# **MAINTENANCE MANUAL PCS REAR ASSEMBLIES** 19D902175G1 (136-153 MHz) 19D902175G2 (150-174 MHz)

**SECOND MIXER/LIMITER/FM DETECTOR U501** 19A704619P1

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# DESCRIPTION

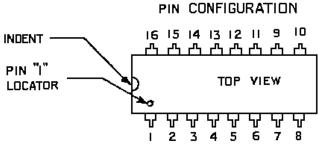
The PCS Portable Radio Rear Assemblies 19D902175G1 and G2 provide metal housings for RF Boards 19D438222G1 (136-153 MHz) and 19D438222G3 (150-174) respectively. The RF board are the same except for certain frequency sensitive elements.

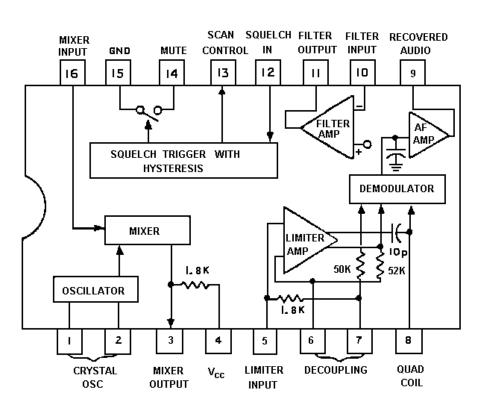
The RF boards consist of the following circuits:

- A frequency synthesizer for generating the transmit carrier frequency and the receive circuit first mixer injection frequency.
- The transmit circuit, receive circuit and TX/RX switch.
- A voltage regulator and low battery switch.

Refer to Figure 1 for a block diagram of the synthesizer circuit. Refer to Figure 2 for a transmit and receive circuit block diagram. Transmit circuit adjustments for frequency and power are accessible from the top side of the board, as are IF alignment, second oscillator and quadrature detector adjustments for the receiver circuit. Chip components on the bottom of the board provide optimum RF performance.

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. A single friction fit shield provides RF shielding.





**BLOCK DIAGRAM** 



Ericsson GE Mobile Communications Inc. Mountain View Road • Lynchburg, Virginia 24502

## IC DATA

Printed in U.S.A.

# **CIRCUIT ANALYSIS**

## SYNTHESIZER CIRCUIT

The frequency synthesizer circuit generates all transmit and receive RF frequencies for the PCS Personal Radio. This circuit uses a phase-locked Voltage Controlled Oscillator (VCO) operating on the actual transmitter frequency (136-153 or 150-174 MHz) during transmit and 45 MHz above the actual receive frequency during receive. The synthesizer output signal is generated directly by VCO module U204 and fed through a low pass filter to a LO buffer, a PA buffer and a prescaler buffer.

The synthesizer frequency output is controlled by a microprocessor on the Audio Logic Board. Frequency stability is maintained by a temperature compensated crystal controlled oscillator (TCXO) module. The oscillator has a stability of 5 PPM over the temperature range of -30C to 60C and determines the overall frequency stability of the radio.

The VCO output is also buffered by transistor Q201 to feed divide by 64/65 dual modulus prescaler U205. The prescaler feeds the Fin input of Phase-Lock-Loop (PLL) chip U201. Within U201, the prescaler signal is further divided down to 5 KHz to be compared with a reference signal. This reference signal is derived from 12.8 MHz TCXO module U203. The PLL chip, U201, divides the 12.8 MHz TCXO down to the 5 KHz reference frequency. Divider circuits in U201 are programmed by three inputs from the Audio/Logic Board. These are SYN ENABLE, SYN DATA and SYC CLOCK lines. A **LOCK DETECT** line from the PLL chip to the audio board microprocessor for processing to prevent transmissions when the synthesizer is unlocked. A blinking **BAT** flag is displayed on the LCD and a pulsed beep will be sounded if this condition occurs.

Audio modulation from the Audio/Logic Board is applied to loop filter circuit board A201 in the synthesizer circuit. The audio is summed with the unfiltered control voltage and fed to operational amplifier U1 on the loop filter Board. Amplifier U1 is biased to produce gain variation with different control voltages. When the control voltage is below 1.7 volts, both diodes in diode package D1 are biased off. The operational amplifier gain is then one. As the control voltage rises above approximately 1.7 volts, one of the diodes (D1) is forward biased. This increases the operational amplifier gain to approximately 1.2. Further increases in the control voltage above approximately 2.5 volts turns both diode paths on, thus increasing the gain to about 1.4. Gain variation verses control voltage compensates for decreasing VCO gain and keeps the VCO gain constant at higher control voltages. The net effect of this is to linearize the loop response across the frequency

band to maintain relatively constant audio modulation and constant digital Channel Guard waveshape.

The synthesizer enable line also drives bilateral switches U2A and U2B on the loop filter board. The pulse applied to these gates, when channel changes occur, turns the gates on which shorts out resistors R11 and R12. This allows rapid channel acquisition.

At low control voltages, below approximately 0.9 volts, operational amplifier U1B is enabled by the pulse on the synthesizer enable line. This enables transistor Q1 for the duration of the channel change pulse. Transistor Q1 acts as a current sink for operational amplifier U1A which speeds up the slow rate on U1A at low voltages.

### **TRANSMIT CIRCUIT**

The transmit circuit consists of a transmit buffer amplifier, a 7-watt power amplifier (U101), a Power Control circuit (A101), a low pass filter circuit and a Tx/Rx switch. Transistors O102 through O105 switch power to the TX stages and drives the Disable Line of the Power Control Module.

### **Tx Buffer**

Transmit buffer transistor Q101 is driven by the synthesizer VCO output at a level of approximately 0 dBm. Amplifier transistor Q101, in turn, drives power module U101 at approximately  $+3 \, dBm$ . DC power is applied to the buffer only in the transmit mode and is regulated to provide constant drive with decreasing battery voltage.

### **Power Module**

Power module U101 is a three-stage broadband power amplifier with internal matching. This module mounts to the rear casting for heat sinking. Output power is controlled by varying the supply voltage to stage two of the module. Stage one and bias for stage two are supplied with the same regulated voltage as the transmit buffer. The final PA stage is supplied by the battery voltage in order to obtain maximum power. The final stage power feed is through inductor L103. The d.c. voltage drop across this coil provides the sense voltage for power control.

### **Power Control Board**

The power control circuitry, located on circuit board A101, has the task of sensing the d.c. drop across L103 and producing an output d.c. voltage to control stage two of the PA module. This feedback system holds the current to stage three of the PA module essentially constant as frequency, battery voltage, temperature and load varies. The output current level and output power are set by power adjusting potentiometer R119, located on the RF Board. A lower power level may be set by adjusting potentiometer R11, located on the Power Control Board. Transistor O2 on the power control board must be turned ON to enable the R11 path. This transistor is in turn controlled by the microprocessor on the Audio/Logic Board to control high or low power operation.

The input voltages to the power control module are on Pins 7 and 8. These voltages are divided down by precision resistors to set input voltages to operational amplifier U1. The voltage on the positive terminal of U1 may be adjusted above and below the divider voltage on the negative terminal of U1. When the positive and negative terminals are at equal potentials, the output of U1 is about 5 volts (depending on battery voltage). As the voltage on the positive terminal is adjusted by potentiometer R11, the output of U1 moves higher or lower in potential by about 60 time the ^ Vin. This output is buffered by emitter follower transistor Q3. The output voltage on Pin 2 is set by the resistor ratio R7+R8/R7. Current is supplied at this output mode by external transistor Q106.

### Low Pass Filter

A six element low pass filter is provided to prevent excessive transmitter harmonics from being transmitted. This filter in conjunction with the matching circuitry in the PA module limits the conducted harmonic energy to less than -30 dBm.

### Tx/Rx Switch

The Tx/Rx Switch consists of series **PIN** diode D101 and shunt **PIN** diode D102. Both diodes are off during receive and are therefore essentially open. This isolates the transmit circuit from the receive circuit while in the receive mode. During transmit, regulated voltage is switched to inductor L105. This produces a d.c. current through both D101 and D102, which transforms both diodes into RF shorts. This allows the PA output power to be conducted to the radio antenna. The RF short produced by D102 protects

the receiver but is still essentially an open to the transmitter. This is true because inductor L106 and part of capacitor C116 form a parallel resonant circuit across the transmit output.

The transmit circuit is enabled by the **DPTT** line from the Audio/Logic Board. When the PTT button is activated, the **DPTT** line is pulled high. This turns transistor Q102 on **A** and allows transistors Q103, Q104 and Q105 to conduct. **R** The voltage on the emitter of transistor Q104 is approximately 0.7 volts (VBE + VSAT) below the regulated 5.4Volts. The voltage at the collector of transistor Q105 is set by the (R117 + R118)/R117 resistor ratio. This boosts the output voltage back to about 5.4 volts while allowing Q105 to supply the relatively high currents needed for the Tx Buffer, the PA module and the **PIN** diode switch.

The collector of transistor Q102 is also used to drive transmit disable transistor O1 located on the power control module. When in the Rx state, the base of Q1 is baised on by a high voltage level at the collector of Q102. This in turn keeps the positive terminal of U1 sufficiently low to drive the output of U1 low enough to bias Q3 off. When Q102 is turned on by the DPTT line, transistor Q1 is biased off. This allows the normal Tx operation previously described.

LBI-38275

## **Tx Switches**

## **RECEIVE CIRCUIT**

The dual conversion receive circuit consists of a receiver front end, 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/Logic Board.

### **Front End**

RF is coupled from antenna jack J1 to the RF Board through antenna clip connector J101. The receive signal is then conducted through the Tx low pass filter to receive preselector filter Z401. This is a fixed tuned 3-pole band pass filter covering the 136 to 153 or 150 to 174 MHz bands. Its output is matched to the input of RF amplifier transistor Q401. A fixed tuned 2-pole output filter is connected between the RF amplifier and double balanced mixer Z402. About 10 dB of RF gain is provided to the mixer input. The Local Oscillator (LO) port of the mixer (Pin 1) is driven by LO buffer transistor Q450. The filtered synthesizer output drives this buffer. The output of Q450 drives a 2-pole filter which couples the drive to the mixer at about +4 dBm.

Y

R

## 45 MHz IF

The mixer output is connected to the Source of common Gate Field Effect Transistor (FET) Q501. This stage provides a low impedance input to match the mixer and a high impedance output to drive the 45 MHz 4-pole crystal filter. The crystal filter output is amplified by bipolar device transistor Q502. This IF amplifier output drives the Second Mixer circuit in Mixer/Limiter/FM Detector module U501. Crystal Y101 is an external crystal operating a 45.455 MHz. This crystal when coupled to the internal circuitry forms the second LO for the second mixer circuit. The frequency of the second LO is adjusted with inductor L505. The second mixer output is a 455 kHz IF and is filtered by a 4-pole ceramic filter. This output is further amplified and limited by U501. A quadrature detector circuit provides an audio output from U501. The quadrature detector coil is L506. The audio output is pre-filtered and connected to the Audio/Logic Board as VOL SO HI.

## 5.4 Volt Regulator

The 5.4 volt regulator circuit supplies a regulated 5.4 volts to all circuits requiring a stable reference voltage. This regulated voltage is generated by voltage reference diode U801 and transistors Q801, Q802 and Q803. Diode U801 provides 2.5 volts which is stable with both temperature and

battery voltage. The 2.5 volt reference is fed to the base of Q802. Transistors Q802 and Q803 form a differential amplifier while Q801 acts as a pass transistor. The regulated 5.4 volts output on the collector of Q801 is divided by voltage divider resistors R805 and R806 to apply 2.5 volts to the base of transistor Q803. With this voltage on the base of Q803 the differential amplifier is balanced.

### **Battery Indicator**

Transistor Q804 senses the battery voltage and compares it to the regulated 5.4 volts on the emitter. When the battery voltage drops to approximately 6.3 volts, Q804 is sufficiently on to produce about 0.4 volts on the battery indicator output (P801-1). This voltage is fed to the audio/logic board to drive an inverter which toggles a microprocessor port to provide a low battery indication.

