Courtesy of http://BlackRadios.terryo.org

INSTRUCTION MANUAL

TYPE 501 RECEIVER

Communication Electronics Inc. Bethesda 14, Maryland

Courtesy of http://BlackRadios.terryo.org

INSTRUCTION MANUAL

FOR

TYPE 501 RECEIVER

COMMUNICATION ELECTRONICS, INC.
4900 HAMPDEN LANE
BETHESDA 14, MARYLAND

Courtesy of http://BlackRadios.terryo.org

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

Courtesy of http://BlackRadios.terryo.org

TABLE OF CONTENTS

Courtesy of http://BlackRadios.terryo.org

SECTION IV

INSTALLATION AND OPERATION

SECTION V

MAINTENANCE

Courtesy of http://BlackRadios.terryo.org

SECTION VI

PARTS LIST

Figure

LIST OF ILLUSTRATIONS

Courtesy of http://BlackRadios.terryo.org

LIST OF TABLES

Courtesy of http://BlackRadios.terryo.org

TUBE, TRANSISTOR, AND DIODE COMPLEMENT, TYPE 501 RECEIVER

Symbol	Type	Function
V501	7077	RF Amplifier
V502	7077	RF Amplifier
V503	7587	Mixer
V504	6CW4	Local Oscillator
V601	7587	1st IF Amplifier
V602	7587	2nd IF Amplifier
V603	7587	AM: 3rd IF Amplifier; FM: 1st Limiter
V604	7587	AM: Detector; FM: 2nd Limiter
V605	6CW4	BFO
Q201 Q202	2N335	DC Amplifier
Q203 Q204	2N335	Video Amplifier
Q301 Q302	2N335	Audio Amplifier
Q303	2N1700	Audio Output Amplifier
Q401 Q402	2N335	Squelch Amplifier
Q403	1N1700	Squelch Relay Driver
CR101 through CR104	1N2615	Rectifier
CR105 through CR110	1N2610	Rectifier
CR201	1N759A	Voltage Regulator
CR301	1N759A	Voltage Regulator
CR401 through CR403	1N461	Signal Strength Meter Stabilization
CR601 CR604	1N756A	Gain Control Delay
CR602 CR603	1N198A	FM Demodulator
CR605	1N979A	Voltage Regulator
CR606	1N463	BFO Crystal Cutoff

Table 1

Courtesy of http://BlackRadios.terryo.org

SECTION I
SPECIFICATIONS

Type of Reception	AM-FM-CW
Frequency Range	54-260 mc, in one band
Input	
Connector	BNC type
Impedance	Suitable for 50-ohm source
Noise Figure	6.0 db, maximum
Image Rejection	50 db, minimum
Oscillator to Antenna Conduction	40 μv, maximum
Intermediate Frequency	21.4 mc
Sensitivity at 260 mc	
300-kc Bandwidth	AM: 3 μv input, modulated 50%, produces 10 db $\frac{S+N}{N}$, minimum
	FM: 4 μv input, modulated at 1 kc with 100 kc deviation, produces 23 db $\frac{S+N}{N}$, minimum
10-kc Bandwidth	AM: 2 μv input, modulated 50% produces 21 db $\frac{S+N}{N}$, minimum
Maximum Audio Output	100 mw, into 600-ohm load
Audio Response	100 cps to 40 kc ±3 db

Courtesy of http://BlackRadios.terryo.org

Video Response	Response at 3-db points adjustable to range from 50 cps up to 1 kc, 3 kc, 10 kc, 30 kc, or 150 kc
Signal Monitor Output	21.4-mc center frequency IF signal output for use with CEI signal monitors
Output Stability with AGC	FM: Output varies less than 2 db for inputs above 1.5 uv AM: Output varies less than 15 db for input range of 2-10,000 uv
BFO	21.4-mc, crystal-controlled, fixed frequency, BFO pitch controlled by adjusting local oscillator frequency in RF tuner
Squelch	Interrupts audio output in absence of carrier by means of carrier-operated relay
Carrier-operated Relay Terminals	Three terminals from a form C relay
Power Input	115 or 230 vac, 50-400 cps
Power Consumption	30 watts
Weight	18 pounds
Size	19" wide, 3 1/2" high, 15 1/2" deep, front panel to rearmost extension

Courtesy of http://BlackRadios.terryo.org

SECTION II

GENERAL DESCRIPTION

1. ELECTRICAL CHARACTERISTICS

The CEI Type 501 Receiver is an AM-FM-CW superheterodyne receiver covering the frequency range 54 to 260 mc in one band. The input impedance is suitable for a 50-ohm source. The receiver uses single conversion to a 21.4-mc IF. The IF bandwidth can be set to either 10 kc or 300 kc. The audio output impedance is suitable for a 600-ohm load, balanced or unbalanced. The video output impedance is suitable for a 10K-ohm, unbalanced load. The video bandwidth is variable. The low frequency end 3-db point is approximately 50 cps. As the video bandwidth control is varied, the high frequency end 3-db point is 2 kc, 3 kc, 10 kc, or 150 kc. The receiver includes a SIGNAL STRENGTH meter; a TUNING meter; a carrier-operated relay (COR); an IF signal output suitable for driving a signal monitor (SM); an audio SQUELCH circuit; and a built-in speaker.

2. MECHANICAL CHARACTERISTICS

The front panel mounts the following: The BANDWIDTH switch with positions marked 300 KC and 10 KC; the TUNING meter; the FM-AM-CW switch; the VIDEO BANDWIDTH KC switch marked to indicate 1, 3, 10, 30 and 150 kilocycles; the speaker; the illuminated tuning dial which is recessed behing a window, inscribed with a mark for each megacycle from 54 to 260, and controlled by a tuning crank so that 54 turns are required to cross the band; the SIGNAL STRENGTH meter; the PHONES jack; the BFO TUNING control; the VIDEO GAIN control; the combination AUDIO GAIN control and power switch with the PWR OFF position marked; the SQUELCH sensitivity control; the FINE TUNING control; and the IF GAIN control with the AGC position marked.

