MAINTENANCE MANUAL
ORION™
UHF SYNTHESIZER/RECEIVER/EXCITER BOARD
CMN-354 A/B/C

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DESCRIPTION

The ORION™ UHF Synthesizer/Receiver/Exciter Board provides, on one printed circuit board, circuits for the synthesizer, receiver and transmitter exciter. The synthesizer circuit generates transmit frequencies for three splits, 403-440 MHz designated by (**A**), 440-470 MHz designated by (**B**) and 470-512 MHz designated by (**C**). The synthesizer circuit also generates the receiver injection frequencies, 320.8-357.8 MHz, 357.8-387.8 MHz and 387.8-429.8 MHz so the receive circuit can operate on the same three splits respectively.

The receive circuit is an FM dual-conversion, superheterodyne receiver designed for operation in the 403-512 MHz frequency range splits (**A**), (**B**) and (**C**). Regulated 9 Volts is provided to all receiver stages except the audio PA integrated circuit which operates from the switched A+ supply.

The receiver has Intermediate Frequencies (IF's) of 82.2 MHz and 455 kHz. Adjacent channel selectivity is obtained by using two band-pass filters, an 82.2 MHz crystal filter and a 455 kHz ceramic filter.

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The receiver circuit except for the synthesizer circuit consists of the following:

- Front End and Mixer
- 82.2 MHz 1st IF, 455 kHz 2nd IF and FM Detector
- **A**udio **S**ignal **P**rocessor (**ASP**) including Squelch
- Audio PA

The receiver Front End and Mixer Circuits are on the Synthesizer/Receiver/Exciter Board. The 82.2 MHz 1st IF and the 455 kHz 2nd IF FM Detector, ASP and Audio PA circuits are on the System Control/IF Board (refer to Maintenance Manual LBI-39034).

The Exciter circuit consists of three wide band amplifiers operating over a frequency range of 403-512 MHz without any tuning. The Exciter circuit amplifies a 2 milliwatt signal generated by a **V**oltage **C**ontrolled **O**scillator (**VCO**) in the synthesizer circuit to 500 milliwatts drive to the power amplifier.

CIRCUIT ANALYSIS

FREQUENCY SYNTHESIZER

The frequency synthesizer receives **SYNTH CLOCK**, **SYNTH DATA**, and control information from the microcomputer and generates the Tx/Rx RF frequencies (Refer to Figure 1). The synthesizer also provides frequency-lock status to the microcomputer. The synthesizer consists of synthesizer chip IC201, low and high current buffers, loop filters, Tx and Rx **V**oltage **C**ontrolled **O**scillators (**VCO**'s), feedback amplifiers, the dual modulus prescaler and the reference oscillator. The VCO's are locked to the reference oscillator by a single direct divide synthesis loop consisting of the feedback buffer, prescaler and synthesizer. The Tx VCO operates over a frequency range of 403 MHz to 512 MHz. The Rx VCO operates over the range of 320.8 to 429.8 MHz.

Reference Oscillator

The reference oscillator consists of a 2-PPM **T**emperature **C**ompensated **X**rystal **O**scillator (**TCXO**). The standard reference oscillator frequency is 12.8 MHz. The TCXO is enclosed in an RF shielded housing. Access to the oscillator trimmer is made through the hole in the top of the housing. The TCXO is compensated by an internal temperature compensating circuit for both low and high temperatures. With no additional compensation the oscillators will provide 2 PPM stability from -30/°C to +60°C.

Synthesizer

Synthesizer chip IC201 contains a programmable reference oscillator divider (+R), phase detector and programmable VCO dividers (+N, A). The reference frequency , 12.8 MHz is divided by a fixed integer number to obtain a 6.25 kHz or 5 kHz channel reference for the synthesizer. This divide value can be changed by PROM programming. The internal phase detector compares the output of the reference divider with the output of the internal N, A counter. The N, A counter receives as an input the VCO frequency divided by the dual modulus prescaler and programmed by the microcomputer. This comparison results in a ± error voltage when the phases differ and a constant output voltage when the inputs compare in frequency and phase.

If a phase error is detected an error voltage is developed and applied to the VCO DC offset, high current buffers and loop-filter to reset the VCO frequency. The count of the +N, A counters is controlled by the frequency data received on the **SYNTH CLOCK** and **SYNTH DATA** lines from the microcomputer. When a different channel is selected or when changing to the transmit or receive mode an error voltage is generated and appears at the phase-detector output, **APD OUT**, causing the Phase-Locked-Loop (**PLL**) to acquire the new frequency.

The **SYNTH ENABLE** pulse from the micro-computer enables the synthesizer and allows frequency data to be internally stored.

Equalizer

The equalizer circuit consists of operational amplifier IC203-A, resistors R205 and R207 and capacitor C205. This circuit receives transmit audio from Loop Modulation Adjust RV201. The output of the equalizer is summed with the output signal from the Phase Detector in the Adder operational amplifier IC203-B.

DC Offset And High Current Buffers

DC offset buffer transistors TR201 and TR202 and diode CD202-A receive error voltage from the synthesizer and increase the level of this error voltage by 1.8 Vdc. This extends the operating range of the high current buffers. When the PLL is off frequency due to a channel change or frequency drift, the error voltage from the Synthesizer (APD) rises or falls, turning TR201 either On or Off. This transistor (TR201) controls the DC offset buffer TR202. Resistor R214, capacitor CD202 and transistor TR202 complete a high current rapid charge or discharge path for capacitors C210, C211 and C212. As the error voltage decreases, TR201, TR202 and CD202-A turn on, completing a discharge path for C210 through C212. When the error voltage goes positive, TR201, TR202 and CD212 are turned off, allowing C210 through C212 to charge through R214.

When a channel is changed in receive and when changing from transmit to receive, bilateral switch IC204-E is turned on for 4 milliseconds and bilateral switches IC204-B & D are turned on for 3 milliseconds. When changing from receive to transmit, bilateral switches IC204C & E are turned on for 15 milliseconds and IC204B & D are turned for 5 milliseconds.

Loop Filter

The loop filter consists of resistors R216 through R218 and capacitors C210 through C212. This filter controls the bandwidth and stability of the synthesizer loop. Bilateral switch IC204 is controlled by 9 Volt **SYNTH BANDWIDTH** and **SYNTH ENABLE** pulse. When the **SYNTH BANDWIDTH** pulse and **SYNTH ENABLE** pulse are present, the bilateral switch greatly increasing the loop bandwidth to achieve the 4 millisecond channel acquisition time required for dual priority scan. The low-pass filter removes noise and other extraneous signals internal to the synthesizer chips.

The output of the filter is applied to the varicaps in the transmit and receive VCO's to adjust and maintain the VCO frequency.

The use of two VCO's allows rapid independent selection of transmit and receive frequencies across the frequency split.

Receiver Voltage Controlled Oscillator

The receiver VCO consists of low-noise oscillator transistor TR241 followed by high-gain buffer transistor TR242 and doubler transistor TR244. Transistor TR242 prevents external loading and provides power gain. Transistor TR244 multiplies the input frequency by 2. The VCO is a Colpitts oscillator circuit with the various varactors, capacitors and a high-Q resonator coil forming the tank circuit.

The VCO is switched On and Off under the control of the **T/R** line. When the **T/R** line is high, the receiver VCO is turned on (TR243). Oscillator output is typically +10 dBm. The output is applied to the feedback buffer for VCO frequency control and as the Rx injection frequency to the receiver 1st mixer through local oscillator buffers in the receive circuit. The VCO operates over a frequency range of 320.8- 429.8 MHz. The VCO voltage need only be set once at the highest frequency of the band split, after which it will operate over the entire split with no additional tuning.

Transmitter Voltage Controlled Oscillator

The transmit VCO is basically the same as the receiver VCO. This wide band VCO allows frequency separation of 37 MHz, 30 MHz or 42 MHz as determined by the bandsplit the radio is operating on, 403-440 MHz, 440-470 MHz or 470-512 MHz. The variactors in conjunction with the frequency segment selector circuitry provide a voltage controlled adjustment range that extends across the entire frequency split. The selector circuitry consists of silicon NPN transistor packages TR2301 and TR2302, and diodes CD277 through CD282. VCO control switch transistor TR273 turns the transmit VCO on when the DPTT line is low.

Feed Back Buffer

The buffered output of the Rx VCO and Tx VCO, from buffer transistors TR245 and TR274 respectively, are supplied to feedback buffer IC206. This, in turn, drives dual modulus prescaler IC205. The buffered output also provides Rx or Tx injection drive.

Dual Modulus Prescaler

The dual modulus prescaler completes the PLL feedback path from the synthesizer to the loop- filter, to the feedback buffers and then back to the synthesizer through the prescaler. The prescaler divides the VCO frequency by 128 or 129 under control of **M CONT** signal from the synthesizer. The output of the prescaler is applied to the synthesizer where it is divided down to 6.25 kHz or 5 kHz by an internal +N, A counter and compared in frequency and phase with the divided-down frequency from the reference oscillator. The result of this comparison is the error voltage used to maintain frequency lock. The +N, A counter is controlled by frequency data received from the microcomputer. Depending on the operating frequency, the DC voltage at Test Point TP201 should be within the range of 3.5 to 7.5 Vdc when the PLL is locked.

Lock Detect

The lock detect circuit consists of comparator IC207, diodes CD204 and CD205 and reference oscillator mute switch transistor TR203. It is used to quickly synchronize the phase relation of the divided- down VCO frequency with the reference oscillator if the loop loses lock. It also provides a fast lock-detect signal to the microcomputer to turn on the out-of-lock indicator. If a large change in frequency is required, the ramp capacitor output (**CR**) of the synthesizer will increase voltage on the LD line from the synthesizer. Thus, TR203 disables the reference oscillator and allows the PLL to be brought back to synchronization rapidly.

If a large frequency error exists, the LD positive lead from the synthesizer will carry negative spikes to the microcomputer. Transistor TR203 is turned on, muting the reference oscillator.

Loop Mod Adjust

The Loop Mod Adjust circuit automatically sets the loop modulation level applied to equalizer circuit IC202 and IC203 through Loop Mod Adjust RV291. The loop Mod Adjust modulation circuit consists of decoder IC208, bilateral switch IC209, resistors R2001 through R2005 and RV201. The loop modulation level is controlled by turning bilateral switches IC209 on or Off (under control of IC203) to include attenuators R2001 through R2005 in the circuit. Resistors R2001 through R2005 form an adjustable voltage divider to change the loop modulation level as required. Table 1 also identifies the resistor (if applicable) used for each frequency segment.

Frequency Segment Selector

The Frequency Segment Selector, operating under control of the microcomputer, switches capacitance in and out of the Tx and Rx VCO tank circuits to select the frequency segment containing the selected channel. The Frequency Segment Selector consists of transistor packages TR2301 through TR2303 and band switching diodes CD243 through CD248 and capacitors C277 through C282. Capacitors C224, C245, C249, C250, C254, C255 C289 C290 and C291 •are selected or deselected for operation in a given segment. Table 1 identifies the circuit conditions existing for selection of each segment and the capacitors used.

Reverse bias to turn off the band switching diodes is provided by the +8 Volt filtered supply through resistors R2303, R2306 and R2309. Forward bias for the diodes and current for the switching transistors is provided by the +8 Volts supply through resistors R2301, R2302, R2304, R2305, R2307 and R2308. When segment 3 is selected, switching TRR2301 and TR2303 are turned on. In the Tx VCO diodes CD277, CD278, CD281 and CD282 are reverse biased and CD279 and CD280 are turned on. Capacitors C289 and C291 are effectively isolated from ground and C290 is connected to ground through CD279 and CD280.

Similarly in the Rx VCO capacitors C244, C245, C254 and C255 are isolated from ground. Capacitor C250 is grounded through diodes CD245 and CD246.

