MAINTENANCE MANUAL

29.7-50 MHz NOISE BLANKER
19A704991P105

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DESCRIPTION

The Noise Blanker option for the MLS synthesized radio consists of a plug-in printed wire board which plugs into J503 on the receiver board. The noise blanker is designed to improve receiver performance by blanking out impulse noise emanating from the alternator, ignition system, etc. This is accomplished by delaying the IF signal for 200 nanoseconds while generating a blanking pulse having the same characteristics as the noise pulses. These blanking pulses then are used to turn off the delayed IF signal precisely where the noise occurs, resulting in noise-free audio reception.

The noise blanker may be disabled, if desired, by relocating ground plug P505 on the receiver board. An alternate method (if the noise blanker is to be permanently disabled) is to remove the noise blanker board from the radio and reconnect W501.

INSTALLATION

The noise blanker plugs into J503 on the receiver. If the board is installed after the receiver has been aligned (or installed in the field), cut jumper wire W501 on the receiver board. Be sure that P505 is plugged into J505-2 & 3. Set the output signal level of the RF signal generator so as to obtain 12 dB SlNAD at audio output and adjust L503 on the receiver board to obtain maximum SlNAD sensitivity reading.

NOTE

If the noise blanker is installed prior to receiver alignment, simply plug the noise blanker into J503 and perform standard receiver alignment procedures. Be sure that P505 is plugged into J505-2 and 3 on the receiver board. Refer to the Receiver Alignment Procedures. Be sure P505 is plugged into J505-2 & 3 on the receiver board. Refer to the Receiver Alignment Procedure in the Service Section of the Maintenance Manual and tune accordingly.

CIRCUIT ANALYSIS

The noise blanker consists of: a 200 nanosecond fixed delay line, a 20.8 MHz rejection filter, three pulse amplifiers, a pulse amplifier/limiter, a gate driver, a blanker disable switch, a pulse detector, and FET blanking switches. A block diagram is provided in Figure 1.

The IF signal from JFET buffer TR501 on the receiver board is applied to gate 1 of pulse amplifier TR1 through 20.8 MHz rejection filter FL1. The signal is also applied to delay line Z1. Z1 delays the IF signal by 200

nanoseconds and returns it to the two JFET gating switches TR7 and TR8.

The IF signal is amplified by pulse amplifier TR1 that provides a gain of approximately 20dB. Bias for TR1 is established by R1 and R2. The output of TR1 is further amplified and limited by pulse amplifier/limiter IC1. IC1 provides a gain of approximately 50 dB. The threshold bias for TR2 is established by R8-R11, and CD1. R9 is a negative temperature compensating resistor whose temperature characteristics complement ICI to adjust the threshold level of TR2 with changes in temperature.

The detected pulse is taken from the collector of TR2 and further amplified by pulse amplifiers TR3 and TR5. C14 in the emitter circuit of TR3 provides a low frequency bypass to ground and also maintains a full charge to allow TR3 to be switched on and off more rapidly. The output of pulse amplifier TR5 is applied to gate driver TR6. TR6 provides drive to operate the two JFET switches (TR7 & TR8). The delayed IF signal from delay line Z1 arrives at TR7 and TR8 at the same time as the gating pulses from the blanker switch. The gating pulse switches TR7 and TR8 on coincident with the noise pulses on the IF signal, shunting all noise pulses to ground.

BLANKER DISABLE

Blanker disable input is provided to assure complete turn off of the noise blanker function while allowing the delayed IF signal to be processed through the receiver. BLKR DIS 1 (TP3) is applied to pulse amplifier TR1 gate 2.

This will nearly turn off TR1 . BLKR DIS 2 (TP4) is applied to the base of TR4, turning it on. TR4 shorts the emitter and collector of pulse amplifier TR3, preventing any remaining noise pulses from passing.

MODIFICATION INSTRUCTIONS

These instructions provide a detailed description of the necessary modifications required when installing the noise blanker in the MLS Low Band radio.

Parts Required

The following parts are all supplied in kit B19/CFR-80.

