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MAINTENANCE MANUAL
DUAL FORMAT PCS RADIO
REAR ASSEMBLY
19D902175G6

TABLE OF CONTENTS

DESCRIPTION

The Rear Assembly 19D902175G6 provides a metal housing for the RF Board 19D903723G1. The antenna connects to a BNC type connector that is mounted to the top of the Rear Assembly. The battery contacts and latch are on the bottom of the rear assembly. The RF board consists of the following circuits:

- A frequency synthesizer for generating the transmit carrier frequency and the first mixer injection frequency for the receive circuitry.
- The TX/RX switch along with all transmit and receive circuits.
- Two voltage regulator circuits.

Refer to Figure 1 for a block diagram of the synthesizer and Figure 2 for a block diagram of the Transmit/Receive circuits.

The frequency adjustment for the transmit circuit is accessible from the top side of the board. IF alignment, second oscillator and quadrature detector adjustment for the receive circuit are also accessible from the top of the board. Chip components on the bottom of the board along with carefully placed friction fit shields provide optimum RF performance.

Selected use of sealed modules permits small board size as well as RF and mechanical protection for sensitive circuitry. It is recommended not to repair but to place the following modules if they are determined to be damaged:

- Power Amplifier (PA) Module (U101)
- Prescaler Module (U201)
- Reference Oscillator Module (U202)
- VCO Module (U203)
- Loop Filter (A202)
- Bandpass Filter (Z201)

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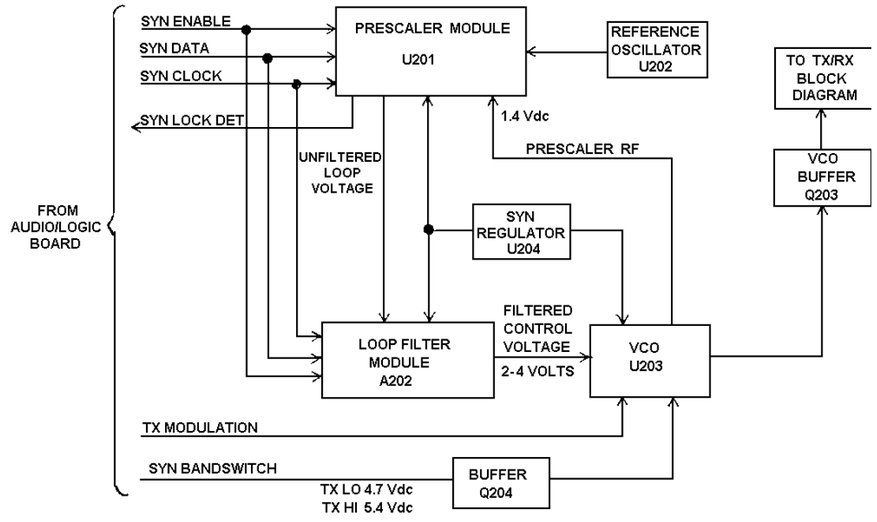


Figure 1 - Synthesizer Block Diagram

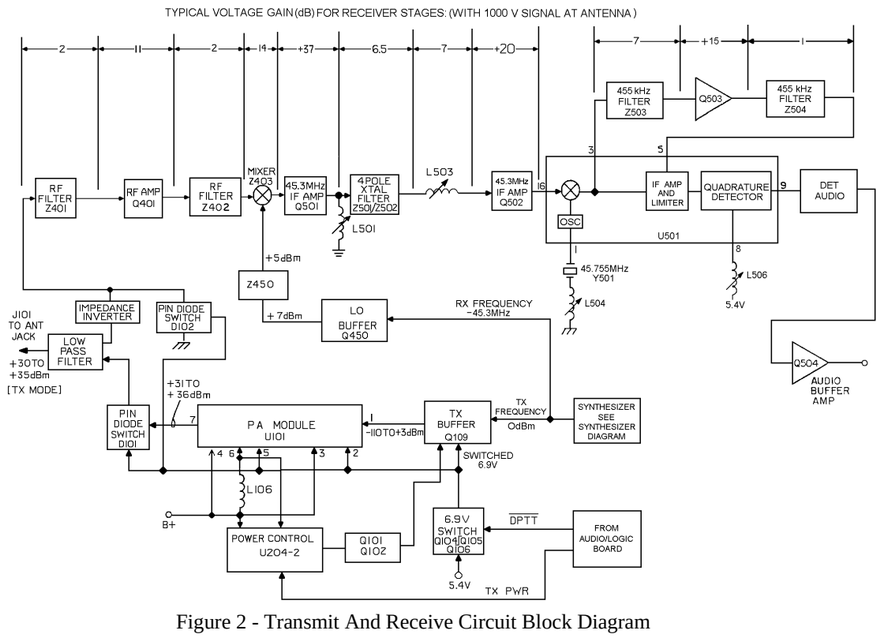


Figure 2 - Transmit And Receive Circuit Block Diagram

CIRCUIT ANALYSIS

The Schematic Diagram for the Transmit/Receive Board is broken into three sheets. Sheet 1 is for the Synthesizer circuits, sheet 2 is for the Transmitter circuits and sheet 3 is for the Receiver circuits. The following sections discuss these circuits in detail.

SYNTHESIZER CIRCUIT

The microprocessor controlled frequency synthesizer circuit generates all transmit and receive RF frequencies for the Dual Format PCS radio. This circuit uses a Voltage Controlled Oscillator (VCO) operating on the actual transmit frequency of 806-824 (851-869 talk-around) during transmit and 45.3 MHz below the actual receive frequency during receive.

VCO (U203)

The Synthesizer output signal is generated directly by the VCO module U203 and fed through the VCO buffer circuitry (Q203) and on to the Local Oscillator buffer and the PA buffer. A control voltage from the Loop Filter is applied to pin 3 of the VCO module and is used to control VCO frequency output at U203-5. Transmitter modulation from the Audio Logic board is applied to pin 2 and summed with the control voltage within the module. A second output (pin 6) provides RF to the Prescaler RF input (U201-9). The **SYN BANDSWITCH** line from the Audio Logic board is applied to pin 1 via invertor Q204. The input at pin 1 is high for VCO frequencies of 806-824 MHz, and low for frequencies of 851-869 MHz.

Reference Oscillator (U202)

The synthesizer frequency output is set by the 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 ±1.5 PPM over the range of -30°C to 60°C and determines the overall frequency stability of the radio. U202 provides a 12.8 MHz reference frequency for the Prescaler Module.

Prescaler Module (U201)

The synthesizer IC and the prescaler IC are both contained in the Prescaler Module. See the schematic of the Prescaler Module.

The **PRESCALER RF** output from the VCO at U203-6 is used to feed the dual-modulus prescaler IC (U2) within the Prescaler Module. U2 divides the VCO signal by 128 or 129 according to the logic level of the modulus control. The prescaler output feeds the synthesizer IC (U1).

Within U1 the signal is further divided down by a programmable ratio which corresponds to the particular frequency being synthesized and compared with a reference signal. This reference signal originates from the Reference Oscillator U202, is fed to the Prescaler Module at pin 7 and divided down by divider circuits within U1. The divider circuits within U1 are programmed by three input from the microprocessor located on the Audio Logic Board. These inputs are labeled **SYN EN**, **SYN DATA**, **SYN CLK** and are fed to the Prescaler Module at pins 4, 3 and 2 respectively. The **SYN LOCK DET** output from the Prescaler Module is sent back to the Microprocessor to prevent transmissions when the Synthesizer is unlocked.

Loop Filter Module

The Loop Filter circuitry consists of the Loop Filter board, C204 and C205. See the schematic of the Loop Filter Module.

The Loop Voltage from the Prescaler Module is applied to the Loop Filter Module at pin 10. Within the Loop Filter Module the Loop Voltage is applied to Operational Amplifier U1.1. U1.1 is biased to produce gain variation with different Loop voltages. When the Loop voltage is below 2.2 volts, both diodes in diode package D1 are biased off. The operational amplifier gain is then one. As the Loop voltage rises above approximately 2.4 volts, one of the diodes in D1 is forward biased. This increases the operational amplifier gain to approximately 1.1. Further increases in the Loop voltage above approximately 3.0 volts turns both diode paths on, thus increasing the gain to about 1.2. Gain variation versus loop voltage compensates for decreasing VCO gain 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.

The synthesizer enable line also drives bilateral switches U2.2 and U2.3 on the loop filter board. The pulse applied to these gates, when channel changes occur, turns the gates on which shorts out resistors R8 and R12. This allows rapid channel acquisition.

Synthesizer Regulator

The **5.4V REG** from Voltage Regulator U801 is divided in half by voltage divider R207/R208 and is used as a

reference for the Synthesizer Regulator consisting of U204.1 and transistors Q201 and Q202. This provides additional filtering and stability for the 5.4 Vdc required by the Prescaler Module and the Loop Filter module.

TRANSMITTER CIRCUIT

The transmitter section consists of a PA buffer section, a Power Control circuit, a 3-watt Power Amplifier Module (U101), a Transmitter switch, a T/R switch and a low pass filter.

PA Buffer

Power Amplifier Buffer Q109 is driven by the VCO output **SYN RF** at a level approximately 0 dBm. Q109 drives Power Amplifier Module U101 at approximately -10 to 0 dBm. The Power Control circuit is used to control the PA Buffer by increasing or decreasing the voltage at the collector. DC power is applied to the buffer only in the transmit mode and is regulated by the Power Control circuit to provide controlled drive over changing frequency and battery voltage.

Power Control

The Power Control circuit allows the radio transmit power to be set between 1 Watt and 3 Watts. It keeps the output power close to the set value in spite of variations in transmit frequency, battery voltage, temperature and load.

To do this, the Power Control circuit senses the current supplied to the final stage of the Power Amplifier Module through current shunt L106 and uses a feedback control circuit to keep this current constant at a value which corresponds to the transmit power setting selected.