Operation of the radio over the frequency ranges 403-440 MHz, 440-470 MHz or 470-512 MHz is determined by the group number of the synthesizer board. Each frequency split is divided into four operating segments varying from 7 to 13 MHz wide.

RECEIVER

Receiver Front End

An RF signal from the antenna is coupled through a low-pass filter, antenna relay and high-pass filter to the input of pre-amplifier (**PRE AMPL**) transistor TR411 (Refer to Figure 2). The output of TR411 is coupled through a switchable attenuator (about 6 dB attenuation when switched into the signal path) to the input of RF amplifier (**RF AMPL**) transistor TR412. The attenuator is controlled by pre-amplifier switch (**PRE AMPL SW**) transistor TR413. The output of TR412 is coupled through a band-pass filter to the input of 1st Mixer HC441. Front end selectivity is provided by this band-pass filter.

The **SHIFT TUNE** and **SHIFT TUNE CONTROL** selects components required to tune the receiver front end to the operating frequency. This circuit is controlled by a microprocessor inputs RxB1 and RxB2 through PNP switching transistors TR431-1 and TR431-2, TR432-1 and TR432-2. Depending on the state of **RxB1** and **RxB2**, diodes CD431 through CD434 are switched in or out to tune the RF filter between TR412 and mixer HC441 to any one of four (4) frequency segments in the split.

Table 1 - Capacitor Selection

SEGMENT	TRANSISTOR SWITCH			BAND SWITCHING DIODES						GROUNDED CAPACITORS
	TR2301	TR2302	TR2303	CD243 CD244	CD245 CD246	CD247 CD248	CD277 CD278	CD279 CD280	CD281 CD282	
1	0	0	0	ON	ON	ON	ON	ON	ON	ALL
2	0	0	1	ON	ON	ON	ON	ON	OFF	C249, C250, C244, C245, C289, C290
3	1	0	1	OFF	ON	OFF	OFF	ON	OFF	C249, C250, C290
4	1	1	1	OFF	OFF	OFF	OFF	OFF	OFF	NONE

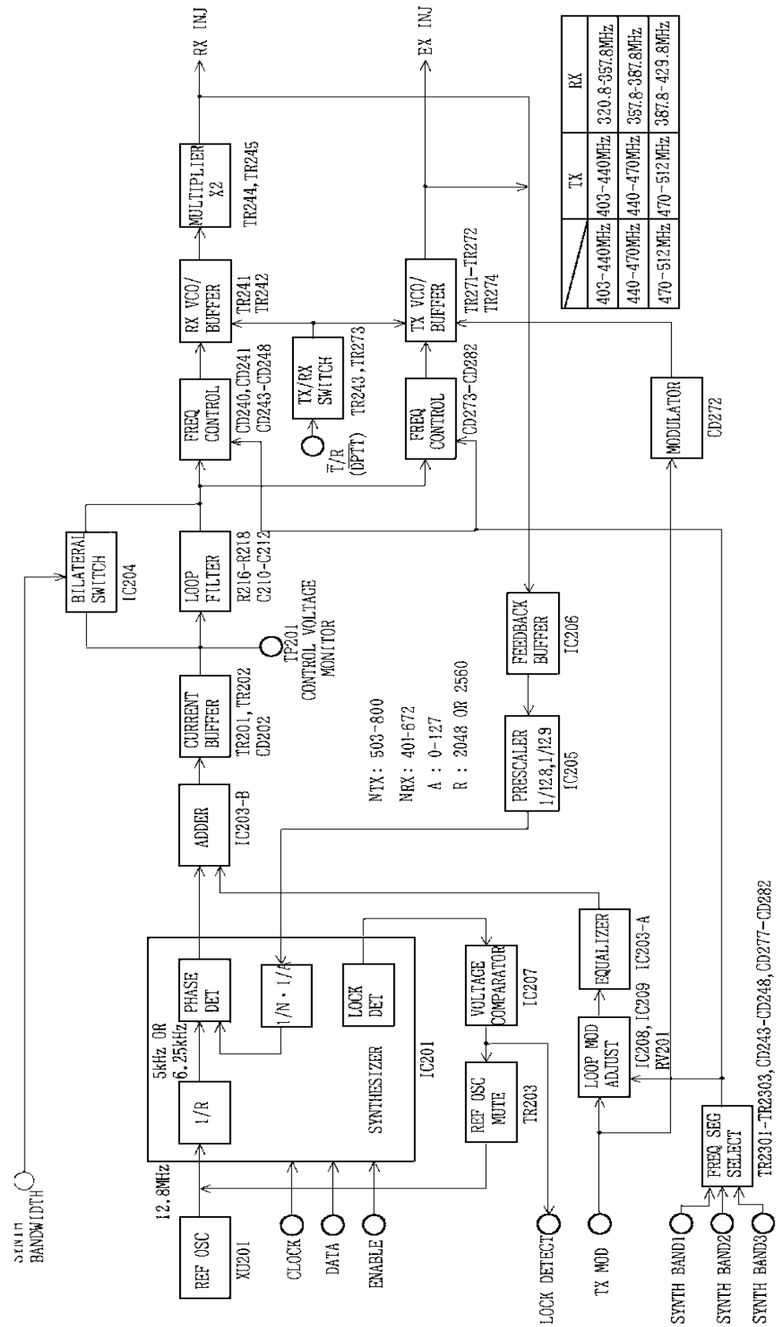


Figure 1 - Synthesizer Block Diagram

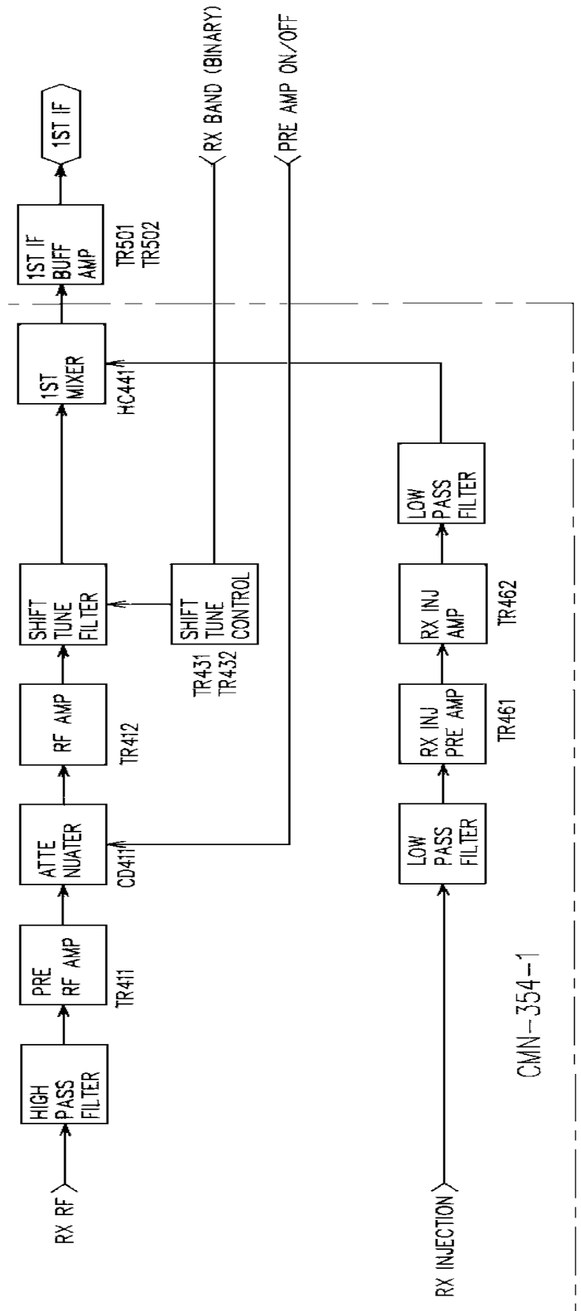


Figure 2 - Receiver Block Diagram

Receiver Injection

Receiver RF injection (320.8-429.8 MHz) from the synthesizer **V**oltage **C**ontrolled **O**scillator (**VCO**) is applied to the base of receiver injection amplifier (**Rx INJ AMP**) transistor TR451. The input level to TR451 is between 1.0 and 2.0 milliwatts. The output of TR451 is coupled to the input of receiver injection amplifier (**Rx INF AMP**) transistor TR452. The output of amplifier TR452 is filtered by a bandpass filter consisting of capacitors C475, C476, C477 and inductor L456. This filter is tuned to pass frequencies in the 320.8-429.8 MHz pass band.

1st Mixer

The first mixer is a double-balanced diode mixer (HC401) that converts a signal in the 403-512 MHz frequency range to the 82.2 MHz first IF. In the mixer stage, RF from the receiver front-end RF filter is applied to one input of the mixer. Injection voltage from the amplifier stage is applied to the other input of the mixer. The difference between the receiver front-end RF frequency and the injection frequency produces the 82.2 MHz first **I**ntermediate **F**requency (**IF**). The circuit analysis for the receiver is continued in maintenance manual LBI-38907 for **SYSTEM CONTROL LOGIC/IF/AUDIO FREQUENCY BOARD CMF-138W.**

EXCITER

The 403-512 MHz Tx injection (**TX INJ**) input from the Tx VCO is applied to the input of amplifier IC151 through an impedance matching circuit consisting of capacitor C151, inductor L151 and capacitor C152 (refer to Figure 3). The Vcc supply voltage (+5 Volts) is applied through Vcc feed network resistor R151 and inductor L152. Capacitor C155 is used to bypass the supply line. The +5 Volts is supplied by voltage regulator IC152 (3-terminal voltage regulator).

The output of IC151 drives amplifier transistor TR151 through an impedance matching circuit consisting of capacitor C154, inductor L153 and coupling capacitor C156. Resistors R151, R152 and diode CD151 set the bias voltage for TR151.

Collector voltage (+9 Volts) for TR151 is applied through a collector feed network consisting of resistor R154 and inductor L155. Capacitors C158 and C159 are bypass capacitors.

The output of TR151 is coupled to connector J151 through impedance matching components consisting of inductor L156 and capacitors C150 and C151.

Resistor R155 provides negative feedback through capacitor C157 to ensure stability.

Transistor TR151 amplifies a 20 milliwatt input level to about 400 milliwatts.

Supply voltage (A+) from connector J501 is regulated to 9 Volts by regulator IC481 (3-terminal regulator). The +9 Volts regulated output on IC481, pin 3 is applied to IC152 and TR151 through Tx power switch transistor TR152. When **TX ENBL** is high (receive mode) +9 Volts is not applied. The exciter energizes when the **TX ENBL** state is made low by the microprocessor, causing TR152 to conduct and apply the regulated +9 Volts to all exciter stages. A typical emitter voltage for TR151 is 1.5 volts.

