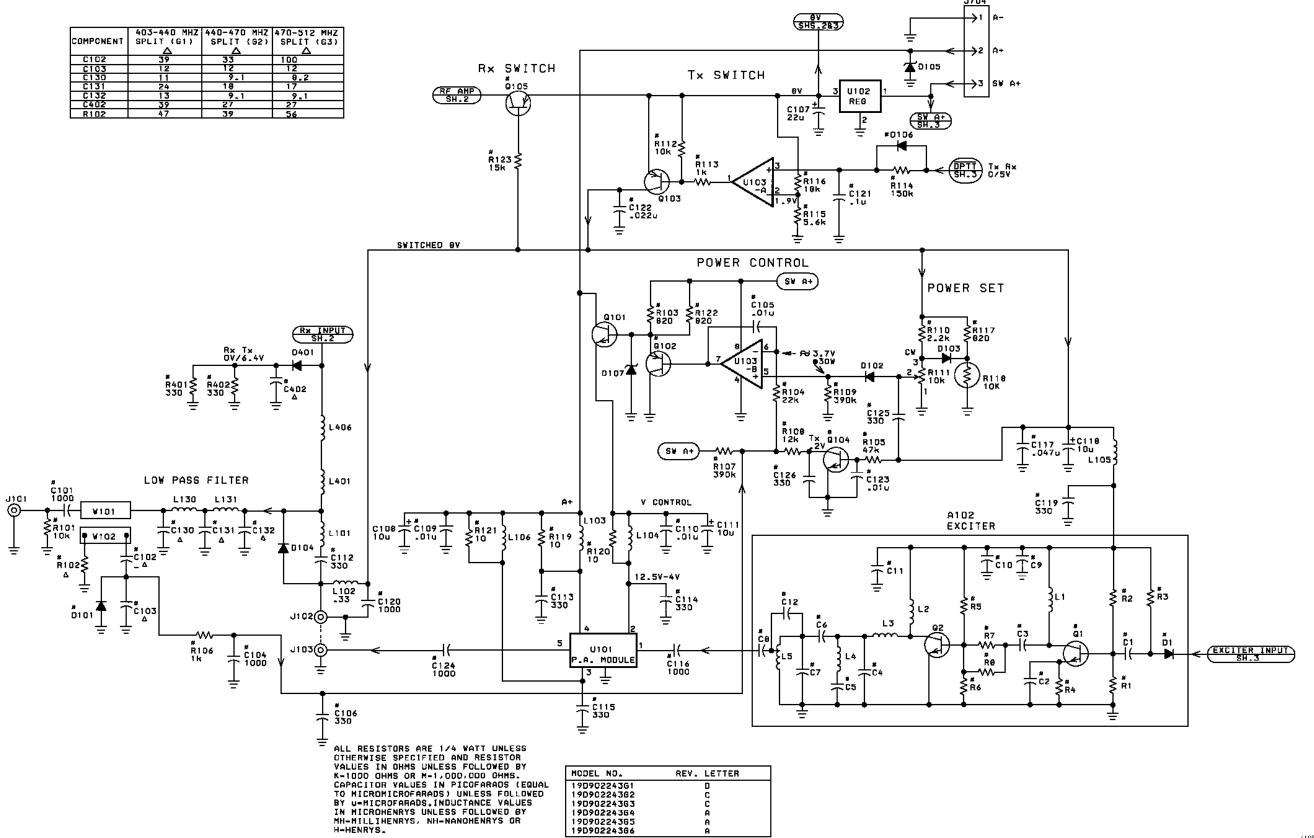


SOLDER SIDE (19D902243, Sh. 1, Rev. 5) (19D902244, Solder Side, Rev. 2)

THE FOLLOWING ITEMS ARE MOS DEVICES REQUIRING
SPECIAL CARE PER 19A7-1294, U202, U205, U206, & Q502.

Z501 AND Z502 ARE A MATCHED PAIR OF CRYSTAL FILTERS
WHICH MUST BE ORIENTATED WITH "B" RESONATOR AS SHOWN.
"B" RESONATOR IS IDENTIFIED BY DOT ON CAN.

SCHEMATIC DIAGRAM LBI-38258E

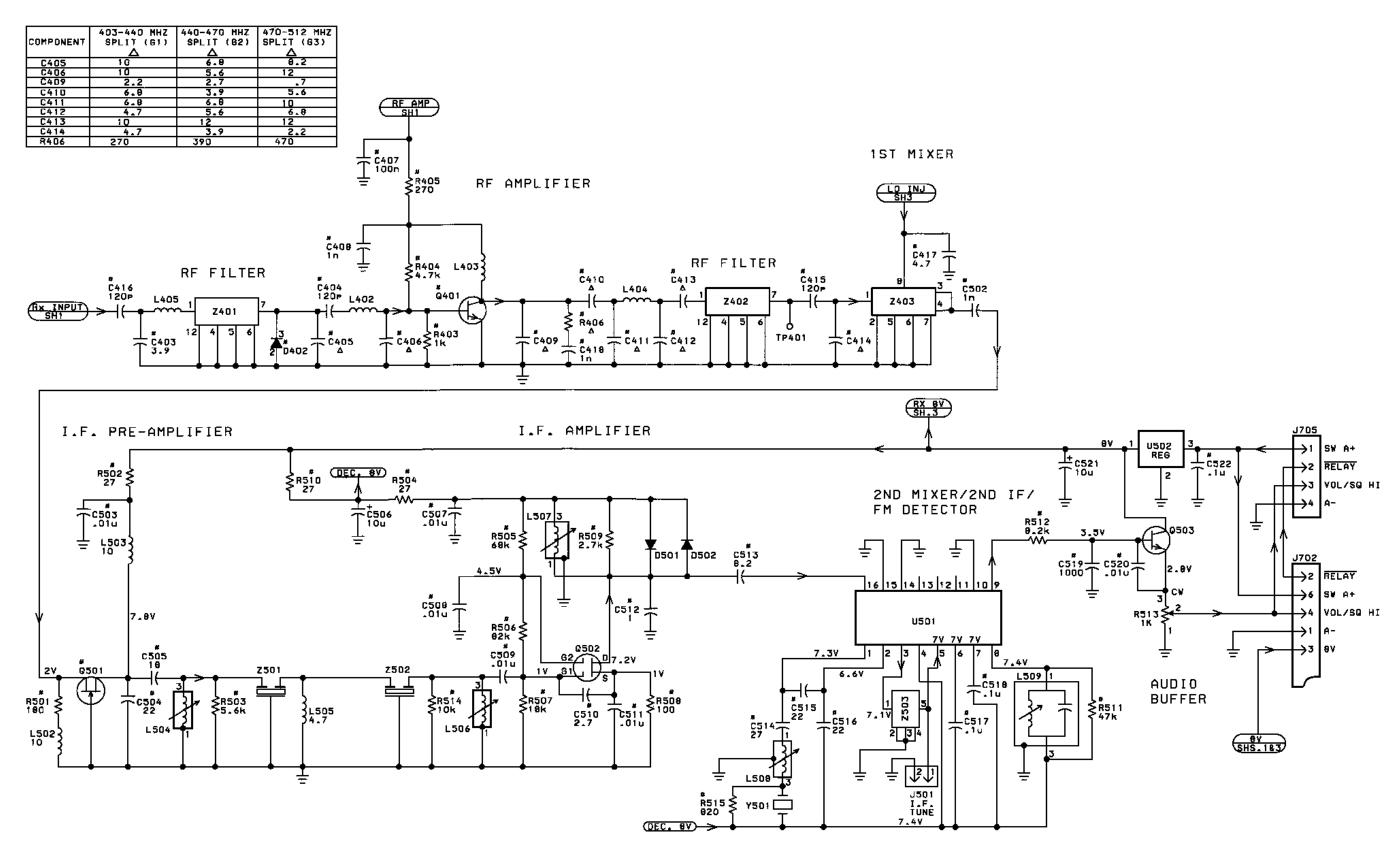


(19D902245, Sh. 1, Rev. 5)