I SENSE and **B+** provide the input voltages to the Power Control circuit. The **I SENSE** input supplies a current sink consisting of R137, Q103.2 and R108. The **B+** input supplies a similar current sink consisting of R104, Q103.1, R117 and R118. The voltages at pin 5 and 6 of Operational Amplifier U204 depend on the input voltages **B+** and **I SENSE** and on the base voltages supplied to Q103.1 and Q103.2.

Under normal conditions the positive and negative terminals of U204.2 are at the same voltage. If the power delivered by the Power Amplifier Module decreases for any reason, the current supplied to its final stage through L106 goes down causing the **I SENSE** voltage to go up. This unbalances the inputs to U204.2 making the positive input slightly higher than the negative one. This causes the output voltage on pin 7 to go up, increasing the bias on Q102/Q101. As Q101 turns on it increases the gain of PA Buffer Q109 by raising its collector voltage. This increase in gain causes increased drive to the Power Amplifier Module restoring its output power to the set value (by forcing the current in the final stage back to its original value).

If the power delivered by the Power Amplifier Module goes up, the loop responds in the opposite manner decreasing the drive from the PA Buffer to restore the output power.

The power setting at which the control loop stabilizes can be changed by increasing or decreasing the current through Q103.1. This is done by supplying a power set voltage to the base of Q103.1 via the voltage divider consisting of R107 and R106. Resistor R105 serves to increase the current setting slightly with increasing battery voltage. This will compensate for changes in the power efficiency of the power amplifier U101.

Q103.1 and Q103.2 are contained within the same SOT packages to reduce the temperature differential between the two parts. In receive mode the 5 volt **DPTT** voltage is supplied to Q103.1 through D103 and R109 to switch this transistor off. This ensures that the transmitter Power Amplifier Module cannot come on in receive mode.

Power Amplifier Module (U101)

Power Module U101 is a five-stage broad band power amplifier with internal matching. This module mounts to the rear casting for heat sinking. Output power is controlled by varying the Power Control Voltage to the PA Buffer stage, which varies the input power to the PA Module. Stage one and four are supplied with **SW B+** which is 6.9 volts. Stages two, three and five are supplied by the battery voltage in order to obtain maximum power. The final stage is fed through current shunt L106. The DC voltage drop across this shunt provides the sense voltage for the power control circuit.

Tx Switches

The transmit circuit is enabled by the **$\overline{\text{DPTT}}$** line from the Audio/Logic Board. When the PTT button is activated, the **DPTT** line is pulled low. This allows transistors Q106, Q105 and Q104 to conduct. The configuration of Q104-Q106 boosts the output voltage to about 6.9 volts, while allowing Q104 to supply the relatively high currents needed for the PA Buffer Q109, Power Amplifier Module U101 and the PIN diode switch.

Tx/Rx Switches

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, **Switched B+** voltage (+6.9V) is switched to inductor L107. This produces a DC 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. Inductor L111 and capacitors C132 and C141 act as an impedance invertor. The RF short produced by D102 protects the receiver by presenting essentially an open to the transmitter. When diode D102 is conducting, capacitor C131 is used to series resonate the package inductance of D102 for improved RF short.

Low Pass Filter

A five element low pass filter consisting of C133-C135, L110 and L112 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.

RECEIVER CIRCUIT

The dual conversion receive circuit consists of a receiver front end, a 45.3 MHz first IF, two 455 kHz bandpass filters to form the second IF and 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 and Tx/Rx Switch to receive preselector filter Z401. This is a non-tunable dielectric-resonator filter covering 851-869 MHz. Its output is matched by inductor strip W402 to the input of RF Amplifier transistor Q401. Q401 provides approximately 10 dB of gain for filter Z402. Both Z401 and Z402 are identical and have insertion losses of less than 2.2 dB in the 851-869 MHz passband with a minimum stopband attentuation of 35 dB. The filters have input and output impedances of 50 ohms. Z402 is connected between the RF amplifier and double balanced mixer Z403. The Local Oscillator (LO) port of the mixer Z403 is driven by LO buffer transistor Q450. The filtered synthesizer output drives this buffer. The output of Q450 drives non-tunable dielectric-resonator filter Z450, which couples the drive to the Mixer Z403 at about +4 dBm.

NOTE

The transistor circuits for the Local Oscillator Buffer Q450, the VCO Buffer Q203 and the RF Amplifier Q401 are connected in series to preserve battery current. The voltage ("A") at the emitter of Q450 (4.1 Vdc) is applied to the collector of Q203. The voltage ("B") at the emitter of Q203 (2 Vdc) is applied to the collector of Q401.

Mixer, IF Pre-Amp, And IF Amp

The mixer output is connected to transistor Q501. Q501 provides a low impedance input to match the mixer and high impedance output to drive the 45.3 MHz 4-pole cystal filter consisting of Z501 and Z502. The crystal filter output is amplified by bipolar IF Amp transistor Q502. This IF amplifier output drives the second Mixer circuit in Mixer/Limiter/Detector U501.

Mixer/Limiter/Detector U501

Crystal Y501 is an external crystal operating at 45.755 MHz and when coupled to the internal circuitry of U501 forms the second LO for the second mixer circuit. The frequency of the second LO is adjusted with inductor L504. The second mixer output 455 kHz IF is filtered by 4-pole ceramic filters Z503 and Z504. 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 filtered, buffered and connected to the Audio/Logic Board as **DET AUDIO**.

5.4 Volt Regulator

The 5.4 Volt Regulator U801 supplies a regulated 5.4 volts to all circuits requiring a stable reference voltage. B+ from the battery at P801-4 is fed to the input of U801 at pin 6. U801 generates a regulated +5.4 volts that is stable with both temperature and battery voltage.

REAR ASSEMBLY
19D902175G6
ISSUE 4

SYMBOL	PART NUMBER	DESCRIPTION
A1		**RF BOARD 19D903723G1**
A202		**LOOP FILTER BOARD 19C852174G1**
		— — — — CAPACITORS — — —
C1 thru C3	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
C4	19A149896P121	Ceramic: .01 µF ±10%, 50 VDCW.
C5	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
C6 and C7	19A149896P121	Ceramic: .01 µF ±10%, 50 VDCW.
C8	19A149896P117	Ceramic: 4700 pF ±10%, 50 VDCW.
C9	19A149896P121	Ceramic: .01 µF ±10%, 50 VDCW.
		— — — — — DIODES — — — —
D1	19A703561P2	Silicon, fast recovery (2 diodes in series).
		— — — — RESISTORS — — —
R1	19A149818P154	Metal film: 150K ohms ±5%, 1/16 w.
R2	19A149818P104	Metal film: 100K ohms ±5%, 1/16 w.
R3 and R4	19A149818P683	Metal film: 68K ohms ±5%, .063 watts at 70 °C.
R5	19A149818P101	Metal film: 100 ohms ±5%, 1/16 w.
R6	19A149818P682	Metal film: 6.8K ohms ±5%, 1/16 w.
R7	19A149818P104	Metal film: 100K ohms ±5%, 1/16 w.
R8	19A149818P105	Metal film: 1M ohms ±5%, 1/16 w.
R9	19A149818P684	Metal film: 680K ohms ±5%, 1/16 w.
R10	19A149818P224	Metal film: 220K ohms ±5%, 1/16 w.
R11	19A149818P123	Metal film: 12K ohms ±5%, 1/16 w.
R12	19A149818P333	Metal film: 33K ohms ±5%, 1/16 w.
R13	19A149818P104	Metal film: 100K ohms ±5%, 1/16 w.
R14	19A149818P101	Metal film: 100 ohms ±5%, 1/16 w.
R15	19A149818P684	Metal film: 680K ohms ±5%, 1/16 w.
		— — INTEGRATED CIRCUITS —
U1	19A702293P3	Linear: Dual Op Amp; sim to LM358D.
U2	19A702705P4	Digital: Quad Analog Switch/Multiplexer; sim to 4066BM.
		— — — — CAPACITORS — — —
C101	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C102	19A702052P7	Ceramic: 2200 pF ±10%, 50 VDCW.
C103 and C104	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C105	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C106 and C107	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C110	19A702236P30	Ceramic: 15 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C111	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C114	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C115	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C116	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C117	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C118 and C119	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C120	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C121	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C124	19A702236P7	Ceramic: 1.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C126	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C127	19A702236P54	Ceramic: 150 pF ±5%, 500 VDCW, temp coef 0 ±30 PPM/°C.
C128	19A702236P19	Ceramic: 5.6 pF ±.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C130	19A702236P3	Ceramic: 0.7 pF ±.1 pF, 50 VDCW, temp coef 0 ±30 PPM.
C131	19A702236P25	Ceramic: 10 pF ±.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C132	19A702236P13	Ceramic: 3.3 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C133	19A702236P3	Ceramic: 0.7 pF ±.1 pF, 50 VDCW, temp coef 0 ±30 PPM.
C134	19A702236P23	Ceramic: 8.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C135	19A702236P15	Ceramic: 3.9 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C141	19A702236P7	Ceramic: 1.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C142	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C144	19A702236P3	Ceramic: 0.7 pF ±.1 pF, 50 VDCW, temp coef 0 ±30 PPM.
C145	19A702236P25	Ceramic: 10 pF ±.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C147 and C148	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C201	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C202	19A702236P50	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C203	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C204	19A700004P9	Metalized polyester: 0.47uF ±10%, 63 VDCW.
C205	19A703902P4	Metal: 0.56 µF ±10%, 50 VDCW.
C207 and C208	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C209 and C210	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C211	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C212	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C213	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C214	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C216 thru C219	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C220	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C222	19A702236P8	Ceramic: 1.5 pF ±.25 pF, 50 VDCW.
C223	19A702236P9	Ceramic: 1.8 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C224	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C225	19A702236P3	Ceramic: 0.7 pF ±.1 pF, 50 VDCW, temp coef 0 ±30 PPM.
C401	19A702236P17	Ceramic: 4.7 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C402	19A702236P28	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C403	19A702236P34	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C404	19A702236P14	Ceramic: 3.6 pF ±.25 pF, 50 VDCW.
C406	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C407	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C451	19A702236P15	Ceramic: 3.9 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C452	19A702236P23	Ceramic: 8.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C453	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C454	19A702236P15	Ceramic: 3.9 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C456	19A702236P6	Ceramic: 1.0 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C457 thru C459	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C501	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C502	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C503	19A702236P23	Ceramic: 8.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C504	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C505	19A702236P11	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C506	19A702236P25	Ceramic: 10 pF ±.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C507 thru C509	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C510	19A702236P44	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM/°C.
C511	19A702236P28	Ceramic: 12 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C512	19A702236P21	Ceramic: 6.8 pF ±0.5 pF, 50 VDCW, temp coef 0 ±60 PPM.
C513 and C514	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C515	19A705205P5	Tantalum: 6.8 uF, 10 VDCW; sim to Sprague 293D.
C516	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C517	19A702052P5	Ceramic: 1000 pF ±10%, 50 VDCW.
C518	19A702052P14	Ceramic: 0.01 µF ±10%, 50 VDCW.
C519	19A702236P6	Ceramic: 1.0 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C520	19A702236P7	Ceramic: 1.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.
C521	19A702236P25	Ceramic: 10 pF ±.5 pF, 50 VDCW, temp coef 0 ±30 PPM/°C.
C802 thru C811	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
C812	19A705205P2	Tantalum: 1 uF, 16 VDCW; sim to Sprague 293D.
C813	19A705205P5	Tantalum: 6.8 uF, 10 VDCW; sim to Sprague 293D.
		— — — — — DIODES — — — — —
D101 and D102	19A702525P2	Silicon, PIN: sim to MMBV3401.
D103	19A700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
D801	344A3326P1	Surface mount, rectifier.
D802	19A700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
		— — — — — JACKS — — — — —
J101	19B801491P2	Antenna clip.
		— — — — INDUCTORS — — — —
L102 and L103	344A3289P10	Coil, fixed: .100 µH ±20%; sim to TDK NL252018T-R10M.
L104	REG704213/1	Coil, fixed: 0.1 µH.
L105	344A3289P10	Coil, fixed: .100 µH ±20%; sim to TDK NL252018T-R10M.
L106	19B801566P11	Shield.
L107	344A3289P5	Coil, fixed: .033 µH ±20%; sim to TDK NL252018T-033M.
L109	344A4540P6R8	Inductor, surface mount: 6.8 nH ±.5.
L110 and L111	344A4540P4R7	Inductor, surface mount: 4.7 nH ±.5.
L112	344A4540P100	Inductor, surface mount: 10 nH ±5%.
L201	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.
L202	344A3289P5	Coil, fixed: .033 µH ±20%; sim to TDK NL252018T-033M.
L203	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.
L204 and L205	344A4540P150	Inductor, surface mount: 15 nH ±5%.
L403	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