Another effect at low battery voltage is produced by the voltage on the collector of Q804 driving Pin 6 of power control module U1. A slight increase of this voltage on the negative terminal of U1 causes the output of U1 to drop and the control voltage to be reduced. The final result is a slight drop in RF power output. Consequently, as the end of battery is approached, the RF power is throttled back. This gives the user additional transmit time before total loss of power due to low battery.

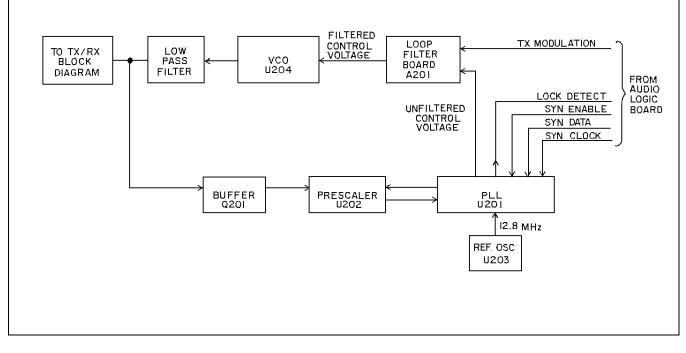


Figure 1 - Synthesizer Circuit

## **BLOCK DIAGRAM**

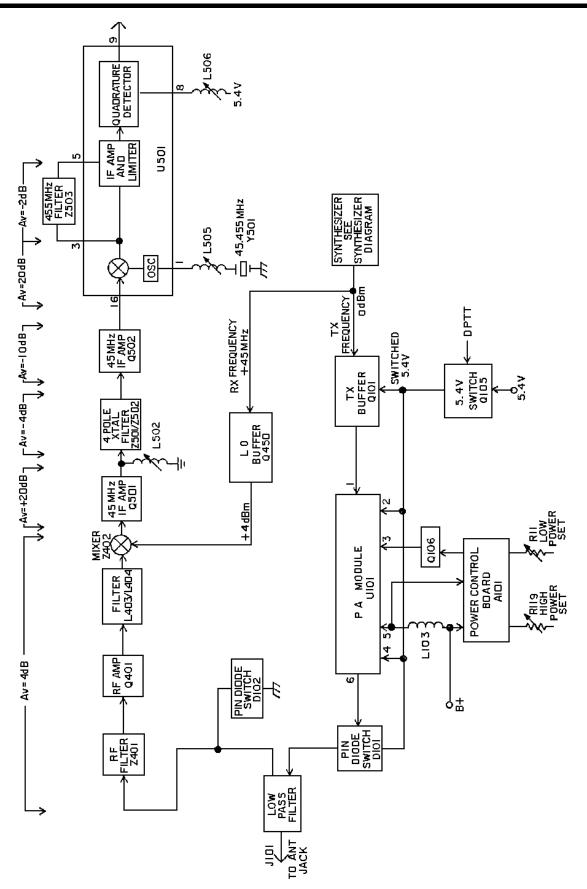


Figure 2 - Transmit And Receive Circuit

# **OUTLINE DIAGRAM**

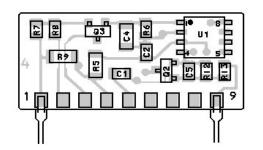
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# **LOOP FILTER BOARD A201**

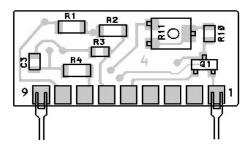
19C851646G1

# **POWER CONTROL BOARD A101**

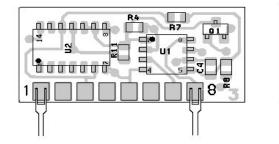
19B801519G1



COMPONENT SIDE

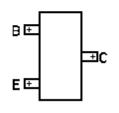


SOLDER SIDE



COMPONENT SIDE





(19B801519, Sh. 1, Rev. 3) (19C851653, Component Side, Rev. 4) (19C851653, Solder Side, Rev. 4)

LEAD IDENTIFICATION FOR D 1 (TOP VIEW)

(19C851646, Sh. 1, Rev. 2) (19C851647, Component Side, Rev. 3) (19C851647, Solder Side, Rev. 3)



LEAD IDENTIFICATION FOR Q1 (TOP VIEW)



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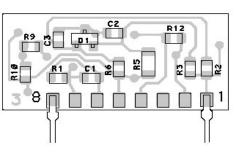
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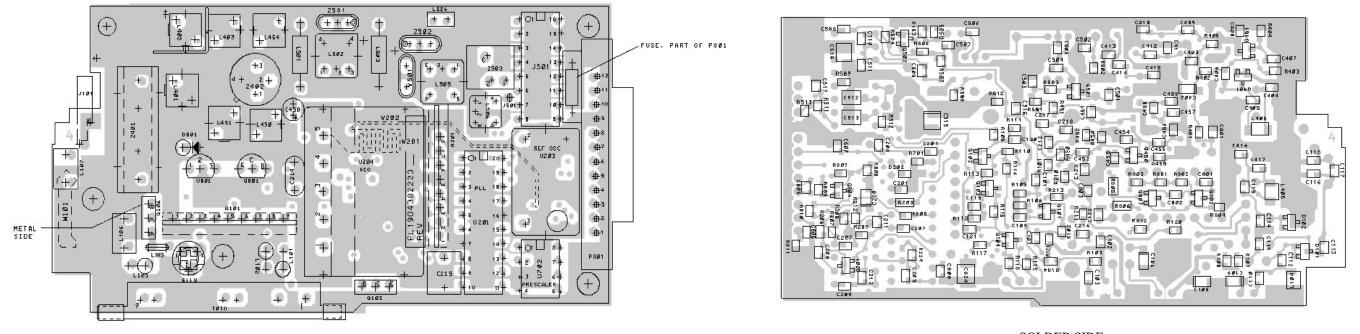


SOLDER SIDE





3

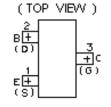


COMPONENT SIDE

SOLDER SIDE

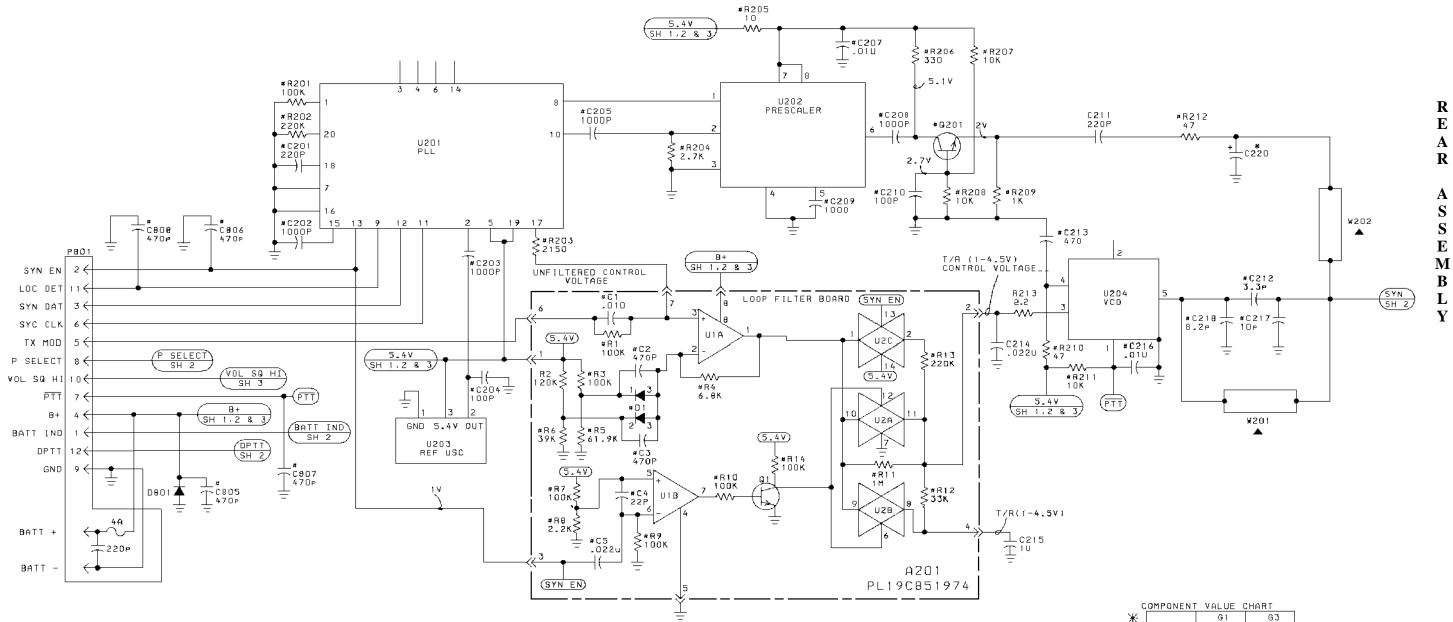
(19D438222, Sh.3, Rev. 3) (19D902627, First Layer, Rev. 4) (19D902627, Fourth Layer, Rev. 4)

LEAD IDENTIFICATION FOR (SOT) TRANSISTORS



RF BOARDS 19D438222G1 & G3 (19D438222, Sh. 4, Rev. 5) (19D902627, Fourth Layer, Rev. 4)





MODEL NO.	REV. LETTER	
PL19D438222G1	D	
PL19D438222G3	D	

NOTES:

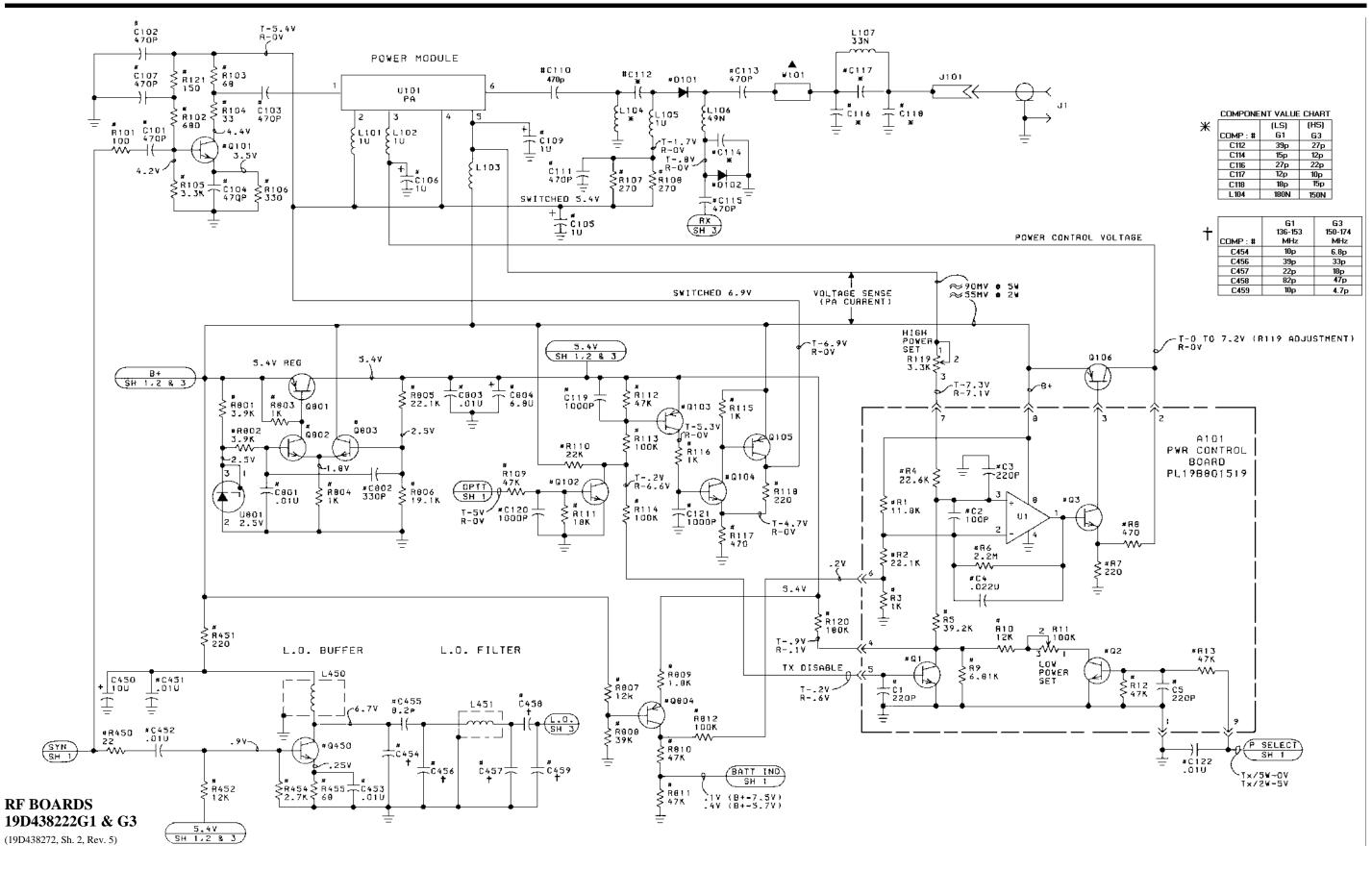
- NOIES: 1. ALL RESISTORS ARE .1 WATT UNLESS OTHERWISE SPECIFIED. RESISTOR VALUES IN ∩ UNLESS FOLLOWED BY MULTIPLIER K OR M. CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER U.N OR P. INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER M OR U.
- 2. INDICATES CHIP COMPONENTS.
- 3. ▲ PART OF P∀B.
- 4. ALL D.C. VOLTAGES ARE TAKEN AT B+-7.5V.