R F

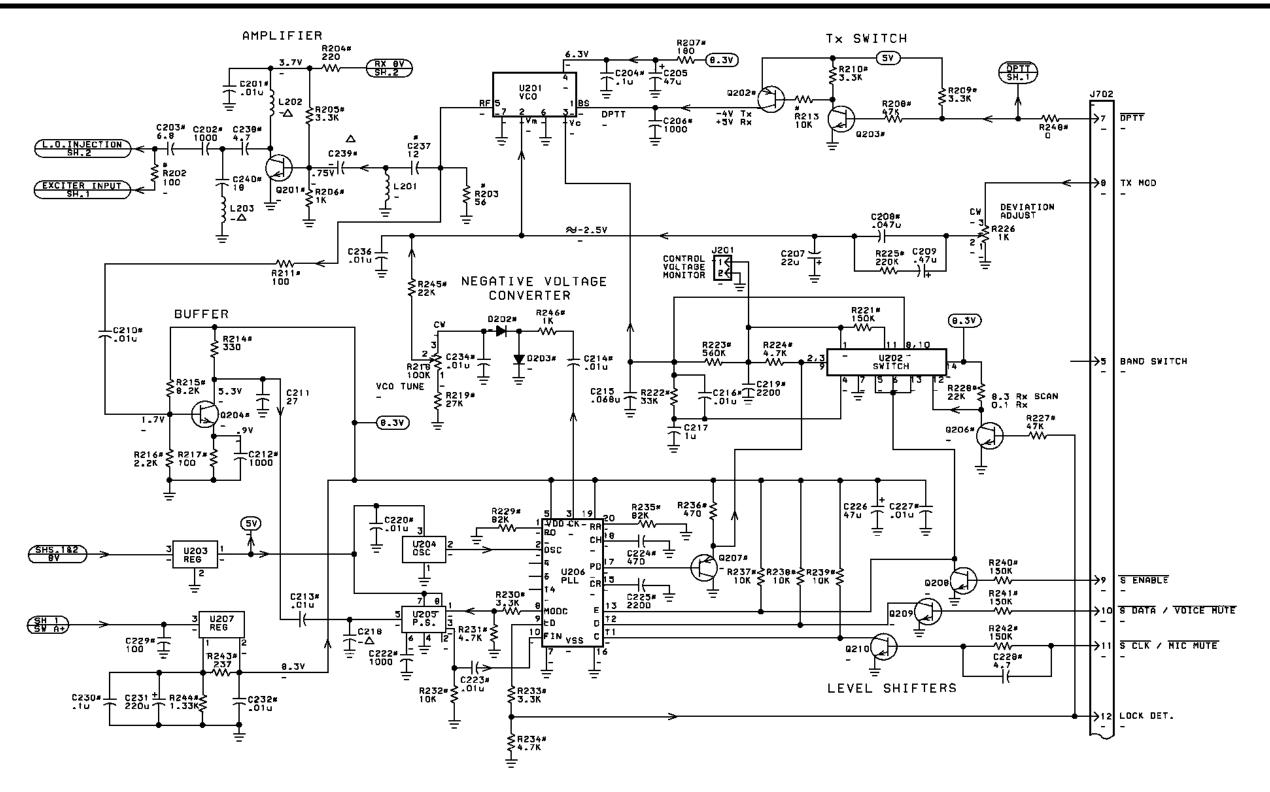
B O

A R D



(19D902245, Sh. 2, Rev. 2)

SCHEMATIC DIAGRAM LBI-38258E



COMPONENT	403-440 MHZ SPLIT (81) 		470-512 MHZ SPLI⊤ (G3) △
L202	27NH	27NH	22NH
L203	27NH	27NH	22NH
C239	8.2	0.2	6.8
C218	27	22	22

(19D902245, Sh. 3, Rev.1)

R F

B O

A R D LBI-38258E PARTS LIST

PARTS LIST

RF BOARD
19D902243G4 - 403 - 440 MHz
19D902243G5 - 440 - 470 MHz
19D902243G6 - 470 - 512 MHz
ISSUE 2

SYMBOL	PART NO.	DESCRIPTION
		ASSEMBLIES
A102		TRANSMIT EKCITER BOARD 19c85164301 - 403-440 MMx 19c85164302 - 440-470 MMx 19c85164303 - 470-517 MMx
	10000000000000	CAPACITORS
Cl and C2	19A702061P77	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ± 30 PPM.
C3	19A702061F17	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1),
C3	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G2).
C3	198702061P11	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).
C4	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C4	19A702061P11	Ceramic: 6.8 pF ±0.5 pF, 50 VDCH, temp coef 0 ±60 PPM. (Used in G2 and G3).
C5	19A702061P61	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 FPM. (Used in Gl).
C5	19A702061P45	Ceramic: 47 pP ±5%, 50 VDCM, temp coef 0 ±30 PPM. (Used in G2 and G3).
C6	19A702061P10	Ceramic: 5.6 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 FPM. (Used in G1).
C6	198702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G2 and G3).
C7	19A702061P12	Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp
C7	19A702061P11	coef 0 ±60 PPM. (Used in G1). Ceramic: 6.8 pF ±0.5 pF, 50 VDCM, temp coef 0 ±60 PPM. (Used in G2 and G3).
C8 thru C10	198702061P77	coef 0 ±60 PPM. (Used in G2 and G3). Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C11	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C12	198702061912	Ceramic: 8.2 pF ±0.5 pF, 50 VDCM, temp coef 0 ±60 PFM. (Used in Gl).
01	19A702525P2	Silicon, PIN: sim to MMBV3401.
£.1		Part of printed wiring board 190851644Pl.
Ļ2	198800891P6	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.
L3 thru L5		Part of printed wiring board 190851644P1.
Q1	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q 2	19A701940P1	Silicon, NPN: sim to MRF-559.
R1	1988006079471	
R2	1988006079222	Metal film: 2.2% ohms ±5%, 1/8 w.
R3	198800607P102	Metal film: 1K ohms ±5%, 1/8 w.
₹4	198800607P330	Metal film: 33 chms ±5%, 1/8 w.
R5	1938006079272	Metal film: 2.7K ohms ±5%, 1/8 w.
R6	19B800607P331	Metal film: 330 ohms ±5%, 1/8 w.
R7	19B800607P100	Metal film: 10 chms ±5%, 1/8 w.
and R8		2001 270 10