Continued

PARTS LIST

SYMBOL	PART NUMBER	DESCRIPTION
L453	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.
L501	19B801413P4	Coil, 39 MHz.
L502	344A3289P21	Surface mount, coil, fixed: 2.2 µH ±5%.
L503	19B801413P3	Coil, 39 MHz.
L504	19B801413P4	Coil, 39 MHz.
L505	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.
L506	19A703591P1	IF: sim to Toko America P5SVLC-A291EL.
		— — — — — PLUGS — — — —
P801	19C851673P2	Connector, 12 position.
		— — — — TRANSISTORS — — —
Q101	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q102	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q103	19A705945P2	Silicon, Dual NPN: sim to R OHM IMX3.
Q104	19A149542P1	Silicon, PNP: sim to Motorola MJD32C-1.
Q105	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q106	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q109	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q201	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q202	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q203	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q204	19A700059P2	Silicon, PNP: sim to MMBT3906, low profile.
Q401	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q402	19A700076P2	Silicon, NPN: sim to MMBT3904, low profile.
Q450	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q501 and Q502	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
Q503 and Q504	19A134739P2	Silicon, NPN.
		— — — — RESISTORS — — —
R101	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R102	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.
R104	19A702931P313	Metal film: 13.3K ohms ±1%, 200 VDCW, 1/8 w.
R105	19B801251P184	Metal film: 180K ohms ±5%, 1/10 w.
R106	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R107	19B801251P183	Metal film: 18K ohms ±5%, 1/10 w.
R108	19A702931P334	Metal film: 22.1K ohms ±1%, 200 VDCW, 1/8 w.
R109	19B801251P333	Metal film: 33K ohms ±5%, 1/10 w.
R110	19B801251P391	Metal film: 390 ohms ±5%, 1/10 w.
R111	19B801251P221	Metal film: 220 ohms ±5%, 1/10 w.
R112	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R113	19B801251P333	Metal film: 33K ohms ±5%, 1/10 w.
R114	19B801251P224	Metal film: 220K ohms ±5%, 1/10 w.
R115	19B801251P564	Metal film: 560K ohms ±5%, 1/10 w.
R116	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R117	19A702931P334	Metal film: 22.1K ohms ±1%, 200 VDCW, 1/8 w.
R118	19B801251P474	Metal film: 470K ohms ±5%, 1/10 w.
R119	19B801251P682	Metal film: 6.8K ohms ±5%, 1/10 w.
R120	19B801251P332	Metal film: 3.3K ohms ±5%, 1/10 w.
R126	19B801251P510	Metal film: 51 ohms ±5%, 1/10 w.
R127	19B801251P272	Metal film: 2.7K ohms ±5%, 1/10 w.
R128	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R130 and R131	19B801251P102	Metal film: 1K ohms ±5%, 1/10 w.
R132 and R133	19B801251P561	Metal film: 560 ohms ±5%, 1/10 w.
R137	19A702931P313	Metal film: 13.3K ohms ±1%, 200 VDCW, 1/8 w.
R138	19B801251P100	Metal film: 10 ohms ±5%, 1/10 w.
R139	19B801251P1R0	Metal film: 1 ohm ±5%, 1/10 w.
R140	19B800607P1	Metal film: Jumper.
R201	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R202	19B801251P153	Metal film: 15K ohms ±5%, 1/10 w.
R203	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R204 and R205	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R206	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R207 and R208	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R211 and R212	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R215	19B801251P1	Jumper.
R216	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R402	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R453	19B801251P100	Metal film: 10 ohms ±5%, 1/10 w.
R454	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R455	19B801251P220	Metal film: 22 ohms ±5%, 1/10 w.
R456	19B801251P181	Metal film: 180 ohms ±5%, 1/10 w.
R457	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R501	19B801251P471	Metal film: 470 ohms ±5%, 1/10 w.
R502	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R503	19B801251P223	Metal film: 22K ohms ±5%, 1/10 w.
R504	19B801251P562	Metal film: 5.6K ohms ±5%, 1/10 w.
R505	19B801251P560	Metal film: 56 ohms ±5%, 1/10 w.
R506	19B801251P273	Metal film: 27K ohms ±5%, 1/10 w.
R507	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R508	19B801251P151	Metal film: 150 ohms ±5%, 1/10 w.
R509	19B801251P222	Metal film: 2.2K ohms ±5%, 1/10 w.
R510	19B801251P472	Metal film: 4.7K ohms ±5%, 1/10 w.
R511	19B801251P152	Metal film: 1.5K ohms ±5%, 1/10 w.
R512	19B801251P682	Metal film: 6.8K ohms ±5%, 1/10 w.
R513	19B801251P182	Metal film: 1.8K ohms ±5%, 1/10 w.
R514	19B801251P270	Metal film: 27 ohms ±5%, 1/10 w.
R515	19B801251P104	Metal film: 100K ohms ±5%, 1/10 w.
R516	19B801251P821	Metal film: 820 ohms ±5%, 1/10 w.
R517	19B801251P510	Metal film: 51 ohms ±5%, 1/10 w.
R518	19B801251P103	Metal film: 10K ohms ±5%, 1/10 w.
R519	19A149818P103	Metal film: 10K ohms ±5%, 1/16 w.
R803 thru R811	19A149818P220	Metal film: 22 ohms ±5%, 1/16 w.
R812	19A149818P473	Metal film: 47K ohms ±5%, 1/16 w.
R813 thru R816	19A149818P220	Metal film: 22 ohms ±5%, 1/16 w.
R818 thru R820	19A149818P220	Metal film: 22 ohms ±5%, 1/16 w.
R821	19B801251P2R2	Metal film: 2.2 ohms ±5%, 1/10 w.
		— — — — TEST POINTS — — —
TP1	19B801566P12	Shield.
		— — INTEGRATED CIRCUITS —
U101	344A4132P1	RF Power Module: 7.5V, 4 watt; sim to Motorola SHW1048.
U201		**PRESCALER BOARD 19C852187G1**
		— — — — CAPACITORS — — —
C1	19A149896P9	Ceramic: 1000 pF ±5%, 50 VDCW.
C2	19A149897P47	Ceramic: 220 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C3	19A149896P121	Ceramic: .01 µF ±10%, 50 VDCW.
C4	19A149896P9	Ceramic: 1000 pF ±5%, 50 VDCW.
C5	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
C6	19A149896P121	Ceramic: .01 µF ±10%, 50 VDCW.
C7	19A149897P14	Ceramic: Ceramic: 8.2 pF ±.25 pF, 50 VDCW.
C8 thru C10	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
C14 and C15	19A149897P33	Ceramic: 56 pF ±5%, 50 VDCW.
		— — — — — DIODES — — — —
D1	19A700053P2	Silicon: 2 Diodes in Series; sim to BAV99.
		— — — — — JACKS — — — —
J1 thru J9	19A703248P9	Contact, electrical.
		— — — — INDUCTORS — — —
L1	344A3289P1	Surface mount, coil, fixed: .01 µH ±20%.
		— — — — TRANSISTORS — — —
Q1	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
		— — — — RESISTORS — — —
R1	19A149818P333	Metal film: 33K ohms ±5%, 1/16 w.
R2	19A149818P220	Metal film: 22 ohms ±5%, 1/16 w.
R3	19A149818P104	Metal film: 100K ohms ±5%, 1/16 w.
R4	19A149818P222	Metal film: 2.2K ohms ±5%, 1/16 w.
R5	19A149818P100	Metal film: 10 ohms ±5%, 1/16 w.
R6	19A149818P471	Metal film: 470 ohms ±5%, 1/16 w.
R7	19A149818P103	Metal film: 10K ohms ±5%, 1/16 w.
R8	19A149818P562	Metal film: 5.6K ohms ±5%, 1/16 w.
R9	19A149818P221	Metal film: 220 ohms ±5%, 1/16 w.
		— — INTEGRATED CIRCUITS —
U1	19B800902P5	Synthesizer, custom: CMOS, serial input.
U2	19A149944P202	Prescaler; sim to Motorola MC12022SLA.
U202	19B801351P22	Crystal Oscillator, 12.8 MHz.
U203		**800 MHz VCO 19C852200G1**
		— — — — CAPACITORS — — —
C1	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C2	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C3	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C4	19A149897P4	Ceramic: 1.2 pF ±.25 pF, 50 VDCW.
C5	19A149896P105	Ceramic: 470 pF ±10%, 50 VDCW.
C6	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C7	19A149896P105	Ceramic: 470 pF ±10%, 50 VDCW.
C8	19A705205P5	Tantalum: 6.8 uF, 10 VDCW; sim to Sprague 293D.
C9	19A149897P55	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C10 and C11	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C12	19A149897P55	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C13	19A149897P10	Ceramic: 3.9 pF ±.25 pF, 50 VDCW.
C14	19A704350P101	Variable: 2-6 pF +50-0%.
C15	19A149897P208	Ceramic: 2.7 pF ±.1 pF, 50 VDCW.
C16	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C17	19A149897P208	Ceramic: 2.7 pF ±.1 pF, 50 VDCW.
C18	19A702236P23	Ceramic: 8.2 pF ±.25 pF, 50 VDCW, temp coef 0 ±30 PPM.