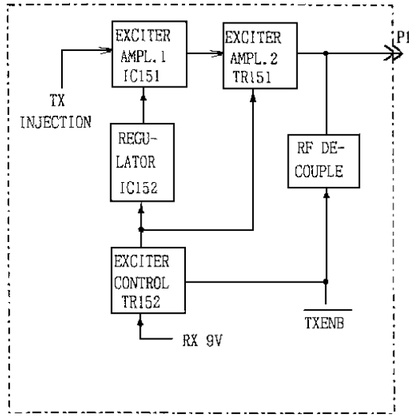
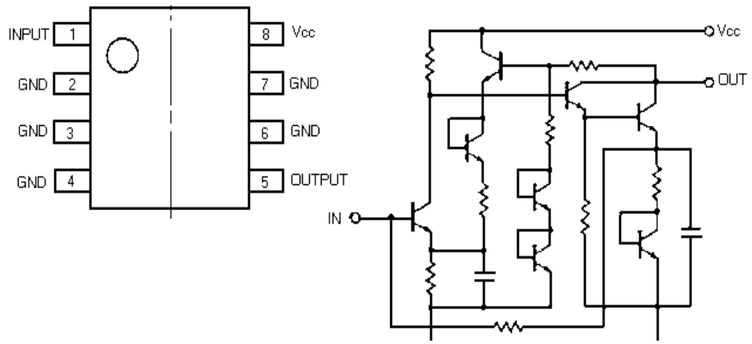
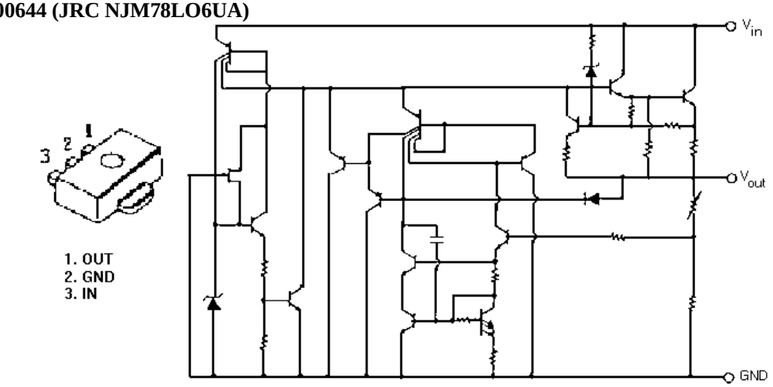


Figure 3 - Exciter Block Diagram

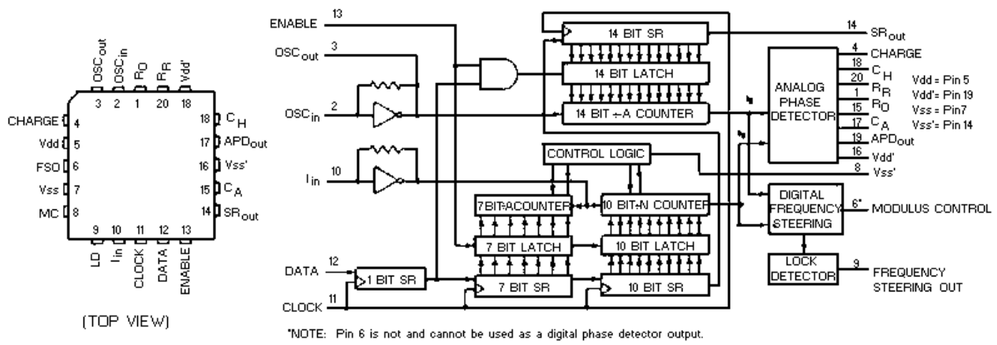
RF WIDE-BAND AMPLIFIER IC151
B19/5DDAC00946 (NEC UPC1678G)



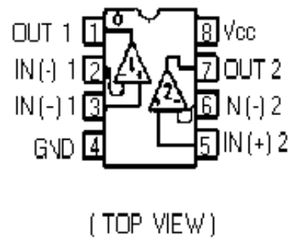
POSITIVE VOLTAGE REGULATOR IC152
B19/5DAAN00644 (JRC NJM78LO6UA)

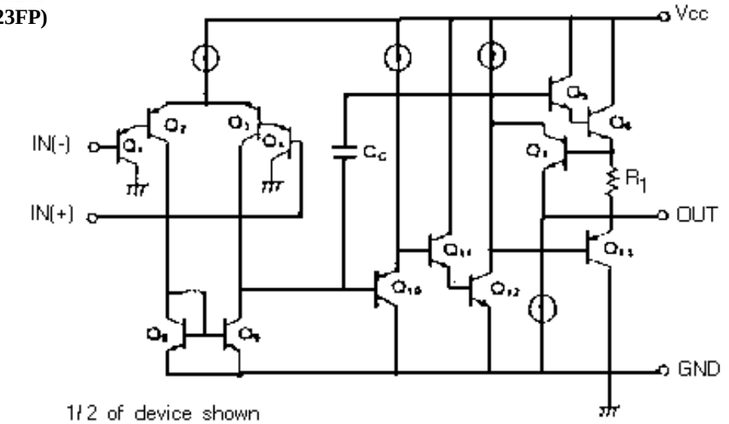


SYNTHESIZER IC201
B19/5DAAJ00861 (MOTOROLA MC145159FN)

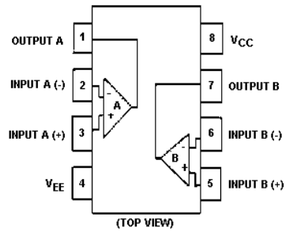


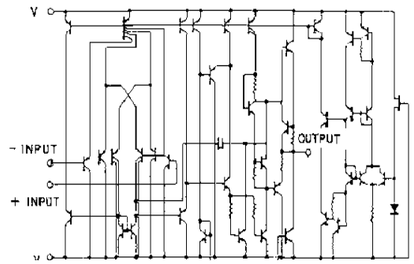
DUAL OPERATIONAL AMPLIFIER IC202
B19/5DDAB00446 (MITSUBISHI M5223FP)



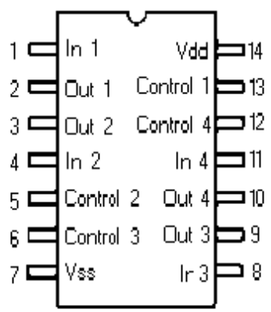


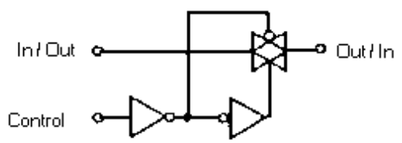
DUAL OPERATIONAL AMPLIFIER IC203
B19/5DAAN00368 (NEW JRCNJM34004AM)





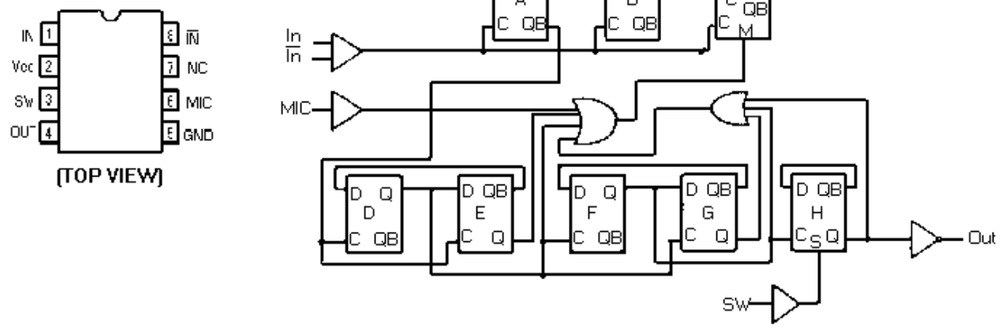
BILATERAL SWITCH IC204, IC209
B19/5DAAJ00629 (MOTOROLA MC14066BF)



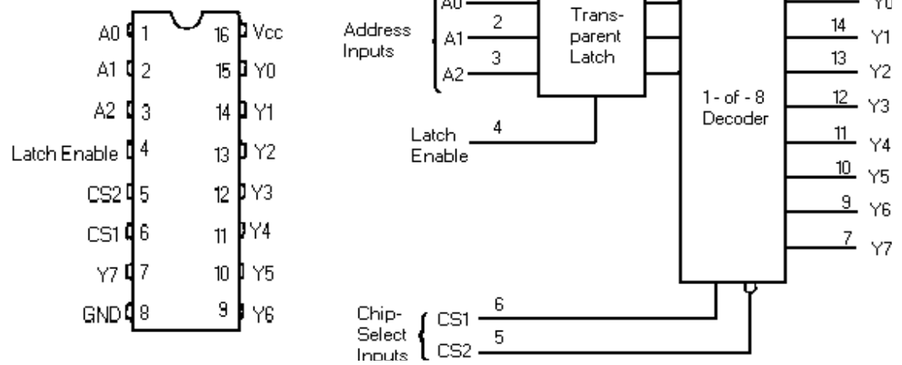


Control	Switch
0 = Vss	OFF
1 = Vdd	ON

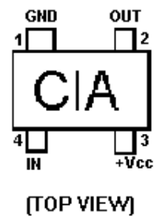
PRESCALER IC205
B19/5DDAS00232 (MOTOROLA MC12011SLAD)

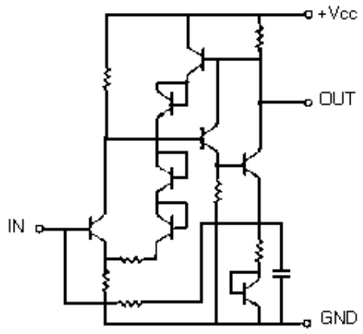


B19/5DAAJ00985 (MOTOROLA MC74HC237F) DECODER IC208

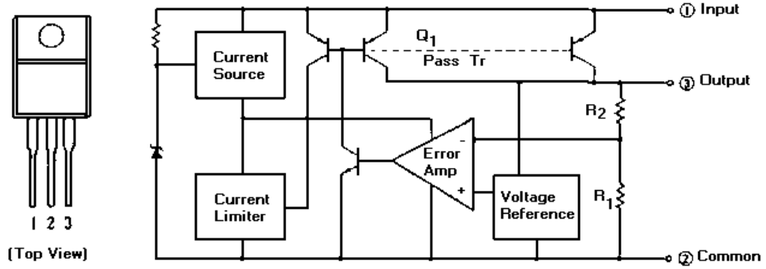


RF WIDE BAND AMPLIFIER IC206
B19/5DAAA00331 (NEC UPC1675G)

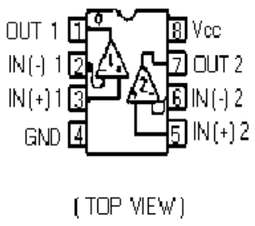


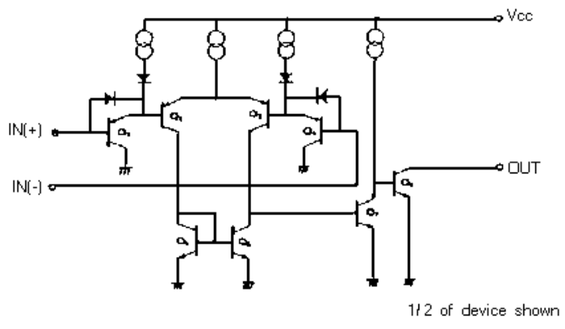


POSITIVE VOLTAGE REGULATOR IC230
B19/5DAAR00021 (MATSUSHITA AN6541)

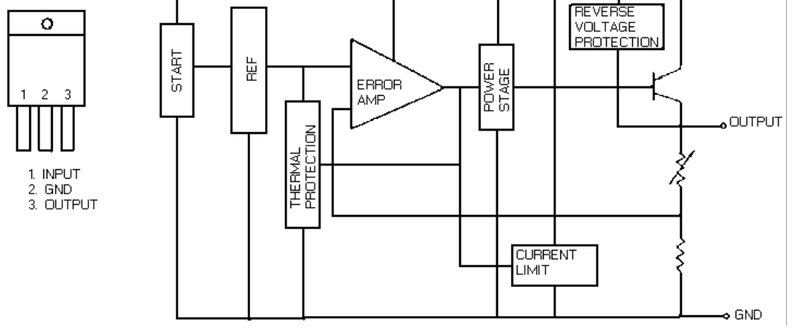


DUAL COMPARATOR IC207
B19/5DDAB00447 (MITSUBISHI M5233FP)





POSITIVE VOLTAGE REGULATOR IC481
B19/5DAAA00428 (NEC UPC2409HF)



SYNTHESIZER BOARD
CMN-354K2 A/B/C
CMN-354A (Used in P1)
CMN-354B (Used in P2)
CMN-354C (Used in P3)
Issue 1