SYMBOL	PART NO.	DESCRIPTION
C101	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C102	19A702061P41	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G4).
C102	19A702061P37	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 t30 PPM/C. (Used in C5).
C102	19 A 702061P61	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0
C103	19A702061P17	t30 PFM. (Used in G6). Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0
C104	19 A 702061P99	±30 PPM. Ceramic: 1000 pP ±5%, 50 VDCW, temp coef 0
C105	19A702052P14	#30 PPM/ C. Geramic: 0.01 uF #10%, 50 VDCM.
C106	19A702061P73	Ceramic: 330 pF ±5%, 50 VDCW, temp coef 0
C107	19A701534P8	±30 PPM/'C. Tantalum: 22 uF ±20%, 16 VDCW.
C108	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to
a		Panasonic LS Series.
C109 and C110	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C111	19A703314F10	Electrolytic: 10 uF -10+50%, 50 VDCM; sim to Fanasonic LS Series.
Cll2 thru Cll4	19A702061P73	Ceramic: 330 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C115	19A702061P73	Ceramic: 330 pP ±5%, 50 VDCW, temp coef 0 ±30 PPM/'C. (Used in G5).
C116	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/C.
C117	19A702052P22	Ceramic: 0.047 uF ±10%, 50 VDCW.
C118	19A703314P10	Electrolytic: 10 uP -10+50%, 50 VDCW; sim to Panasonic LS Series.
C119	19A702061F73	Ceramic: 330 pF ±5%, 50 VDCM, temp coef 0 ±30 PPM/*C.
C120	19 8 702061 P 99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PFM/°C.
C121	198702052P26	Ceramic: 0.1 uF ±10%, 50 VDCW.
C122	19A702052P28	Ceramic: 0.022 uF ±10%, 50 VDCW.
C123	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C124	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/C.
C125	19A702061P73	Ceramic: 330 nF +58 50 UNW town conf 6
and C126		#30 PPM/'C.
C130	19A705108P14	Mica Chip: 11 pF ±5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G4).
C130	19A705108P12	Mica: 9.1 pF ±5%, 500 VDCW. (Used in G5).
C130	19A705108Pll	Hica: 8.2 pF ±5%, 500 VDCW. (Used in G6).
C131	19A705108P22	Mica: 24 pF ±5%, 500 VDCW. (Used in G4).
C131	19A705108P19 19A705108P200	Mica: 18 pf ±5%, 500 VDCW. (Used in G5).
C131		Mica Chip: 17 pF ±5%, 500 VDCW, temp coef 0 + 100 FPM/ C. (Used in G6).
C132	19A705108P16	Mica Chip: 13 pF ±5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in C4).
C132	19A705108P12	Mica: 9.1 pF ±5%, 500 VDCW, (Used in G5 and G6).
C201	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C202	198702051P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/'C.
C203	198702061911	Coramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.
C204	19A702052P26	Ceramic: 0.1 uF ±10%, 50 VDCW.
C205	19A701534P17	Tantalum: 47 uF ±20%, 10 VDCW.
C206	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C207	19A701534P8	Tantalum: 22 uF ±20%, 16 VDCW.
C208	198702052P22	Ceramic: 0.047 uF ±10%, 50 VDCW.
C209	19A701534P3	Tantalum: 0.47 uF ±20%, 35 VDCW.
C210	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.

SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
C211	19A702061P33	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.	0409	19A702236P3	Ceramic: 0.7 pF t0.1 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G6).
C212	19A702052P5	Geramic: 1000 pF ±10%, 50 VDCW.	C410	19A702061P11	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G4).
C213 and C214	19A702052P14	Ceramic: 0.01 uP ±10%, 50 VDCW.	C410	19A702236P15	Ceramic: 3.9 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in O5).
C215	19A700004F1	Metallized polyester: 0.068 uF ±10%, 63	C410	198702061910	Ceramic: 5.6 pF ±0.5 pP, 50 VDCH, temp coef 0 ±60 PPH. (Used in C6).
C216	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.	C411	19A702061P11	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G4 and G5).
C217 C218	19A700004P11 19A702061P33	Metallized Polysster: 1.0 uP ±10%, 63 VDCW. Geramic: 27 pF ±5%, 50 VDCW, temp coef 0	C411	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G6).
C218	198702061929	r30 PPM/'C. (Used in 04). Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0	C412	19A702061p9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PFM. (Used in G4).
C219	19A702061P93	±30 PPM, (Used in G5 and G6). Ceramic: 2200 pF ±5%, 50 VDCM, temp coef	C412	19 A 702061P10	Ceramic: 5.6 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G5).
C220	19A702052P14	0 ±30 PPM. Ceramic: 0.01 uF ±10%, 50 VDCW.	C412	19 A 702061P11	Ceramic: 6.8 pF ±0.5 pF, 50 VDCM, temp coef 0 ±60 FPM. (Used in G6).
C222	19A702061P99	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PFM/°C.	. C413	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G4).
C223	19A702052F14	Ceramic: 0.01 uF ±10%, 50 VDCW.	C413	19A702061P17	Ceramic: 12 pF ±5%, 50 VDCM, temp coef 0 ±30 PPM. (Used in C5 and G6).
C224	198702061277	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.	C414	19A702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDGW, temp coef 0 ±60 PPM. (Used in G4).
C225	19A702061P93	Ceramic: 2200 pF ±5%, 50 VDCW, temp coef. 0 ±30 PPM.	C414	19A702236P15	Ceramic: 3.9 pF ±0.25 pF, 50 VDCM, temp coef 0 ±30 PPM/ C. (Used in C5).
C226	19A701534P17 19A702052P14	Tantalum: 47 uF ±20%, 10 VDCW, Ceramic: 0.01 uF ±10%, 50 VDCW.	C414	19A702236P10	Ceramic: 2.2 pF ±2.5 pF, 50 VDCW, temp coef 0 ±30 PPM/*C. (Used in G6).
C228	198702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.	C415 and	19A702061P63	Ceramic: 1.20 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C229	19A702061P61	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.	C416 C417	19A702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp
C230	19A702052P26	Ceramic: 0.1 uF ±10%, 50 VDCM,	C418	19A702052P5	coef 0 ±60 PPM.
C231	19A703314P2	Tantalum: 220 uF, -10+50%, 10 VDCW.	C502	198702052P5 198702061P99	Ceramic: 1000 pF ±10%, 50 VDCW.
C232	19A702052P14	Ceramic: 0.01 uP ±10%, 50 VDCW.			Ceramic: 1000 pP ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C234 C236	19A702052P14 19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW. Ceramic: 0.01 uF ±10%, 50 VDCW.	C503	19A702052F14	Ceramic: 0.01 uF ±10%, 50 VDCW,
C237	19A702061P17	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.	C504	19A702061P29	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C238	19A702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.	C506	198701534P7	Ceramic: 18 pP 15%, 50 VDCW, temp coef 0 130 PPM/'C.
C239	19 A 702061P12	Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp	C507	19A702052P14	Tantalum: 10 uF ±20%, 16 VDCW. Ceramic: 0.01 uF ±10%, 50 VDCW.
C239	19A702061P11	coef 0 ±60 PPM. (Used in G4 and G5). Ceramic: 5.8 pF ±0.5 pF, 50 VDCM, temp.	thru C509		101 d. 1201, 30 1201.
C240	19A702061P2S	coef 0 ±60 PPM. (Used in G6). Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0	C510	19A702061P6	Ceramic: 2.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±120 FPM.
C402	19A702061P41	±30 PPM/°C.	C511	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
0402	138702001941	Ceramic: 39 pF ±5%, 50 VDCW, temp coef () ±30 PFM. (Used in G4),	C512 C513	19A702061P1	Ceramic: 1 pF.±0.5 pF, 50 VDCW.
C402	19A702061P33	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G5 and G6).	C514	19A702061P12	Geramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.
C403 .	19A702236P15	Ceramic: 3.9 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.	C514	19A702061P33 19A702061P29	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C. Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0
C404	19A702061P63	Ceramic: 120 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.	and C516	739105001553	130 PPM.
C405	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G4).	C517 and C518	19A702052F26	Ceramic: 0.1 uF ±10%, 50 VDCW.
C405	19A702061P11	Ceramic: 6.8 pF ±0.5 pF, S0 VDCW, temp coef 0 ±60 PPM. (Used in G5).	C519	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C405	198702061P12	Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 FFM. (Used in G6),	C520 C521	19A702052P14 19A703314P10	Geramic: 0.01 uF ±10%, 50 VDCM. Electrolytic: 10 uF -10+50%, 50 VDCM; sim to
C406	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 FPM. (Used in G4).	C522	19A702052F26	Panasonic LS Series. Ceramic: 0.1 uF ±10%, 50 vpcw.
C406	19A702061P10	Ceramic: 5.6 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G5).	5522	1.31,02002120	Ceramic: U.1 ur flow, 50 VDCW.
C406	19A702061P17	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in C6).	D101	19A705377Pl	Silicon, Hot Carrier: sim to MMB0201.
C407	19A702052P26	Ceramic: 0.1 uF ±10%, 50 VDCW.	D102	19A700028P1	Silicon: 75 mA, 75 PIV; sim to 1N4148.
C408	19A702061F99	Ceramic: 1000 pF +5%, 50 VDCW, temp coef 0 ±30 PPM/°C.	and D103	19J706892P2	Silian Pik si ta mass
C409	19A702236P10	Ceramic: 2.2 pF ±2.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C. (Used in G4).	D104 D105	193706892P2 198703588P3	Silicon, PIN: sim to UM9401. Zener, transient suppressor: sim to 186278A.
C409	19A702236P11	Geramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in O5).	D106	19A702526P2	Silicon: Schottky Barrier; sim to BAT 17.
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SYMBOL	PART NO.	DESCRIPTION	SYMBOL	PART NO.	DESCRIPTION
			Q104	198700076P2	Silicon, NPN: sim to MMBT3904, low profile.
D107	19A700025P8	Silicon, zener: 400 mW max; sim to BZX55-C6V8. (Used in G4).	Q105	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
D202	198702526P2	Silicon: Schottky Barrier; sim to BAT 17.	Q201.	19A704708P2	Silicon, NPN: sim to NEC 28C3356.
and D203			Q202	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
D401	19J706892P2	Silicon, PIN: sim to UM9401.	Q203	19A700076P2	Silicon, NRN: sim to MMBT3904, low profile.
D402	19A700155P2	Silicon, fwd current: 100 mA, 35 VIP.	Q204	19A704708P2	Silicon, NPN: sim to NEC 28C3356.
D501	19A700028P1	Silicon: 75 mA, 75 PIV; sim to 184148.	Q206	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
and D502			0207	19870005982	Silicon, PNP: sim to MMBT3906, low profile.
			Q208	19A700023F2	Silicon, NPN: sim to 2N3904.
3101	19B801341P1	RF Jack.	Q209 and	19A702084F2	Silleon, MPN: sim to MPS 2369.
thru Jl03	19800134161	RF Jack.	Q216		
J201	19A700072P1	Printed wire: 2 contacts rated @ 2.5 amps; sim	Q401	19870470822	Silicon, MPN: sim to NEC 2SC3356.
""	134170007211	to Molex 22-03-2021.	Q501	19A702524P2	N-Type, field effect; sim to MMBFU310.
J501	19A700072P1	Printed wire: 2 contacts rated @ 2.5 amps; sim to Molex 22-03-2021.	Q502	19811681874	N Channel, field effect; sim to Type 3M1877.
J702	19A704779P11	Connector; sim to Molex 22-17-2122.	Q503	19A700023P2	silicon, NPN: sim to 2N3904.
3704	198700072P29	Printed wire: 3 contacts rated at 2.5 amps; sim			
		to Molex 22-27-2031.	R101	198800607P103	Metal film: 10K ohms ±5%, 1/8 w.
J705	19A700072P30	Printed wire: 4 contacts rated at 2.5 amps; sim to Molex 22-27-2041.	R102	198800607P390	Metal film: 39 ohms ±5%, 1/8 w. (Used in
			R102	198800607P470	G5). Metal film: 47 ohms ±5%, 1/8 w. (Used in G4).
L101	19880089126	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.	R102	1988006079560	Metal film: 56 ohms ±5%, 1/8 w. (Used in
L102	198700024P7	Coil, RF: 330 nH ±10%.			G6).
L103 thru	19A704921P1	Coil.	R103	19B800607P821	Hetal film: 820 chms ±5%, 1/8 w.
C106			R104	19B800607P223	Metal film: 22K ohms ±5%, 1/8 w.
£130 and	19B800891P1	Coil, RF Choke: sim to Faul Smith SK-890-1.	R105	198800607P473	Metal film: 47K ohms ±5%, 1/8 w.
L131			R106	198800607P102	Metal film: 1K ohms ±5%, 1/8 w.
L201		Part of printed wiring board.	R107	198800607P394	Metal film: 390K obms ±5%, 1/8 w.
L202	19A705470P6	Coil: sim to Toko 380NB-27nM. (Used in G4 and G5).	R108	19B800607P123 19B800607P394	Hetal film: 12K chms ±5%, 1/8 w.
L202	19A705470P5	Coil, Fixed: 22 nH; sim to Toko 380NB-22nM.	R110	1988006079394	Metal film: 390K ohms ±5%, 1/8 w, Metal film: 2.2K ohms ±5%, 1/8 w.
L203	19870547026	(Used in G6). Coil: sim to Toko 380NB-27nM. (Used in G4 and	R111	198800779P10	Variable: 10% ohms ±25%, 100 VDCW, .3 watt.