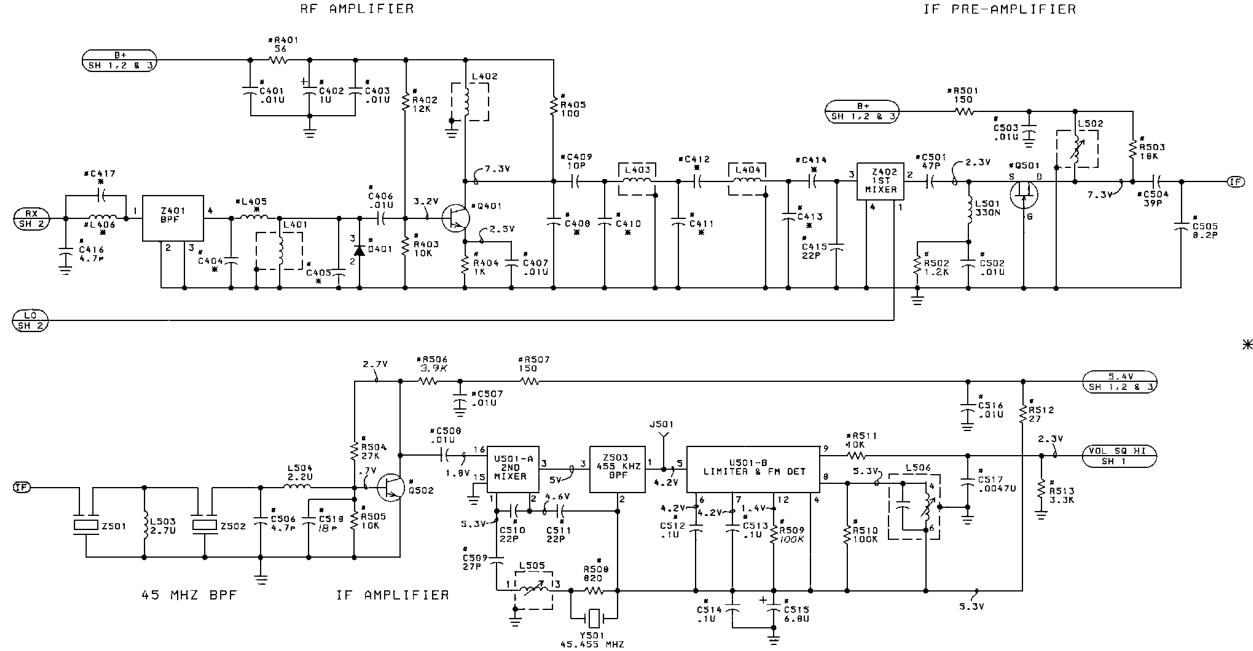
	COMPONENT	VALUE (	CHART
Ж		G1	GJ
		136-153	150-174
	COMP:#	MHZ	MHZ
	C220		Ιu

## **RF BOARDS** 19D438222G1 & G3

(19D438272, Sh. 1, Rev. 6)

## SCHEMATIC DIAGRAM





Ε Α R Α S S E M B L Y

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COMPONENT	VALUE	CHART

		61	63
€		136-153	150-174
	COMP #	MHZ	MHZ
	C404	3.90	8.2r
	C405	10e	4.7e
	C408	15₽	10p
	C410	ЗĴр	22P
	C411	150 <b>p</b>	120 <b>p</b>
	C412	150e	120P
	C413	22P	15P
	C414	150p	€2P
	C417	220p	
	L405	68n	82n
	L406		15n

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SH	1		フ

## **RF BOARDS** 19D438222G1 & G3

(19D438272, Sh. 3, Rev. 5)

### RADIO REAR ASSEMBLY 19D901275G1 (136-153 MHz) 19D902175G2 (150-174 MHz) ISSUE 6

	-	ISSUE 6
SYMBOL	PART NUMBER	DESCRIPTION
A1		RF BOARD 19D438222G1 (136-153 MHz) 19D438222G3 (150-174 MHz)
A101		POWER CONTROL MODULE 19B801519G1
		CAPACITORS
C1	19A702061P69	Ceramic: 220 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C2	19A702061P61	Ceramic: 100 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C3	19A702061P69	Ceramic: 220 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C4	19A702052P28	Ceramic: 0.022 uF ±10%, 50 VDCW.
C5	19A702061P69	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
		TRANSISTORS
Q1 thru Q3	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile
		RESISTORS
R1	19A702931P308	Metal film: 11.8K ohms $\pm$ 1%, 200 VDCW, 1/8 w.
R2	19A702931P334	Metal film: 22.1K ohms $\pm 1\%,$ 200 VDCW, 1/8 w.
R3	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R4	19A702931P335	Metal film: 22.6K ohms $\pm 1\%,$ 200 VDCW, 1/8 w.
R5	19A702931P358	Metal film: 39.2K ohms $\pm 1\%,$ 200 VDCW, 1/8 w.
R6	19B801251P225	Metal film: 2.2M ohms ±5%, 1/10 w.
R7	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.
R8	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R9	19A702931P281	Metal film: 6810 ohms $\pm 1\%,$ 200 VDCW, 1/8 w.
R10	19B801251P123	Metal film: 12K ohms ±5%, 1/10 w.
R11	19A705496P8	Variable: 200K ohms max, 1/10 w.
R12 and R13	19B801251P473	Metal film: 47K ohms ±5%, 1/10 w.
		—— INTEGRATED CIRCUITS ———
U1	19A702293P3	Linear: Dual Op Amp; sim to LM358D.
A201		LOOP FILTER MODULE 19C851974G1
		CAPACITORS
C1	19A702052P114	Ceramic: 0.01 uF ±5%, 50 VDCW.
C2 and	19A702061P77	Ceramic: 470 pF 5±%, 50 VDCW, temp coef 0 ±30 PPM.
C3 C4	19A702061P29	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C5	19A702052P30	Ceramic: 0.022 uF ±10%, 50 VDCW.
D1	19A703561P2	Silicon, fast recovery (2 diodes in series).
Q1	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
R1	19B801251P104	Metal film: 100K ohms $\pm$ 5%, 1/10 w.
R2	19B801251P124	Metal film: 120K ohms ±5%, 1/10 w.
R3	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R4	19B801251P682	Metal film: 6.8K ohms ±5%, 1/10 w.
R5	19A702931P377	Metal film: 61.9K ohms $\pm$ 1%, 200 VDCW, 1/8 w
R6	19B801251P393	Metal film: 39K ohms $\pm$ 5%, 1/10 w.
R7	19B801251P104	Metal film: 100K ohms $\pm$ 5%, 1/10 w.
		TED OR CHANGED BY PRODUCTION CHANGES

R9 and R10	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R11	19B801251P105	Metal film: 1M ohms ±5%, 1/10 w.
R12	19B801251P333	Metal film: 33K ohms $\pm$ 5%, 1/10 w.
R13	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R14	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
		—— INTEGRATED CIRCUITS ————
U1	19A702293P3	Linear: Dual Op Amp; sim to LM358D.
U2	19A702705P4	Digital: uad Analog Switch/Multiplexer; sim to 4066BM.
		TRANSMITTER
		CAPACITORS
C101 thru C104	19A702061P77	Ceramic: 470 pF $\pm 5\%, 50$ VDCW, temp coef 0 $\pm 30$ PPM.
C105 and C106	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C107	19A702061P77	Ceramic: 470 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C109	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
*C110	19A702061P77	Ceramic: 470 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM
C111	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C112	19A702061P33	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).
*C112	19A702236P40	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C113	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C114	19A702061P21	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C114	19A702061P17	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).
C115	19A702061P77	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C116	19A702061P33	Ceramic: 27 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C116	19A702061P29	Ceramic: 22 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C117	19A702061P17	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C117	19A702061P13	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).
C118	19A702061P25	Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).
C118	19A702061P21	Ceramic: 15 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C119 thru C121	19A702052P5	Ceramic: 1000 pF $\pm 10\%,$ 50 VDCW.
C122	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
D101 and D102	19A700155P2	Silicon: fwd current 100 mA, 35 PIV.
		JACKS
1101	10890140182	
J101	19B801491P2	Clip, Antenna.
L101 and	19A700024P13	Coil, RF: 1.0 uH ±10%.
L102		
*L103	19B801566P11	Shield.
*L104	19A705470P15	Coil, 150 nH ±20% (Used in G3).
L104		