The chassis rear apron mounts the following: A type BNC jack marked J101 INPUT; a type BNC jack marked J102 SM OUTPUT; a type BNC jack marked J103 VIDEO OUTPUT; a three-terminal barrier strip marked TB101 AUDIO OUTPUT with the terminals marked G, 1, and 2, respectively; a three-terminal barrier strip marked TB102 with its terminals numbered 1, 2, and 3; a fuse marked F101 3/8 AMP SLOW BLOW; and a fuse marked F102 3/16 AMP SLOW BLOW. The power cord is permanently connected through the rear of the receiver.

The panel and main chassis are constructed of aluminum. The main chassis top and bottom are covered with aluminum dust covers. The front panel is overlaid with a black-anodized etched plate. Within the main chassis are

Courtesy of http://BlackRadios.terryo.org

six subassemblies. Two of these, the RF tuner and the IF strip, are assembled on silver-plated brass chassis which have been gold flashed to prevent tarnishing. These two chassis are wired into the main chassis. The other four subassemblies consist of etched circuit board modules. One of these, a small component board, is wired to the main chassis underside. The other three, the audio module, the video module, and the squelch module, are mounted plug-in fashion on the main chassis top.

The receiver is designed for mounting in a standard 10-inch rack. It measures 19" wide, 3-1/2" high, and 15-1/2" deep from the front panel to the rear apron. The weight is 18 pounds.

3. EQUIPMENT SUPPLIED

The 501 receiver is shipped with an instruction book, a mating connector for each input and output receptacle, and a three-pin to two-pin power cord plug adapter.

4. ADDITIONAL EQUIPMENT REQUIRED FOR OPERATION

To use the signal monitor output, a CEI type signal monitor is needed.

Courtesy of http://BlackRadios.terryo.org

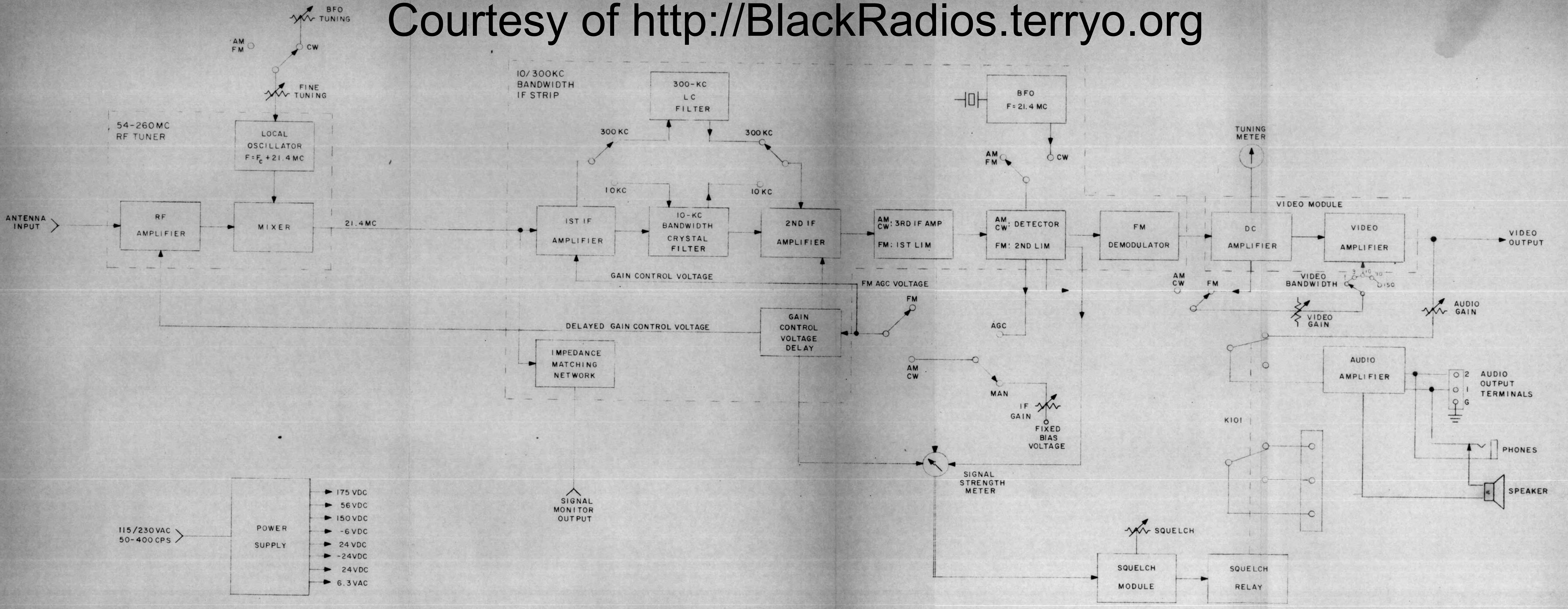


FIGURE 3-1. TYPE 501 RECEIVER, FUNCTIONAL BLOCK DIAGRAM.

Courtesy of http://BlackRadios.terryo.org

SECTION III

CIRCUIT DESCRIPTION

1. FUNCTIONAL ANALYSIS

The Type 501 receiver (depicted by functional block diagram in fig. 3-1) tunes the frequency range 54 to 260 mc. Either a 300-kc or a 10-kc IF bandwidth is available and five signal outputs are present: a signal monitor output providing a 21.4-mc IF signal, a video signal output, and three audio signal outputs: a headphones jack, a pair of terminals, and a built-in speaker.

The antenna input jack connects to the 54-260 mc RF tuner. The tuner contains an RF amplifier, a local oscillator, and a mixer. The local oscillator is operated at a frequency 21.4 mc above the carrier being received, making the mixer output a 21.4-mc IF signal. The FINE TUNING control functions by making precise adjustments of the local oscillator frequency. During CW reception the beat note pitch is varied by the use of the BFO TUNING control which functions by varying the local oscillator frequency enough to change the IF from its normal center frequency of 21.4 mc by an amount sufficient to provide an audible beat between the IF and 21.4-mc BFO signal.