Continued

SYMBOL	PART NUMBER	DESCRIPTION
C19	19A149897P55	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C20	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C21	T644ACP333K	Polyester: .033 µF ±10%, 50 VDCW.
C22	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C23	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C24	19A149897P7	Ceramic: 2.2 pF ±.25 pF, 50 VDCW.
C25	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C26	19A149897P25	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C27	19A149897P4	Ceramic: 1.2 pF ±.25 pF, 50 VDCW.
C29	19A149897P13	Ceramic: 6.8 pF ±.25 pF, 50 VDCW.
C30	19A149897P211	Ceramic: 4.7 pF ±.25 pF, 50 VDCW.
C31	19A149897P43	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C32	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C33	19A149897P10	Ceramic: 3.9 pF ±.25 pF, 50 VDCW.
C34	19A705205P12	Tantalum: .33 uF, 16 VDCW; sim to Sprague 293D.
C35	19A702052P134	Ceramic: 0.1 µF ±5%, 25 VDCW.
C36	19A149897P5	Ceramic: 1.5 pF ±.25 pF, 50 VDCW.
C37	19A700228P44	Ceramic: 27 pF ±.25 pF, 50 VDCW.
C38 and C39	19A149897P208	Ceramic: 2.7 pF ±.1 pF, 50 VDCW.
		——— DIODES ———
D1	19A700079P3	Silicon; sim to BBY 31.
D2	19A702525P2	Silicon, PIN: sim to MMBV3401.
D3	19A700085P2	Silicon; sim to MMBV109.
D4	19A705377P1	Silicon, Hot Carrier: sim to MMB0201.
		——— JACKS ———
J1 thru J6	19A703248P9	Contact, electrical.
		——— INDUCTORS ———
L1	19A700021P3	Coil, fixed: 68 nH ±10%.
L2	19B235531P22	Coil, molded, 2.5 turns: 38 nH.
L3	19A700021P10	Coil, RF: 270 nH.
L4 and L5	19A700021P17	Coil, fixed: 1 µH ±10%.
*L6	344A4540P100	Coil, Fixed: 10 nH; sim to L0805100JEW.
L7	19A705470P3	Coil, Fixed: 15 nH; sim to Toko 380NB-15nM.
L8	344A3289P3	Surface mount, coil, fixed: .018 µH ±20%.
L9	344A4540P100	Inductor, surface mount: 10 nH ±5%.

SYMBOL	PART NUMBER	DESCRIPTION
		——— TRANSISTORS ———
Q1	19A702524P2	N-Type, field effect; sim to MMBFU310.
Q2 thru Q5	19A704708P2	Silicon, NPN: sim to NEC 2SC3356.
		——— RESISTORS ———
R1	19A149818P824	Metal film: 820K ohms ±5%, 1/16 w.
R2	19A149818P333	Metal film: 33K ohms ±5%, 1/16 w.
R3 and R4	19A149818P472	Metal film: 4.7K ohms ±5%, 1/16 w.
R5	19A149818P473	Metal film: 47K ohms ±5%, 1/16 w.
R6	19A149818P470	Metal film: 47 ohms ±5%, 1/16 w.
R7	19A149818P103	Metal film: 10K ohms ±5%, 1/16 w.
R8 and R9	19A149818P332	Metal film: 3.3K ohms ±5%, 1/16 w.
R10	19A149818P102	Metal film: 1K ohms ±5%, 1/16 w.
R11	19A149818P221	Metal film: 220 ohms ±5%, 1/16 w.
R12	19A149818P102	Metal film: 1K ohms ±5%, 1/16 w.
R13	19A149818P103	Metal film: 10K ohms ±5%, 1/16 w.
R14 and R15	19A149818P222	Metal film: 2.2K ohms ±5%, 1/16 w.
R16	19A149818P100	Metal film: 10 ohms ±5%, 1/16 w.
R17	19A149818P470	Metal film: 47 ohms ±5%, 1/16 w.
R18	19A149818P473	Metal film: 47K ohms ±5%, 1/16 w.
R19	19A149818P474	Metal film: 470K ohms ±5%, 1/16 w.
U204	19A702293P3	Linear: Dual Op Amp; sim to LM358D.
U501	19A704619P2	Linear: Osc/Mixer/IF/Det/Amp; sim to MC3361D.
U801	344A3303P202	Linear: +5.5 Volt Regulator; sim to TK11455.
		——— CABLES———
W101 and W102		**Part of printed wire board.**
W401 thru W405		**Part of printed wire board.**
		——— CRYSTALS ———
Y501	19B233066G18	Crystal, 800 MHz.

SYMBOL	PART NUMBER	DESCRIPTION
		——— FILTER ———
Z401 and Z402	19A704888P1	Bandpass Filter, 851-871 MHz; sim to: Murata DFC3R861P020BTD.
Z403	19A705423P1	Mixer: Double (balanced); sim to Tele-Tech MT45.
Z450	19A704888P5	RF, bandpass, 806-825 MHz; sim to Murata DFC3R815P020BTD.
Z501	19A705613G34	Crystal pair: 45.3 MHz.
Z502		Part of Z501.
Z503	19A702171P9	Bandpass: 455 kHz; sim to SFG455G.
Z504	19A702171P2	Bandpass, 455 kHz; sim to Murata CFU455F2.
		——— MISCELLANEOUS ———
		NOTE: Refer to the Outline diagram of the RF Board on page 20 and 21 for the location of the following miscellaneous part.
6	19A705883P4	Crystal cushion.
		——— MISCELLANEOUS ———
		NOTE: Refer to the Assembly diagram of the Rear Assembly on page 17 for the location of the following miscellaneous parts.
3	19A702364P304	Machine screw, TORX drive, Pan Head.
10	19A705883P5	Crystal cushion.
14	19A703346P2	Pad.
17	19B801492P3	Clip.
18	19B801572G2	RF shield.
19	19D902174G2	Assembly cover.
20	19B801671P2	Connector 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 - <u>TRANSMIT/RECEIVE BOARD 19D902175G6</u>
To improve the Power Set circuitry, PA efficiency and to replace the tunable Bandpass Filter (Z201) with fixed parts on PCB.

The following parts were deleted:

C125 was 19A702236P44 - Ceramic: 56 pF ±5%, 50 VDCW.
C144 was 19A702236P6 - Ceramic: 2.7 pF ±.25 pF, 50 VDCW.
C215 was 19A702236P44 - Ceramic: 56 pF ±5% pF, 50 VDCW.
R209 was 19B801251P1 - Jumper.
Z201 was 19C852251G1 - Bandpass Filter Board.
ITEM 21 19B801566P10 - Shield.

The following parts were changed:

C127 was 19A702236P44 - Ceramic: 56 pF ±5%, 50 VDCW.
C128 was 19A702236P20 - Ceramic: 6.2 pF ±.25 pF 50 VDCW.
C132 was 19A702236P9 - Ceramic: 1.8 pF ±.25 pF, 50 VDCW.
C133 was 19A702236P6 - Ceramic: 1 pF ±.25 pF, 50 VDCW.
C135 was 19A702236P13 - Ceramic: 3.3 pF ±5% pF, 50 VDCW.
C141 was 19A702236P9 - Ceramic: 1.8 pF ±.25 pF, 50 VDCW.
D802 was 19A700028P1 - Silicon: 75 mA, 75 PIV; sim to 1N4148.
L109 was 344A3967P2 - Coil, surface mount, 2-turn: 5 nH ±10%.
L110 was 344A3967P2 - Coil, surface mount, 2-turn: 5 nH ±10%.
L111 was 344A3967P2 - Coil, surface mount, 2-turn: 5 nH ±10%.
L112 was 344A3967P3 - Coil, surface mount, 3-turn: 8 nH ±5%.
Q103 was 19A700076P2 - Silicon, NPN: sim to MMBT3904, low profile.
R105 was 19A702931P381 - Metal film: 68.1K ohms ±1%, 1/8 w.
R106 was 19A702931P377 - Metal film: 61.9K ohms ±1%, 1/8 w.
R107 was 19B801251P393 - Metal film: 39K ohms ±5%, 1/10 w.
R108 was 19B801251P682 - Metal film: 6.8K ohms ±5%, 1/10 w.
R109 was 19B801251P104 - Metal film: 100K ohms ±5%, 1/10 w.
R519 was 19B801251P103 - Metal film: 10K ohms ±5%, 1/10 w.
TP1 was 19A701622P2 - Cotter pin.