SYMBOL PART NUMBER

# PARTS LIST

DESCRIPTION

L104     tts/mpturer     Cat. Sci 44 - 200x. (data in G3).     Cat. Sci 44 - 200x. (data in G3).     Cat. Sci 124 - 1144.AC/SCI 777     Catarance An Jan Ano, Sci 200x. (tarp cost 0).       L104     tts/mpturer     Cat. Sci 124 - 1144.AC/SCI 777     Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Catarance An Jan Ano, Sci 700 - 1144.AC/SCI 777.     Catarance Ca	SYMBOL	PART NUMBER	DESCRIPTION	SYMBOL	PART NUMBER	DESCRIPTION
Line     193/00020173     Col. RT 10 Let 10%     20 PTM.     20 PTM.       Line     193/00020173     Col. RT 10 Let 10%     20 PTM.     20 PTM.       Line     193/00020174     Col. RT 10 Let 10%     20 PTM.     20 PTM.       Line     193/00020174     Col. RT 10 Let 10%     20 PTM.     20 PTM.       Col. RT 10 Let 10%     Col. RT 10 Let 10%     20 PTM.     20 PTM.     20 PTM.       Col. RT 10 Let 10%     Col. RT 10 Let 10%     20 PTM.     20 PTM.     20 PTM.       Col. RT 10 Let 10%     Col. RT 10 Let 10%     20 PTM.     20 PTM.     20 PTM.       Col. RT 10 Let 10%     Sinon, NPH am MART2862, tox polic.     Col. RT 10 Let 10%     20 PTM.     20 PTM. <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
Line     1980008174     Call, P Coluce sim Paul Smith 94:0801.     Coll     1764447222C     Physees: 02 at 70%. 50 VDCW.       Line     1987007079     Stein, NPA: sim bASC20354.     Coll     1987007079     Corrant, Call Science, Scien			· · · · · · · · ·	6213	19A702061P77	
Lior     1980/08179     Coll, R. Chuke sin p And Smith Stabul.     C215     1987/0010P10     Maintaid Release 1: 0 & E10%, STOCOV.       000     1967/070392     Silos, NPN sin to NEC 250355.     C217     1967/2030F13     Camere 23, P10, P5. 00 VCOV.     Camere 23, P10, P5. 00 VCOV. <td></td> <td></td> <td></td> <td>C214</td> <td>T644ACP322K</td> <td>Polyester: .022 uF ±10%, 50 VDCW.</td>				C214	T644ACP322K	Polyester: .022 uF ±10%, 50 VDCW.
			,	C215	19A700004P10	Metallized Polyester: 1.0 uF ±10%, 63 VDCW.
OH1     1837/02/001713     Sillow, NPA sim to NACE 3202000     C217     1937/2001713     Comment 2014, 2017 PM, 2010000, teep cold a 2017 PM, 2010000, teep cold a 2017 PM, 20100000, teep cold a 2017 PM, 20100000000       OH2     1937/2001713     Sillow, NPA sim to MART2000, teep cold a 2017 PM, 2010000, teep cold a 2017 PM, 201000000000     Camment 2014, 2017 PM, 20100000000000000000000000000000000000	2.01	1020000110		C216	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
Q102     193/0007892     Silicon, NPL and MMR12004, leg prefix     Q218     193/0007892     Silicon, NPL and MMR12004, leg prefix     Q218     Taradaum 1, UT, M 2000, hump on the parage       Q104     193/0007892     Silicon, NPL and MMR12004, leg prefix     Q220     Taradaum 1, UT, M 2000, hump on the parage       Q105     Silicon, NPL and MMR12004, leg prefix     Q201     193/0007892     Silicon, NPL and MS12004, leg prefix     Q201     193/0007892     Taradaum 1, UT, M 2000, hump on the parage       Q105     Silicon, NPL and MMR 100, ohme 35%, 110 w.     R201     1998071251104     Mara film: 00 ohme 35%, 110 w.     R201     1998071251104     Mara film: 200 ohme 45%, 110 w.     R201     1998071251104     Mara film: 200 ohme 45%, 110 w.     R201     1998071251104     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     Mara film: 200 ohme 45%, 110 w.     R202     1998071251104     Mara film: 200 ohme 45%, 110 w.     Mara film: 200 ohme 45%, 110 w.	0101	10470470902		C217	19A702061P13	
103     104/2003092     Secon PMP and MMS1306, key profile, 34704372P1     CL18     104/0005072     Tantiaum 1, F, 19 (2000); and 5 progue 2005       019     134704372P1     Silicon, PMP and Info Morarda 2M916.     C220     134705072P2     Tantiaum 1, F, 19 (2000); and 5 progue 2005       010     134704372P1     Silicon, PMP and Info Morarda 2M916.     C220     134705072P2     Silicon, PMP and Info Morarda 2M916.       011     1387050578P1     Medial film: 50 ohm 55%, 110 w.     R201     13880125172P1     Medial film: 200 ohm 55%, 110 w.       010     1388012517891     Medial film: 30 ohm 55%, 110 w.     R202     13880125172P1     Medial film: 200 ohm 55%, 110 w.       010     1388012517921     Medial film: 30 ohm 55%, 110 w.     R204     1388012517291     Medial film: 30 ohm 55%, 110 w.       010     1388012517921     Medial film: 47K ohm 55%, 110 w.     R208     1388012517912     Medial film: 74K ohm 55%, 110 w.       010     1388012517912     Medial film: 74K ohm 55%, 110 w.     R208     1388012517912     Medial film: 74K ohm 55%, 110 w.       011     1388012517912     Medial film: 74K ohm 55%, 110 w.     R208     1388012517912     Medial film: 74K ohm 55%, 110 w. <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
Q104     194/700/78/2     Sicon, NPX and SiX04, Iop volte, Sicon, PAP-sim to Materials 2144918.     C220     194/702078/2     Zatab, (Lues 10, S),				C218	19A702061P12	
Diag     199/09/241     Silico, MP Sili				C220	19A705202P2	
106	Q105	19A704972P1	Silicon, PNP: sim to Motorola 2N4918.			( ,
R101     198807251P101     Meal lift: 100 chms ±5%, 110 w.     P201     198807251P101     Meal lift: 200 chms ±5%, 110 w.       R102     198807251P101     Meal lift: 55, 110 w.     P201     198807251P101     Meal lift: 500 chms ±5%, 110 w.       R104     198807251P101     Meal lift: 500 chms ±5%, 110 w.     P201     198807251P201     Meal lift: 500 chms ±5%, 110 w.       R106     198807251P23     Meal lift: 500 chms ±5%, 110 w.     P202     198807251P23     Meal lift: 500 chms ±5%, 110 w.       R106     198807251P23     Meal lift: 200 chms ±5%, 110 w.     P206     198807251P33     Meal lift: 500 chms ±5%, 110 w.       R106     198807251P23     Meal lift: 200 chms ±5%, 110 w.     P206     198807251P33     Meal lift: 100 chms ±5%, 110 w.       R107     198807251P37     Meal lift: 200 chms ±5%, 110 w.     P206     198807251P30     Meal lift: 100 chms ±5%, 110 w.       R111     198807251P47     Meal lift: 100 chms ±5%, 110 w.     P206     198807251P30     Meal lift: 100 chms ±5%, 110 w.       R111     198807251P47     Meal lift: 100 chms ±5%, 110 w.     P211     198807251P40     Meal lift: 100 chms ±5%, 110 w.     P211     198807251P47     Meal						———— TRANSISTOR —————
R101     198801251P101     Metal film: 100 chms ±5%, 110 w.     R201     198801251P104     Metal film: 100 chms ±5%, 110 w.       R102     198801251P104     Metal film: 60 chms ±5%, 110 w.     R202     198801251P104     Metal film: 20 chms ±5%, 110 w.       R104     198801251P23     Metal film: 30 chms ±5%, 110 w.     R204     198801251P23     Metal film: 20 chms ±5%, 110 w.       R105     198801251P23     Metal film: 30 chms ±5%, 110 w.     R204     198801251P20     Metal film: 30 chms ±5%, 110 w.       R106     198801251P105     Metal film: 30 chms ±5%, 110 w.     R206     198801251P10     Metal film: 10 chms ±5%, 110 w.       R107     198801251P27     Metal film: 47% chms ±5%, 110 w.     R206     198801251P10     Metal film: 10 chms ±5%, 110 w.       R110     198801251P12     Metal film: 47% chms ±5%, 110 w.     R210     198801251P47     Metal film: 10 chms ±5%, 110 w.       R111     198801251P14     Metal film: 10 chms ±5%, 110 w.     R211     198801251P47     Metal film: 10 chms ±5%, 110 w.       R113     198801251P41     Metal film: 10 chms ±5%, 110 w.     R213     198801251P47     Metal film: 10 chms ±5%, 110 w.       R114     198			RESISTOR	Q201	19A704708P2	
R103     198801251984     Meal film: 80 ohms 25%, 1/10 w.     R201     198801251792     Meal film: 200 htms 25%, 1/10 w.       R104     1988012517923     Meal film: 33 ohms 25%, 1/10 w.     R203     198801251792     Meal film: 250 ohms 25%, 1/10 w.       R105     1988012517923     Meal film: 33 ohms 25%, 1/10 w.     R203     198801251792     Meal film: 250 ohms 15%, 1/10 w.       R106     198801251792     Meal film: 30 ohms 25%, 1/10 w.     R206     198801251792     Meal film: 30 ohms 15%, 1/10 w.       R107     1988012517912     Meal film: 30 ohms 15%, 1/10 w.     R206     1988012517912     Meal film: 10 ohms 15%, 1/10 w.       R108     1988012517912     Meal film: 10 ohms 15%, 1/10 w.     R210     1988012517912     Meal film: 10 ohms 15%, 1/10 w.       R111     1988012517912     Meal film: 10 ohms 15%, 1/10 w.     R211     1988012517912     Meal film: 10 ohms 15%, 1/10 w.       R111     1988012517912     Meal film: 10 ohms 15%, 1/10 w.     R211     1988012517912     Meal film: 10 ohms 15%, 1/10 w.       R111     1988012517912     Meal film: 10 ohms 15%, 1/10 w.     R211     1988012517912     Meal film: 10 ohms 15%, 1/10 w.       R111     <	R101	19B801251P101	Metal film: 100 ohms ±5%, 1/10 w.			RESISTORS
R104     1958012515923     Meal film: 30 chm ±5%, 110 w.     R202     195801251723     Meal film: 220 chm ±5%, 110 w.       R106     1958012517231     Meal film: 33 ohm ±5%, 110 w.     R204     195801251727     Meal film: 33 ohm ±5%, 110 w.       R107     1958012517271     Meal film: 27 chm ±5%, 110 w.     R205     195801251727     Meal film: 33 ohm ±5%, 110 w.       R108     1958012517271     Meal film: 72 chm ±5%, 110 w.     R207     195801251793     Meal film: 10 ohm ±5%, 110 w.       R109     1958012517271     Meal film: 72 chm ±5%, 110 w.     R209     195801251793     Meal film: 10 ohm ±5%, 110 w.       R111     195801251793     Meal film: 10 chm ±5%, 110 w.     R210     195801251793     Meal film: 10 chm ±5%, 110 w.       R111     195801251793     Meal film: 10 chm ±5%, 110 w.     R211     195801251793     Meal film: 10 chm ±5%, 110 w.       R111     195801251794     Meal film: 10 chm ±5%, 110 w.     R211     195801251794     Meal film: 10 chm ±5%, 110 w.       R111     195801251794     Meal film: 10 chm ±5%, 110 w.     R211     195801251794     Meal film: 10 chm ±5%, 110 w.       R111     195801251794     Meal film: 1			,	R201	19B801251P104	Metal film: 100K ohms $\pm$ 5%, 1/10 w.
R104     1980/1251930     Meal film: 33 ohm ±5%, 110 w.     R203     19A70231723     Meal film: 210 ohm ±5%, 110 w.     R204     1980/1251972     Meal film: 33 ohm ±5%, 110 w.       R106     1988/1251973     Meal film: 33 ohm ±5%, 110 w.     R204     1980/1251970     Meal film: 30 ohm ±5%, 110 w.       R107     1988/12519747     Meal film: 33 ohm ±5%, 110 w.     R206     1988/1251970     Meal film: 30 ohm ±5%, 110 w.       R108     1988/12519747     Meal film: 32 ohm ±5%, 110 w.     R207     1988/12519707     Meal film: 30 ohm ±5%, 110 w.       R110     1988/12519747     Meal film: 30 ohm ±5%, 110 w.     R210     1988/12519707     Meal film: 30 ohm ±5%, 110 w.       R111     1988/12519747     Meal film: 47 ohm ±5%, 110 w.     R211     1988/12519747     Meal film: 22 ohm ±5%, 110 w.       R113     1988/12519747     Meal film: 20 ohm ±5%, 110 w.     R211     1988/12519747     Meal film: 22 ohm ±5%, 110 w.       R114     1988/12519747     Meal film: 20 ohm ±5%, 110 w.     R211     1988/12519747     Meal film: 22 ohm ±5%, 110 w.       R115     1988/12519747     Meal film: 22 ohm ±5%, 110 w.     R211     1988/12519747     Meal film: 22 ohm ±5%, 1	R103	19B801251P680		R202	19B801251P224	Metal film: 220K ohms $\pm$ 5%, 1/10 w.
R106     1980/1251P32     Metal film: 23 w hms :5%, 1/10 w.     R205     1980/1251P20     Metal film: 20 wms :5%, 1/10 w.       R107     1980/1251P331     Metal film: 23 w hms :5%, 1/10 w.     R205     1980/1251P30     Metal film: 20 wms :5%, 1/10 w.       R108     1980/1251P20     Metal film: 22 w hms :5%, 1/10 w.     R207     1980/1251P30     Metal film: 20 wms :5%, 1/10 w.       R110     1980/1251P31     Metal film: 22 w hms :5%, 1/10 w.     R207     1980/1251P30     Metal film: 10 w hms :5%, 1/10 w.       R111     1980/1251P31     Metal film: 13 w hms :5%, 1/10 w.     R211     1980/1251P30     Metal film: 12 whms :5%, 1/10 w.       R113     1980/1251P30     Metal film: 13 whms :5%, 1/10 w.     R211     1980/1251P37     Metal film: 10 w hms :5%, 1/10 w.       R114     1980/1251P37     Metal film: 12 whms :5%, 1/10 w.     R211     1980/1251P37     Metal film: 20 whms :5%, 1/10 w.       R115     1980/1251P37     Metal film: 20 whms :5%, 1/10 w.     R211     1980/1251P37     Metal film: 20 whms :5%, 1/10 w.       R115     1980/1251P37     Metal film: 20 whm :5%, 1/10 w.     R212     1980/1251P37     Metal film: 20 whms :5%, 1/10 w.       R117				R203	19A702931P233	Metal film: 2150 ohms $\pm 1\%,$ 200 VDCW, 1/8 w.
R100     HBB01251P31     Metal film: 20 ohms ±5%, 1/10 w.     R205     198801251P33     Metal film: 30 ohms ±5%, 1/10 w.       R107     198801251P473     Metal film: 270 ohms ±5%, 1/10 w.     R206     198801251P133     Metal film: 30 ohms ±5%, 1/10 w.       R110     198801251P473     Metal film: 270 ohms ±5%, 1/10 w.     R206     198801251P133     Metal film: 10 ohms ±5%, 1/10 w.       R111     198801251P473     Metal film: 47 ohms ±5%, 1/10 w.     R207     198801251P402     Metal film: 10 ohms ±5%, 1/10 w.       R112     198801251P473     Metal film: 14 ohms ±5%, 1/10 w.     R212     198801251P470     Metal film: 10 ohms ±5%, 1/10 w.       R113     198801251P471     Metal film: 14 ohms ±5%, 1/10 w.     R213     198801251P470     Metal film: 160 ohms ±5%, 1/10 w.       R114     198801251P471     Metal film: 14 ohms ±5%, 1/10 w.     L201     198801251P471     Metal film: 100 ohms ±5%, 1/10 w.       R114     198801251P471     Metal film: 120 ohms ±5%, 1/10 w.     L202     194703001P1     Digita: 64, 65 Pescaler, sim to MC12017P.       R114     198801751P471     Metal film: 120 ohms ±5%, 1/10 w.     L202     194703001P1     Digita: 64, 56 Pescaler, sim to MC12017P.	R105	19B801251P332		R204	19B801251P272	Metal film: 2.7K ohms ±5%, 1/10 w.
N107     198801251P21     Metal Itm: 2/0 chmi ±3%, 1/10 w.     R207 and and R208     198801251P103     Metal Itm: 10K chmi ±5%, 1/10 w.       R110     198801251P23     Metal Itm: 2/0 chmi ±5%, 1/10 w.     R209     198801251P102     Metal Itm: 10K chmi ±5%, 1/10 w.       R111     198801251P33     Metal Itm: 2/0 chmi ±5%, 1/10 w.     R210     198801251P470     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R113     198801251P473     Metal Itm: 2/0 chmi ±5%, 1/10 w.     R211     198801251P470     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R113     198801251P40     Metal Itm: 2/0 chmi ±5%, 1/10 w.     R212     198801251P470     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R114     198801251P40     Metal Itm: 2/0 chmi ±5%, 1/10 w.     U201     19870521P470     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R117     198801251P40     Metal Itm: 100 chmi ±5%, 1/10 w.     U201     198705281P4     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R118     198801251P40     Metal Itm: 100 chmi ±5%, 1/10 w.     U204     198705281P4     Metal Itm: 2/0 chmi ±5%, 1/10 w.       R119     198801251P40     Metal Itm: 100 chmi ±5%, 1/10 w.     U204     198705281P4     Metal Itm: 2/0 chmi ±5%, 1/10 w.	R106	19B801251P331		R205	19B801251P100	Metal film: 10 ohms ±5%, 1/10 w.
R108     Beb/1251P27     Metal film: 47X chms ±5%, 1/10 w.     R209     1980/1251P102     Metal film: 47 chms ±5%, 1/10 w.       R110     1980/1251P183     Metal film: 18X chms ±5%, 1/10 w.     R211     1980/1251P102     Metal film: 47 chms ±5%, 1/10 w.       R1112     1980/1251P183     Metal film: 100 chms ±5%, 1/10 w.     R211     1980/1251P103     Metal film: 10X chms ±5%, 1/10 w.       R113     1980/1251P104     Metal film: 100 chms ±5%, 1/10 w.     R211     1980/1251P103     Metal film: 10X chms ±5%, 1/10 w.       R114     1980/1251P104     Metal film: 100 chms ±5%, 1/10 w.     R213     1980/1251P104     Metal film: 10X chms ±5%, 1/10 w.       R115     1980/1251P104     Metal film: 100 chms ±5%, 1/10 w.     U201     1980/032P1     Synthacizer (MOS, Serial Programming, sim to M/10107.       R116     1980/1251P147     Metal film: 100 chms ±5%, 1/10 w.     U201     1980/032P1     Digta: /64, /65 Prescaler, sim to M/10107.       R119     1980/1251P147     Metal film: 100 chms ±5%, 1/10 w.     U204     1947/0508P1     Voltage Controlled Cocillator.     Voltage Controlled Cocillator.       R119     1980/1251P144     Metal film: 100 chms ±5%, 1/10 w.     U204     1947/0508P1	R107	19B801251P271	Metal film: 270 ohms ±5%, 1/10 w.			Metal film: 330 ohms ±5%, 1/10 w.
R109     198801251P473     Metal Ilm: 47K ohms ±5%, 1/10 w.     R208       R110     198801251P123     Metal Ilm: 2X ohms ±5%, 1/10 w.     R208       R111     198801251P43     Metal Ilm: 2X ohms ±5%, 1/10 w.     R211     198801251P43     Metal Ilm: 47K ohms ±5%, 1/10 w.       R113     198801251P473     Metal Ilm: 7X ohms ±5%, 1/10 w.     R211     198801251P470     Metal Ilm: 47K ohms ±5%, 1/10 w.       R113     198801251P473     Metal Ilm: 47K ohms ±5%, 1/10 w.     R211     198801251P470     Metal Ilm: 47K ohms ±5%, 1/10 w.       R114     198801251P473     Metal Ilm: 47K ohms ±5%, 1/10 w.     R213     198801251P473     Metal Ilm: 22 ohms ±5%, 1/10 w.       R117     198801251P474     Metal Ilm: 47K ohms ±5%, 1/10 w.     L/201     198801251P47     Metal Ilm: 47K ohms ±5%, 1/10 w.       R117     198801251P47     Metal Ilm: 47K ohms ±5%, 1/10 w.     L/201     198801251P47     Metal Ilm: 47K ohms ±5%, 1/10 w.       R118     198801251P47     Metal Ilm: 47K ohms ±5%, 1/10 w.     L/201     19870525P4     Valuego Controlied Oscillator.       R119     198801251P47     Metal Ilm: 100 chm ±5%, 1/10 w.     L/204     19870525P4     Valuego Controlied O					19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R110     198801251P223     Metal lim: 22K ohms ±5%, 1/10 w.     R209     198801251P102     Metal lim: 1K ohms ±5%, 1/10 w.       R111     19801251P103     Metal lim: 18K ohms ±5%, 1/10 w.     R210     198801251P103     Metal lim: 47 ohms ±5%, 1/10 w.       R112     198801251P102     Metal lim: 10K ohms ±5%, 1/10 w.     R211     198801251P270     Metal lim: 47 ohms ±5%, 1/10 w.       R113     198801251P20     Metal lim: 10K ohms ±5%, 1/10 w.     R212     198801251P270     Metal lim: 47 ohms ±5%, 1/10 w.       R114     198801251P20     Metal lim: 10K ohms ±5%, 1/10 w.     L/201     198801251P270     Metal lim: 27 ohms ±5%, 1/10 w.       R115     198801251P21     Metal lim: 10K ohms ±5%, 1/10 w.     L/201     198801251P27     Metal lim: 10K ohms ±5%, 1/10 w.       R113     198801251P21     Metal lim: 10K ohms ±5%, 1/10 w.     L/202     19870581P1     Olgiti: //4, //6 Prescaler; mito MC12017P.       R114     198801251P24     Metal lim: 10K ohms ±5%, 1/10 w.     L/202     19870581P1     Olgiti: //0 K.     Metal lim: 10K ohms ±5%, 1/10 w.       R114     198801251P174     Metal lim: 10K ohms ±5%, 1/10 w.     L/204     198705262P1     Voltage Controlled Oscillator.		10B801251P/73	Metal film: 47K ohms +5% 1/10 w			
R111     198801251P133     Metal lim: 10K ohms ±5%, 1/10 w.     R210     198801251P473     Metal lim: 47 ohms ±5%, 1/10 w.       R112     198801251P473     Metal lim: 47 ohms ±5%, 1/10 w.     R211     198801251P470     Metal lim: 47 ohms ±5%, 1/10 w.       R114     198801251P104     Metal lim: 20 ohms ±5%, 1/10 w.     R211     198801251P470     Metal lim: 47 ohms ±5%, 1/10 w.       R114     198801251P471     Metal lim: 100K ohms ±5%, 1/10 w.     U201     198801251P470     Metal lim: 20 ohms ±5%, 1/10 w.       R117     198801251P471     Metal lim: 100K ohms ±5%, 1/10 w.     U201     19880092P1     Digital: /64, /65 Prescaler; sim to MC12017P.       R118     19880072F17     Metal lim: 100K ohms ±5%, 1/10 w.     U202     194703091P1     Digital: /64, /65 Prescaler; sim to MC12017P.       R118     19880072F17     Metal lim: 100K ohms ±5%, 1/10 w.     U204     192651913C     Voltage controlled Oscillator.       R112     19880072F174     Metal lim: 100K ohms ±5%, 1/10 w.     U204     192651913C     Voltage controlled Oscillator.       R112     19880072F14     Metal lim: 100K ohms ±5%, 1/10 w.     U204     192651913C     Voltage controlled Oscillator. <td< td=""><td></td><td></td><td></td><td>R209</td><td>19B801251P102</td><td>Metal film: 1K ohms ±5%, 1/10 w.</td></td<>				R209	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R112   19801251P473 and and R114   Metal film: 47K ohms ±5%, 1/10 w.   R211   118001251P231   Metal film: 10K ohms ±5%, 1/10 w.     R113   19801251P102   Metal film: 10K ohms ±5%, 1/10 w.   R212   19801251P232   Metal film: 22 ohms ±5%, 1/10 w.     R114   19801251P102   Metal film: 1K ohms ±5%, 1/10 w.   U201   19800251P232   Metal film: 22 ohms ±5%, 1/10 w.     R116   19801251P231   Metal film: 47K ohms ±5%, 1/10 w.   U202   198000321P1   Digital (84, 65 Prescaler; sim to MC12017P.     R119   1980073PP7   Variable: 33K ohms ±5%, 1/10 w.   U202   198001351P8   Reference Occilator.   Voltage Controlled Oscillator (Used in G3).     R121   198001251P131   Metal film: 10K ohms ±5%, 1/10 w.   U204   196201351P8   Reference Oscillator.   Voltage Controlled Oscillator (Used in G3).     R121   19801251P131   Metal film: 10K ohms ±5%, 1/10 w.   U204   19670522P1   Voltage Controlled Oscillator (Used in G3).     U101   194705774P1   Module: 136-155 MH2 RF PA; sim to SHV1030.   W202   Part of printed wire board.   RECEVER				R210	19B801251P470	Metal film: 47 ohms $\pm$ 5%, 1/10 w.
P113 and R114   198801251P104   Metal film: 100K ohms ±5%, 1/10 w.   R212   198801251P270   Metal film: 27 ohms ±5%, 1/10 w.     R115   198801251P102   Metal film: 1K ohms ±5%, 1/10 w.   R213   198801251P271   Metal film: 27 ohms ±5%, 1/10 w.     R116   198801251P21   Metal film: 20 ohms ±5%, 1/10 w.   U201   198800902P1   Synthesizer: CMOS, Serial Programming; sim to MC14519P.     R117   198801251P21   Metal film: 20 ohms ±5%, 1/10 w.   U202   1947030391P1   Digital: 64, 765 Prescaler; sim to MC12017P.     R118   198801251P21   Metal film: 100 ohms ±5%, 1/10 w.   U202   1947056528P1   Voltage Controlled Oscillator (Used in G1).     R121   198801251P151   Metal film: 100 ohm ±5%, 1/10 w.   U204   19C851913G2   Voltage Controlled Oscillator (Used in G3).       W101   194705774P1   Module: 136-155 MHz R P A; sim to SHV1033.   W202   Voltage Controlled Oscillator (Used in G3).      CAPACITORS    CA01   194702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     W101   194702052P5   Ceramic: 0.01 uF ±10%, 50 VDCW.   Caramic: 0.01 uF ±10%, 50 VDCW.   Caramic: 0.01 uF ±10%, 50 VDCW.     W101   194702052P5				R211	19B801251P103	Metal film: 10K ohms $\pm$ 5%, 1/10 w.