Noise Blanker Unit	MPXP02021
Threaded Spacer	MTK004208
Split lockwasher	BSSW03000S
Mounting screw (quantity 2)	BSNA03008S
Manual Request Card	ECR3224

Procedure

1. Remove the bottom cover from the radio.
2. Remove or cut wire link W501 on the receiver board of the MLS radio. W501 is identified in Figure 2.
3. Mount the threaded spacer and the split lockwasher in location “A” (See Figures 2 & 3).
4. Plug in the noise blanker unit at J503 on the receiver board in the radio.
5. Secure the noise blanker unit using the two mounting screws.

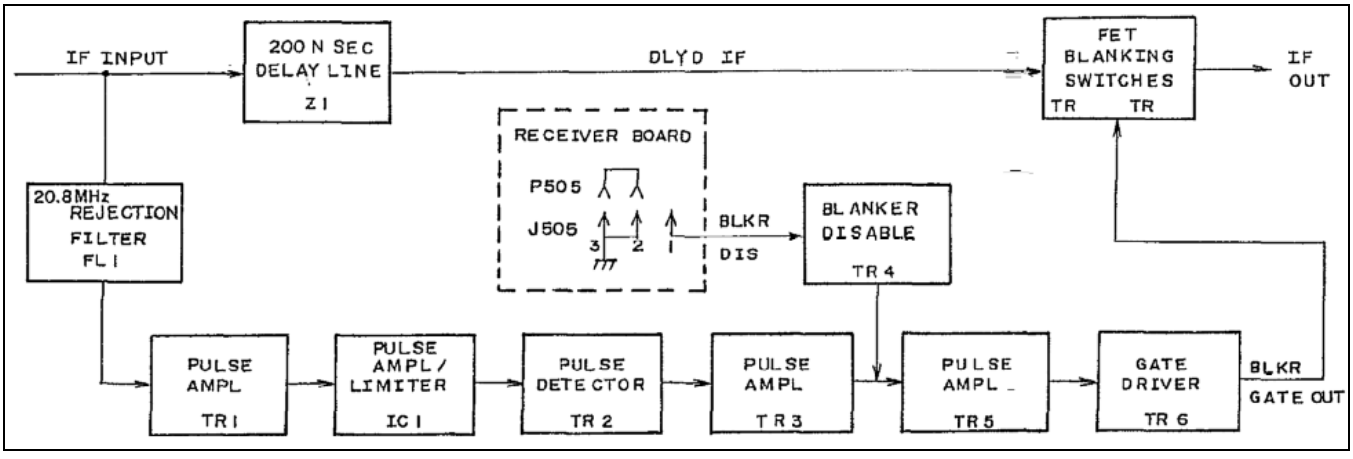


Figure 1 – Block Diagram

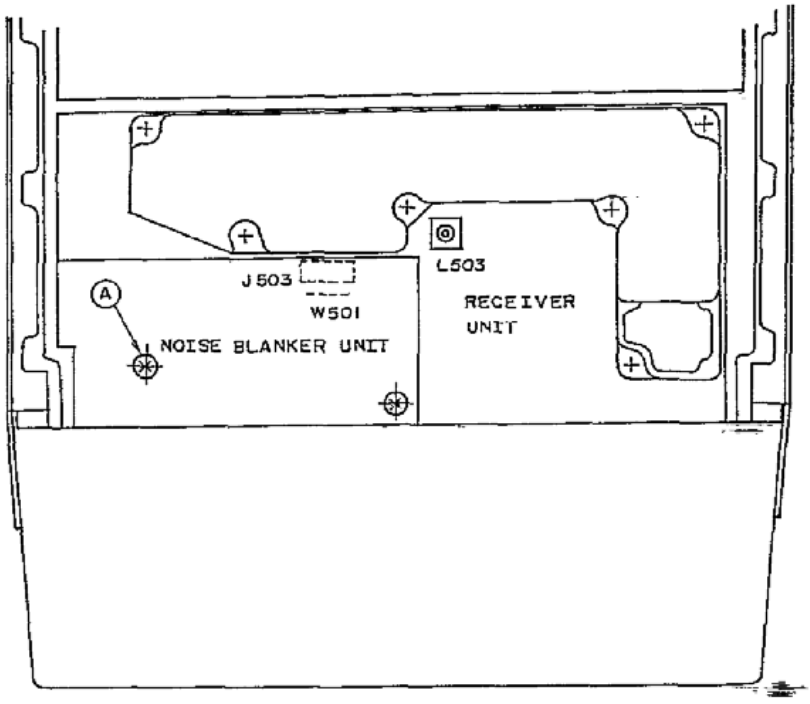


Figure 2 – Partial Bottom View of MLS Low Band Radio

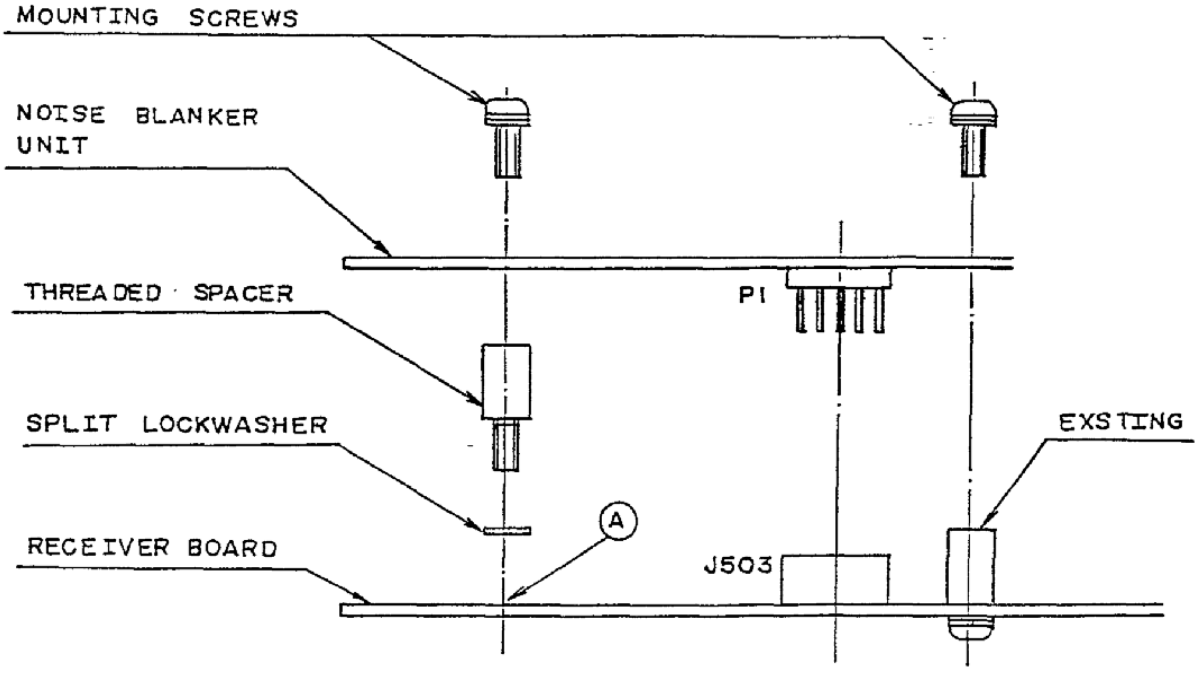
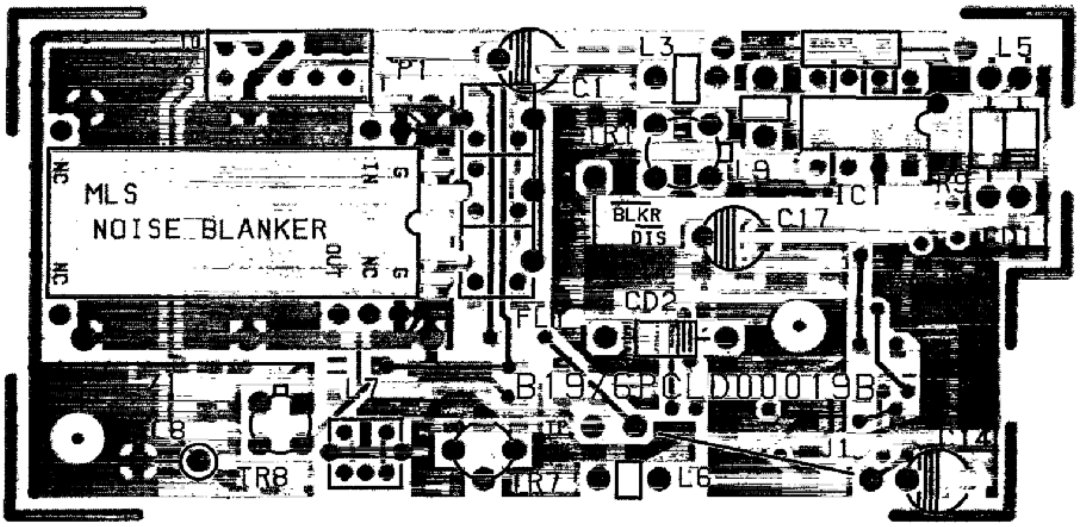
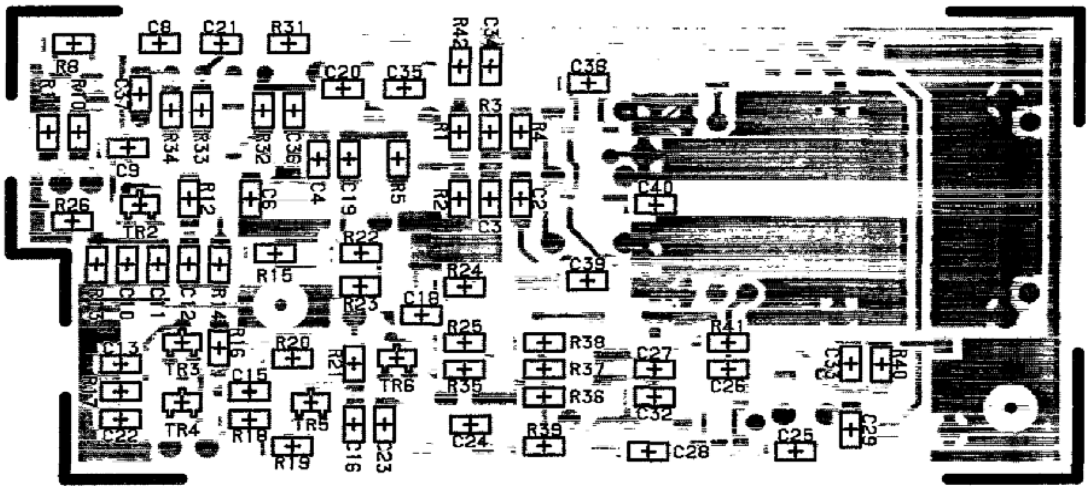