A portion of the IF signal is applied through an impedance-matching network to the signal monitor output. The remainder of the IF signal is applied to the IF strip.

The first stage of the IF strip is the first IF amplifier. From there the signal is coupled to the second IF amplifier through either one or the other of two different paths, a 10-kc bandwidth crystal filter or a 300-kc bandwidth LC filter. The path desired is selected by relays located in the IF chassis and operated by the BANDWIDTH switch.

From the second IF amplifier the signal is conducted through two stages whose functions change according to the mode of receiver operation. In the AM and CW modes the two stages are operated as a third IF amplifier and AM detector, respectively. In the FM mode the same two stages operate as a first and second limiter, respectively. The FM demodulator receives signals through a direct connection from the second limiter. The output from the FM demodulator is applied to a dc amplifier located in the video module.

In the AM and CW modes the demodulated signal is taken from the stage functioning as a detector and applied, through the VIDEO GAIN and VIDEO BANDWIDTH controls, to the video amplifier. In the FM mode the same thing is done except that the demodulated signal is obtained from the dc amplifier.

Courtesy of http://BlackRadios.terryo.org

From the video amplifier the video signal is applied simultaneously to the VIDEO OUTPUT and to the AUDIO GAIN control. From the AUDIO GAIN control the signal is applied to the audio amplifier, through a set of squelch relay contacts. This arrangement permits the squelch circuit to interrupt the audio signal in the absence of a carrier. The audio amplifier terminates in a speaker, a PHONES jack, and a set of terminals.

The squelch module receives a voltage applied to it through the SIGNAL STRENGTH meter. The voltage originates in the third and fourth stages of the IF strip and is applied directly to the meter and also through the gain control voltage delay circuit. The squelch module's function is to control the squelch relay. In the absence of a carrier the module actuates the relay, cutting off the signal input to the audio amplifier. In the presence of a carrier of sufficient level the opposite action appears, restoring audio output. The sensitivity of the squelch circuit to a carrier is governed by the setting of the SQUELCH control.

There is a second set of form C contacts from the squelch relay which is connected to a terminal board, making the set available for the control of external equipment. Thus the squelch relay also functions as an instantaneously acting carrier-operated relay.

The TUNING meter is controlled by a voltage from the dc amplifier. The voltage it receives is one which varies according to the deviation of the IF signal from its center frequency.

The power supply operates on either 115 or 230 vac and produces all the voltage sources required by the receiver. These are: 175 vdc, 56 vdc, 150 vdc, -3 vdc, two sources of +24 vdc, -24 vdc, and 6.3 vac.

2. RF TUNER

A. RF Amplifier. The RF amplifier consists of two type 7077 ceramic triodes connected in a cascode configuration. As seen at the INPUT, J102, the input impedance of the cascode amplifier is transformed down to a value suitable for a 50-ohm source. RF amplifier input tuning is accomplished by inductor L502A, one of four sections of an inductuner. RF amplifier output tuning is accomplished by inductor L502B in the plate circuit of V502.

To achieve a low noise figure and high stability, the amplifier is neutralized. The neutralization circuit is in the form of a capacitive bridge, with capacitor C507 and the combination of capacitor C503 and trimmer capacitor C508 balancing the grid-to-plate capacitance and combined grid-to-cathode and grid-to-ground capacitances of V501.

Courtesy of http://BlackRadios.terryo.org

To extend the dynamic range of the receiver, the RF amplifier is gain-controlled by application of a gain control voltage to the grid of V501. The gain control voltage is developed in the IF strip and delayed by a Zener diode in the strip before application to V501. Such a delay allows the signal to reach a suitable level in the IF strip before the RF amplification is reduced.

The cathodes of V501 and V502 return to -3 vdc through 620-ohm dropping resistors, R505 for the V501 cathode and R507 for the V502 cathode. This design provides dc degeneration which normalizes the effect of tube variations. Such degeneration also causes the tubes to function with a more remote cutoff, a characteristic desirable for a gain-controlled stage.

B. Local Oscillator. The local oscillator, V504, is a Nuvistor triode operated in a balanced Colpitts configuration. It is tuned by L502D, a section of the inductuner, and is maintained at a frequency 21.4 mc above that of the carrier. Capacitor C526 of the tank circuit has a negative temperature coefficient to compensate for the frequency drift caused by ambient temperature change. Oscillator energy is taken from the grid side of the tank circuit through capacitor C530.

To reduce first local oscillator radiation from the antenna, a small portion of the oscillator signal is fed back, in phase opposition, through capacitors C516 and C518 to the plate of V502. This feedback tends to cancel the oscillator energy coupled to the antenna through the tuned circuits.

Fine tuning and BFO pitch control are accomplished by obtaining small variations of the local oscillator frequency through the use of a voltage-variable capacitor, C538. This capacitor is a semiconductor device whose effective capacity varies with the voltage across it. It is coupled through a dc blocking capacitor, C535, so as to vary the tank circuit capacitance. It receives a variable dc voltage through resistor R516. The dc voltage is derived from the FINE TUNING potentiometer, R117, which forms part of a voltage-divider-to-ground from +120 vdc. In the CW mode, switch section S104F places the BFO TUNING potentiometer, R116, in series with the voltage-divider-to-ground so that adjustments of the latter control also vary the local oscillator frequency. The amount of frequency change which can be brought about by means of the BFO TUNING control is less than that which can be obtained by using the FINE TUNING control.

The B+ supply to the oscillator is unregulated because, in this oscillator, plate and filament voltage variations tend to compensate for each other.

C. Mixer. The mixer, V503, is a Nuvistor tetrode with its control grid circuit tuned by a third section of the inductuner, L502C. This grid circuit and the plate circuit of the second RF amplifier form a tuned, two-section,

Courtesy of http://BlackRadios.terryo.org

band-pass filter in which a T-network serves as the coupling device. The T-network series arms are capacitors C522 and C524. The shunt arm is composed of the parallel combination of inductor L509 and capacitor C523. The shunt arm is resonated below 54 mc and becomes capacitive at higher frequencies. Therefore, a nearly constant bandwidth is maintained throughout the entire tuning range.