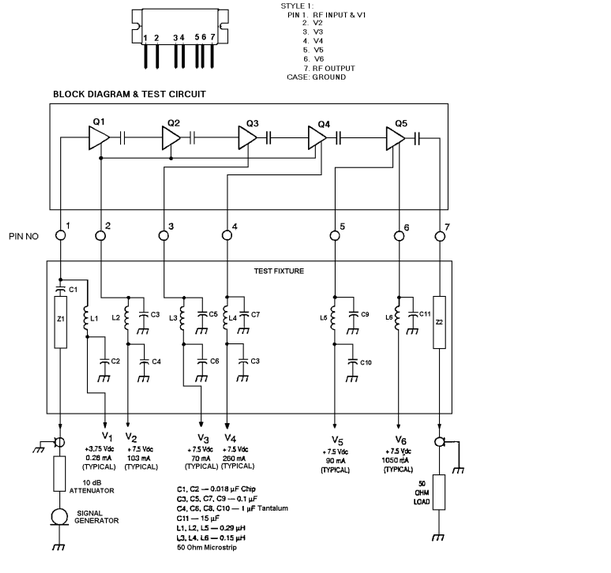
The following parts were added:

C107, C124, C130, C144, C219, C222, C223, C224, C225, C458, C459, C460,
D103, L204, L205, Q402, R117, R118, R119, R120, R215, R216, R457

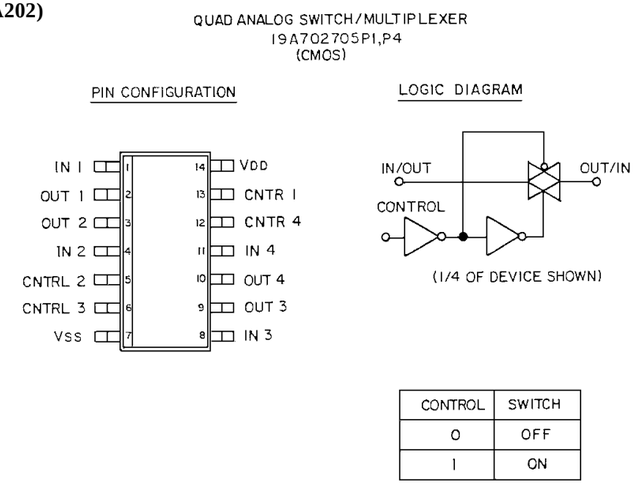
REV. A - <u>800 MHz VCO 19C852200G1</u>
To improve DCG operation:
R1 was 560k ohms (19A149818P564).
R2 was 22k ohms (19A149818P223).
R16 added.

REV. B - <u>800 MHz VCO 19C852200G1</u>
To improve operation:
L6 was 19A705470P1.

RF POWER AMPLIFIER MODULE U101344A4132P1

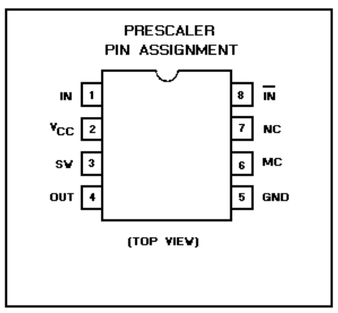


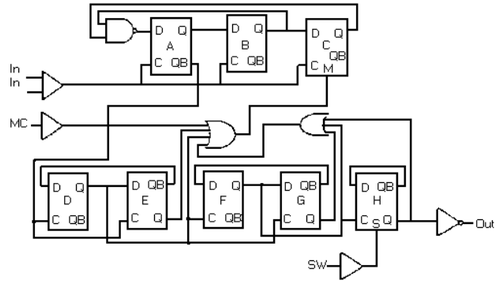
QUAD ANALOG SWITCH/ MULTIPLEXER U2 (Part of A202) 19A702705P4



CONTROL	SWITCH
0	OFF
1	ON

PRESCALER U2 (Part of U201) 19A149944P202

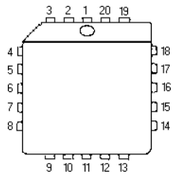


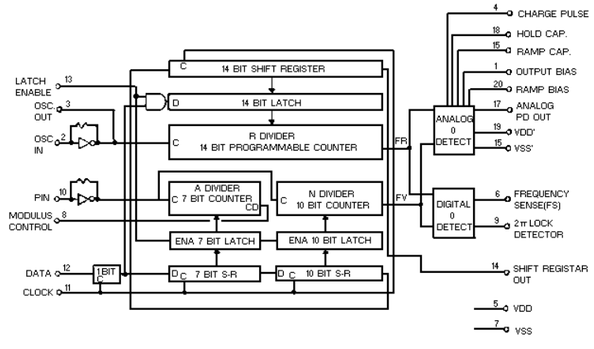


FUNCTION TABLE		
SW	MC	DIVIDE RATIO
H	H	64
H	L	65
L	H	128
L	L	129

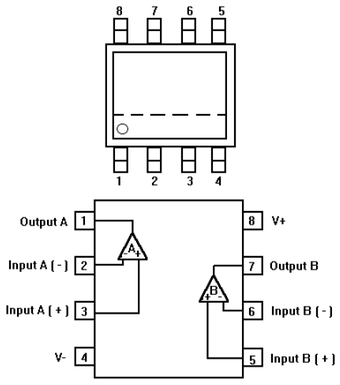
SW: H = Vcc L = OPEN
MC: H = 2.0V TO Vcc
L = GND TO 0.8V

SYNTHESIZER U1 (Part of U201) 19B800902P5

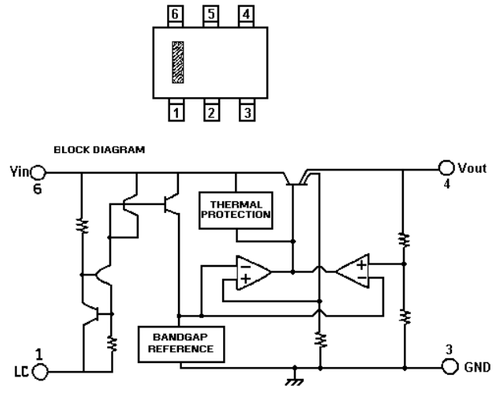




OPERATIONAL AMPLIFIER U204, U1
(Part of U201) 19A702293P3

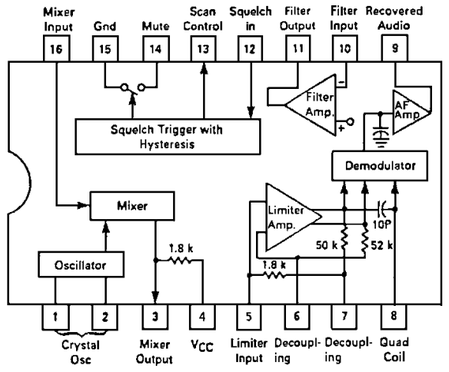


VOLTAGE REGULATOR U801
344A3303P202



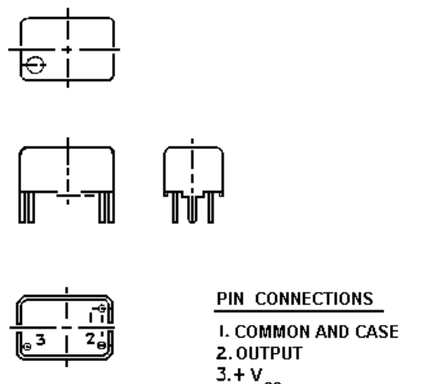
LINEAR OSC/MIXER/IF/DETECTOR/AMP U501
19A704619P2

LINEAR IF AMPL & DETECTOR
19A704619P2



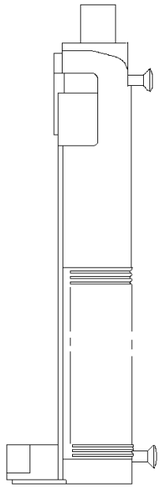
PIN IDENTIFICATION (TOP VIEW) AND FUNCTIONAL BLOCK DIAGRAM

CRYSTAL OSCILLATOR U202
19B801351P22



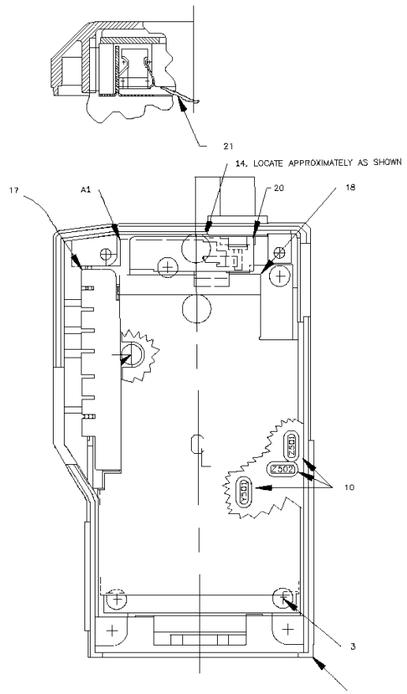
PIN CONNECTIONS

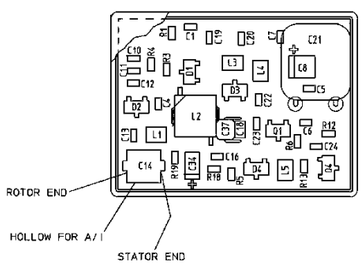
1. COMMON AND CASE
2. OUTPUT
3. + V_{CC}

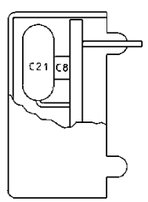


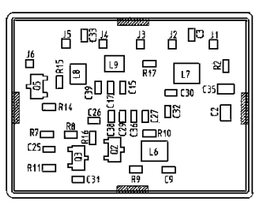
REAR ASSEMBLY
19D902175G6

(19D902175, Sh. 2, Rev. 0



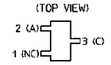




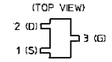


BACK VIEW OF BOARD

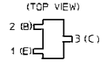
LEAD IDENTIFICATION FOR
D1 - D4
(SOT) DIODES
(TOP VIEW)