1,203	198/054/076	G5).	R112	19B800607P103	Metal film: 10K ohms ±5%, 1/8 w.
L203	19A705470F5	Coil, Fixed: 22 nH; sim to Toko 380NB-22nM. (Used in G6).	R113	19B800607P102	Metal film: 1K ohms ±5%, 1/8 w.
L401	198800891P1	Coil, RF Choke: sim to Paul Smith SK-890-1.	R114	19B800607P154	Metal film: 150K ohms ±5%, 1/8 w.
L402	19880089191	Coil, RF Choke: sim to Paul Smith SK-890-1.	R115	19B800607P562	Metal film: 5.6K ohms ±5%, 1/8 w.
		(Used in G4 and G5).	R116	19B800607P183	Metal film: 18X ohms ±5%, 1/8 w.
L402	198800890P6	Coil, RF: 14.7 nH ±5%, sim to Faul Smith SK-891-1. (Used in G6).	R117	1988006079821	Metal film: 820 ohms ±5%, 1/8 w.
1.403	19B800890P3	Coil, RF: 11.7 uH ±5%, sim to Paul Smith	R118	19A701864P4	Thermal 10K ohms ±10%, sim to Midwest
		SK-896-1. (Used in G4 and G5).	R119	1988006079100	Components 2H-103. Metal film: 10 ohms ±5%, 1/8 w.
L403	19B800890P2	RF: sim to Paul Smith SK-891-1. (Used in G6).	thru R121	138000077100	Metal tilli. IV Onins 134, 176 w.
L404	19B800891P2	Coil, RF Chake: sim to Paul Smith SK-890-1. (Used in G4 and G5).	R121	198800607P821	Netai film: 820 ohms ±5%, 1/8 w.
L404	19B800891P1	Coil, RF Choke: sim to Paul Smith SK-890-1.	R122	198800607P153	Metal film: 15K ohms ±5%, 1/8 w.
L405	19B800891P1	(Used in G6). Coil, RF Choke: sim to Paul Smith SK-890-1.	R202	19B800607F101	Metal film: 100 ohms ±5%, 1/8 w.
L405	1,800069181	Part of printed wiring board.	R203	1988006072560	Metal film: 56 ohms ±5%, 1/8 w.
L502	H343CLP10022	Coil, Fixed: 10 uH ±10%.	R204	19B800607P221	Metal film: 220 ohms ±5%, 1/8 w.
and L503			R205	19B800607P332	Metal film: 3.3K ohms ±5%, 1/8 w.
L504	198801413P4	Coil, 39 MHz.	R206	1988006079102	Metal film: 1K ohms ±5%, 1/8 w.
L505	198209420921	Coil, RF: 4.7 uH ±5%, 1.20 ohms DC res	R207	198800607P181	Metal film: 180 ohms ±5%, 1/θ ω.
		max; sim to Jeffers 4436-8J.	R208	198800607P473	Metal film: 47K ohms ±5%, 1/8 w.
L506 thru L508	198801413P4	Coil, 39 MHz.	R209 and R210	198800607P332	Metal film: 3.3K ohms ±5%, 1/8 w.
L509	198801415P2	Transformer, 455 KHz.: sim to AEPD 162B3277P17.	R211	19B800607P101	Metal film: 100 ohms ±5%, 1/8 w.
			R213	1988006079103	Metal film: 10K ohms ±5%, 1/8 w.
Q101	344A3225Pl	Silicon, NPN: sim to Motorola MJF3055.	R214	198800607P331	Metal film: 330 ohms ±5%, 1/8 w.
0102	19870319792	Silicon, PNP; sim to MMBT4403 Cow Profile Pkg.	R215	1988006079822	Metal film: 8.2K ohms ±5%, 1/8 w.
0103	19A704972P1	Silicon, PNP: sim to Motorola 2N4918.	R216	19B800607P222	Metal film: 2.2K ohms ±5%, 1/8 w.
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### 19800607P101 Metal film: 100 ohms i5%, 1/8 w. ### 19800607P273 Metal film: 150K ohms i2%, 1/8 w. ### 19800607P273 Metal film: 150K ohms i5%, 1/8 w. ### 19800607P273 Metal film: 150K ohms i5%, 1/8 w. ### 19800607P273 Metal film: 560K ohms i5%, 1/8 w. ### 19800607P274 Metal film: 560K ohms i5%, 1/8 w. ### 19800607P274 Metal film: 200K ohms i5%, 1/8 w. ### 19800607P274 Metal film: 200K ohms i5%, 1/8 w. ### 19800607P274 Metal film: 220K ohms i5%, 1/8 w. ### 19800607P274 Metal film: 220K ohms i5%, 1/8 w. ### 19800607P275 Metal film: 220K ohms i5%, 1/8 w. ### 19800607P275 Metal film: 220K ohms i5%, 1/8 w. ### 19800607P276 Metal film: 3.3K ohms i5%, 1/8 w. ### 19800607P277 Metal film: 10K ohms i5%, 1/8 w. ### 19800607P277 Metal film: 3.3K ohms i5%, 1/8 w. ### 19800607P277 Metal film: 82K ohms i5%, 1/8 w. ### 19800607P277 Metal film: 82K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 82K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 82K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 10K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 10K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 237 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 237 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 22K ohms i5%, 1/8 w. ### 19800607P27 Metal film: 22T ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ### 19800607P27 Metal film: 270 ohms i5%, 1/8 w. ##	SYMBOL	PART NO.	DESCRIPTION	L
R218	R217	1988006079101	Metal film: 100 ohms ±5%, 1/8 w.	
### ### ### ### ### ### ### ### ### ##				Ш
### ### ##############################	R219			Ш
No.	R221	198800607P154	Metal film: 150K ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##		198800607P333	Metal film: 33K ohms ±5%, 1/8 w.	Ш
R225 198800407824	R223	198800607P564	Metal film: 560K ohms ±5%, 1/8 w.	Ш
### R226	R224	19BB00607P472	Metal film: 4.7K ohms ±5%, 1/8 w.	Ш
R227 19800607P473 Netal film: 47K ohms 15%, 1/8 w. R229 19800607P223 Netal film: 82K ohms 15%, 1/8 w. R230 19800607P232 Netal film: 3.3K ohms 15%, 1/8 w. R231 19800607P472 Netal film: 4.7K ohms 15%, 1/8 w. R232 19800607P472 Netal film: 3.3K ohms 15%, 1/8 w. R233 19800607P472 Netal film: 3.3K ohms 15%, 1/8 w. R234 19800607P472 Netal film: 3.3K ohms 15%, 1/8 w. R235 19800607P472 Netal film: 82K ohms 15%, 1/8 w. R236 19800607P471 Netal film: 82K ohms 15%, 1/8 w. R237 19800607P471 Netal film: 82K ohms 15%, 1/8 w. R238 19800607P471 Netal film: 10K ohms 15%, 1/8 w. R239 R240 19800607P471 Netal film: 150K ohms 15%, 1/8 w. R241 19800607P103 Netal film: 237 ohms 15%, 200 VDCM, 1/8 w. R242 198702831P137 Netal film: 237 ohms 15%, 200 VDCM, 1/8 w. R244 198702831P137 Netal film: 22K ohms 15%, 1/8 w. R245 198800607P23 Netal film: 330 ohms 15%, 1/8 w. R246 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R247 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R408 198800607P27 Netal film: 10K ohms 15%, 1/8 w. R409 198800607P27 Netal film: 270 ohms 15%, 1/8 w. R406 198800607P27 Netal film: 270 ohms 15%, 1/8 w. R406 198800607P27 Netal film: 270 ohms 15%, 1/8 w. R406 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R406 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R406 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R407 198800607P27 Netal film: 270 ohms 15%, 1/8 w. R501 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R502 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R503 198800607P27 Netal film: 470 ohms 15%, 1/8 w. R504 198800607P27 Netal film: 270 ohms 15%, 1/8 w. R505 198800607P27 Netal film: 370 ohms 15%, 1/8 w. R506 198800607P27 Netal film: 300 ohms 15%, 1/8 w. R509 198800607P27 Netal film: 470 ohms 15%, 1/8 w. R501 198800607P27 Netal film: 470 ohms 15%, 1/8 w. R50	R225	198800607P224	Hetal film: 220K ohms ±5%, 1/8 ₩.	Ш
### ### ### ### ### ### ### ### ### ##	R226	198800779P4	Variable: 1K ohms ±25%, 100VDCW, .3 w.	Ш
R229 198800607P823 Metal film: 82K ohms: 15%, 1/8 w. R230 198800607P832 Metal film: 3.3K ohms: 15%, 1/8 w. R231 198800607P832 Metal film: 10K ohms: 15%, 1/8 w. R232 198800607P832 Metal film: 10K ohms: 15%, 1/8 w. R233 198800607P823 Metal film: 4.7K ohms: 15%, 1/8 w. R234 198800607P823 Metal film: 4.7K ohms: 15%, 1/8 w. R235 198800607P823 Metal film: 4.7K ohms: 15%, 1/8 w. R236 198800607P823 Metal film: 10K ohms: 15%, 1/8 w. R237 Metal film: 10K ohms: 15%, 1/8 w. R238 198800607P103 Metal film: 150K ohms: 15%, 1/8 w. R239 Metal film: 150K ohms: 15%, 1/8 w. R240 198800607P104 Metal film: 237 ohms: 15%, 1/8 w. R241 198702931P137 Metal film: 1330 ohms: 15%, 1/8 w. R242 198800607P102 Metal film: 1330 ohms: 15%, 1/8 w. R243 198800607P102 Metal film: 10K ohms: 15%, 1/8 w. R244 198800607P102 Metal film: 10K ohms: 15%, 1/8 w. Metal film: 330 ohms: 15%, 1/8 w. R401 198800607P102 Metal film: 330 ohms: 15%, 1/8 w. R402 198800607P271 Metal film: 4.7K ohms: 15%, 1/8 w. R406 198800607P271 Metal film: 270 ohms: 15%, 1/8 w. R406 198800607P271 Metal film: 270 ohms: 15%, 1/8 w. R406 198800607P271 Metal film: 390 ohms: 15%, 1/8 w. R406 198800607P271 Metal film: 270 ohms: 15%, 1/8 w. R406 198800607P270 Metal film: 270 ohms: 15%, 1/8 w. R501 198800607P270 Metal film: 270 ohms: 15%, 1/8 w. R502 198800607P270 Metal film: 270 ohms: 15%, 1/8 w. R503 198800607P270 Metal film: 270 ohms: 15%, 1/8 w. R504 198800607P272 Metal film: 270 ohms: 15%, 1/8 w. R506 198800607P272 Metal film: 270 ohms: 15%, 1/8 w. R507 198800607P272 Metal film: 270 ohms: 15%, 1/8 w. R508 198800607P272 Metal film: 270 ohms: 15%, 1/8 w. R509 198800607P270 Metal film: 270 ohms: 15%, 1/8 w. R511 198800607P27 Metal film: 270 ohms: 15%, 1/8 w. R512 198800607P27 Metal film: 270 ohms: 15%, 1/8 w. R513 19880075P24	R227	198800607P473	Hetal film: 47K ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R228	198800607P223	Metal film: 22K ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R229	198800607P823	Metal film: 82K ohms ±5%, 1/8 w.	Ш
R232 198800607P103 Metal film: 10K obms f5%, 1/8 w.	R230	198800607P332	Metal film: 3.3K ohms ±5%, 1/8 w.	Ш
Net	R231	19B800607P472	Hetal film: 4.7K ohms ±5%, 1/8 w.	Ш
R234 198800607P472 Metal film: 4.7K ohms 15%, 1/8 w.	R232	19B800607P103	Metal film: 10K ohms ±5%, 1/8 w.	Ш
R235 198800607P23	R233	19B800607F332	Metal film: 3.3K ohms ±5%, 1/8 w.	Ш