SYMBOL	PART NO.	DESCRIPTION
		----------CAPACITORS----------
C201	B19/5CAAD01777	Ceramic: 0.047 µF ±10% 25 VDCW, temp coef ±15%.
C202	B19/5CAADO1051	Ceramic: 470 pF ±5% 50 VDCW, temp coef +350 -1000 PPM.
C203	B19/5CEAA02922	Electrolytic: 220 µF ±20% 10 VDCW.
C204	B19/5CAAD01777	Ceramic: 0.047 µF ±10% 25 VDCW, temp coef ±15%.
C205	B19/5CAAA03470	Ceramic: 0.01 µF ±10% 50 VDCW, temp coef ±15%.
C206	B19/5CRAA00419	Polyester: 0.47 µF ±5% 50 VDCW.
C207 Thru C209	B19/5CEAA02625	Electrolytic: 47 µF ±20% 16 VDCW.
C210	B19/5CRAH00066	Metallized Plastic: 1 µF ±10%.
C211	B19/5CAAD01777	Ceramic: 0.047µF ±10% 25 VDCW, temp coef ±15%.
C212	B19/5CRAA00680	Polyester: 0.1 µF ±5% 50 VDCW.
C213	B19/5CAAA03471	Ceramic:1000 pF ±10% 50 VDCW, temp coef ±15%.
C214	B19/5CAADO0838	Ceramic:1000 pF ±10% 50 VDCW, temp coef ±15%.
C215 and C216	B19/5CAAA03471	Ceramic:1000 pF ±10% 50 VDCW, temp coef ±15%.
C217	B19/5CAAD01777	Ceramic: 0.047 µF ±10% 25 VDCW, temp coef 0±15%.
C218 thru C220	B19/5CAADO0838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C221	B19/5CAAD01777	Ceramic: 0.047 µF ±10% 25 VDCW, temp coef ±15%.
C222	B19/5CAAD00839	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C223	B19/5CAAD01063	Ceramic: 680 pF ±5% 50 VDCW, temp coef +350-1000 PPM.
C224	B19/5CSAC01768	Tantalum: 10 µF ±20% 10 VDCW.
C225	B19/5CSAC01769	Tantaium: 4.7 µF ±20% 16 VDCW.
C226	B19/5CRAA01768	Tantalum: 10 µF ±20% 10 VDCW.
C227	B19/5CAAD01063	Ceramic: 680 pF ±5% 50 VDCW, temp coef +350-1000 PPM.
C230	B19/5CRAA00617	Polyester: 0.1 µF ±5% 50 VDCW.
C231	B19/5CEAA02625	Electrolytic: 47 µF ±20% 16 VDCW.
C232 and C233	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C234	B19/5CEAA02625	Electrolytic: 47 µF ±20% 16 VDCW.
C235	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C236	B19/5CEAA02625	Electrolytic: 47 µF ±20% 16 VDCW.
C240	B19/5CAADO0838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C241	B19/5CAAD00840	Ceramic: 22 pF ±5%. 50 VDCW, temp coef 0±30 PPM (Used in A).
C241	B19/5CAAD00963	Ceramic: 18 pF ±5%. 50 VDCW, temp coef 0±30 PPM (Used in B).
C241	B19/5CAAD00953	Ceramic: 10 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in C).

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	PART NO.	DESCRIPTION
C242	B19/5CAAD01696	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef -750+120 PPM (Used in A).
C242	B19/5CAAD01791	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef -750+120 PPM (Used in B).
C243	B19/5CAAD00963	Ceramic: 18 pF ±10%. 50 VDCW, temp coef 0±30 PPM (Used in A,B).
C243	B19/5CAAD00840	Ceramic: 22 pF ±10%. 50 VDCW, temp coef 0±30 PPM (Used in C).
C244	B19/5CAAD00967	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM.
C245	B19/5CAAD00989	Ceramic: 8 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C245	B19/5CAAD00951	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C245	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF. 50 VDCW, temp coef 0±30 PPM (Used in C).
C247 and C248	B19/5CAADO0838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C249	B19/5CAAD00967	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in A,C).
C249	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C250	B19/5CAAD00956	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C250	B19/5CAAD00961	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C250	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in C).
C252 and C253	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C254	B19/5CAAD00968	Ceramic: 12 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in A).
C254	B19/5CAAD00953	Ceramic: 10 pF ±5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C254	B19/5CAAD00989	Ceramic: 8 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in C).
C255	B19/5CAAD00968	Ceramic: 12 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in A).
C255	B19/5CAAD00953	Ceramic: 10 pF ±5 pF 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C257 and C258	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C259	B19/5CAAD00840	Ceramic: 22 pF ±5 pF 50 VDCW, temp coef 0±30 PPM (Used in A,B).
C259	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15% (Used in C).
C260	B19/5CAAD01791	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef -750±120 PPM (Used in A).
C260	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C260	B19/5CAAD01790	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef -750±120 PPM (Used in C).
C261	B19/5CAAD00952	Ceramic: 27 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in A).
C261	B19/5CAAD00840	Ceramic: 22 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in B,C)
C262	B19/5CAAD00948	Ceramic: 33 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in A).
C262	B19/5CAAD00952	Ceramic: 27 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C263	B19/5CAAD00852	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C264 and C265	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15% PPM.

SYMBOL	PART NO.	DESCRIPTION
C266 thru C268	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15% PPM.
C270	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C271	B19/5CAAD00852	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C272	B19/5CAAD00949	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C273 and C274	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C275	B19/5CZAJ00013	Ceramic: 18 pF ±5% 50 VDCW, temp coef -7501±20 PPM (Used in A).
C275	B19/5CAAD01422	Ceramic: 12 pF ±5%. 50 VDCW, temp coef -7501±20 PPM (Used in A,B).
C277	B19/5CAAD00956	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C278	B19/5CAAD00989	Ceramic: 8 pF ±0.25 pF 50 VDCW, temp coef ±30 PPM (Used in A).
C278	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C278	B19/5CAAD00967	Ceramic: 7 pF ±0.2 pF 50 VDCW, temp coef 0±30 PPM (Used in C)
C279	B19/5CAAD00853	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C280	B19/5CAAD00950	Ceramic: 15 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in A).
C280	B19/5CAAD00968	Ceramic: 12 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C281	B19/5CAAD00963	Ceramic: 18 pF ±10%. 50 VDCW, temp coef 0±30 PPM (Used in A).
C281	B19/5CAAD00968	Ceramic: 12 pF ±5%. 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C282	B19/5CAAD00852	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C283	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C284	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15 %.
C285	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM.
C286 and C287	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C288	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15 %.
C289	B19/5CAAD00967	Ceramic: 7 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C289	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C289	B19/5CAAD00956	Ceramic: 5 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in C).
C290	B19/5CAAD00961	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C290	B19/5CAAD00853	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C291	B19/5CAAD00989	Ceramic: 8 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C291	B19/5CAAD00967	Ceramic: 7 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C291	B19/5CAAD00962	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM (Used in C).
C293	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C295	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C297 thru C299	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.

SYMBOL	PART NO.	DESCRIPTION
C2001	B19/5CAAD00853	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef ±15%.
C2304	B19/5CAAD01777	Ceramic: 0.047 µF ±10% 25 VDCW, temp coef 0±30 PPM.
C2401	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C2402 and C2404	B19/5CAAD03471	Ceramic: 1000pF ±10% 50 VDCW, temp coef ±15%.
C2405	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM.
C2406 and C2407	B19/5CAAD03471	Ceramic: 1000pF ±10% 50 VDCW, temp coef ±15%.
C2408	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C2409	B19/5CAAA03471	Ceramic: 1000pF ±10% 50 VDCW, temp coef ±15%.
C2411	B19/5CAAD00956	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C2701	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C2702	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±30 PPM.
C2703	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C2704	B19/5CAAA03642	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C2705	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C2706	B19/5CAAA03471	Ceramic: 1000pF ±10% 50 VDCW, temp coef ±15%.
C2707	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%
		---------- DIODES ----------
CD201	B19/5TXAE00891	Zener: 4.0 V; sim to HITACHI HZM3.9N.
CD202	B19/5TXAD00320	Silicon: fast recovery (2 diodes in series); sim to TOSHIBA 1SS226.
CD203	B19/5TXAE00897	Zener: 3.6 V; sim to HITACHI HZK3B.
CD204	B19/5TXAD00320	Silicon: fast recovery (2 diodes in series); sim to TOSHIBA 1SS226.
CD205	B19/5TXAD00356	Silicon: fast recovery (2 diodes with anode Common); sim to TOSHIBA 1SS181.
CD240 and CD241	B19/5TXAD00803	Silicon: Variable Capacitance Diode; sim to TOSHIBA 1SV228.
CD243 thru CD248	B19/5TXCW00087	Silicon: Epitaxial Planer Diode: sim to ROHM 1SS318.
CD271	B19/5TXAV00114	Silicon: fast recovery (2 diodes in series); sim to PANASONIC MA153A.
CD272	B19/5TXAE00918	Silicon: Variable Capacitance Diode; sim to HITACHI HVU202.
CD273 thru CD276	B19/5TXAE00981	Silicon: Variable Capacitance Diode; sim to HITACHI HVU351.
CD277 thru CD282	B19/5TXCW00087	Silicon: Epitaxial Planer Diode: sim to ROHM 1SS318.
CD283	B19/5TXAE00912	Silicon (Schottky Barrier); sim to HITACHI HSU88.
CV201 and CV202	B19/5CVAV00003	Variable: 9 pF max.
		----------FILTERS----------
FL201 and FL202	B19/5NBAP00005	RF Filter: BPF 320-358 MHz (Used in A).

(Continued)