and R114     R213     198801251P2R2     Metal film: 22 ohns ±5%, 1/10 w.       R114 R115 and R116     198801251P471     Metal film: 1K ohns ±5%, 1/10 w.     U201     198800902P1     Synthesizer. CMOS, Serial Programming: sim to MC145159P.       R117     198801251P471     Metal film: 470 ohns ±5%, 1/10 w.     U201     198800351P8     U204     Digita: Ad, 85 Prescaler; sim to MC12017P.       R118     198801251P471     Metal film: 50 ohns ±5%, 1/10 w.     U203     198801351P8     Voltage Controlled Oscillator.     Voltage Controlled Oscillator.     Voltage Controlled Oscillator.       R119     198801251P471     Metal film: 150 ohns ±5%, 1/10 w.     U204     194705628P1     Voltage Controlled Oscillator.     Voltage Controlled Osc				R212	19B801251P470	Metal film: 47 ohms ±5%, 1/10 w.
and R116     With State (MCS, Serial Programming; sim to MC145159P.     Synthesizer: CMCS, Serial Programming; sim to MC145159P.       R117     198801251P21     Metal film: 470 ohms ±5%, 1/10 w.     U201     198800902P1     Synthesizer: CMCS, Serial Programming; sim to MC145159P.       R118     198801251P21     Metal film: 220 ohms ±5%, 1/10 w.     U201     19870582P1     Uotage Controlled Oscillator (Used in G1).       R120     198001251P151     Metal film: 180 ohms ±5%, 1/10 w.     U204     19870582P1     Votage Controlled Oscillator (Used in G1).       U101     198705774P1     Module: 136: 155 MHz RF PA; sim to SHW1030.     W201     and w202     Votage Controlled Oscillator, Used in G3).       U101     19A705774P2     Module: 146-174 MHz RF PA; sim to SHW1030.     W202     Trantum: 1 + f. 16 VDCW; sim to SPRGUE 200 CP2P14     Ceramic: 0.01 # ±10%, 50 VDCW.       W101     19A702057P2     Part of printed wire board.     C402     19A702052P14     Ceramic: 0.01 # ±10%, 50 VDCW.       C201     19A702051P69     Ceramic: 120 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     19A702052P14     Ceramic: 0.01 # ±10%, 50 VDCW.       C202     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     19A702052P14     Ceramic: 10 pF ±5%, 50 VDCW, temp	and			R213	19B801251P2R2	
R116     MC145159P.     MC145159P.       R117     19801251P21     Metal film: 470 ohms ±5%, 1/10 w.     U202     19A703091P1     Digital: /64, /65 Prescaler; sim to MC12017P.       R119     1980075797     Variable: 3.3K ohms ±25%, 1/0 W.     U203     198801251P8     Voltage Controlled Oscillator. (Used in G1).       R120     198801251P151     Metal film: 180K ohms ±5%, 1/10 w.     U204     19A705628P1     Voltage Controlled Oscillator. (Used in G1).       U101     19A705774P1     Module: 136.155 MHz RF PA; sim to SHW1030.     W201 and G1).     Part of printed wire board.       U101     19A705774P1     Module: 136.155 MHz RF PA; sim to SHW1031.     W201 and G3).     Tanialum: 1 / 6 NOCW.     RECEIVER       U101     19A705774P2     Module: 136.155 MHz RF PA; sim to SHW1031.     W201 and G3).     Tanialum: 1 / 6 NOCW.     RECEIVER       W101     19A702051P69     Ceramic: 20 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C402     19A702052P14     Ceramic: 30 if F ±30 SP NOCW.       C201     19A702051P69     Ceramic: 100 pF ±5%, 50 VDCW.     C404     19A702051P12     Ceramic: 30 if F ±30, S0 VDCW.       C202     19A702052P54     Ceramic: 100 pF ±5%, 50 VDCW.     C404		19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.	11201	10B800002P1	Synthesizer: CMOS Serial Programming: sim to
Numerical form     Numerical form     Numerical form     Numerical form     Reference Oscillator     Reference Oscillator       R118     198801251P184     Metal film: 200 ohms ±5%, 1/10 w.     U203     198801251P184     Voltage Controlled Oscillator (Used in G1).       R120     198801251P184     Metal film: 150 ohms ±5%, 1/10 w.     U204     19705628P1     Voltage Controlled Oscillator (Used in G3).       U101     198801251P151     Metal film: 150 ohms ±5%, 1/10 w.     U204     196051251P163     CABLES     Part of printed wire board.       U101     19A705774P2     Module: 136-174 MHz RF PA; sim to SHW1031.     W202     W201     and				0201	130003021 1	
N100   Decaration 2201 (21)   Decaration 2201, (21)   Decaration 2201, (21)   Decaration 2201, (21)   Voltage Controlled Oscillator (Used in G1).     R119   1980072971   Variable: 3.3 k ohms ±25%, 100 VDCW, 3.w.   U204   19A705628P1   Voltage Controlled Oscillator (Used in G3).     R121   198001251P151   Metal film: 150 ohms ±5%, 1/10 w.	R117	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.	U202	19A703091P1	Digital: /64, /65 Prescaler; sim to MC12017P.
N130   H300001791 /r   Valuality 2004 (Used in G3).     R120   198801251P154   Metal film: 150 ohns ±5%, 1/10 w.   Ilex 1   Voltage Controlled Oscillator (Used in G3).     R121   198801251P151   Metal film: 150 ohns ±5%, 1/10 w.   Ilex 2004   Voltage Controlled Oscillator (Used in G3).     U101   19A705774P1   Module: 136-155 MHz RF PA; sim to SHW1030.   W202   W202   Voltage Controlled Oscillator (Used in G3).     U101   19A705774P2   Module: 146-174 MHz RF PA; sim to SHW1031.   Ilex 63.   Ilex 63.   Ilex 63.     W101   19A705774P2   Module: 146-174 MHz RF PA; sim to SHW1031.   Ilex 63.   Ilex 63.   Ilex 63.     W101   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.   Ceramic: 0.01 uF ±10%, 50 VDCW.   Sprague 2930.   Sprague 2930.     C201   19A702061P69   Ceramic: 100 pF ±1%, 50 VDCW.   Ceramic: 0.01 uF ±10%, 50 VDCW.     C202   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW.   C405   19A702061P13   Ceramic: 0.01 uF ±10%, 50 VDCW.     C203   19A702052P5   Ceramic: 100 pF ±10%, 50 VDCW.   C405   19A702061P13   Ceramic: 0.01 uF ±10%,	R118	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.	U203	19B801351P8	Reference Oscillator.
K120   198801251P164   Metal limit: 100 with 35%, 1/10 w.   Image and the state infinition of the state infinithe state infinition of the state infinithe state infinition of th	R119	19B800779P7	Variable: 3.3K ohms $\pm$ 25%, 100 VDCW, .3 w.			• • • •
K121   1988/01/251P131   Metal tilth: 150 onthe s5%, 1/10 W.   Part of printed wire board.     U101   19A705774P1   Module: 136-155 MHz RF PA; sim to SHW1030.   W201 and W202   Part of printed wire board.     U101   19A705774P2   Module: 146-174 MHz RF PA; sim to SHW1031.   W202   Fart of printed wire board.   RECEIVER     W101   19A705774P2   Module: 146-174 MHz RF PA; sim to SHW1031.   C4001   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     W101   19A702061P69   Ceramic: 200 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C403   19A702052P14   Ceramic: 3.9 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C202 and C203 and C203 and C204   19A702052P5   Ceramic: 1000 pF ±5%, 50 VDCW.   C404   19A702061P12   Ceramic: 3.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).     C204   19A702052P5   Ceramic: 100 pF ±5%, 50 VDCW.   C405   19A702061P13   Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).     C205   19A702052P5   Ceramic: 1000 pF ±5%, 50 VDCW.   C406   19A702052P14   Ceramic: 100 pF ±0.5%, 50 VDCW.     C206   19A702052P5   Ceramic: 100 pF ±0%, 50 VDCW.   C406   19A702052P14   Ceramic: 10.0 u F ±10%, 50 VDCW.     C207   19A702052P5<	R120	19B801251P184	Metal film: 180K ohms ±5%, 1/10 w.	U204	19C851913G2	
U101     19A705774P1     Module: 136-155 MHz RF PA; sim to SHW1030. (Used in G1).     and W202     Macual     RECEIVER       U101     19A705774P2     Module: 136-174 MHz RF PA; sim to SHW1031. (Used in G3).     CAPACITORS     C401     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       W101     Part of printed wire board. SYNTHESIZER     C402     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702052P14     Ceramic: 3.9 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C202 and C203 and C203 and C204     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C404     19A702061P12     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±50 PFN. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW.     C404     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C405     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C205     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C406 and c207     19A702052P54     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).       C2	R121	19B801251P151	Metal film: 150 ohms ±5%, 1/10 w.			CABLES
U101     19A705774P1     Module: 146-174 MHz RF PA; sim to SHW1030. (Used in G3).     W202     RECEIVER       U101     19A705774P2     Module: 146-174 MHz RF PA; sim to SHW1031. (Used in G3).     CABLES     C401     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       W101     Part of printed wire board.     SYNTHESIZER     C402     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coel 0 ±30 PPM.     C403     19A702061P12     Ceramic: 3.2 pF ±0.5 pF, 50 VDCW, temp coel 0 ±60 PPM. (Used in G1).       C202     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C405     19A702061P12     Ceramic: 3.2 pF ±0.5 pF, 50 VDCW, temp coel 0 ±60 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C405     19A702061P12     Ceramic: 4.7 PF ±0.5 pF, 50 VDCW, temp coel 0 ±60 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C405     19A702052P14     Ceramic: 0.0 tu # ±10%, 50 VDCW.       C205     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C406     19A702052P14     Ceramic: 0.0 tu # ±10%, 50 VDCW.       C206     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW.     C406 </td <td></td> <td></td> <td>—— INTEGRATED CIRCUITS ———</td> <td></td> <td></td> <td>Part of printed wire board.</td>			—— INTEGRATED CIRCUITS ———			Part of printed wire board.
U101     19A705774P2     Module: 146-174 MHz RF PA; sim to SHW1031. (Used in G3).     CAPACITORS     CAPACITORS       W101     Part of printed wire board. SYNTHESIZER     C401     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702061P12     Ceramic: 3.0 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C202 and C203     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702061P12     Ceramic: 3.0 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C204     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW, temp coef 0 ±30 PPM.     C404     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C405     19A702061P13     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C205     19A702052P5     Ceramic: 0.01 uF ±10%, 50 VDCW.     C406 and c207     19A702052P14     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C208     19A702052P5     Ceramic: 10.01 uF ±10%, 50 VDCW.     C406 and c207     19A702061P21     Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).	U101	19A705774P1				RECEIVER
W101     CABLES     CABLES     Cammedia     Cam	U101	19A705774P2				
W101     Part of printed wire board. SYNTHESIZER     C401     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C201     19A702052P5     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C404     19A702061P12     Ceramic: 3.2 pF ±25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C202 and C203     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW.     C405     19A702061P12     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW.     C405     19A702061P9     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).       C205     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C406     19A702052P14     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C205     19A702052P14     Ceramic: 100 pF ±10%, 50 VDCW.     C406     19A702052P14     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW.       C208 and and and acd and acd 209     19A702052P14     Ceramic: 100 pF ±5%, 50 VDCW.     C408     19A702061P21     Ceramic: 15 pF ±5%, 50 VDCW.       C210     19A702061P61     Ceramic: 100 pF			· · · · · ·			
SYNTHESIZER     Serague 293D.       C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702052P14     Ceramic: 3.9 pF ±2.5 pF, 50 VDCW, temp coef 0 ±30 PPM.       C202 and C203     19A702052P5     Ceramic: 1000 pF ±10%, 50 VDCW.     C404     19A702061P12     Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C204     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW.     C405     19A702061P13     Ceramic: 1.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW.     C405     19A702061P13     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C205     19A702052P5     Ceramic: 1000 pF ±10%, 50 VDCW.     C406     19A702061P9     Ceramic: 0.01 uF ±10%, 50 VDCW.       C206     19A702052P5     Ceramic: 0.01 uF ±10%, 50 VDCW.     C406     19A702061P9     Ceramic: 0.01 uF ±10%, 50 VDCW.       C207     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW.     C408     19A702061P21     Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C210     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0     C408     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. <td></td> <td></td> <td></td> <td>C401</td> <td>19A702052P14</td> <td>Ceramic: 0.01 uF ±10%, 50 VDCW.</td>				C401	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C201     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C403     19A702236P15     Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C202 and C203     19A702052P5     Ceramic: 1000 pF ±10%, 50 VDCW.     C404     19A702061P12     Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C204     19A702052P5     Ceramic: 1000 pF ±10%, 50 VDCW.     C405     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C204     19A702052P5     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C405     19A702061P9     Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).       C205     19A702052P5     Ceramic: 0.01 uF ±10%, 50 VDCW.     C406     19A702052P14     Ceramic: 0.01 uF ±10%, 50 VDCW.       C207     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C406     19A702052P14     Ceramic: 100 pF ±10%, 50 VDCW.       C208 and C209     19A702061P61     Ceramic: 100 pF ±10%, 50 VDCW.     C408     19A702061P21     Ceramic: 10 uF ±10%, 50 VDCW. temp coef 0 ±30 PPM. (Used in G3).       C210     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C408     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).	W101			C402	19A705205P2	
C201   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C404   19A702236P15   Ceramic: 3.9 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C202 and C203   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C404   19A702061P12   Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±50 PPM. (Used in G3).     C204   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C405   19A702061P13   Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C205   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C206   19A702052P5   Ceramic: 0.01 uF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C207   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C408   19A702061P21   Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C208   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0   C408   19A702061P13   Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C210   19A702061P61   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C211   19A702061P69   Ceramic: 3.0 pF ±5%, 50 V				C403	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C201   194702051P00   ±30 PPM.   C404   19A702061P12   Ceramic: 8.2 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).     C202   and   C203   Ceramic: 100 pF ±10%, 50 VDCW.   C405   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C204   19A702052P5   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C405   19A702061P9   Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C205   19A702052P5   Ceramic: 100 pF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C208   19A702052P5   Ceramic: 100 pF ±10%, 50 VDCW.   C408   19A702061P21   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C210   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C408   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C211   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C212   19A702061P7   Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C410   19A702061P37   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0				C404	19A702236P15	
C202 and C203   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C405   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C204   19A702052P5   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C405   19A702061P9   Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C205   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C208   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C209   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C406   19A702061P21   Ceramic: 10.01 uF ±10%, 50 VDCW.     C209   19A702052P5   Ceramic: 1000 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C408   19A702061P21   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C210   19A702061P61   Ceramic: 200 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C211   19A702061P69   Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C410   19A702061P13   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.	C201	19A702061P69		C101	10A702061D12	, ,
and C203   Image: Constraint of the symbol	C202	19A702052P5		0404	19A702001F12	
±30 PPM.   ±30 PPM.   C405   19A702051P9   Cerarric: 4.7 pF 30.5 pF, 30 VDCW, temp coef 0 ±60 PPM. (Used in G3).     C205   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C406   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.     C208   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C408   19A702061P21   Ceramic: 10.01 uF ±10%, 50 VDCW.     C209   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0   C408   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C211   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C212   19A702061P7   Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp coef 0   C410   19A702061P37   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0	and			C405	19A702061P13	
C207   19A702052P14   Ceramic: 0.01 uF ±10%, 50 VDCW.   and C407   and C407   Ceramic: 0.01 uF ±10%, 50 VDCW.     208 and C209   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C408   19A702061P21   Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C210   19A702061P61   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C408   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C211   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C410   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C212   19A702061P7   Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp   C410   19A702061P37   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0	C204	19A702061P61		C405	19A702061P9	
C208   19A702052P5   Ceramic: 1000 pF ±10%, 50 VDCW.   C407   C408   19A702061P21   Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).     C210   19A702061P61   Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C408   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).     C211   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C212   19A702061P7   Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp   C410   19A702061P37   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0	C205	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.		19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C208 and C209     19A702052P5     Ceramic: 100 pF ±10%, 50 VDCW.     C408     19A702061P21     Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G1).       C210     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C408     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C211     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C409     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.       C212     19A702061P7     Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp     C410     19A702061P37     Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0		19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.			
C209     ±30 PPM. (Used in G1).       C210     19A702061P61     Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C408     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).       C211     19A702061P69     Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C409     19A702061P13     Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.       C212     19A702061P7     Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp     C410     19A702061P37     Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0		19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.		19A702061P21	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0
±30 PPM.   ±30 PPM.   ±30 PPM. (Used in G3).     C211   19A702061P69   Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.   C409   19A702061P13   Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.     C212   19A702061P7   Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp   C410   19A702061P37   Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0						±30 PPM. (Used in G1).
±30 PPM.     ±30 PPM.     ±30 PPM.       C212     19A702061P7     Ceramic: 3.3 pF ±0.5 pF, 50 VDCW, temp     C410     19A702061P37     Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0	C210	19A702061P61		C408	19A702061P13	
	C211	19A702061P69		C409	19A702061P13	
	C212	19A702061P7		C410	19A702061P37	

\* COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	PART NUMBER	DESCRIPTION
C410	19A702061P29	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).
C411	19A702061P65	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/xC. (Used in G1).
C411	19A702061P63	Ceramic: 120 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM. (Used in G3).
C412	19A702061P65	Ceramic: 150 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM/xC. (Used in G1).
C412	19A702061P63	Ceramic: 120 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C413	19A702061P29	Ceramic: 22 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C413	19A702061P21	Ceramic: 15 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C414	19A702061P65	Ceramic: 150 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C414	19A702061P57	Ceramic: 82 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C415	19A702061P29	Ceramic: 22 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C416	19A702061P9	Ceramic: 4.7 pF $\pm$ 0.5 pF, 50 VDCW, temp coef 0 $\pm$ 60 PPM.
C417	19A702061P69	Ceramic: 220 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C450	19A704879P5	Electrolytic: 10 uF ±20%, 16 VDCW.
C451 thru C453	19A702052P14	Ceramic: 0.01 uF ±10%, 50 VDCW.
C454	19A702061P13	Ceramic: 10 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C454	19A702061P11	Ceramic: 6.8 pF $\pm$ 0.5 pF, 50 VDCW, temp coef 0 $\pm$ 60 PPM. (Used in G3).
C455	19A702061P12	Ceramic: 8.2 pF $\pm$ 0.5 pF, 50 VDCW, temp coef 0 $\pm$ 60 PPM.
C456	19A702061P41	Ceramic: 39 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C456	19A702061P37	Ceramic: 33 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C457	19A702061P29	Ceramic: 22 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C457	19A702061P25	Ceramic: 18 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM/xC. (Used in G3).
C458	19A702061P57	Ceramic: 82 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C458	19A702061P45	Ceramic: 47 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G3).
C459	19A702061P13	Ceramic: 10 pF $\pm$ 5%, 50 VDCW, temp coef 0 $\pm$ 30 PPM. (Used in G1).
C459	19A702061P9	Ceramic: 4.7 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM. (Used in G3).
D401	19A700155P2	Silicon, fwd current: 100 mA, 35 VIP.
		INDUCTORS
L401	19B801493P6	Coil, RF; sim to Toko NE545GNAS-1130.
L402 thru	19B801493P3	Coil, RF; sim to Toko NE545GNAS-100127.
L404		
L405	19A705470P11	Coil, Fixed: 68 nH; sim to Toko 380NB-68nM. (Used in G1).
L405	19A705470P12	Coil, Fixed: 82 nH; sim to Toko 380NB-82nM. (Used in G3).
L406	19A705470P3	Coil, Fixed: 15 nH; sim to Toko 380NB-15nM. (Used in G3).
L450 and L451	19B801493P3	Coil, RF; sim to Toko NE545GNAS-100127.
		——— TRANSISTORS ————
Q401	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q450	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.