The mixer control grid receives local oscillator signals through capacitor C530. An oscilloscope can be connected to test point TP501 at the junction of the mixer's two grid-to-ground resistors, R512 and R513, for checking oscillator injection or RF amplifier response. TP501 is accessible at the chassis top.

The mixer output, a 21.4-mc IF signal, is through a plate circuit pi-network. This network is made up of variable inductor L514 with a capacitance to ground at each of its ends. One of these capacitances is formed by the plate-to-ground capacity of V503 plus cable capacitance. The other of these capacitances is capacitor C533. Capacitor C539 is a dc blocking capacitor and presents no appreciable impedance at 21.4 mc. This network is tuned to the IF frequency and is so designed that, at the tuner output jack, J502, the plate impedance of V503 is transformed down to approximately 50 ohms. From this network the IF signal is connected to the IF strip.

3. IF STRIP

A. Input. The input connector to the IF strip is jack J601, which is coupled to the tuner output by coaxial cable. From J601, a portion of the IF signal is coupled through a 50-ohm T-pad composed of resistors R601, R602, and R603, to the SM OUTPUT, J102. At J102 a signal monitor may be connected to view the 21.4-mc IF signal. In parallel with the T-pad input is the primary of transformer T601, a broadband transformer whose secondary applies the IF signal to the first IF amplifier.

B. First and Second IF Amplifiers. The first and second IF amplifiers, V601 and V602, are type 7587 Nuvistor tetrodes. Coupling between them is according to the IF bandwidth selected and is determined by relays K601 and K602. When the BANDWIDTH switch, S103, is in the 300KC position, K601 is actuated, K602 is unactuated, and coupling is through a 300-kc bandwidth coupling network consisting of inductor L603, capacitors C613 through C617, and inductor L604. When the bandwidth switch is in the 10 KC position, K601 is unactuated, K602 is actuated, and coupling is through crystal filter Y601. The crystal filter's low impedance level requires impedance transformation, which is achieved by capacitive tapping of the V601 plate circuit, through C611 and C612, and of the V602 grid circuit, through C618 and C620. Additional

Courtesy of http://BlackRadios.terryo.org

relay contacts ground both the input and output of whichever coupling network is not in use.

Gain control of the first and second IF amplifiers is by application of a grid bias. The gain control voltage is applied directly to the first stage, but is applied to the second stage after being delayed by Zener diode CR601. This permits signal build-up to a sufficient level in the first IF stage before the gain of the second stage is reduced.

To keep the limiters driven to saturation, only an automatic gain control voltage is used during FM operation. The FM AGC voltage is developed by grid rectification in the stage functioning as a first limiter, V603, and reaches the first IF stage through FM-AM-CW switch section S104A and feed-through capacitor C602. During AM operation with AGC, an AGC voltage from the stage functioning as a detector, V604, is applied to the first IF stage through a series consisting of switch section S104A, the AGC contact of the AM-FM switch, S105, and the AM or CW contact of switch section S104B.

During operation with manual gain control (possible during both the AM and CW modes) the gain control voltage is derived from the IF GAIN potentiometer, R109. This potentiometer, in series with resistor R110 is connected between -24 vdc and ground. The voltage tapped from R109 for manual gain control reaches the first IF amplifier through the MAN position contact of S105 and the AM or CW contacts of S104A. From there it is conducted to other stages the same as the AGC voltages.

During either manual or automatic gain control, the delayed gain control voltage from Zener diode CR601 is also applied to the RF amplifier (see subsection 2, paragraph A, of this section).

To avoid regeneration (which might distort the response curve shape or even bring about oscillation) the plate-to-grid capacitance in the first and second IF amplifier stages is neutralized. This is done by connecting a three-capacitor pi-network between the plate and screen grid circuits. These capacitors are C605, C606, and C607 in the V601 circuit, and C624, C625, and C626 in the V602 circuit.

C. <u>AM Third IF Amplifier/FM First Limiter</u>. A type 7587 Nuvistor tetrode, V603, is used as a third IF amplifier in the AM mode and as a first limiter in the FM mode. This change of functions according to the mode of operation is brought about by using an FM-AM-CW switch section, S104C, to vary the screen grid potential, a higher potential being used to operate the tube as an IF amplifier and a lower potential being used to operate it as a limiter. In the FM mode the switch section grounds resistor R618, and that resistor acts as a screen grid bleeder, reducing the V603 screen voltage. In

Courtesy of http://BlackRadios.terryo.org

the AM position S104C removes the ground from R618, raising the V603 screen voltage. In the CW position S104C also grounds R618.

A double-tuned circuit is used to couple to this stage from the second IF amplifier. The output circuit from this stage is through the mutual inductance of inductors L607 and L608.

In the FM mode this stage also provides the AGC voltage. The voltage is developed by grid rectification across resistor R615 and is conducted to the FM position contact of S104A. From there, it functions as the FM AGC voltage (see paragraph B of this subsection and subsection 2, paragraph A of this section).

D. AM Detector/FM Second Limiter. A type 7587 Nuvistor tetrode, V604, is used as a grid detector in the AM and CW modes, and as a second limiter in the FM mode. Its input is through a transformer of a bandwidth wide enough to prevent IF response shape distortion resulting from the grid circuit detuning during signal level changes.

In the AM and FM modes the stage performs its required function without circuit change, due to operation with a relatively low voltage B+ source. The source is +56 vdc, regulated by diode CR605. In the CW mode, plate voltage is removed from the stage. This is to block the BFO signal from feeding through the FM demodulator and dc amplifier to the TUNING meter, because, if this happened, the meter would respond to the BFO instead of the IF signal during CW operation.

In the AM and CW modes, the detector load is formed by resistors R626 and R627. Inductor L609 is a self-resonant choke which filters IF from the output. From the junction of the load resistors, the demodulated output is taken off through dc blocking capacitor C642 and conducted to switch section S104D, which applies the signal to the VIDEO GAIN control, R111.