### R236	R234	19B800607P472	Metal film: 4.7K ohums ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R235	19B800607F823	Metal film: 82K ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R236	198800607P471	Metal film: 470 ohms ±5%, 1/8 w.	Ш
R239 R240 thru R242 R243 19A702931P137 Metal film: 237 ohms ±1%, 200 VDCM, 1/8 w. R244 19A702931P213 Metal film: 1330 ohms ±1%, 200 VDCM, 1/8 w. R245 19B800607P202 Metal film: 22K ohms ±5%, 1/8 w. R246 19B800607P102 Metal film: 330 ohms ±5%, 1/8 w. R248 19B800607P102 Metal film: 330 ohms ±5%, 1/8 w. R401 19B800607P331 Metal film: 330 ohms ±5%, 1/8 w. R402 R403 19B800607P472 Metal film: 270 ohms ±5%, 1/8 w. R404 19B800607P271 Metal film: 270 ohms ±5%, 1/8 w. R405 19B800607P271 Metal film: 390 ohms ±5%, 1/8 w. R406 19B800607P271 Metal film: 470 ohms ±5%, 1/8 w. (Used in Of). R406 19B800607P391 Metal film: 27 ohms ±5%, 1/8 w. (Used in Of). R501 19B800607P471 Metal film: 27 ohms ±5%, 1/8 w. Metal		19B8Q0607F103	Metal film: 10K ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R239 R240	1988006079154	Metal film: 150K ohms ±5%, 1/8 w.	
### ### ### ### ### ### ### ### ### ##	thru R242			Ш
R245 198800607P223 Motal film: 22K ohms ±5%, 1/8 w. R246 198800607P102 Hetal film: 1K ohms ±5%, 1/8 w. R401 198800607P102 Hetal film: Jumper. R401 198800607P102 Hetal film: 330 ohms ±5%, 1/8 w. R402 198800607P102 Hetal film: 1K ohms ±5%, 1/8 w. R403 198800607P102 Hetal film: 1K ohms ±5%, 1/8 w. R404 198800607P271 Hetal film: 270 ohms ±5%, 1/8 w. R405 198800607P271 Hetal film: 270 ohms ±5%, 1/8 w. R406 198800607P271 Hetal film: 270 ohms ±5%, 1/8 w. (Used in G4). R406 198800607P391 Hetal film: 390 ohms ±5%, 1/8 w. (Used in G5). R406 198800607P471 Metal film: 470 ohms ±5%, 1/8 w. (Used in G5). R406 198800607P471 Hetal film: 180 ohms ±5%, 1/8 w. R501 198800607P471 Hetal film: 27 ohms ±5%, 1/8 w. R502 198800607P270 Hetal film: 27 ohms ±5%, 1/8 w. R503 198800607P270 Hetal film: 27 ohms ±5%, 1/8 w. R504 198800607P270 Hetal film: 27 ohms ±5%, 1/8 w. Metal film: 82k ohms ±5%, 1/8 w. Metal film: 180 ohms ±5%, 1/8 w. Metal film: 27 ohms ±5%, 1/8 w. Metal film: 27 ohms ±5%, 1/8 w. Metal film: 27 ohms ±5%, 1/8 w. Metal film: 100 ohms ±5%, 1/8 w. Metal film: 27 ohms ±5%, 1/8 w. Metal film: 100 ohms ±5%, 1/8 w. Metal film: 27 oh	R243	19A702931P137	Metal film: 237 ohms ±1%, 200 VDCW, 1/8 w.	Ш
R246 198806079102	R244	19A702931P213	Metal film: 1330 ohms ±1%, 200 VDCW, 1/8 w.	Ш
R248	R245	1988006077223	Metal film: 22K ohms ±5%, 1/8 w.	Ш
### R401	R246	198800607P102	Metal film: 1K ohms ±5%, 1/8 w.	
### ### ### ### ### ### ### ### ### ##	R248	19B800607Pl	Metal film: Jumper,	Ш
R402 R403	8401	19B800607P331	Metal film: 330 ohms ±5%, 1/8 w.	Ш
### ### ### ### ### ### ### ### ### ##	R402			Ш
R405 198806079271 Metal film: 270 ohms ±5%, 1/8 w. R406 198800607P271 Metal film: 270 ohms ±5%, 1/8 w. (Used in G4). R406 198800607P391 Metal film: 390 ohms ±5%, 1/8 w. (Used in G5). R406 198800607P471 Metal film: 470 ohms ±5%, 1/8 w. (Used in G5). R501 198800607P471 Metal film: 180 ohms ±5%, 1/8 w. R502 198800607P562 Metal film: 27 ohms ±5%, 1/8 w. R503 198800607P562 Metal film: 27 ohms ±5%, 1/8 w. R504 198800607P562 Metal film: 27 ohms ±5%, 1/8 w. R505 198800607P663 Metal film: 68K ohms ±5%, 1/8 w. R506 198800607P673 Metal film: 82K ohms ±5%, 1/8 w. R507 198800607P823 Metal film: 82K ohms ±5%, 1/8 w. R508 198800607P813 Metal film: 100 ohms ±5%, 1/8 w. R509 198800607P101 Metal film: 2.7K ohms ±5%, 1/8 w. R510 198800607P272 Metal film: 2.7K ohms ±5%, 1/8 w. R511 19880607P272 Metal film: 27 ohms ±5%, 1/8 w. R512 19880607P272 Metal film: 27 ohms ±5%, 1/8 w. R513 198800779P4 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P103 Metal film: 8.2K ohms ±5%, 1/8 w. R515 198800779P4 Variable: 1K ohms ±5%, 1/8 w. R516 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R517 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R519 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R510 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R511 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R512 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R513 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R514 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R515 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R516 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R517 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R519 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R510 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R511 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R512 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R513 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R514 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R515 19880607P821 Met	R403	198800607P102	Metal film: 1K ohms ±5%, 1/8 w.	Ш
R406 198800607P271 Metal film: 270 ohms ±5%, 1/8 w. (Used in G4). R406 198800607P391 Metal film: 390 ohms ±5%, 1/8 w. (Used in G5). R406 198800607P471 Metal film: 470 ohms ±5%, 1/8 w. (Used in G5). R501 198800607P471 Metal film: 180 ohms ±5%, 1/8 w. R502 198800607P562 Metal film: 27 ohms ±5%, 1/8 w. R503 198800607P562 Metal film: 27 ohms ±5%, 1/8 w. R504 198800607P670 Metal film: 27 ohms ±5%, 1/8 w. R505 198800607P683 Metal film: 82R ohms ±5%, 1/8 w. R506 198800607P803 Metal film: 82R ohms ±5%, 1/8 w. R507 198800607P803 Metal film: 180 ohms ±5%, 1/8 w. R508 198800607P803 Metal film: 100 ohms ±5%, 1/8 w. R509 198800607P101 Metal film: 2.7K ohms ±5%, 1/8 w. R510 198800607P270 Metal film: 2.7K ohms ±5%, 1/8 w. R511 198800607P473 Metal film: 27 ohms ±5%, 1/8 w. R512 198800607P473 Metal film: 47R ohms ±5%, 1/8 w. R513 198800779P4 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P821 Metal film: 8.2K ohms ±5%, 1/8 w. R515 19880067P821 Metal film: 8.2K ohms ±5%, 1/8 w. R516 19880067P821 Metal film: 8.2K ohms ±5%, 1/8 w. R517 19880067P822 Metal film: 8.2K ohms ±5%, 1/8 w. R518 19880067P821 Metal film: 8.2K ohms ±5%, 1/8 w. R519 19880607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R510 19880607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R511 19880607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R512 19880607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198806779P4 Variable: 1K ohms ±5%, 1/8 w. R514 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R515 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R516 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R517 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R519 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R510 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R510 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R511 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R512 19880607P822 Metal film: 820 ohms ±5%, 1/8 w. R513 19880607P821 Metal film: 820 ohms ±5%, 1/8 w. R514 19880607P821 Metal film: 820 ohms ±5%, 1/8 w.	R404	19B800607P472	Metal film: 4.7K ohms ±5%, 1/8 w.	Ш
G44	R405	1988006077271	Metal film: 270 ohms ±5%, 1/8 w.	Ш
R406 198800607P391 Metal film: 390 ohms 15%, 1/8 w. (Used in G5). R406 198800607P471 Metal film: 470 ohms 15%, 1/8 w. (Used in G6). R501 198800607P270 Metal film: 180 ohms 15%, 1/8 w. R502 198800607P270 Metal film: 27 ohms 15%, 1/8 w. R503 198800607P270 Metal film: 5.6K ohms 15%, 1/8 w. R504 198800607P270 Metal film: 68 ohms 15%, 1/8 w. R505 198800607P683 Metal film: 82K ohms 15%, 1/8 w. R506 198800607P683 Metal film: 82K ohms 15%, 1/8 w. R507 198800607P101 Metal film: 18K ohms 15%, 1/8 w. R508 198800607P101 Metal film: 100 ohms 15%, 1/8 w. R509 198800607P272 Metal film: 2.7K ohms 15%, 1/8 w. R510 198800607P270 Metal film: 27 ohms 15%, 1/8 w. R511 198800607P270 Metal film: 47K ohms 15%, 1/8 w. R512 198800607P473 Metal film: 8.2K ohms 15%, 1/8 w. R513 198800779P4 Variable: 1K ohms 15%, 1/8 w. R514 198800607P03 Metal film: 10K ohms 15%, 1/8 w. R515 198800607P821 Metal film: 820 ohms 15%, 1/8 w. Uariable: 1K ohms 15%, 1/8 w. Hetal film: 820 ohms 15%, 1/8 w. THEGRATED CINCUITS	R406	19B800607P271	Metal film: 270 ohms ±5%, 1/8 w. (Used in G4).	Ш
Metal film: 180 ohms ±5%, 1/8 w.	R406	19B800607 P3 91	Metal film: 390 ohms ±5%, 1/8 w. (Used in	