Figure 3 – Installation of Noise Blanker

FRONT VIEW



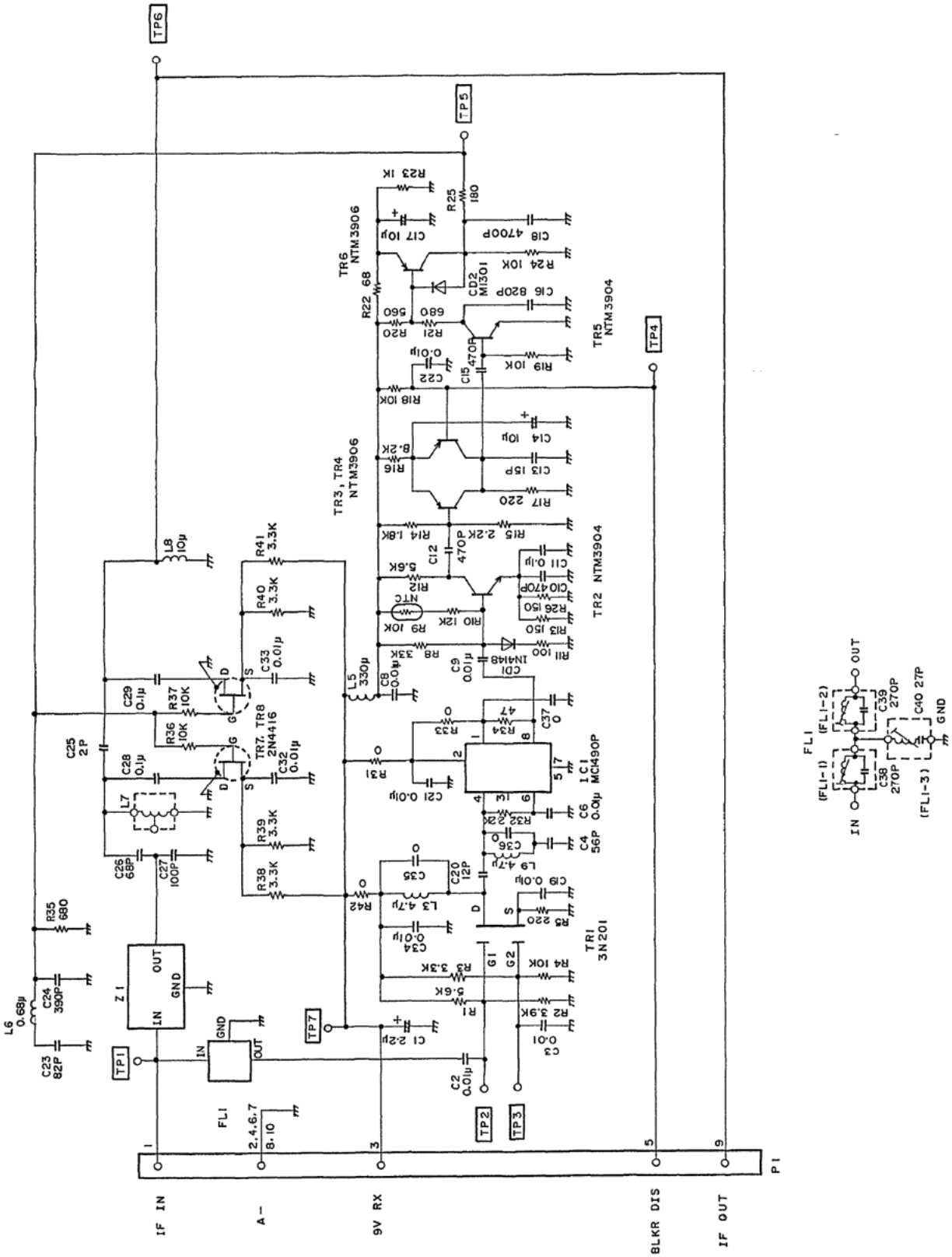
BACK VIEW



RUNS ON SOLDER SIDE

RUNS ON BOTH SIDES

RUNS ON COMPONENT SIDE


TP6
TP5
TP4
TP7
TP1
TP2
TP3
R23 1K
R25 180
C17 10µ
C18 4700P
R24 10K
TR6 NTM3906
CD2 M1301
R22 68
C16 820P
R20 560
R21 680
TR5 NTM3904
C15 470P
C22 0.01µ
R19 10K
R18 10K
C14 10µ
R16 8.2K
C13 15P
R17 220
TR3, TR4 NTM3906
R14 1.8K
R15 2.2K
C12 470P
C11 0.1µ
R12 5.6K
C10 470P
R26 150
R13 150
NTC
R10 12K
R9 10K
R11 100
R8 33K
IN4148
C9 0.01µ
C1
TR2 NTM3904
L8 10µ
R41 3.3K
R40 3.3K
L5 330µ
C8 0.01µ
C37
R33
R34 47
C29 0.1µ
R37 10K
C33 0.01µ
R36 10K
TR7, TR8 2N4416
C25 2P
C28 0.1µ
C32 0.01µ
R31
C21 0.01µ
IC1 MC1490P
C6 0.01µ
R32 2.2K
C4 56P
C36
L9 4.7µ
L7
C26 68P
C27 100P
R39 3.3K
R38 3.3K
C35
C20 12P
C19 0.01µ
R42
L3 4.7µ
R5 220
C34 0.01µ
TR1 3N201
R3 3.3K
R4 10K
R1 5.6K
R2 3.9K
C3 0.01
C1 2.2µ
R35 680
L6 0.68µ
C24 390P
C23 82P
Z1
OUT
GND
IN
C2 0.01µ
FL1
2.4.6.7
8.10
P1
1
3
5
9
IF IN
A−
9V RX
BLKR DIS
IF OUT
FL1
(FLI-1)
(FLI-2)
(FLI-3)
OUT
IN
C38 270P
C39 270P
C40 27P
GND