In the AM mode with AGC, this stage also provides an AGC voltage. This AGC voltage is taken from the junction of resistors R624 and R639, which form a relatively high resistance shunt to the detector load. From the junction of these resistors the AM AGC voltage is conducted through switch section S104B to the AGC contact of S105, from which it is applied to the gain control line through S104A.

In the CW mode this stage receives the BFO signal from the BFO through capacitor C647.

Courtesy of http://BlackRadios.terryo.org

In both the AM and FM modes this stage applies its output to the FM demodulator stage, through the discriminator transformer made up of inductors L610 and L611. The signal is applied to the FM demodulator in the AM mode to keep the TUNING meter operating during AM reception.

E. FM Demodulator. A Foster-Seeley type FM demodulator with a capacitance tapping of the secondary circuit is used. This method of tapping provides a high degree of balance unaffected by coil characteristics or tuning slug positions. Germanium diodes, CR602 and CR603, are used for phase detection. C646 and C662 of the primary and secondary circuits, respectively, have negative temperature coefficients and are used to compensate for the center frequency drift caused by ambient temperature variations. A self-resonant choke, L612, is in series with the demodulator output to attenuate the IF signal. The output from this stage is always applied to the dc amplifier, Q201 and Q202 in the video module. During FM operation switch section S104D conducts the demodulated FM signal from the second dc amplifier stage to the VIDEO GAIN potentiometer.

F. Beat Frequency Oscillator. The BFO uses a type 6CW4 triode, V605, operated as a crystal-controlled oscillator. The frequency is kept at exactly 21.4 mc by crystal Y602. The oscillator is placed in operation by applying a +150 vdc B+ source to the tube through FM-AM-CW switch section S104G when that switch is at the CW position.

Diode CR606 is used to shunt the crystal during FM and AM operation. Such a shunt is needed to keep the crystal from loading V604 during FM and AM operation as a result of the crystal's connection to V604 through the inter-electrode capacitance of V605 when the latter is not operating. CR606 is biased to conduction by a -24 vdc applied to it through either the FM or AM contact of switch section S104G.

4. DC AMPLIFIER

The dc amplifier consists of two 2N335 transistors, Q201 and Q202, in a cascaded emitter-follower configuration. The input is permanently connected to the output of the FM demodulator, to which the dc amplifier presents a high impedance. The output presents a low impedance across which the VIDEO GAIN potentiometer is shunted during FM operation. This shunt connection is made through switch section S104D.

Through resistor R204 the TUNING meter is shunted across the dc amplifier output. A bleeder current to ground from +12 vdc through resistor R205 and the meter holds the meter to a center indication (zero) when the meter

Courtesy of http://BlackRadios.terryo.org

is not receiving a voltage from the dc amplifier. Therefore the TUNING meter circuit is self-balancing, eliminating the need for a zero-adjust control. When receiver tuning is inexact, a dc component appears in the FM demodulator output, and this dc component is amplified and applied to the meter.

Thus, in the AM and FM modes the TUNING meter functions by indicating the value of the dc component of the FM demodulator output, a component which is zero when tuning is exactly at the carrier center frequency, and when tuning is inexact is of a polarity and level such as to indicate the direction and extent to which the tuning is off.

5. VIDEO AMPLIFIER

The video amplifier consists of two 2N335 transistors, Q203 and Q204. The input is to a common emitter amplifier through resistor R202 in series with capacitor C201. To give the video amplifier a low output impedance, the output stage is an emitter follower. Over-all response improvement is gained by resistor R208, which feeds back from the output to the input. A Zener diode, CR201, establishes a regulated +12 vdc supply for application to the video amplifier, as well as to the dc amplifier. A -24 vdc is also used in establishing the bias levels of the four transistors in the video module.

The video amplifier receives its signal through the VIDEO GAIN control, R111. Shunted across R111 is the VIDEO BANDWIDTH control network, consisting of switch S106 and capacitors C108 through C112. The high frequency extreme of the receiver's over-all video bandwidth is controlled by the value of shunt capacitor placed in the circuit at this point.

The video amplifier output connector is the VIDEO OUTPUT jack, J103, at which there is an impedance suitable for a 10K-ohm, unbalanced load. The AUDIO GAIN control is shunted to ground across the video amplifier output so that the audio amplifier receives its signal through the video amplifier.

6. AUDIO AMPLIFIER

The audio amplifier is contained on a separate module and consists of three dc-coupled transistors, Q301, Q302, and Q303. The input signal from the AUDIO GAIN potentiometer, R113, is applied to the module through a set of contacts in the SQUELCH relay, K101. From there the audio signal passes through capacitor C301 and resistor R301 to the first stage, a conventional voltage amplifier in a common emitter configuration. The second stage is an emitter follower used to match the high impedance of the first stage output to the low input impedance of the third stage, the power amplifier.

Courtesy of http://BlackRadios.terryo.org

. Resistor R307 provides inverse feedback from the third to the first stage. Resistor R310 in the emitter lead of the output stage, provides signal frequency current feedback.

Operating voltages are provided by a +12 vdc source, regulated by Zener diode CR301 for application to the first two stages. The positive voltage applied to the output stage collector is not regulated, since the collector current is relatively independent of collector voltage.

The output is through transformer T301, which forms the third stage collector load. T301 provides a balanced output of 600 ohms impedance. In parallel across the secondary of T301 are connected the terminals 1 and 2 on TB101; the PHONES jack, J101; and the speaker. The connection to the speaker is through a set of normally closed contacts in the PHONES jack so that the speaker is automatically disconnected when a mating plug is inserted into the jack.

7. SQUELCH CIRCUIT

The SQUELCH module uses two type 2N335 transistors, Q401 and Q402, and a type 2N1700 transistor, Q403. The SQUELCH relay, K101, is not mounted on the module.

The first two stages form a cascaded emitter follower. The third stage is a dc amplifier with the relay winding as a part of its collector load. In the absence of a carrier the emitter follower conducts and holds the dc amplifier biased to nonconduction. In the presence of a carrier a negative control voltage, similar to an AGC voltage, is applied to the input of the module through the SIGNAL STRENGTH meter, M101. This voltage turns off the emitter follower, turning on the dc amplifier and actuating the relay. Since the input signal to the audio amplifier passes through a set of K101 contacts designed so that the circuit to the audio amplifier is closed when the relay is actuated, the audio output is available in the presence of a carrier and cut off in its absence.