R502 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R503 198800607P562 Metal film: 5.6K ohms ±5%, 1/8 w. R504 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R505 198800607P683 Metal film: 68K ohms ±5%, 1/8 w. R506 198800607P823 Metal film: 82K ohms ±5%, 1/8 w. R507 198800607P183 Metal film: 18K ohms ±5%, 1/8 w. R508 198800607P101 Metal film: 100 ohms ±5%, 1/8 w. R509 198800607P272 Metal film: 2.7K ohms ±5%, 1/8 w. R510 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R511 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R511 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R512 198800607P272 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198800707P4 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P103 Metal film: 8.2K ohms ±5%, 1/8 w. R515 198800607P821 Metal film: 8.20 ohms ±5%, 1/8 w. R516 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R517 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 19880007P821 Metal film: 820 ohms ±5%, 1/8 w. R519 19880007P821 Metal film: 820 ohms ±5%, 1/8 w. R510 19880007P821 Metal film: 820 ohms ±5%, 1/8 w. R511 198800007P821 Metal film: 820 ohms ±5%, 1/8 w. R512 19880007P821 Metal film: 820 ohms ±5%, 1/8 w. R513 19880007P821 Metal film: 820 ohms ±5%, 1/8 w. R514 198800007P822 Metal film: 820 ohms ±5%, 1/8 w. R515 198800007P821 Metal film: 820 ohms ±5%, 1/8 w. R516 198800007P821 Metal film: 820 ohms ±5%, 1/8 w. R517 198800000000000000000000000000000000000	R406		Metal film: 470 ohms ±5%, 1/8 w. (Used in G6).	
R503 198800607P562 Metal film: 5.6K ohms ±5%, 1/8 w. R504 198800607P6270 Metal film: 27 ohms ±5%, 1/8 w. R505 198800607P633 Metal film: 68K ohms ±5%, 1/8 w. R506 198800607P823 Metal film: 82K ohms ±5%, 1/8 w. R507 198800607P101 Metal film: 10K ohms ±5%, 1/8 w. R508 198800607P270 Metal film: 2.7K ohms ±5%, 1/8 w. R509 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R510 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R511 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R512 198800607P272 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198800607P622 Metal film: 8.2K ohms ±5%, 1/8 w. R514 198800607P622 Metal film: 8.2K ohms ±5%, 1/8 w. R515 198800607P103 Metal film: 8.2K ohms ±5%, 1/8 w. R516 198800607P103 Metal film: 8.2W ohms ±5%, 1/8 w. R517 198800607P103 Metal film: 8.2W ohms ±5%, 1/8 w. R518 198800607P103 Metal film: 820 ohms ±5%, 1/8 w. R519 198800607P21 Metal film: 820 ohms ±5%, 1/8 w. R510 198800607P22 Metal film: 820 ohms ±5%, 1/8 w. R511 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R512 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R513 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R514 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R515 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R516 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R517 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R518 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R519 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R510 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R511 198800607P20 Metal film: 820 ohms ±5%, 1/8 w. R512 198800607P20 Metal film: 820 ohms ±5%, 1/8 w.			'	
R504 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R505 198800607P683 Metal film: 68K ohms ±5%, 1/8 w. R506 198800607P823 Metal film: 82K ohms ±5%, 1/8 w. R507 198800607P183 Metal film: 18K ohms ±5%, 1/8 w. R508 198800607P101 Metal film: 100 ohms ±5%, 1/8 w. R509 198800607P272 Metal film: 27 ohms ±5%, 1/8 w. R510 198800607P270 Metal film: 27 ohms ±5%, 1/8 w. R511 198800607P273 Metal film: 27 ohms ±5%, 1/8 w. R512 198800607P473 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198800707P4 Wetal film: 8.2K ohms ±5%, 1/8 w. R514 198800607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R515 198800607P103 Metal film: 8.2K ohms ±5%, 1/8 w. R516 198800607P821 Metal film: 8.20 ohms ±5%, 1/8 w. R517 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R519 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R510 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R511 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R512 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R513 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R514 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R515 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R516 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R517 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R518 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R519 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R510 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R511 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R512 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. R513 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R514 198800607P822 Metal film: 820 ohms ±5%, 1/8 w. R515 198800607P822 Metal film: 820 ohms ±5%, 1/8 w.				
R505 19880607P633 Metal film: 68K ohms ±5%, 1/8 w. R506 198800607P633 Metal film: 82K ohms ±5%, 1/8 w. R507 198800607P133 Metal film: 18K ohms ±5%, 1/8 w. R508 198800607P101 Metal film: 100 ohms ±5%, 1/8 w. R509 198800607P272 Metal film: 2.7K ohms ±5%, 1/8 w. R510 198800607P270 Metal film: 2.7 ohms ±5%, 1/8 w. R511 198800607P270 Metal film: 47K ohms ±5%, 1/8 w. R512 198800607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198800607P822 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P810 Metal film: 10K ohms ±5%, 1/8 w. R515 198800607P821 Metal film: 820 ohms ±5%, 1/8 w. U101 19A705457P1 RP Power Amplifier Module. Part of next higher assembly. (Used in G4). U101 19A705457P2 RP Power Amplifier Module. Part of next higher			2007 270 11	
R506 1988006079823 Metal film: 82K ohms ±5%, 1/8 w. R507 1988006079183 Metal film: 18K ohms ±5%, 1/8 w. R508 1988006079101 Metal film: 100 ohms ±5%, 1/8 w. R509 1988006079270 Metal film: 2.7K ohms ±5%, 1/8 w. R510 1988006079270 Metal film: 27 ohms ±5%, 1/8 w. R511 1988006079270 Metal film: 47K ohms ±5%, 1/8 w. R512 1988006079822 Metal film: 8.2K ohms ±5%, 1/8 w. R513 19880077994 Variable: 1K ohms ±5%, 1/8 w. R514 1988006079103 Metal film: 10K ohms ±5%, 1/8 w. R515 198800607921 Metal film: 820 ohms ±5%, 1/8 w. U101 19A70545791 RF Power Amplifier Module. Part of next higher assembly. (Used in C4). U101 19A70545792 RF Power Amplifier Module. Part of next higher		7		-
R507 198800607P183 Hetal film: 18K ohms ±5%, 1/8 w. R508 198800607P101 Hetal film: 100 ohms ±5%, 1/8 w. R509 198800607P272 Hetal film: 2.7K ohms ±5%, 1/8 w. R510 198800607P270 Hetal film: 27 ohms ±5%, 1/8 w. R511 198800607P473 Hetal film: 47K ohms ±5%, 1/8 w. R512 198800607P822 Hetal film: 8.2K ohms ±5%, 1/8 w. R513 198800779P4 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P802 Hetal film: 10K ohms ±5%, 1/8 w. R515 198800607P821 Hetal film: 820 ohms ±5%, 1/8 w. U101 19A705457P1 RF Power Amplifier Module. Part of next higher assembly. (Used in 04). U101 19A705457P2 RF Power Amplifier Module. Part of next higher				1
R508 19880607P101 Hetal film: 100 ohms ±5%, 1/8 w. R509 19880607P272 Hetal film: 2.7K ohms ±5%, 1/8 w. R510 19880607P270 Hetal film: 2.7 ohms ±5%, 1/8 w. R511 19880607P473 Hetal film: 47K ohms ±5%, 1/8 w. R512 19880607P822 Hetal film: 8.2K ohms ±5%, 1/8 w. R513 19880779P4 Variable: 1K ohms ±5%, 1/8 w. R514 19880607P103 Hetal film: 10K ohms ±5%, 1/8 w. R515 19880607P821 Hetal film: 820 ohms ±5%, 1/8 w. Uniol 198705457P1 RF Power Amplifier Module. Part of next higher assembly. (Used in G4). U101 198705457P2 RF Power Amplifier Module. Part of next higher assembly.			· ·	٦
R509 198808607P272 Metal film: 2.7K ohms ±5%, 1/8 w. R510 198808607P270 Metal film: 27 ohms ±5%, 1/8 w. R511 198808607P473 Metal film: 47K ohms ±5%, 1/8 w. R512 198808607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R513 19880779P4 Variable: 1K ohms ±5%, 1/8 w. R514 198808607P103 Metal film: 10K ohms ±5%, 1/8 w. R515 198808607P821 Metal film: 820 ohms ±5%, 1/8 w. U101 19A705457P1 RF Power Amplifier Module. Part of next higher assembly. (Used in G4). U101 19A705457P2 RF Power Amplifier Module. Part of next higher				
R510				T
R511 198800607P473 Metal film: 47K ohms ±5%, 1/8 w. R512 198800607P822 Metal film: 8.2K ohms ±5%, 1/8 w. R513 198800779P4 Variable: 1K ohms ±5%, 1/8 w. R514 198800607P103 Metal film: 10K ohms ±5%, 1/8 w. Metal film: 820 ohms ±5%, 1/8 w.			· ·	th
R512 198800607P822 Hetal film: 8.2K ohms ±5%, 1/8 w. R513 198800779P4 Variable: 1K ohms ±5%, 100VDCW, .3 w. R514 198800607P103 Hetal film: 10K ohms ±5%, 1/8 w. R515 198800607P821 Hetal film: 820 ohms ±5%, 1/8 w.				_
R513 198800779P4 Variable: 1K ohms ±25%, 100VDCW, .3 w. R514 198800607P103 Hetal film: 10K ohms ±5%, 1/8 w. R515 198800807P821 Hetal film: 820 ohms ±5%, 1/8 w				l R
R514 198800607P103 Hetal film: 10K ohms ±5%, 1/8 w. R515 198800607P821 Hetal film: 820 ohms ±5%, 1/8 w.				1
R515 198800607PB21 Hetal film: 820 ohms ±5%, 1/8 w.				1
UIO1 19A705457P1 RF Power Amplifier Module. Part of next higher assembly. (Used in G4). UIO1 19A705457P2 RF Power Amplifier Module. Part of next higher				1
Ul01 19A705457P1 RF Power Amplifier Module. Part of next higher assembly. (Used in G4). Ul01 19A705457P2 RF Power Amplifier Module. Part of next higher	Katp	136800007FBZ1	notes clim: 820 ohms ±5%, 1/8 w.	1
assembly. (Used in G4). Ul01 19A705457P2 RF Power Amplifier Module. Part of next higher			INTEGRATED CIRCUITS - · · · · ·	1
U101 19A705457P2 RF Power Amplifier Module. Part of next higher	0101	19 3 705457P1	RF Power Amplifier Module. Part of next higher	1
appearer, (page in 00).	111.01	19A70\$457P2	RF Power Amplifier Module. Part of next higher	