PARTS LIST

NOISE BLANKER
19A704991P105
ISSUE 1

SYMBOL	PART NO.	DESCRIPTION
		NOISE BLANKER BOARD B19/CFR-80
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	B19/5CBAC00826	Tantalum: 2.2 uF ± 20%, 25 VDCW.
C2 and C3	B19/5CAAD00789	Ceramic: 0.01 uF ± 10%, 25 VDCW, temp coef 0 ± 60 PPM.
C4	B19/5CAAD00863	Ceramic: 56 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C6 thru C9	B19/5CAAD00789	Ceramic: 0.01 ± 10%, 25 VDCW, temp coef 0 ± 60 PPM.
C10	B19/5CAAD00797	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C11	B19/5CAAD01237	Ceramic: 0.1 uF ± 10%, 25 VDCW, temp coef 0 ± 60 PPM.
C12	B19/5CAAD00797	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C13	B19/5CAAD00787	Ceramic: 15 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C14	B19/5CBAC00326	Tantalum: 10 uF ± 20%, 16 VDCW.
C15	B19/5CAAD00797	Ceramic: 470 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C16	B19/5CAAD01068	Ceramic: 820 pF ± 5%, 50 VDCW, temp coef + 350 -1000 PPM.
C17	B19/5CBAC00326	Tantalum: 10 uF ± 20%, 16 VDCW.
C18	B19/5CAAD00783	Ceramic: 4700 pF ± 10%, 50 VDCW, temp coef ± 10%.
C19	B19/5CAAD00789	Ceramic: 0.01 uF ± 10%, 25 VDCW, temp coef 0 ± 60 PPM.
C20	B19/5CAAD00784	Ceramic: 12 pF ± 5%, 50 VDCW, temp coef ± 10%.
C21 and C22	B19/5CAAD00789	Ceramic: 0.01 uF ± 10%, 25 VDCW, temp coef ± 10%.
C23	B19/5CAAD00930	Ceramic: 82 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C24	B19/5CAAD00786	Ceramic: 390 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C25	B19/5CAAD00798	Ceramic: 2 pF ± 0.25, 50 VDCW, temp coef 0 ± 60 PPM.
C26	B19/5CAAD00929	Ceramic: 68 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C27	B19/5CAAD00780	Ceramic: 100 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C28 and C29	B19/5CAAD01237	Ceramic: 0.1 uF ± 10%, 25 VDCW, temp coef ± 15%.
C32 thru C34	B19/5CAAD00789	Ceramic: 0.01 uF ± 10%, 25 VDCW.
C38 and C39	B19/5CAAD00883	Ceramic: 270 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
C40	B19/5CAAD00793	Ceramic: 27 pF ± 5%, 50 VDCW, temp coef 0 ± 60 PPM.
		- - - - - - - - - - DIODES - - - - - - - - - -
CD1	B19/5TXDA00001	Silicon, rectifier: sim to Thomson 1N4148.
CD2	B19/5TXDR00004	Silicon, RF Switching: sim to Mitsubishi M1301.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
IC1	B19/5DAAJ00341	Linear, wideband amplifier: sim to Motorolla MC1490P.