LEAD IDENTIFICATION FOR
Q1
(SOT) TRANSISTORS
(TOP VIEW)

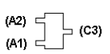


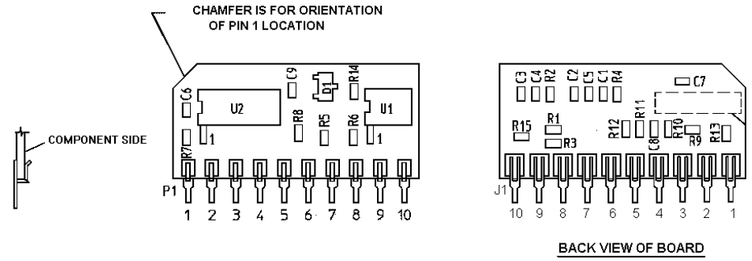
LEAD IDENTIFICATION FOR
Q2 - Q5
(SOT) TRANSISTORS
(TOP VIEW)



800 MHz VCO BOARD
19C852200G1

LEAD IDENTIFICATION FOR
D1
(SOT) DIODES
(TOP VIEW)

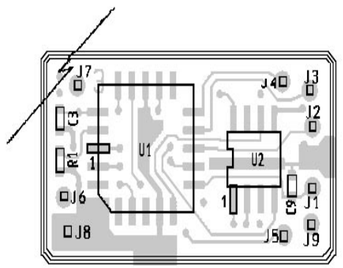


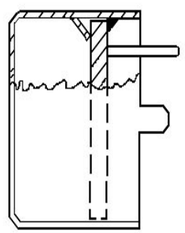


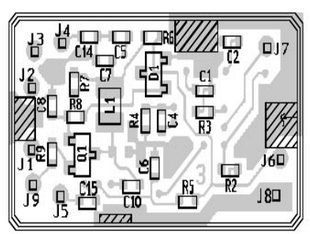
BACK VIEW OF BOARD

CAUTION
CONTENTS SUBJECT
TO DAMAGE BY
STATIC ELECTRICITY
DO NOT OPEN
EXCEPT AT APPROVED
STATIC FREE WORKSTATIONS

LOOP FILTER BOARD
19C851274G1



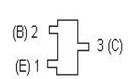




BACK VIEW OF BOARD

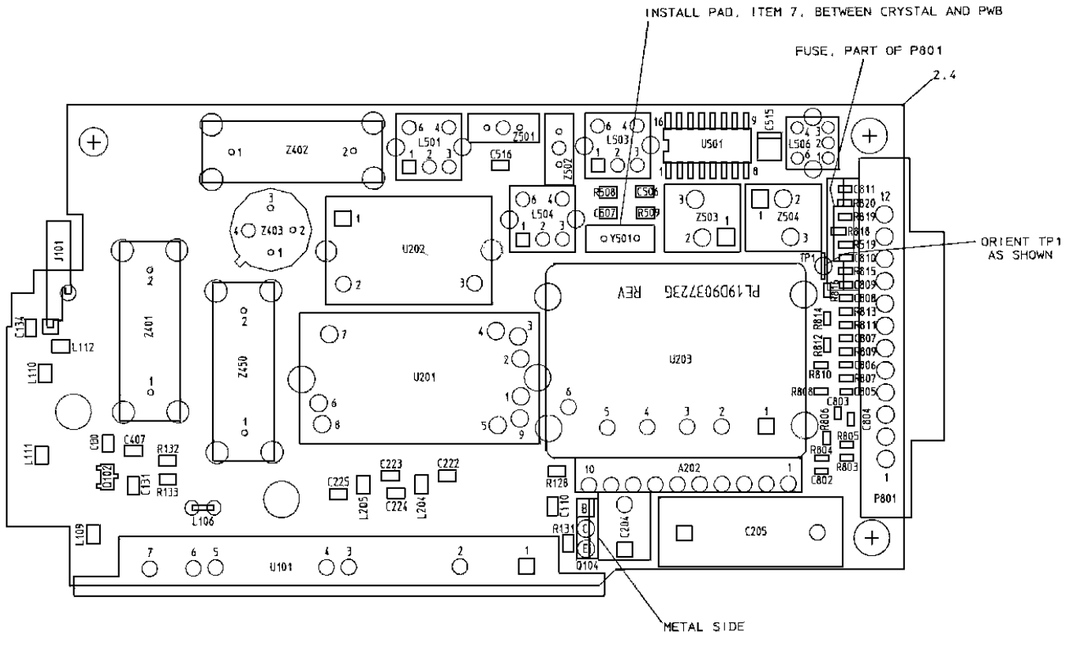
CAUTION
CONTENTS SUBJECT
TO DAMAGE BY
STATIC ELECTRICITY
DO NOT OPEN
EXCEPT AT APPROVED
STATIC FREE WORKSTAIONS

LEAD IDENTIFICATION FOR
Q1
(SOT) TRANSISTORS
(TOP VIEW)