SYMBOL	PART NO.	DESCRIPTION
FL201 and FL202	B19/5NBAP00006	RF Filter: BPF 357-388 MHz (Used in B).
FL201 and FL202	B19/5NBAP00007	RF Filter: BPF 387-430 MHz (Used in C).
FL204	B19/5NXAA00081	EMI Filter.
		-------INTEGRATED CIRCUITS --------
IC201	B19/5DAAJ00861	Synthesizer: CMOS serial input; sim to MOTOROLA MC145159FN.
IC202	B19/5DDAB00446	Linear, Dual OP Amp; sim to MITSUBISHI M5223FP.
IC203	B19/5DAAN00368	Linear, Dual OP Amp; sim to NEW JRC NJM3404AM.
IC204	B19/5DAAJ00629	Digital, Bilateral switch: sim to MOTOROLA MC14066BF.
IC205	B19/5DDAS00232	Prescaler: sim to MOTOROLA MC12011SLAD.
IC206	B19/5DAAA00331	RF wide band amplifier: sim to NEC UPC1675G.
IC207	B19/5DDAB00516	Linear: Dual Comparator; sim to MITSUBISHI M5233FP.
IC208	B19/5DAAJ00985	Digital : Decoder; sim to MOTOROLA MC74HC237F.
IC209	B19/5DAAJ00629	Digital: Bilateral switch; sim to MOTOROLA MC14066BF.
IC230	B19/5DAAR00021	Linear: Positive Voltage Regulator; sim to PANASONIC AN6541.
		----------INDUCTORS ----------
L201	B19/5LCAA00787	Coil: RF 10µH ±10%.
L240 and L241	B19/5LCAC01369	Coil: RF 0.68 µH±10%.
L242	B19/6LALD00170	Coil: RF 28 nH (Used in A).
L242	B19/6LALD00171	Coil: RF 20 nH (Used in B, C).
L243	B19/5LCAP00296	Coil: RF 1.0 pH.
L244	B19/5LCAP00234	Coil: RF 0.22 µF ±10%.
L245	B19/5LCAP00275	Coil: RF 33 nH ±5%.
L246	B19/5LCAP00270	Coil: RF 27 nH ±5%.
L247 thru L252	B19/5LCAC01369	Coil: RF 0.68 µF ±10%.
L253	B19/5LCAP00270	Coil: RF 27 nH ±5%.
L270 and L271	B19/5LCAP00256	Coil: RF 0.18 µH ±10%.
L272	B19/5LZPA00005	Coil: Dielectric resonater (Used in A).
L272	B19/5LZPA00004	Coil: Dielectric resonater (Used in B).
L272	B19/5LZPA00003	Coil: Dielectric resonater (Used in C).
L273	B19/5LCAA00809	Coil: RF 0.47 µH ±10%.
L274	B19/5LCAP00256	Coil: RF 0.18 µH ±10%.
L275	B19/5LCAP00275	Coil: RF 33 nH ±10%.
L276 thru L278	B19/5LCAP00256	Coil: RF 0.18 µH ±10%.
L279	B19/5LCAP00275	Coil: RF 33 nH ±10%.
L280	B19/5LCAP00252	Coil: RF 19 nH ±10%.
L281	B19/5LCAA00813	Coil: RF 4.7 µH ±10%.
		---------- RESISTORS ----------
R201	B19/5REAG03228	Metal film: 10K ohms ±5%, 50 VDCW, 1/16W.
R202	B19/5RDAC02465	Metal film: 22 ohms ±5%, 100 VDCW, 1/10W.
R203	B19/5REAG03600	Metal film: 150K ohms ±5%, 50 VDCW, 1/16W.
R204	B19/5REAG03235	Metal film: 470K ohms ±5%, 50 VDCW, 1/10W.
R205	B19/5RDAC02455	Metal film: 150K ohms ±5%, 100 VDCW, 1/10W.
R206	B19/5REAG03445	Metal film: 2.2K ohms ±5%, 50 VDCW, 1/16W.
R207	B19/5REAG03238	Metal film: 1M ohms ±5%, 50 VDCW, 1/16W.
R208	B19/5REAG03445	Metal film: 2.2K ohms ±5%, 50 VDCW, 1/16W.
R209	B19/5REAG03424	Metal film: 100 ohms ±5%, 50 VDCW, 1/16W.
R210	B19/5REAG03235	Metal film: 470K ohms ±5%, 50 VDCW, 1/16W.
R211	B19/5REAG03446	Metal film: 100K ohms ±5%, 50 VDCW, 1/16W.
R213	B19/5REAG03378	Metal film: 0 ohms.
R214	B19/5RDAC03109	Metal film: 330 ohms ±5%, 50 VDCW, 1/4W.
R215	B19/5RDAC02445	Metal film: 10K ohms ±5% 100 VDCW.1/10W.
R216	B19/5REAG03638	Metal film: 56K ohms ±5%, 50 VDCW, 1/16W.
R217	B19/5REAG03425	Metal film: 15K ohms ±5%, 50 VDCW, 1/16W.
R218	B19/5REAG03354	Metal film: 6.8K ohms ±5%, 50 VDCW, 1/16W.
R219	B19/5REAG03631	Metal film: 15 ohms ±5%, 50 VDCW 1/16W.
R220 thru R224	B19/5REAG03228	Metal film: 10K ohms ±5%, 50 VDCW, 1/16W.
R225	B19/5RDAC02578	Metal film: 180 ohms ±5%, 100 VDCW, 1/10W.
R226	B19/5REAG03224	Metal film: 33 ohms ±5%, 50 VDCW, 1/16W.
R227	B19/5RDAC02578	Metal film: 180 ohms ±5%, 100 VDCW, 1/10W.
R228	B19/5RDAA02260	Metal film: 220K ohms ±5%, 50 VDCW, 1/16W.
R229	B19/5REAG03232	Metal film: 39K ohms ±5%, 50 VDCW, 1/16W.
R230	B19/5REAG03335	Metal film: 8.2K ohms ±5%, 50 VDCW, 1/16W (Used in A,C).
R230	B19/5REAG03378	Metal film: 0 ohms (Used in B).
R231	B19/5REAG03230	Metal film: 22K ohms ±5%, 50 VDCW, 1/16W.
R232	B19/5REAG03549	Metal film: 1.5K ohms ±5%, 50 VDCW, 1/16W.
R233	B19/5REAG03230	Metal film: 22K ohms ±5%, 50 VDCW, 1/16W.
R234	B19/5REAG03446	Metal film: 100K ohms ±5%, 50 VDCW, 1/16W.
R235 and R236	B19/5REAG03228	Metal film: 10K ohms ±5%, 50 VDCW, 1/16W.
R237	B19/5REAG03377	Metal film: 4.7K ohms ±5%, 50 VDCW, 1/16W.
R238	B19/5REAG03426	Metal film: 5.6K ohms ±5%, 50 VDCW, 1/16W.
R240	B19/5REAG03445	Metal film: 2.2K ohms ±5%, 50 VDCW, 1/16W.
R241	B19/5RDAC02458	Metal film: 6.8K ohms ±5%, 100 VDCW, 1/10W.
R242	B19/5RDAC02451	Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W.
R244	B19/5RDAC02468	Metal film: 150K ohms 5%, 100 VDCW, 1/10W.
R245	B19/5RDAC02452	Metal film: 5.6K ohms ±5%, 100 VDCW, 1/10W.
R246	B19/5REAG03549	Metal film: 1.5K ohms ±5%, 100 VDCW, 1/10W.
R247	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W.
R248	B19/5REAG03426	Metal film: 5.6K ohms ±5%, 50 VDCW, 1/16W.
R249	B19/5REAG03549	Metal film: 1.5K ohms ±5%, 50 VDCW, 1/16W.
R250	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W.
R251	B19/5REAG03225	Metal film: 180 ohms ±5%, 50 VDCW, 1/16W (Used in A).
R251	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R252	B19/5REAG03224	Metal film: 33 ohms ±5%, 50 VDCW, 1/16W (Used in A).
R252	B19/5REAG03548	Metal film: 18 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R253	B19/5REAG03225	Metal film: 180 ohms ±5%, 50 VDCW 1/16W (Used in A).
R253	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R254	B19/5REAG03426	Metal film: 5.6K ohms ±5%, 50 VDCW, 1/16W.
R255	B19/5REAG03549	Metal film: 1.5K ohms ±5%, 50 VDCW, 1/16W.
R256	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W.
R257	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW, 1/16W.
R258	B19/5REAG03548	Metal film: 18 ohms ±5%, 50 VDCW, 1/16W.
R259	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW 1/16W.
R260	B19/5REAG03544	Metal film: 68 ohms ±5%, 50 VDCW, 1/16W.
R261	B19/5REAG03226	Metal film: 220 ohms ±5%, 50 VDCW 1/16W.
R262 and R263	B19/5RDAC02467	Metal film: 68 ohms ±5%, 100 VDCW, 1/10W.
R264	B19/5REAG03544	Metal film: 68 ohms ±5%, 50 VDCW, 1/16W.
R270	B19/5RDAC02449	Metal film: 100K ohms ±5%, 100 VDCW, 1/10W.
R271	B19/5RDAC02483	Metal film: 33K ohms ±5%, 100 VDCW, 1/10W.
R272	B19/5RDAC02454	Metal film: 22K ohms ±5%, 100 VDCW, 1/10W.
R273	B19/5RDAC02480	Metal film: 12K ohms ±5%, 100 VDCW, 1/10W.
R274	B19/5RDAC02486	Metal film: 82K ohms ±5%, 100 VDCW, 1/10W (Used in A).
R274	B19/5RDAC02449	Metal film: 100K ohms ±5%, 100 VDCW, 1/10W (Used in B).
R274	B19/5RDAC02487	Metal film: 120K ohms ±5%, 100 VDCW, 1/10W (Used in C).
R275	B19/5RDAC02458	Metal film: 6.8K ohms ±5%, 100 VDCW, 1/10W.
R276	B19/5RDAC02451	Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W.
R278	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W.
R279	B19/5REAG03426	Metal film: 5.6K ohms ±5%, 50 VDCW, 1/16W.
R280	B19/5REAG03549	Metal film: 1.5K ohms ±5%, 50 VDCW, 1/16W.
R281	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16 W.
R282	B19/5REAG03228	Metal film: 10K ohms ±5%, 50 VDCW, 1/16W.
R283	B19/5REAG03567	Metal film: 56K ohms ±5%, 50 VDCW, 1/16W.
R284	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W.
R285	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W (Used in A).
R285	B19/5REAG03342	Metal film: 120 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R286	B19/5REAG03617	Metal film: 39 ohms ±5%, 50 VDCW, 1/16W (Used in A).
R286	B19/5REAG03547	Metal film: 56 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R287	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/10W (Used in A.)
R287	B19/5REAG03342	Metal film: 120 ohms ±5%, 50 VDCW, 1/16W (Used in B,C).
R288 thru R293	B19/5REAG03446	Metal film: 100K ohms ±5%, 50 VDCW, 1/16W.
R294	B19/5REAG03228	Metal film: 10K ohms ±5%, 50 VDCW, 1/16W.
R2001	B19/5REAG03230	Metal film: 22K ohms ±5%, 50 VDCW, 1/16W.
R2002	B19/5REAG03237	Metal film: 820K ohms ±5%, 50 VDCW, 1/16W (Used in A,B).
R2002	B19/5REAG03851	Metal film: 270K ohms ±5%, 50 VDCW, 1/16W (Used in C).
R2003	B19/5REAG03601	Metal film: 180K ohms ±5%, 50 VDCW, 1/16W (Used in A).
R2003	B19/5REAG03851	Metal film: 270K ohms ±5%, 50 VDCW, 1/16W (Used in B).
R2003	B19/5REAG03446	Metal film: 100K ohms ±5%, 50 VDCW, 1/16W (Used in C).
R2004	B19/5REAG03599	Metal film: 120 ohms ±5%, 50 VDCW, 1/16W (Used in A,B).
R2004	B19/5REAG03231	Metal film: 27K ohms ±5%, 50 VDCW, 1/16W (Used in C.)
R2005	B19/5REAG03230	Metal film: 22K ohms ±5%, 50 VDCW, 1/16W.
R2008	B19/5REAG03422	Metal film: 330 ohms ±5%, 50 VDCW, 1/16W.
R2011	B19/5REAG03238	Metal film: 1 ohms ±5%, 50 VDCW, 1/16W.
R2012	B19/5RDAC02449	Metal film: 100K ohms ±5%, 100 VDCW, 1/10W.
R2013	B19/5REAG03378	Metal film: 0 ohms.
R2301 and R2302	B19/5REAG01738	Metal film: 1K ohms ±5%, 200 VDCW, 1/8W.
R2303	B19/5RDAC02478	Metal film: 4.7K ohms ±5%, 100 VDCW, 1/10W.
R2304 and R2305	B19/5REAG01738	Metal film: 1K ohms ±5%, 200 VDCW, 1/8W.
R2306	B19/5RDAC02478	Metal film: 4.7K ohms ±5%, 100 VDCW, 1/10W.
R2307 and R2308	B19/5REAG01738	Metal film: 1K ohms ±5%, 200 VDCW, 1/8W.
R2309	B19/5RDAC02478	Metal film: 4.7K ohms ±5%, 100 VDCW, 1/10W.
R2310 thru R2312	B19/5REAG03425	Metal film: 15K ohms ±5%, 50 VDCW, 1/16W.
R2313 thru R2315	B19/5REAG03232	Metal film: 39K ohms ±5%, 50 VDCW, 1/16W.