SYMBOL	PART NO.	DESCRIPTION
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L3	B19/5LCAA00228	Choke coil: 4.7 uH ± 10%.
L5	B19/5LCAA00136	Choke coil: 330 uH ± 10%.
L6	B19/5LCAA00218	Choke coil: 0.68 uH ± 10%.
L7	B19/6LALD00034	Coil, RF.
L8	B19/5LCAC00325	Coil, RF.
L9	B19/5LCAA00228	Choke coil: 4.7 uH ± 10%.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	B19/5REAG01747	Metal film: 5.6K ohms ± 5%, 200 VDCW, 1/8 w.
R2	B19/5REAG01745	Metal film: 3.9K ohms ± 5%, 200 VDCW, 1/8 w.
R3	B19/5REAG01744	Metal film: 3.3K ohms ± 5%, 200 VDCW, 1/8 w.
R4	B19/5REAG01750	Metal film: 10K ohms ± 5%, 200 VDCW, 1/8 w.
R5	B19/5REAG01730	Metal film: 220 ohms ± 5%, 200 VDCW, 1/8 w.
R8	B19/5REAG00592	Metal film: 33K ohms ± 5%, 200 VDCW, 1/8 w.
R9	B19/5RZBX00002	Thermistor.
R10	B19/5REAG00681	Metal film: 12K ohms ± 5%, 200 VDCW, 1/8 w.
R11	B19/5REAG00586	Metal film: 100 ohms ± 5%, 200 VDCW, 1/8 w.
R12	B19/5REAG01747	Metal film: 5.6K ohms ± 5%, 200 VDCW, 1/8 w.
R13	B19/5REAG01728	Metal film: 150 ohms ± 5%, 200 VDCW, 1/8 w.
R14	B19/5REAG01741	Metal film: 1.8K ohms, ± 5%, 200 VDCW, 1/8 w.
R15	B19/5REAG00575	Metal film: 2.2K ohms ± 5%, 200 VDCW, 1/8 w.
R16	B19/5REAG00584	Metal film: 8.2K ohms ± 5%, 200 VDCW, 1/8 w.
R17	B19/5REAG01730	Metal film: 220 ohms ± 5%, 200 VDCW, 1/8 w.
R18 and R19	B19/5REAG01750	Metal film: 10K ohms ± 5%, 200 VDCW, 1/8 w.
R20	B19/5REAG00571	Metal film: 560 ohms ± 5%, 200 VDCW, 1/8 w.
R21	B19/5REAG00591	Metal film: 680 ohms ± 5%, 200 VDCW, 1/8 w.
R22	B19/5REAG01724	Metal film: 68 ohms ± 5%, 200 VDCW, 1/8 w.
R23	B19/5REAG00572	Metal film: 1K ohms ± 5%, 200 VDCW, 1/8 w.
R24	B19/5REAG01750	Metal film: 10K ohms ± 5%, 200 VDCW, 1/8 w.
R25	B19/5REAG01729	Metal film: 180 ohms ± 5%, 200 VDCW, 1/8 w.
R26	B19/5REAG01728	Metal film: 150 ohms ± 5%, 200 VDCW, 1/8 w.
R31	B19/5REAG01775	0 ohms.
R32	B19/5REAG00575	Metal film: 2.2K ohms ± 5%, 200 VDCW, 1/8 w.
R33	B19/5REAG01775	0 ohms.
R34	B19/5REAG01722	Metal film: 47 ohms ± 5%, 200 VDCW, 1/8 w.
R35	B19/5REAG01736	Metal film: 680 ohms ± 5%, 200 VDCW, 1/8 w.
R36 and R37	B19/5REAG01750	Metal film: 10K ohms ± 5%, 200 VDCW, 1/8 w.
R38 thru R41	B19/5REAG01744	Metal film: 3.3K ohms ± 5%, 200 VDCW, 1/8 w.
R42	B19/5REAG01775	0 ohms.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
TR1	B19/5TCAS00032	N-channel, dual gate (MOSFET): sim to Motorolla 3N201.
TR2	B19/5TCAB01234	Silicon, NPN: sim to NEC NTM3904-T1.
TR3 and TR4	B19/5TCAB01233	Silicon, PNP: sim to NEC NTM3906-T1.
TR5	B19/5TCAB01234	Silicon, NPN: sim to NEC NTM3904-T1.
TR6	B19/5TCAB01233	Silicon, PNP: sim to NEC NTM3906-T1.
TR7 and TR8	B19/5T3AR00015	N-channel, field effect: sim to Motorolla 2N4416.
		- - - - - - - - - - FILTERS - - - - - - - - - -
Z1	B19/5NDAB00060	Delay Line: sim to JPC SDL300-201T-24S.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

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