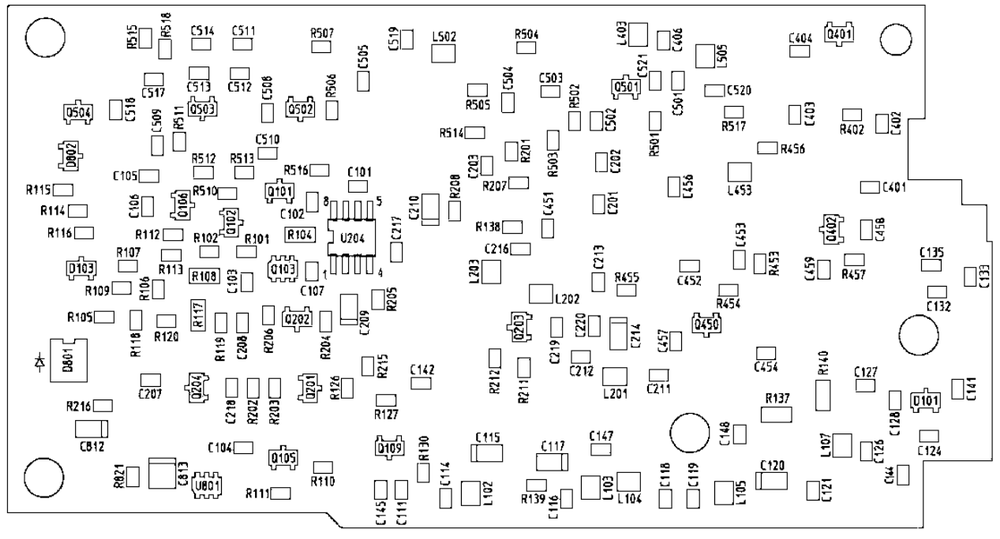


PRESCALER BOARD
19C852187G1

Front View

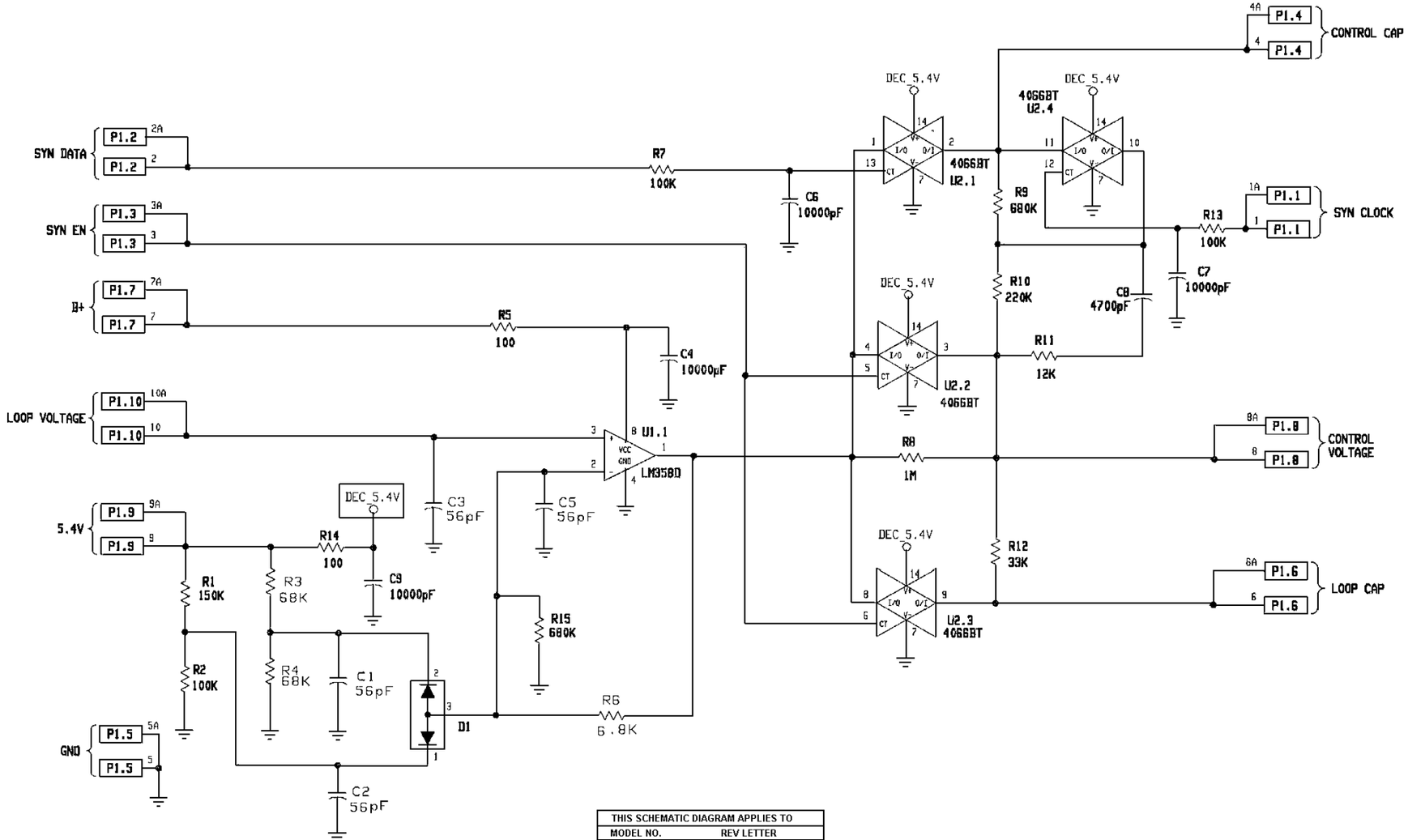


Rear View



TRANSMIT/RECEIVE BOARD
19D903723G1

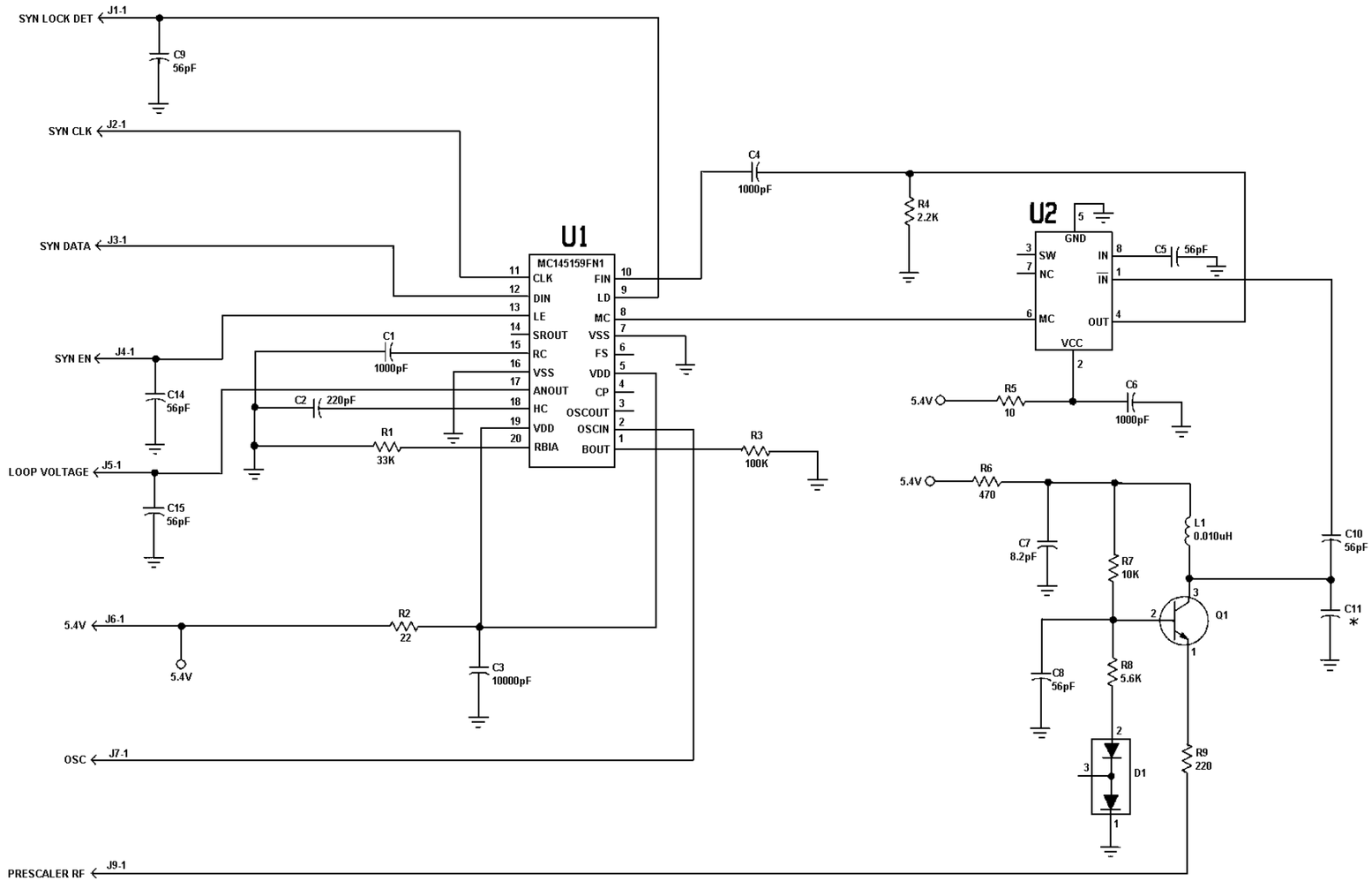
NOTES:
1. RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER K OR M.
2. ALL COMPONENTS ARE CHIP COMPONENTS.



THIS SCHEMATIC DIAGRAM APPLIES TO	
MODEL NO.	REV LETTER
PL19C852174G1	A

LOOP FILTER BOARD
19C852174G1

(19C852176, Rev. 3)



* THIS PART INTENTIONALLY OMITTED IN CURRENT BOARDS.

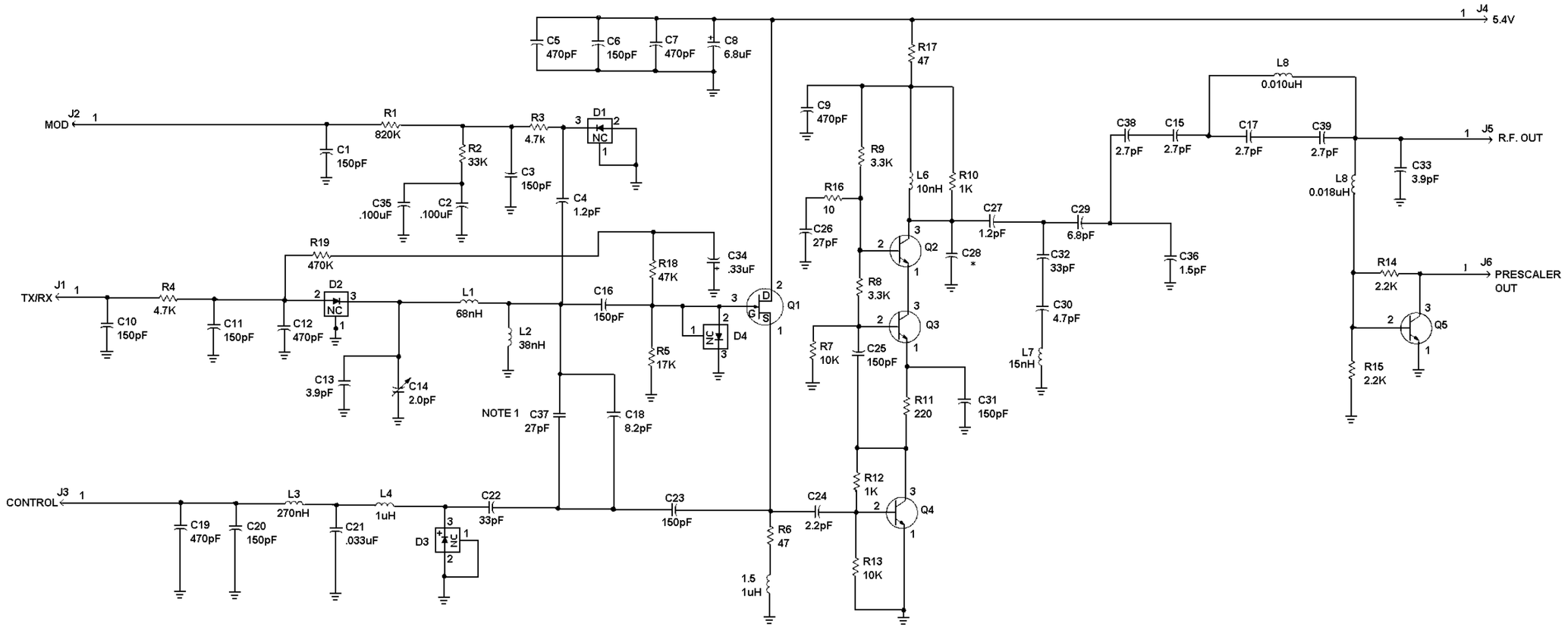
NOTES:

1. RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER K OR M.
2. ALL COMPONENTS ARE CHIP COMPONENTS.

THIS SCHEMATIC DIAGRAM APPLIES TO	
MODEL NO.	REV LETTER
PL19C852187G1	

PRESCALER BOARD
19C852187G1

(19C852189, Rev. 3)