and

### SYMBOL PART NUMBER DESCRIPTION SYMBOL PART NUMBER DESCRIPTION ---- RESISTORS --------- RESISTORS \_\_\_\_ R401 19B801251P560 Metal film: 56 ohms ±5%, 1/10 w. 19B801251P151 R501 Metal film: 150 ohms ±5%, 1/10 w. R402 19B801251P123 Metal film: 12K ohms ±5%, 1/10 w 19B801251P122 R502 Metal film: 1.2K ohms ±5%, 1/10 w. R403 19B801251P103 Metal film: 10K ohms ±5%, 1/10 w 19B801251P183 R503 Metal film: 18K ohms +5%, 1/10 w. R404 19B801251P102 Metal film: 1K ohms ±5%, 1/10 w. R504 19B801251P273 Metal film: 27K ohms ±5%, 1/10 w. R405 19B801251P101 Metal film: 100 ohms +5%, 1/10 w. R505 19B801251P103 Metal film: 10K ohms ±5%, 1/10 w. R450 19B801251P220 Metal film: 22 ohms +5%, 1/10 w. R506 19B801251P392 Metal film: 3.9K ohms ±5%, 1/10 w. R451 19B801251P221 Metal film: 220 ohms +5% 1/10 w R507 19B801251P151 Metal film: 150 ohms ±5%, 1/10 w. R452 19B801251P123 Metal film: 12K ohms +5% 1/10 w R508 19B801251P821 Metal film: 820 ohms ±5%, 1/10 w. R454 19B801251P272 Metal film: 2 7K ohms ±5% 1/10 w R509 19B801251P104 Metal film: 100K ohms ±5%, 1/10 w. and R455 19B801251P680 Metal film: 68 ohms +5%, 1/10 w. R510 \_\_\_\_ FILTER \_\_\_\_\_ R511 19B801251P103 Metal film: 10K ohms ±5%, 1/10 w. 19A705424P2 Printed mica; sim to SOSHIN BP136-153A1 Z401 R512 19B801251P270 Metal film: 27 ohms $\pm$ 5%, 1/10 w. (Used in G1). R513 19B801251P332 Metal film: 3.3K ohms ±5%, 1/10 w. Z401 19A705424P1 Printed mica; sim to SOSHIN BP150-174A1 -- INTEGRATED CIRCUITS ----(Used in G3). Z402 19A705423P1 Mixer: Double (balanced); sim to Tele-Tech U501 19A704619P1 Linear: Osc/Mixer/IF/Det/Amp; sim to MT45. MC3361AP. 45 MHz 1F ---- CRYSTALS--------- CAPACITORS -----Y501 19A705376P5 Crystal, Fixed Frequency: 45.455 MHz 10 PPM C501 19A702061P45 Ceramic: 47 pF ±5%, 50 VDCW, temp coef 0 ---- FILTER -----+30 PPM. Monolithic Crystal: 45.000 MHz; sim to 19A702052P14 19A705328P1 C502 Ceramic: 0.01 uF ±10%, 50 VDCW, Z501 Toyocom 45É2B2. and C503 7502 Part of Z501. C504 19A702061P41 Ceramic: 39 pF $\pm 5\%,\,50$ VDCW, temp coef Z503 19A702171P3 Bandpass: 455 1.5 KHz; sim to Murata +30 PPM CFU455F2. 19A702061P12 C505 Ceramic: 8.2 pF $\pm 0.5$ pF, 50 VDCW, temp REGULATOR coef 0 +60 PPM ---- CAPACITORS -----C506 19A702061P9 Ceramic: 4.7 pF $\pm 0.5$ pF, 50 VDCW, temp coef 0 ± 60 PPM. 19A702052P14 Ceramic: 0.01 uF ±10%, 50 VDCW. C801 19A702052P14 Ceramic: 0.01 uF ±10%, 50 VDCW. C507 C802 19A702061P73 Ceramic: 330 pF ±5%, 50 VDCW, temp coef 0 +30 PPM C508 C803 19A702052P14 Ceramic: 0.01 uF ±10%, 50 VDCW. 19A702061P33 C509 Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 +30 PPM. 19A705205P14 C804 Tantalum: 6.8 uF, 6 VDCW; sim to Sprague C510 19A702061P29 Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM C805 19A702061P77 Ceramic: 470 pF $\pm$ 5%, 50 VDCW, temp coef 0 and C511 ±30 PPM. thru C808 19A702052P26 C512 Ceramic: 0.1 uF ±10%, 50 VDCW, \_\_\_\_ DIODES \_\_\_\_\_ C514 D801 19A116585P1 Silicon, fast recovery, 600 mA, 50 PIV. C515 19A705205P14 Tantalum: 6.8 uF, 6 VDCW; sim to Sprague 293D \_\_\_\_ PLUGS \_\_\_\_ C516 19A702052P14 Ceramic: 0.01 uF ±10%, 50 VDCW. P801 19C851673P2 Connector C517 19A702052P10 Ceramic: 4700 pF ±10%, 50 VDCW. ---- TRANSISTORS -----C518 19A702061P25 Ceramic: 18 pF $\pm$ 5%, 50 VDCW, temp coef 0 Q801 19A700026P2 Silicon PNP: sim to BC369 +30 PPM Q802 19A700076P2 Silicon, NPN: sim to MMBT3904, low profile. \_\_\_\_ JACKS \_\_\_\_\_ and 19A701622P1 Q803 J501 Cotter pin. 19A700059P2 Silicon, PNP: sim to MMBT3906, low profile. Q804 ---- INDUCTORS --------- RESISTORS -----19A700024P7 Coil. RF: 330 nH ±10%. L501 R801 19B801251P392 Metal film: 3.9K ohms +5%, 1/10 w. L502 19B801413P4 Coil, 39 MHz. L503 19A700024P18 Coil, RF: 2.7 uH ±10%. R802 L504 19A705753P17 Coil. Toroidal: 2.2uH ±5%. R803 19B801251P102 Metal film: 1K ohms +5%, 1/10 w. L505 19B801413P4 Coil, 39 MHz R804 L506 19A703591P1 IF: sim to Toko America P5SVLC-A291EL. R805 19A702931P334 Metal film: 22.1K ohms ±1%, 200 VDCW, 1/8 ---- TRANSISTORS------R806 19A702931P328 Metal film: 19.1K ohms ±1%, 200 VDCW, 1/8 Q501 19A702524P3 N-Type, field effect; sim to MMBFJ310. Q502 19A704708P2 Silicon, NPN: sim to NEC 2SC3356. R807 19B801251P123 Metal film: 12K ohms +5% 1/10 w R808 19B801251P393 Metal film: 39K ohms ±5%, 1/10 w. Metal film: 1.8K ohms ±5%, 1/10 w. R809 19B801251P182