	SYMBOL	PART NO.	DESCRIPTION
1	U101	19A705457P3	RF Power Amplifier Module. Part of next higher
ı			assembly, (Used in O6).
١	U102	19A134717P3	Linear: 8 Volt Regulator; sim to MC7808CT.
ı	U103	19A701789P2	Linear: Dual Op Amp; sim to LM358.
١	0301	19D901958G3	Voltage Controlled Oscillator. (Used in G4).
١	U201	19D901958G4	Voltage Controlled Oscillator. (Used in G5).
١	Ų201	19D901958G5	Voltage Controlled Oscillator. (Used in G6).
١	0202	19A700029P44	Digital: BILATERAL SWITCH.
١	U203	19A704971P1	Linear: +5 Volt Regulator; sim to MC78L05ACP.
	U204	198801351P6	Crystal Oscillator, temperature compensated: 12.80 MHz. ±5 PPM.
١	0205	19A704287P2	Prescaler: /128, /129; sim to MC12018.
١	0206	19B800902P4	Digital: Synthesizer, CHOS Serial Input.
	U207	19A701999P4	Linear, (Positive Voltage Regulator): sim to LM317LZ.
١	U501	19A704619P3	Linear: Osc/Mixer/IF/Det/Amp.
	U502	19A704073P2	Linear: 8 Volt Regulator; sim to MC78L08CP.
١			
	W101 and W102		Part of printed wiring board.
	¥501	198705376P5	
١			
١	2401	19A705458P4	Kelical, UHF: 403-425 MHz. (Used in G4).
١	2401	19A705458P1	Helical, UHF: 450-470 MHz. (Used in US).
١	2401	19A705458P2	Helical, UHF: 470-492 MHz. (Used in G6).
١	2402	19A705458P4	Helical, UHF: 403-425 MHz. (Used in G4).
١	Z402	19A705458P1	Helical, UHF: 450-470 MHz. (Used in G5).
١	Z402	19A705458P2	Helical, UHP: 470-492 MHz. (Used in G6).
١	Z403	19B801025P1	Balanced Mixer (Double); sim to Mini-Circuits SBL-1.
	Z501	19A705328P1	Monolithic Crystal: 45.000 MHz; sim to Toyocom 45E2B2.
١	Z502		Part of Z501.
	Z503	198801021P2	Bandpass filter: 455 kHz ±1.5; sim to Murata CFW-455E.
			MISCELLANEOUS
		198801490Pi	Ground Strap.
		19B801566P1	Shield.
		198801566P2	Shield.
		DD	ODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to he Parts List for descriptions of parts affected by these revisions.

REV. A - RF BOARD 19D902243G4, 5 & 6 U501 was 19A704619P1. Replaced with 19A704619P3.