The SQUELCH control, R107, sets the level of emitter follower base-to-emitter bias current which flows in the absence of a carrier. Thus, adjusting the SQUELCH control fixes the level of negative control voltage (and hence the carrier level) required to stop the emitter follower from conducting.

Before the emitter follower ceases to conduct, capacitor C401 must be charged to a certain voltage level. Thus, C401 functions to prevent the SQUELCH

Courtesy of http://BlackRadios.terryo.org

circuit from changing over to the carrier-off state during those instants of 100% AM negative peaks when the carrier level approaches zero. Yet the time constant of the C401 circuit is not long enough to unduly delay the response of the SQUELCH circuit to the return of a carrier after it has been absent.

Because the SIGNAL STRENGTH meter sees ground through the SQUELCH module input, that input must be so designed that the meter sees a small voltage drop to ground, a voltage drop independent of both the SQUELCH control settings and the carrier presence or absence. Otherwise, the meter would not give a true indication of relative carrier level in the IF strip.

This requirement is met by diodes CR401 through CR403, which keep the Q401 base at an approximately constant ground potential. In the absence of a carrier the bleeder current through resistor R401 and diodes CR402 and CR403 places a drop across those diodes which is approximately equal and opposite to the emitter-to-base voltage drop within Q401 and Q402 because of their conduction. Thus the Q401 base is placed at approximately ground potential. In the presence of a carrier, diode CR401 is biased to conduction by approximately the same negative voltage level necessary to stop Q401 and Q402 from conducting. Thus the Q401 base is held at approximately ground potential as the circuit changes over to the carrier-on stage.

8. POWER SUPPLY

The power supply is operated from a 115- or 230-vac, 50-400 cps source. A 3/8-ampere fuse of the slow-blow type in the primary winding of transformer T101 protects the entire receiver. Four secondary windings supply all the necessary voltages to the receiver. One 6.3-vac winding supplies the filaments. One powers a full-wave rectifier whose output is LC filtered and taken off at +175 vdc. From that same rectifier an output is taken off through resistor R101 and applied to the IF strip within which it is regulated to +56 vdc (see subsection 3, D, of this section). A third winding supplies another full-wave rectifier whose output is +150 vdc. The negative side of this rectifier is held at -3 vdc and used as cathode return for V501 and V502. The fourth secondary winding powers three full-wave rectifiers in parallel across it. These three rectifiers produce two sources of +24 vdc and one source of -24 vdc.

Courtesy of http://BlackRadios.terryo.org

SECTION IV

INSTALLATION AND OPERATION

1. INSTALLATION

A. Mounting. The receiver is designed for installation in a standard 19-inch rack. It requires 3 1/2" of vertical space and will project 15 1/2" into the rack. Adequate ventilation should be allowed.

B. Power Connections. First check that switch S102, located on the chassis top, is in the position appropriate for the primary source voltage to be used. Then plug the power cord into the primary power source, which will be either 115 or 230 vac, 50 to 400 cps. The third pin of the power cord plug grounds the receiver. If a three-pin receptacle is not available, use the adapter provided.

C. Antenna Connection. Use an antenna suitable for the 54-260 mc range with a 50-ohm output impedance. Connect it to the INPUT, J101, using a 50-ohm coaxial cable.

D. Signal Monitor Connection. To use a signal monitor with the receiver, connect its input to the SM OUTPUT, J102. Use a 50-ohm coaxial cable.

E. Video Output Connection. Connect a video amplifier load of not less than 10K ohms to the VIDEO OUTPUT, J103.

F. Audio Output Connections. The speaker is normally in operation. If headphones are used, best results will be obtained if they are of 600 ohms impedance. If it is desired to use an audio line, it should be of 600 ohm impedance and should be connected across terminals 1 and 2 of the AUDIO OUTPUT TB101. To deliver full power to the audio line the speaker must be disconnected. To disconnect it, insert a dummy plug into the PHONES jack.

G. Carrier-Operated Relay Connections. If desired to control an external circuit with the carrier operated relay, make connections at TB102. Terminal 1 is the common connection. Terminals 1 and 2 are closed in the absence of a carrier and open in the presence of a carrier. Terminals 1 and 3 are closed in the presence of a carrier and open in the absence of a carrier.

H. Ground. System ground should be connected to terminal G of the AUDIO OUTPUT TB101.

Courtesy of http://BlackRadios.terryo.org

2. OPERATION

A. To apply ac to the receiver, turn the AUDIO GAIN control clockwise from the PWR OFF position. The tuning dial light will come on.

B. The BANDWIDTH KC switch should be set to the 300 KC position for wide band operation and to the 10KC position for narrow band operation. When searching for signals it is advisable to use wide band operation. For CW operation, only the narrow bandwidth is recommended.

C. The FM-AM-CW switch should be set, prior to tuning, for the kind of signal to be received.

D. The IF GAIN control should be set according to the FM-AM-CW switch position selected. For CW operation manual IF gain control is necessary For AM operation the AGC position is recommended, but manual IF gain may be needed in the presence of strong interfering signals. For FM operation the IF GAIN control may be left in any position since AGC is automatically present whenever FM operation is selected.

E. The VIDEO BANDWIDTH switch should be set, prior to tuning, to a video bandwidth suitable for the signals to be received. The use of an unnecessarily wide video bandwidth may increase the amount of background noise present in the audio and video signals.

F. Tuning should be performed by first using the tuning crank and then using the FINE TUNING control.

G. The SIGNAL STRENGTH meter indicates the relative magnitude of the carrier being received and is not calibrated in any specific units. It is of maximum usefulness when tuning in AM or CW signals, which should be tuned to maximum signal strength.

H. The TUNING meter indicates zero when tuning is exactly to the center of the carrier, to the left of center when tuning is below the carrier frequency, and to the right of center when tuning is above the carrier frequency. The amount of meter deviation indicates the relative degree of detuning, but the meter is not calibrated to interpret detuning in frequency units. This meter is useful in tuning in both AM and FM signals but will not indicate during CW operation.