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SYMBOL	PART NUMBER	DESCRIPTION
R810 and R811	19B801251P473	Metal film: 47K ohms $\pm$ 5%, 1/10 w.
R812	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
		—— INTEGRATED CIRCUITS ————
U801	19A702939P2	Linear: Adjustable Shunt Regulator; sim to TL431CLP.
		MISCELLANEOUS
	19D902174G1	Cover.
	19A702364P304	Screw, Machine.
	19B801572G1	Shield, RF.
	19A705732P329	Screw, Machine.
	19A705732P333	Screw, Machine.
	19B801492P2	Clip.
	19A705883P3	Crystal cushion.
	19B801657P1	Insulating plate.
	19B801655P1	Shield.

### **PRODUCTION CHANGES**

Changes in the equipment to improve performance 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 the Parts List for the descriptions of parts affected by these revisions.

### REV. A - RF BOARD 19D438222G1

### REV. A - RF BOARD 19D438222G3

To improve selectivity, changed IF bandpass filter Z503. To improve low level frequency stability, removed capacitor C206. To allow scan operation, changed loop filter module A201. Old part numbers were:

Z503 - 19A702171P1, Filter, Bandpass.

C206 - 19A702061P69, Ceramic: 220 pF ±5%, 50 VDCW temp coef  $0 \pm 30$  PPM,

A201 - 19C851646, Loop Filter Module.

### REV. B - RF BOARD 19D438222G3

To improve radio performance changed C110, C112, L104 and U204. Old part numbers were:

C110 - 19A702061P77, Ceramic: 470 pF ±5%, 50 VDCW temp coef 0 ±30 PPM.

C112 - 19A702061P33, Ceramic: 33 pF 5±%, 50 VDCW temp coef 0 ±30 PPM.

L104 - 19A700024P2, Coil, RF; 120 nH.

U204 - 19A705628P2, Voltage Controlled Oscillator.

### REV. C - RF BOARD 19D438222G1 & G3

To improve receiver adjacent channel selectivity, improve a receiver spur and resolve an out of lock condition the following were changed. L104 changed to a surface mount component. R213 was 1k ohms (19B801251P102). C219 deleted. C220 added (19A705205P2). C808 added (19A702061P77). REV. D - RF BOARD 19D438222G1 & G3

To improve impedance matching C110 in G3 was 22 pF (19A702236P34). C112 in G3 was 22 pF (19A702236P34). C112 in G1 was 27 pF (19A702061P33). L103 was a coil (19A700024P1). L104 was 56 NH (19A705470P10).

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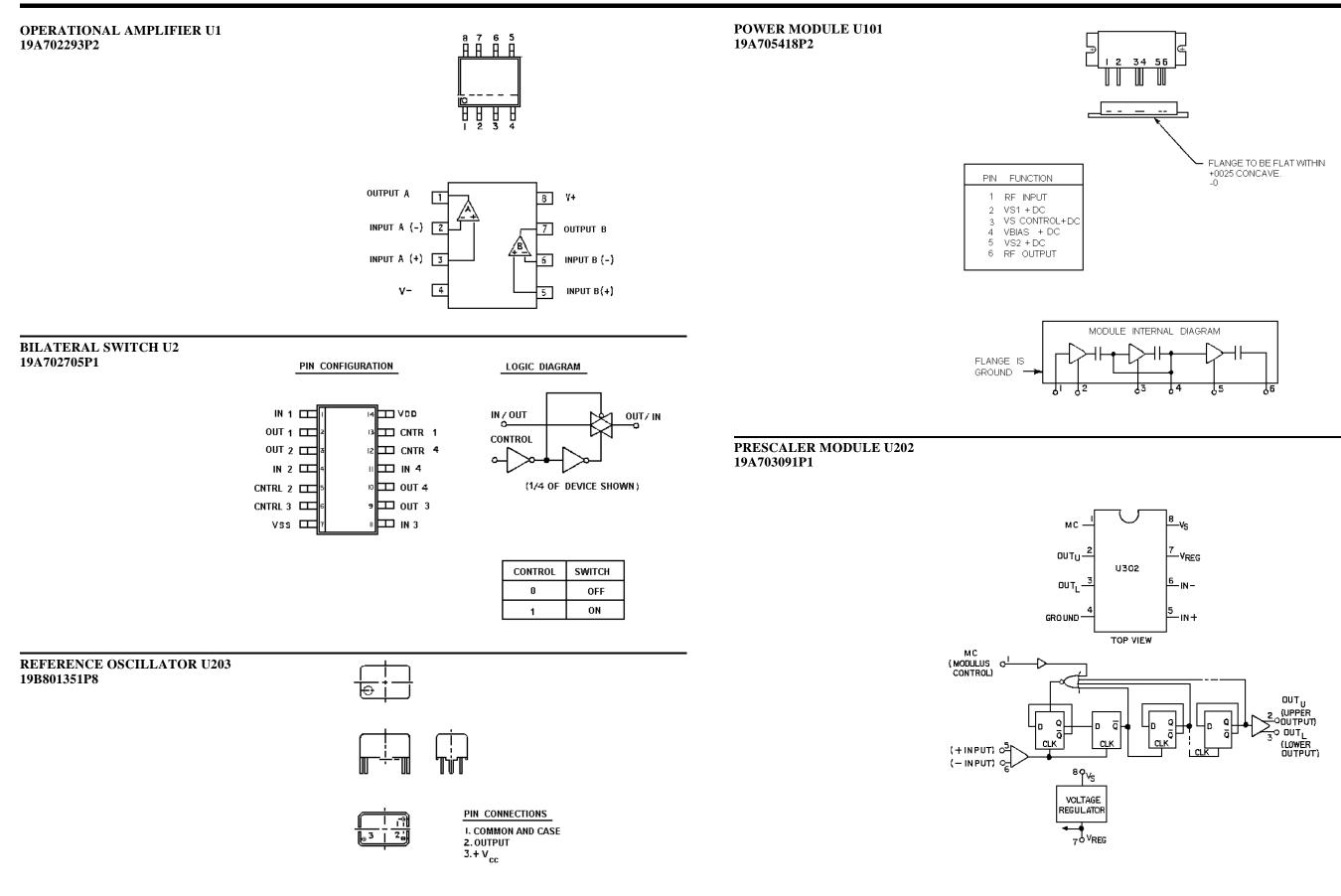
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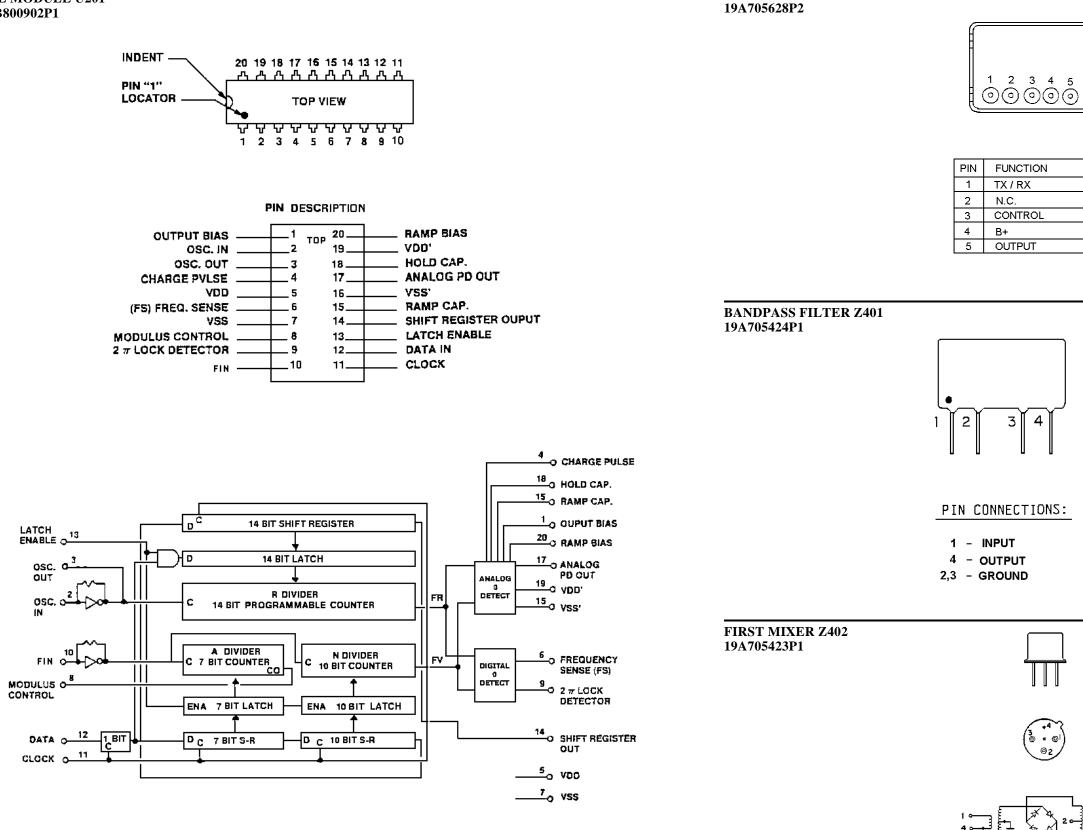
# IC DATA







### PLL MODULE U201 19B800902P1

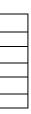


IC DATA

**VCO U204** 

# LBI-38275





R Ε Α R Α S S Ε Μ B L Y



PIN CONNECTIONS			
LOCAL OSC.			
RF			
IF 2			
GROUND & CASE	4		