(Continued)

SYMBOL	PART NO.	DESCRIPTION
R2401	B19/5REAG03597	Metal film: 150 ohms ±5%, 50 VDCW, 1/16W (Used in A).
R2401	B19/5REAG03424	Metal film: 100 ohms ±5%, 50 VDCW, 1/16W (Used in B).
R2401	B19/5REAG03423	Metal film: 470 ohms ±5%, 50 VDCW, 1/16W (Used in C).
R2402	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW, 1/16W.
R2403	B19/5REAG03548	Metal film: 18 ohms ±5%, 50 VDCW, 1/16W.
R2404	B19/5REAG03822	Metal film: 270 ohms ±5%, 50 VDCW, 1/16W.
RV201	B19/5RVAF00077	Variable: 20K ohms ±25% , 1/10W.
		----------TRANSISTORS ----------
TR201 and TR202	B19/5TBAB00055	Silicon, PNP: sim to NEC 2SC624.
TR203	B19/5TKAK00029	Silicon, NPN: sim to PANASONIC XP1211.
TR230	B19/5TDAB00054	Silicon, NPN: sim to NEC 2SD596.
TR241 and TR242	B19/5TCAB00288	Silicon, NPN: sim to NEC 2SC3356.
TR243	B19/5TKAK00025	Silicon, NPN: sim to PANASONIC UN5216.
TR244 and TR245	B19/5TCAB00288	Silicon, NPN: sim to NEC 2SC3356.
TR271	B19/5TCAA00352	Silicon, NPN: sim to HITACHI 2SC4591.
TR272	B19/5TCAB00288	Silicon, NPN: sim to NEC 2SC3356.
TR273	B19/5TKAK00015	Silicon, NPN: sim to NEC 2SC3356.
TR274	B19/5TCAB00288	Silicon, NPN: sim to NEC 2SC3356.

RECEIVER/EXCITER SECTION
CMN-354A (Used in P1)
CMN-354B (Used in P2)
CMN-354C (Used in P3)

SYMBOL	PART NO.	DESCRIPTION
		----------CAPACITORS----------
C151 and C152	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM.
C153	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C154	B19/5CAAA03285	Ceramic: 10 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM.
C156	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0æ60 PPM.
C157 thru C159	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C161	B19/5CAAA03001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM.
C162	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C163 and C164	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C165 and C166	B19/5CAAA03921	Ceramic: 0.1 µF ±10% 25 VDCW, temp coef ±15%.
C169	B19/5CSAD00403	Tantalum: 22µF ±20% 16 VDCW.
C171	B19/5CAAD00838	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C401	B19/5CAAA03448	Ceramic: 8 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C401	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in B,C).
C402	B19/5CAAA03446	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C402	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in B,C).
C403	B19/5CAAA03448	Ceramic: 8 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A,C).
C403	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in B).
C404	B19/5CAAA03447	Ceramic: 7 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A,C).
C404	B19/5CAAA03446	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in B).
C405	B19/5CAAA03285	Ceramic: 10 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C405	B19/5CAAA03698	Ceramic: 9 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in B,C).
C406	B19/5CAAA03920	Ceramic: 75 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in A).
C406	B19/5CAAA03647	Ceramic: 56 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in B).
C406	B19/5CAAA03286	Ceramic: 39 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in C).
C407	B19/5CAAA03409	Ceramic: 15 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in A).
C407	B19/5CAAA04030	Ceramic: 13 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in B).
C407	B19/5CAAA03448	Ceramic: 8 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in C).
C408	B19/5CAAA03698	Ceramic: 9 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C408	B19/5CAAA03448	Ceramic: 8 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in B).

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	PART NO.	DESCRIPTION
C408	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in C).
C409	B19/5CAAA03657	Ceramic: 18 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in A,B).
C409	B19/5CAAA03408	Ceramic: 12 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in C).
C411 and C412	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in A,B).
C411 and C412	B19/5CAAAO3001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in C).
C413	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C414	B19/5CBAB02717	Ceramic: 330 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C415	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C416	B19/5CAAA03001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C416	B19/5CAAA03003	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef 0±120 PPM (Used in B).
C416	B19/5CAAA03000	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C417	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW temp coef 0±60 PPM.
C418	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM.
C419	B19/5CBAB02717	Ceramic: 330 pF ±5%. 50 VDCW temp coef 0±60 PPM.
C420	B19/5CAAA03471	Ceramic: 1000 pF ±10%. 50 VDCW temp coef ±15%.
C421	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C423 and C424	B19/5CBAB02717	Ceramic: 330 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C425	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C426	B19/5CAAA03471	Ceramic: 1000 pF ±10%. 50 VDCW, temp coef ±15%.
C427 and C428	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C430	B19/5CAAA03004	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A).
C430	B19/5CAAA03444	Ceramic: 0.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B).
C430	B19/5CAAA03919	Ceramic: 0.75 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C431	B19/5CAAA03919	Ceramic: 0.75 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A,B).
C431	B19/5CAAA03444	Ceramic: 0.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C432	B19/5CAAA03000	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A).
C432	B19/5CAAA03061	Ceramic: 1.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B).
C433	B19/5CAAA03444	Ceramic: 0.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A).
C433	B19/5CAAA03919	Ceramic: 0.75 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B).
C433	B19/5CAAA03000	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C434	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C436	B19/5CAAA03004	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM.

SYMBOL	PART NO.	DESCRIPTION
C437	B19/5CAAA03446	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C437	B19/5CAAA03001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in B).
C437	B19/5CAAA03000	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C438 and C439	B19/5CAAD01054	Ceramic: 1.5 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in A).
C438	B19/5CAAD00852	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B,C).
C439	B19/5CAAD00949	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in B).
C439	B19/5CAAD00852	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in C).
C440	B19/5CAAA03446	Ceramic: 6 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM (Used in A).
C440	B19/5CAAA03001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM (Used in B).
C440	B19/5CAAA03000	Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C441	B19/5CAAA03004	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM.
C443	B19/5CAAA03003	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef 0±120 PPM (Used in A).
C443	B19/5CAAA03004	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B).
C443	B19/5CAAA03919	Ceramic: 0.75 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in C).
C444	B19/5CAAA03061	Ceramic: 1.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B,C).
C445	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C446	B19/5CAAA03061	Ceramic: 1.5 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A,C).
C446	B19/5CAAA03004	Ceramic: 1 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in B).
C447	B19/5CAAA03919	Ceramic: 0.75 pF ±0.25 pF 50 VDCW, temp coef 0±250 PPM (Used in A,B).
C448 thru C456	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C459	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C461	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C462	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15 %.
C463	B19/5CBAB02416	Ceramic: 100 pF ±5%. 50 VDCW, temp coef 0±60 PPM.
C465	B19/5CBAB02717	Ceramic: 330 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C467	B19/5CAAA03001	Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM.
C468	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C473	B19/5CAAA03285	Ceramic: 10 pF ±0.5 pF 50 VDCW, temp coef 0±60 PPM.
C474	B19/5CBAB02416	Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C475 and C476	B19/5CAAA03003	Ceramic: 3 pF ±0.25 pF 50 VDCW, temp coef 0±120 PPM.
C477	B19/5CAAA03229	Ceramic: 5 pF ±0.25 pF 50 VDCW, temp coef 0±60 PPM.
C478	B19/5CBAB02717	Ceramic: 330 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C479	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW temp coef ±15%.

(Continued)

SYMBOL	PART NO.	DESCRIPTION
C480	B19/5CAAA03921	Ceramic: 0.1µF ±10% 25 VDCW, temp coef ±15%.
C481	B19/5CSAD00403	Tantalum: 22µF ±20% 16 VDCW.
C482	B19/5CAAA03921	Ceramic: 0.1µF ±10% 25 VDCW, temp coef ±15%.
C483 thru C486	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
C487	B19/5CAAA03471	Ceramic: 1000 pF ±10% 50 VDCW, temp coef ±15%.
CV431 and CB432	B19/5CVAC00145	Variable: 6 pF max.
		----------DIODES ----------
CD151	B19/5TXAD00713	Silicon: fast recovery sim to TOSHIBA 1SS352.
CD152	B19/5TXAD00290	Silicon: fast recovery (2 diodes in cathode); sim to TOSHIBA 1SS184.
CD411	B19/5TXAR00086	Silicon: (Schottky Barrier): sim to MITSUBISHI MI809.
CD431 thru CD434	B19/5TXAE00836	Silicon: Epitaxia Planar Diode ; sim to HITACHI HSU277
		---------- LINE FILTERS ----------
FL481	B19/5NXAA00102	EMI Filter: 1000 pF.
		--------- HYBRID CIRCUITS ---------
HC441	B19/5NZBH00002	Double Balanced Mixer.
		---------- INTEGRATED CIRCUITS ----------
IC151	B19/5DDAC00946	RF wide-band ampifier :sim to NEC UPC1678G.
IC152	B19/5DAAN00644	Linear: Positive Voltage Regulator; sim to NJRC NJM78L06UA.
IC481	B19/5DAAA00428	Linear: Positive Voltage Regulator; sim to NEC UPC2409HF.
		---------- CONNECTORS ----------
J151	B19/5JAAA01686	Connector: RF.
J401	B19/5JAAA01686	Connector: RF.
J501	B19/5JBAX00018	Connector: 30 Pins.
		---------- COILS ----------
L151	B19/5LCAP00252	Coil: RF 19 nh ±10%.
L152	B19/5LCAP00299	Coil: RF 0.1 µh ±10%.
L154	B19/5LCAP00234	Coil: RF 0.22 µh ±10%.
L155	B19/5LCAP00240	Coil: RF 33 nh ±10%.
L156	B19/5LCAP00250	Coil: RF 10 nh ±10%.
L157	B19/5LCAP00234	Coil: RF 0.22 µh ±10%.
L401	B19/6LALD19203	Coil: RF (Used in A).
L401	B19/6LALD19183	Coil: RF (Used in B,C).
L402	B19/6LALD19204	Coil: RF (Used in A,C).
L402	B19/6LALD19184	Coil: RF (Used in B).
L403	B19/6LALD19205	Coil: RF (Used in A,C).
L403	B19/6LALD19185	Coil: RF (Used in B).
L404	B19/6LALD19204	Coil: RF (Used in A).
L404	B19/6LALD19184	Coil: RF (Used in B,C).
L411	B19/6LALD19153	Coil: RF.
L412	B19/5LCAP00249	Coil: RF 22 nh ±10%.
L414	B19/5LCAP00249	Coil: RF 22 nh ±10%.
L431 and L432	B19/6LALD00167	Coil: RF.