I. The SQUELCH control should be set as follows:

(1) In the absence of a carrier adjust the VIDEO GAIN and AUDIO GAIN controls until the background noise is clearly audible.

Courtesy of http://BlackRadios.terryo.org

(2) In the absence of a carrier adjust the SQUELCH control until the background noise is just below the threshold of audibility.

J. The VIDEO GAIN control should be adjusted for the desired video output level.

K. The AUDIO GAIN control should be adjusted to provide the desired audio level after adjustment of the VIDEO GAIN control. Subsequent readjustment of the VIDEO GAIN control may necessitate readjustment of the AUDIO GAIN control because the audio signal level varies with the video signal level.

L. The BFO TUNING control may be adjusted during CW operation to obtain the desired pitch of the beat note.

Courtesy of http://BlackRadios.terryo.org

SECTION V

MAINTENANCE

1. GENERAL

The type 501 receiver will give comparatively trouble-free performance. However, should trouble occur, it is important that maintenance personnel be familiar with Section III, in which the circuits are described. In addition, use should be made of Figure 6-1, the complete schematic diagram, and Table 2, in which the tube socket and transistorized module pin voltages are given. The receiver presents no special maintenance problems and normally requires no care beyond being kept clean. This is best accomplished by the careful use of dry compressed air at not more than 60 psi.

CAUTION

All maintenance work within this receiver should be kept to a minimum and performed only by trained and experienced personnel. The placement of components and the dress of leads in the equipment (especially within the RF tuner) have been carefully engineered to give optimum performance. In replacing any components, great care should be exercised to duplicate the exact physical layout and lead length of the original assembly.

2. MAINTENANCE OF GEAR TRAIN

The gear train mechanism uses friction drive and relies on the stops of the inductuner to halt the turning of the inductuner. The only maintenance it normally needs is the occasional application of a few drops of light oil on the shaft bearings. Be careful not to get oil on the friction drive plates.

The tuning dial is rigidly attached to its shaft and is geared to the tuner in a manner such as to make it quite unlikely it will ever get out of position. However, if it becomes necessary to mechanically realign the dial (such as after an inductuner replacement), follow these steps:

Courtesy of http://BlackRadios.terryo.org

TUBE SOCKETS AND MODULE PIN VOLTAGES, TYPE 501 RECEIVER

Symbol	Type	Tube Socket Pin Numbers					Plate	Grid	Cathode	Heater	Heater
		2	4	8	10	12					
V501	7077	-	-	-	-	-	+160V	-0.20V	+1.08V	6.3 vac	0
V502	7077	-	-	-	-	-	+155V	0	+1.3V	6.3 vac	0
V503	7587	+23.0V	-1.1V**	0	6.3 vac	0	+170V	-	-	-	
V504	6CW4	+100V	-3.2V*	0	0	6.3 vac	-	-	-	-	-
V601	7587	+19.0V	-1.1V	0	0	6.3 vac	+155V	-	-	-	-
V602	7587	+27.0V	-0.34V	+0.24V	0	6.3 vac	+160V	-	-	-	-
V603	7587	+24.0V	-0.2V	+0.19V	0	6.3 vac	+175V	-	-	-	-
V604	7587	+16.5V	-13.4V	0	0	6.3 vac	+24.0V	-	-	-	-
V605***	6CW4	+95.0V	-3.5V*	0	0	6.3 vac	-	-	-	-	-

Video Module Pin Numbers							
1	2	3	4	9	10	11	12
0	-18.0V	-0.1V	0	26.5V	0.86V	-0.3V	0

Audio Module Pin Numbers				
2	3	4	11	13
0	0	26.5V	0	0

Squelch Module Pin Numbers						
1	2	3	4	5	11	13
25.0V	26.0V	0.85V	0	-18.5V	0	26.5V

Note: All readings taken with reference to ground, using RCA VoltOhmyst WV-98B. All readings are positive dc unless otherwise noted. All readings taken with receiver powered by 115 vac, 60 cps; no signal input; controls set as follows unless otherwise noted: BANDWIDTH switch at 300 KC; mode selector at FM; IF GAIN control at AGC; AUDIO GAIN maximum clockwise; VIDEO GAIN maximum clockwise; VIDEO BANDWIDTH at 150 KC position; SQUELCH maximum clockwise.

* Voltages in this column taken with 1 megohm resistor in series with probe.

** Readings will vary with frequency.

*** Readings taken with FM-AM-CW switch in CW position; BANDWIDTH switch at 10 KC position.

Table 2

Courtesy of http://BlackRadios.terryo.org

(1) By releasing the Allen set screws on each side of it. loosen the coupling between the gear shaft and the inductuner shaft.

(2) Rotate the inductuner shaft to maximum clockwise position.

(3) Turn the dial until the hairline is at the second mark above 260.

(4) Tighten the coupling between the gear train and inductuner shaft.

(5) Check the operation by turning the tuning crank counter-clockwise until the inductuner no longer turns. The dial should read at the mark just beyond 54.

3. PLUG-IN MODULES

The modules used for the squelch circuit, the video amplifier, and the audio amplifier can be easily removed by pulling them out of the receptacles into which they are fitted. The numbers on the pins coming out of the modules correspond to the numbers indicated on the complete schematic diagram, Figure 6-1, at the points where the connecting leads pass through the dashed lines outlining each module on the schematic. For example, the output from the audio amplifier to the PHONES jack is through pins 11 and 13 of the receptacle into which the audio amplifier module is plugged.

4. TROUBLESHOOTING

The greatest percentage of troubles will be caused by failures of the fuse, tubes, diodes, or relays. The proper functioning of all these parts should be assured either by test or by replacement with parts known to be good before any further troubleshooting is carried out.