THIS SCHEMATIC DIAGRAM APPLIES TO	
MODEL NO.	REV LETTER
PL19C85200G1	B

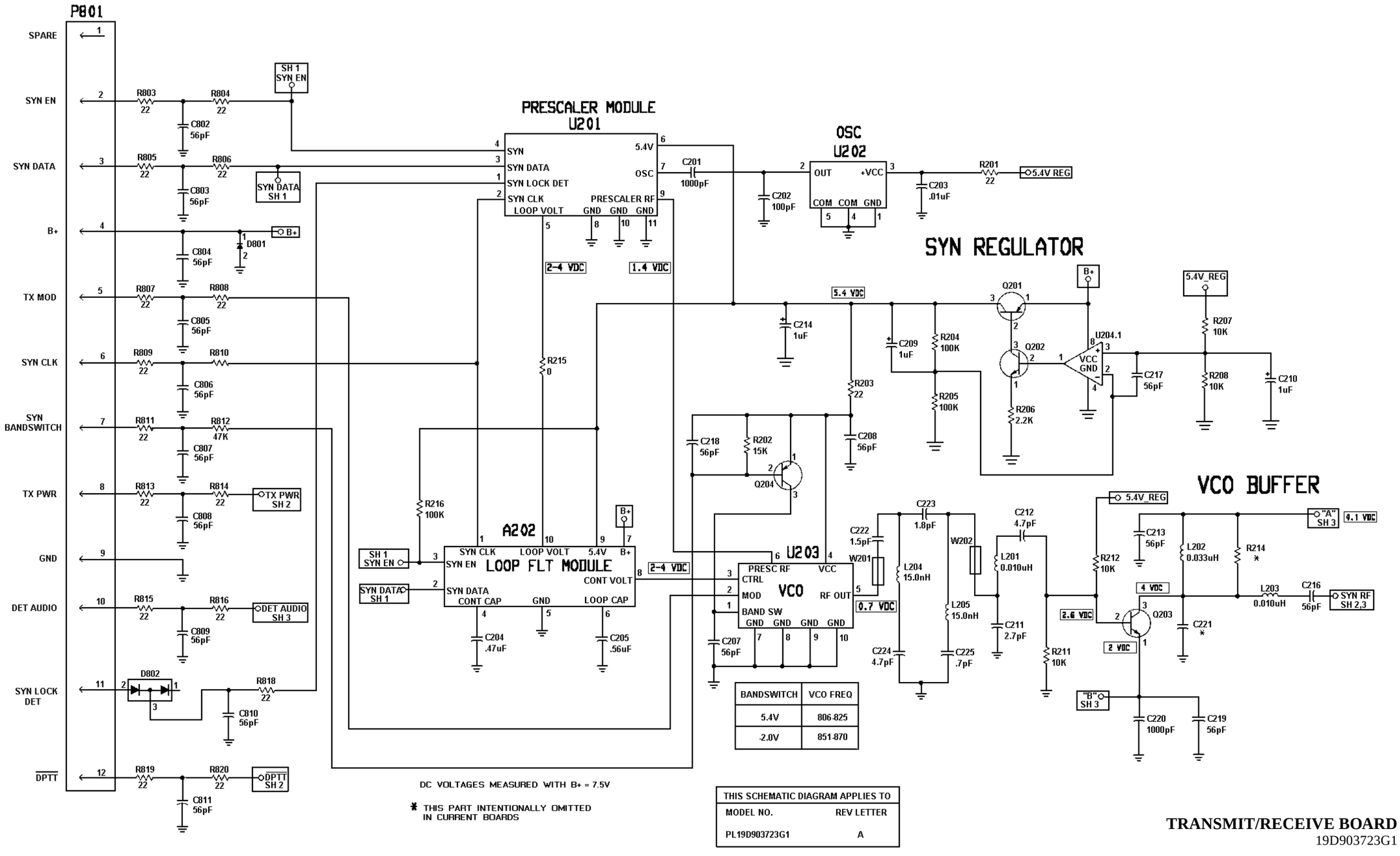
* THIS PART INTENTIONALLY OMITTED ON CURRENT BOARDS.

NOTES:

1. C37 IS MANUALLY INSERTED OVER ON PWB AND IS DRAWN AS LINES ONLY.

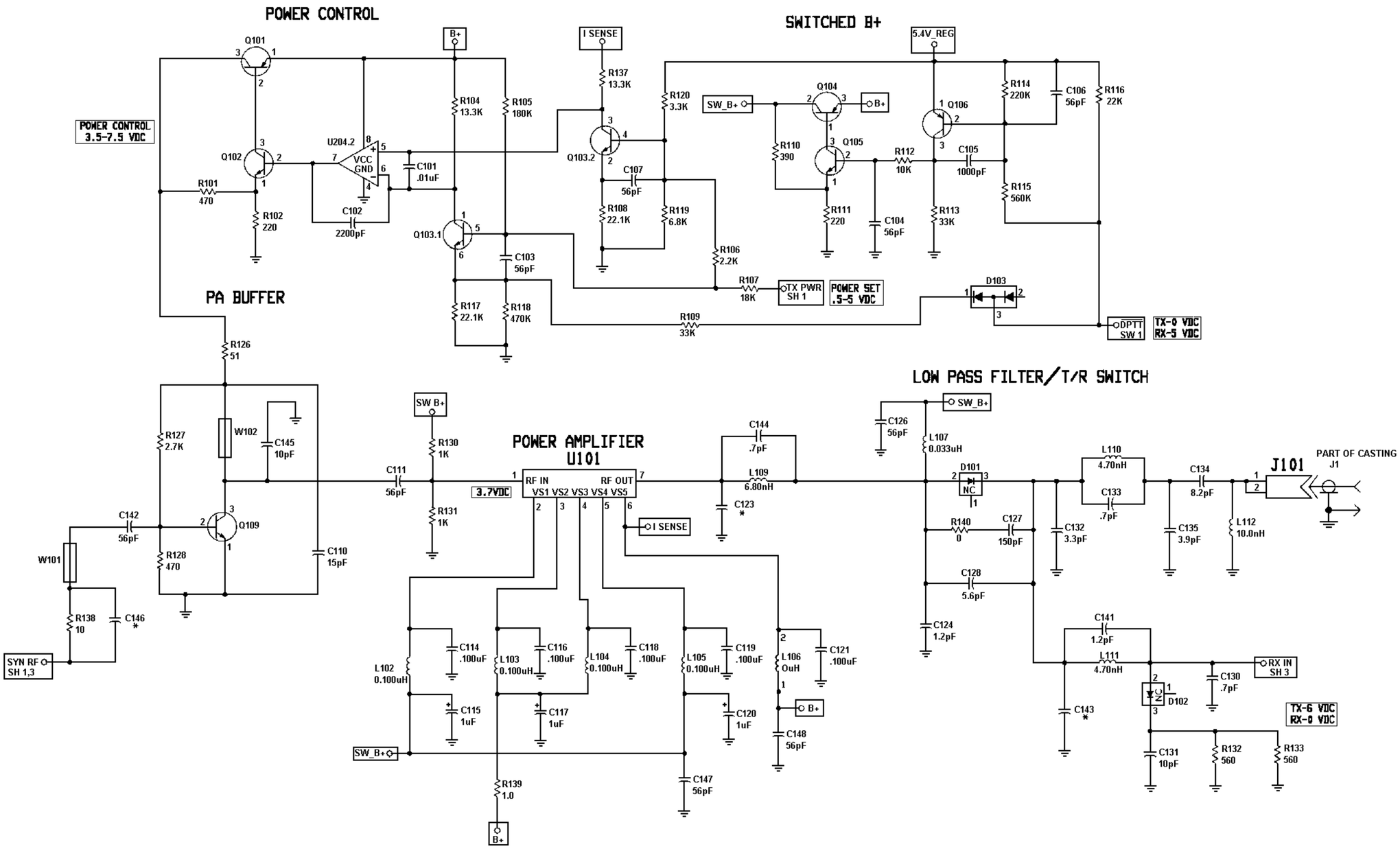
800 MHz VCO BOARD
19C852200G1

(19D903832, Rev. 5)



TRANSMIT/RECEIVE BOARD
19D903723G1

(19D903725, Sh. 1, Rev. 5)



TRANSMIT/RECEIVE BOARD
19D903723G1

(19D903725, Sh. 2, Rev. 4)

DC VOLTAGES MEASURED WITH B+ = 7.5V

* THIS PART INTENTIONALLY OMITTED IN CURRENT BOARDS

RF AMPLIFIER

SW_B+ SH 2
R57 4.7K
C459 56pF
C458 56pF
Q402
R456 180
"B" SH 2
2 VDC
C46 *
1 VDC
C403 22pF
R402 4.7K
W403 PART OF PWB
Z401
861 MHz
SH 2 RX IN
C407 56pF
W402
C402 12pF
PART OF PWB
C401 4.7pF
R403 *
Q401
C404 3.6pF
Z402
861 MHz
L403 0.010uH
C406 2.7pF
Z403
RF OSC
GND IF
L505 0.010uH
C501 1000pF
C20 1.2pF
R517 51
C21 10pF
R501 470

IF PRE AMP

R504 5.6K
R505 56
5.4V REG
L501
NC NC
GND GND
C504 .01uF
5.5 VDC
.9 VDC
Q501
Z501
C503 8.2pF
C519 1pF
Z502
L502 2.20uH
L503
NC NC
GND GND
C505 2.7pF
C506 10pF
1.6 VDC
C502 .01uF
R502 10K
R503 22K
5.4V_REG

IF AMP

5.4 VDC
C507 .01uF
R508 150
5.4V REG
R509 2.2K
C508 .01uF
IF
2.8 VDC
R506 27K
Q502
.7 VDC
R507 10K

5.4V REG
R453 10
C453 56pF
5.3 VDC
R454 10K
W404 PART OF PWB
W405
PART OF PWB
C454 3.9pF
4.8 VDC
Q450
Z450
815 MHz
SH 1,2 SYN RF
W401
PART OF PWB
C452 8.2pF
L450 *
C451 3.9 pF
R452 *
4.2 VDC
C455 *
L453 0.010uH
C456 1pF
C457 56pF
R455 22
4.1 VDC
"A" SH 1
5.4_REG
R514 27
Y501
L504
NC NC
GND GND
C510 56pF
R516 820
C515 6.8uF
C516 .100uF
5.4 VDC
5.3 VDC
R510 4.7K
5.4V REG
C509 .01uF
2.6 VDC
R511 1.5K
R512 8.8K
Z503
455KHz
IN GND OUT
Q503
R513 1.8K
C511 12pF
4.7 VDC
C512 6.8pF
U501
OSCI MXIN
OSC2 GND
MXOUT MUTE
VCC SCN
LIM IN SQL IN
DCP1 FLT0
DCP2 FLT1
QC AUD
1.8 VDC
IF
C513 .100uF
5.1 VDC
C514 .100uF
5 VDC
5.1 VDC
2.1 VDC
TP1
R515 100K
OUT GND IN
455KHz
Z504
L506
R518 10K
2.7 VDC
Q504
C517 1000pF
C518 .01uF
SH 1
DET AUDIO
2.1 VDC
R519 10K

DC VOLTAGES MEASURED WITH B+ = 7.5V

5.4 REGULATOR

UB01
CNT Vin
GND GND
GND Vout
7.5 VDC
5.6 VDC
5.4V REG
R821 2.2
7.5 VDC
B+
C812 1uF
C813 6.8uF

* THIS PART INTENTIONALLY OMITTED IN CURRENT BOARDS

TRANSMIT/RECEIVE BOARD
19D903723G1

(19D903725, Sh. 3, Rev. 4)