SYMBOL	PART NO.	DESCRIPTION
L462	B19/5LCAP00249	Coil: RF 22 nh ±10%.
L464	B19/5LCAP00242	Coil: RF 39 nh ±10%.
L465	B19/5LCAP00250	Coil: RF 10 nh ±10%.
		----------RESISTORS ----------
R151	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, 1/16W.
R152	B19/5RDAC02832	Metal film: 220 ohms ±5% 100 VDCW, 1/16W.
R153	B19/5RDAC02822	Metal film: 1.5K ohms ±5% 100 VDCW, 1/16W.
R154	B19/5REAG03959	Metal film: 2.2 ohms ±10% 100 VDCW, 1/2W.
R155	B19/5RDAC02832	Metal film: 220 ohms ±5% 100 VDCW, 1/16W.
R156	B19/5RDAC02447	Metal film: 100 ohms ±5% 100 VDCW, 1/10W.
R157	B19/5RDAC02821	Metal film: 3.3K ohms ±5% 100 VDCW, 1/16W.
R158	B19/5RDAC02446	Metal film: 1k ohms ±5% 100 VDCW, 1/10W.
R159	B19/5RDAC02828	Metal film: 100 ohms ±5% 100 VDCW, 1/16W.
R411	B19/5RDAC02816	Metal film: 5.6K ohms ±5% 100 VDCW, 1/16W.
R412	B19/5RDAC02835	Metal film: 1.2K ohms ±5% 100 VDCW, 1/16W.
R413 and R414	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, 1/16W.
R415	B19/5RDAC02897	Metal film: 22 ohms ±5% 100 VDCW, 1/16W.
R416	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, 1/16W.
R417	B19/5RDAC02835	Metal film: 1.2K ohms ±5% 100 VDCW, 1/16W.
R418	B19/5RDAC02816	Metal film: 5.6K ohms ±5% 100 VDCW, 1/16W.
R420	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, /16W.
R421	B19/5RDAC02828	Metal film: 100 ohms ±5% 100 VDCW, 1/16W.
R422	B19/5RDAC02821	Metal film: 3.3K ohms ±5% 100 VDCW, 1/16W.
R423	B19/5RDAC02804	Metal film: 8.2K ohms ±5% 100 VDCW, 1/16W.
R424	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, 1/16W.
R425	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W.
R426	B19/5RDAC02834	Metal film: 470 ohms ±5% 100 VDCW, 1/16W.
R431 thru R434	B19/5RDAC02807	Metal film: 10K ohms ±5% 100 VDCW, 1/16W.
R435	B19/5RDAC02896	Metal film: 18 ohms ±5% 100 VDCW, 1/16W.
R436 and R437	B19/5RDAC02833	Metal film: 270 ohms ±5% 100 VDCW, 1/16W.
R438	B19/5RZAB01429	Metal film: 0 ohms.
R445 thru R447	B19/5RDAC02803	Metal film: 100K ohms ±5% 100 VDCW, 1/16W.
R448 and R449	B19/5RDAC02807	Metal film: 10K ohms ±5% 100 VDCW, /16W.
R450 thru R452	B19/5RDAC02803	Metal film: 100K ohms ±5% 100 VDCW, 1/16W.
R453 and R454	B19/5RDAC02807	Metal film: 10K ohms ±5% 100 VDCW, 1/16W.
R461	B19/5RDAC02816	Metal film: 5.6K ohms ±5% 100 VDCW, 1/16W.

SYMBOL	PART NO.	DESCRIPTION
R462	B19/5RDAC02819	Metal film: 1K ohms ±5% 100 VDCW, 1/16W.
R464	B19/5RDAC02893	Metal film: 10 ohms ±5% 100 VDCW, 1/16W.
R465	B19/5RDAC02460	Metal film: 47 ohms ±5% 100 VDCW, 1/10W.
R466	B19/5RDAC02816	Metal film: 5.6K ohms ±5% 100 VDCW, 1/16W.
R467	B19/5RDAC02819	Metal film: 1K ohms ±5% 100 VDCW, 1/16W.
R469	B19/5RDAC02460	Metal film: 47 ohms ±5% 100 VDCW, 1/10W.
R470	B19/5RZAB01429	Metal film: 0 ohms.
R471 and R472	B19/5RDAC02833	Metal film: 270 ohms ±5% 100 VDCW, 1/16W.
R473	B19/5RDAC02896	Metal film: 18 ohms ±5% 100 VDCW, 1/16W.
R474	B19/5RDAC02833	Metal film: 270 ohms ±5% 100 VDCW, 1/16W.
R475	B19/5RDAC02896	Metal film: 18 ohms ±5% 100 VDCW, 1/16W.
R476	B19/5RDAC02833	Metal film: 270 ohms ±5% 100 VDCW, 1/16W.
R477 and R478	B19/5RDAC02460	Metal film: 47 ohms ±5% 100 VDCW, 1/10W.
R480	B19/5RDAC02777	Metal film: 22K ohms ±5% 100 VDCW, 1/16W (Used in A).
R480	B19/5RDAC02808	Metal film: 47K ohms ±5% 100 VDCW, 1/16W (Used in B).
R480	B19/5RDAC02805	Metal film: 68K ohms ±5% 100 VDCW, 1/16W (Used in C).
R481	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in A).
R482	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in B).
R483	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in C).
R484	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in A).
R485	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in B).
R486	B19/5RDAC02825	Metal film: 2.2K ohms ±5% 100 VDCW, 1/16W (Used in C).
R487	B19/5RDAC02897	Metal film: 22 ohms ±5% 100 VDCW, 1/16W.
R488 thru R490	B19/5RDAC02819	Metal film: 1K ohms ±5% 100 VDCW, 1/16W.
		----------TRANSISTORS ----------
TR151	B19/5TZAR00019	Silicon, NPN; sim to MOTOROLA MRF559.
TR152	B19/5TBAB00100	Silicon, PNP; sim to NEC 2SB624.
TR411 and TR412	B19/5TCAB01463	Silicon, NPN; sim to NEC 2SC3357.
TR413	B19/5TZAT00118	Silicon, PNP; sim to PANASONIC XN6401.
TR431 and TR432	B19/5TZAT00118	Silicon, PNP; sim to PANASONIC XN6401.
TR461 and TR462	B19/5TCAB01463	Silicon, NPN; sim to NEC 2SC3357.

COMPONENT IDENTIFICATION CHART
Synthesizer

Symbol	**A** (403-440 MHz)	**B** (440-470 MHz)	**C** (470-512 MHz)
C241	22pF	18pF	10pF
C242	4pF (UJ)	7pF (UJ)	----
C343	18pF	18pF	22pF
C244	7pF	7pF	7pF
C245	8pF	7pF	6pF
C249	7pF	6pF	7pF
C250	5pF	4pF	6pF
C254	12pF	10pF	8pF
C255	12pF	10pF	10pF
C259	10pF	10pF	1000pF
C260	7pF (UJ)	6pF	6pF (UJ)
C261	27pF	22pF	22pF
C262	33pF	27pF	27pF
C275	18pF (UJ)	12pF (UJ)	12pF (UJ)
C278	8pF	6pF	7pF
C279	3pF	3pF	3pF
C280	15pF	12pF	12pF
C281	18pF	12pF	12pF
C289	7pF	6pF	6pF
C290	4pF	3pF	4pF
C291	8pF	7pF	6pF
C2410	----	----	8pF (UJ)
C2411	----	5pF	----
FL201	BPF35819K (7C)	BPF35819K (7C)	BPF35819K (7C)
FL202	BPF35819K (7C)	BPF35819K (7C)	BPF35819K (7C)
L242	E22S6K2 , 6/13 , 2	E22S6K2 , 6/13 , 2	E22S6K2 , 6/13 , 2
R230	8.2kΩ	0Ω	8.2kΩ
R251	180Ω	270Ω	270Ω
R252	33Ω	18Ω	18Ω
R253	180Ω	270Ω	270Ω
R274	82kΩ	100kΩ	120kΩ
R285	150Ω	120Ω	120Ω
R286	39Ω	56Ω	56Ω
R287	150Ω	120Ω	120Ω
R2002	820kΩ	820kΩ	270kΩ
R2003	180kΩ	270kΩ	100kΩ
R2004	120kΩ	120kΩ	68kΩ
R2401	150Ω	100Ω	470Ω

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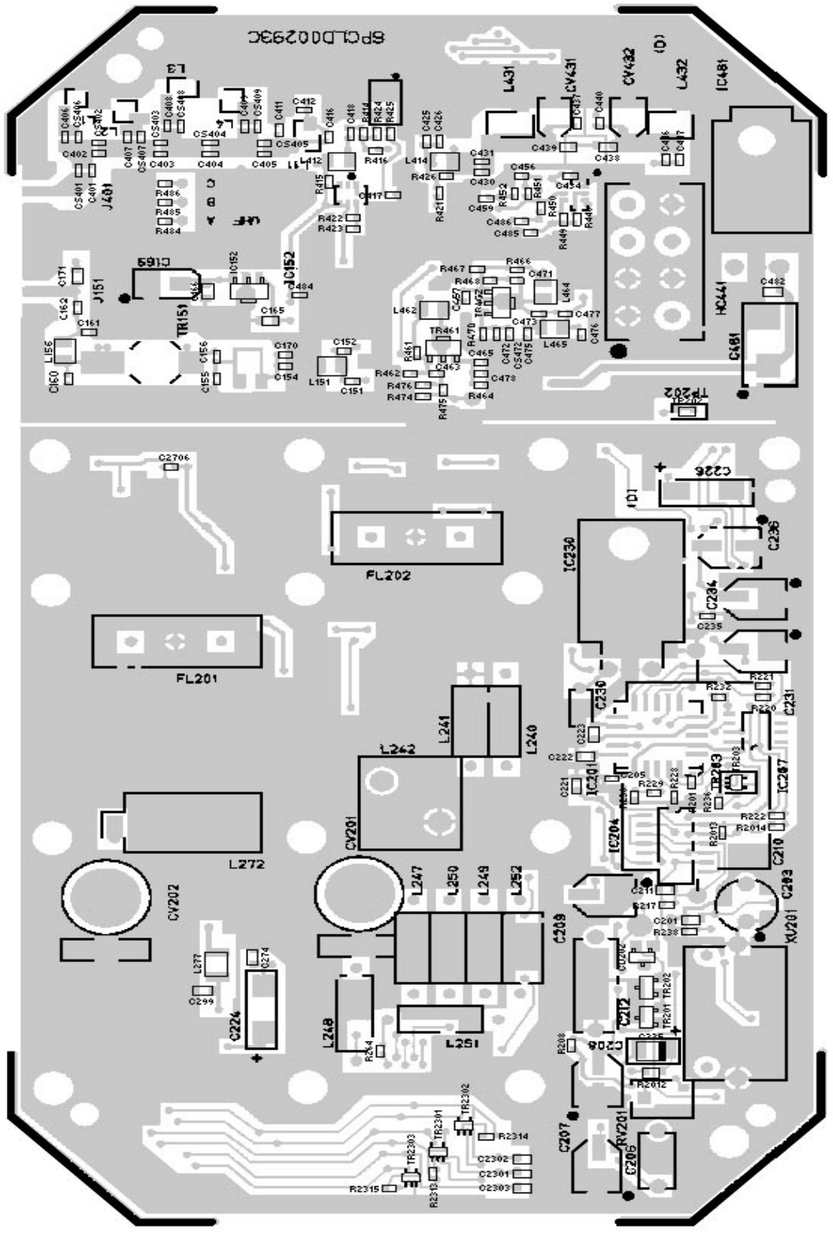
COMPONENT IDENTIFICATION CHART
Receiver/Exciter

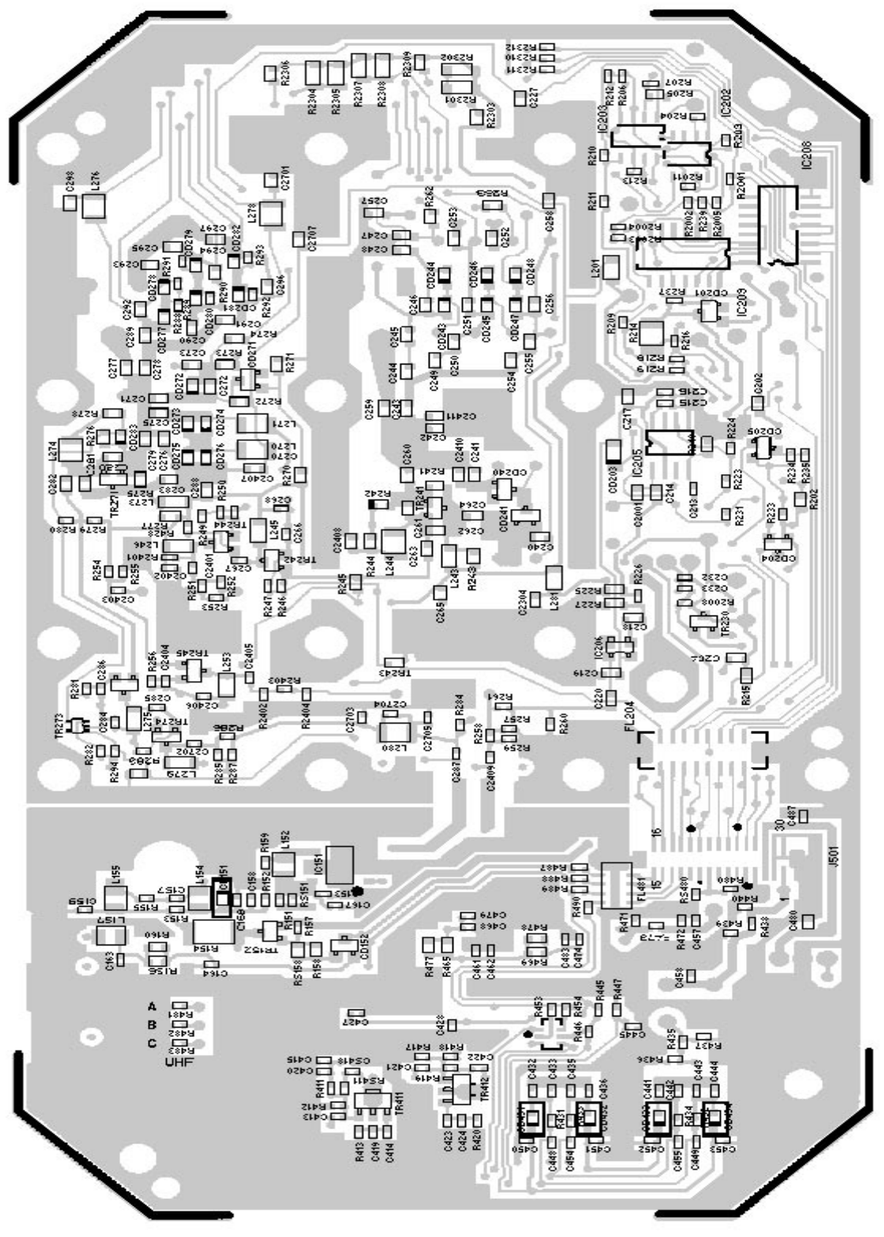
Symbol	**A** (403-440 MHz)	**B** (440-470 MHz)	**C** (470-512 MHz)
C401	8pF	7pF	7pF
C402	6pF	5pF	5pF
C403	8pF	7pF	8pF
C404	7pF	6pF	7pF
C405	10pF	9pF	9pF
C406	75pF	56pF	39pF
C407	15pF	13pF	8pF
C408	9pF	8pF	5pF
C409	18pF	18pF	12pF
C411	5pF	5pF	4pF
C412	5pF	5pF	2pF
C416	4pF	3pF	2pF
C430	1pF	0.5pF	0.75pF
C431	0.75pF	0.75pF	0.5pF
C432	2pF	1.5pF	0pF
C433	0.5pF	0.75pF	2pF
C435	0pF	0pF	0pF
C437	6pF	4pF	2pF
C438	1.5pF	1pF	1pF
C439	1.5pF	2pF	1pF
C440	6pF	4pF	2pF
C441	1pF	1pF	1pF
C442	0pF	0pF	0pF
C443	3pF	1pF	0.75pF
C444	0pF	1.5pF	1.5pF
C446	1.5pF	1pF	1.5pF
C447	0.75pF	0.75pF	0.75pF
C457	0pF	0pF	0pF
C458	0pF	0pF	0pF
L401	2.0Ø3T	1.8Ø3T	1.8Ø3T
L402	2.0Ø4T	1.8Ø4T	2.0Ø4T
L403	2.0Ø5T	1.8Ø5T	2.0Ø5T
L404	2.0Ø4T	1.8Ø4T	2.0Ø4T
R480	22kΩ	47kΩ	58kΩ
R481	2.2kΩ	∞	∞
R482	∞	2.2kΩ	∞
R483	∞	∞	2.2kΩ
R484	2.2kΩ	∞	∞
R485	∞	2.2kW	∞
R486	∞	∞	2.2k

(DD00-CMN-354-1 2/2)

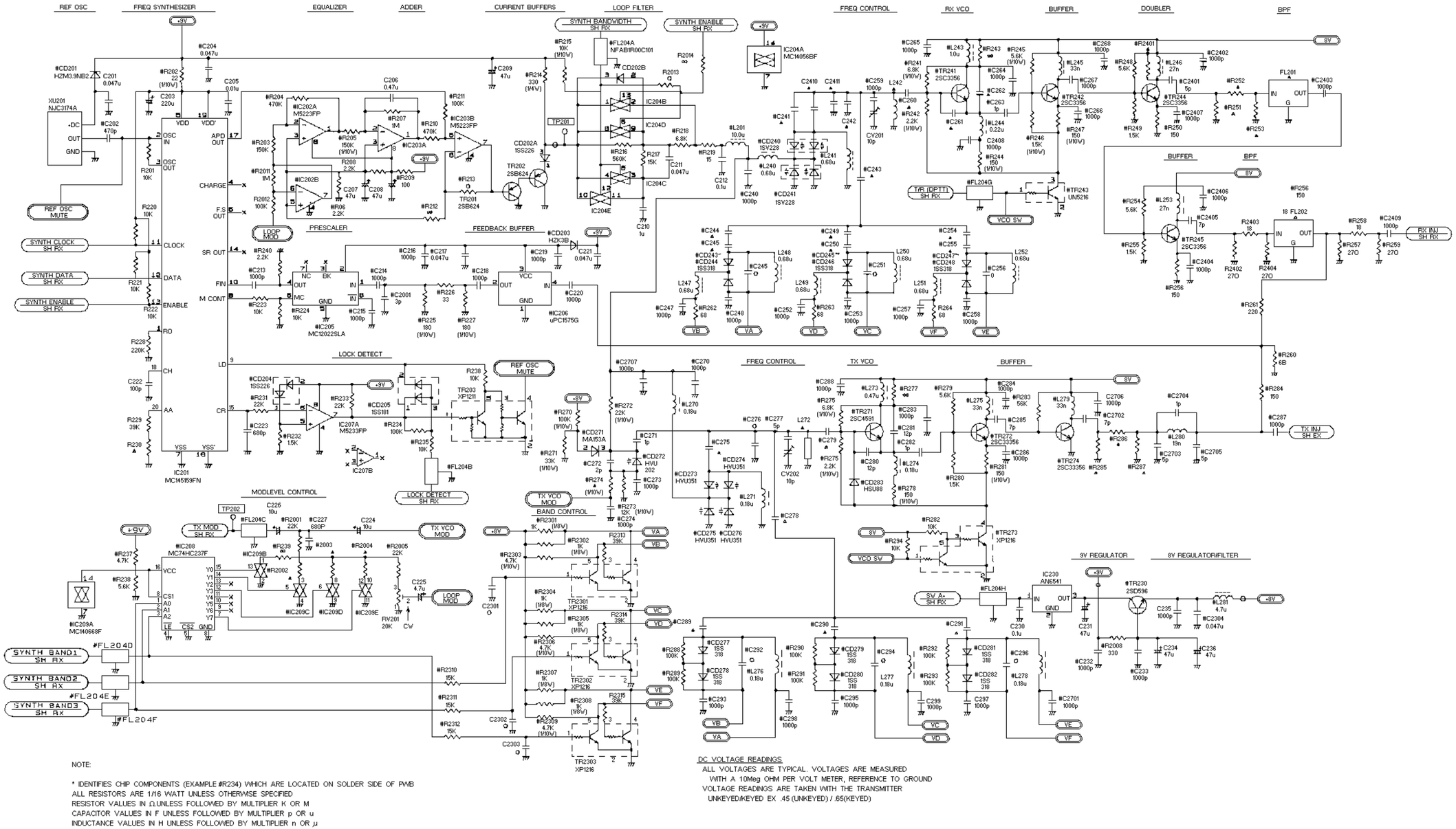
COMPONENT SIDE



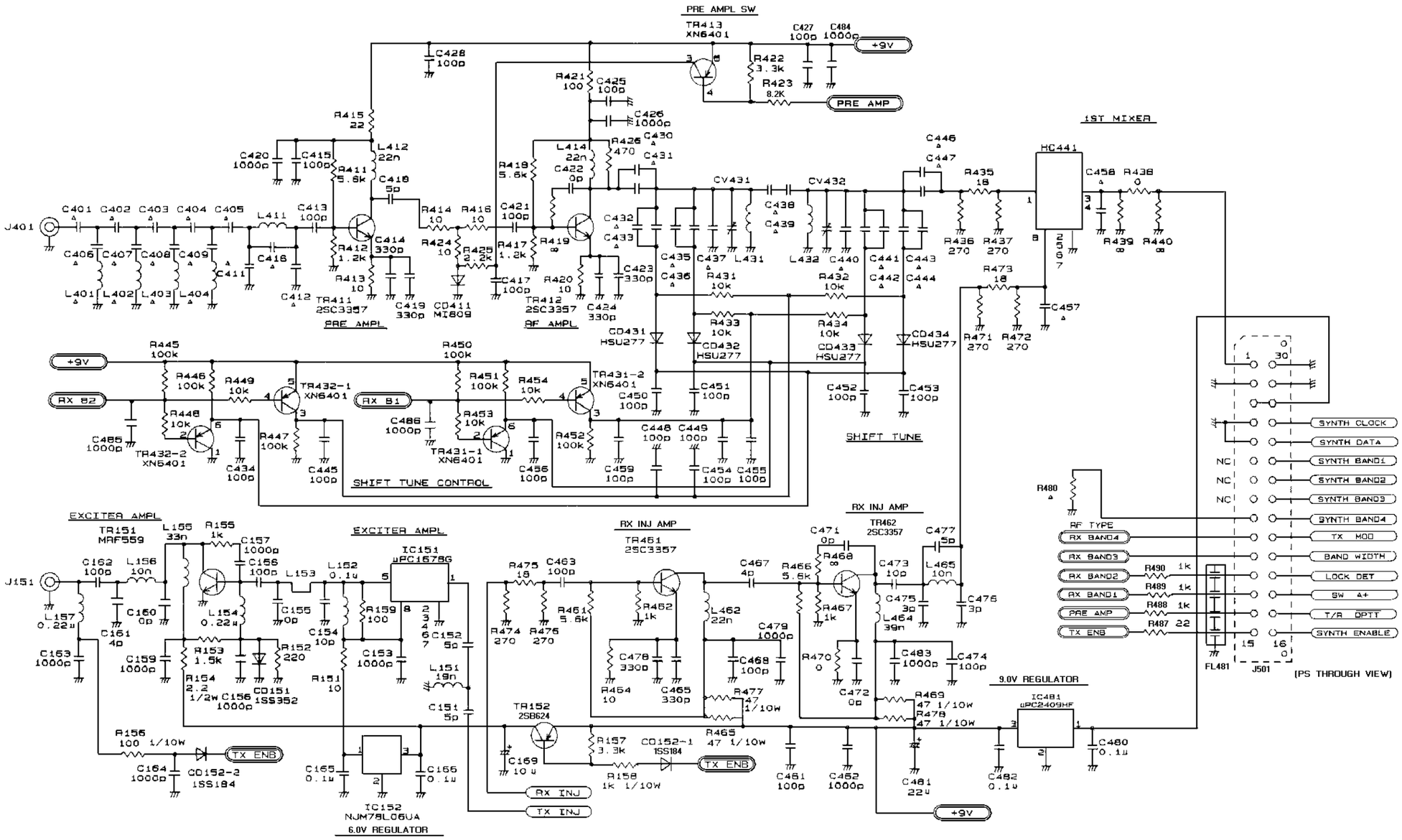
SOLDER SIDE



Synthesizer/Receiver/Exciter Board



Synthesizer
(DD00-CMN-354 1/2)



NOTE:

ALL RESISTORS ARE 1/16 WATT UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER K OR M
CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER μ,n OR P
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m,u OR n

Receiver/Exciter
(DD00-CMN-354-1 1/2)