After the above measure has been carried out, initial troubleshooting should be directed toward localizing the problem to a specific portion of the receiver. In the case of the plug-in modules, a quick check can be made by simply plugging in a new module known to be good. Another procedure which should be considered for localizing troubles is to feed in a signal at the antenna jack and then check the signals present at each test point. To this end, it is desirable that all maintenance personnel familiarize themselves with the alignment procedures, even if an alignment is not required, because those procedures include methods of checking performance which may help in other work. Lastly, it should be borne in mind that the power supply should be known to be functioning perfectly before any other circuit is suspected.

Courtesy of http://BlackRadios.terryo.org

5. ALIGNMENT INSTRUCTIONS

A. General. The alignment procedures in this book are suitable for performance in the field when making periodic performance checks or when making adjustments after replacing tubes or components. Only those controls specifically referred to within a series of steps given for aligning a particular circuit affect the work in that circuit. Those controls not mentioned in any one series of steps may be left in any position. The alignment of this receiver should be performed only with suitable equipments by technicians thoroughly familiar with their use and thoroughly familiar with the receiver. Allow a 30-minute warm-up period before beginning the work.

A post-detection type of marker adder is recommended, and the alignment procedures in this book assume that one is to be used. However, if such a marker adder is not available, the marker generator output should be loosely coupled to the sweep generator output. This can be done by connecting the marker signal source to a turn or two of insulated wire wrapped around the sweep generator lead near the point of connection to the circuit under test, or by coupling to the sweep generator lead through a small capacitor. To insure that the addition of the marker is not affecting the response curve, disconnect the marker generator and observe that no change in the curve's shape or symmetry occurs.

A low-capacity shielded cable should be used to connect to the oscilloscope, and the shield should be grounded as closely as possible to the point to which the center conductor is connected.

B. Equipments Required. The following equipments or their equivalents are required to perform the complete receiver alignment.

(1) Oscilloscope, Tektronix Type 503.

(2) VTVM, RCA Type WV-98B.

(3) Signal Generator, Boonton Type 202E.

(4) Univerter, Boonton Type 207E.

(5) Signal Generator, Hewlett-Packard 606A.

(6) Audio Signal Generator, Hewlett-Packard 200 CD.

(7) Sweep Generator, Jerrold 900A.

(8) Signal Generator, Hewlett-Packard 608D.

(9) Assorted cables, connectors, attenuation pads and alignment tools.

Courtesy of http://BlackRadios.terryo.org

6. IF STRIP ALIGNMENT PROCEDURES

A. General. For each circuit of the IF strip a separate alignment procedure is given under C, D, E, F, G, and H below. Any one of the procedures may be carried out without disturbing other portions of the IF strip.

B. Initial Settings. The following steps should be performed before beginning the alignment procedures given below.

(1) Set receiver FM-AM-CW switch to AM position, with the IF GAIN control at the AGC position.

(2) At C602, ground gain control voltage line to IF strip chassis.

(3) By removing P601 from J601, disconnect IF strip from RF tuners.

(4) Set oscilloscope horizontal sensitivity to 0.2 volt per cm.

C. V601 to V602 Interstage Alignment, 10-kc Bandwidth.

(1) Set up test equipment as shown in Figure 5-1.

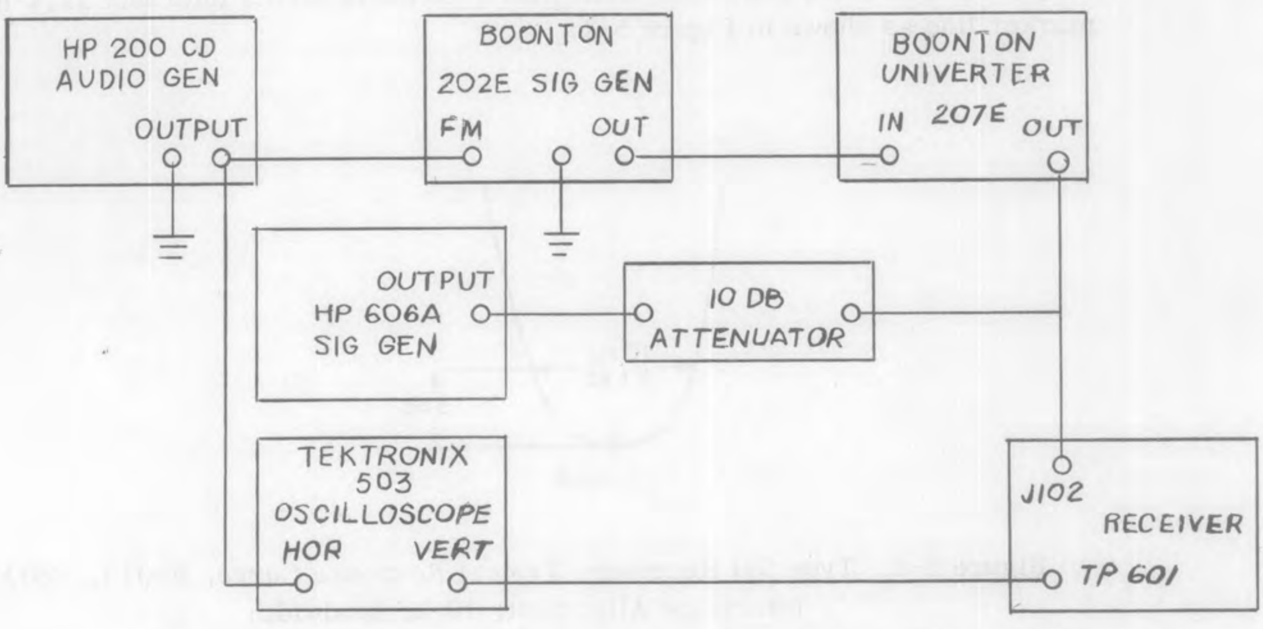


Figure 5-1. Type 501 Receiver, Equipment Setup, V601 to V602 Interstage Alignment, 10-kc Bandwidth

Courtesy of http://BlackRadios.terryo.org

(2) Set audio generator output to 3 cps.

(3) Set oscilloscope vertical sensitivity to 50 mv per cm.

(4) Set Boonton 202E output to 171.4 mc.

(5) Set Boonton Univerter dial at 0 KC.

(6) Adjust sweep width by setting FM deviation to approximately 20 kc.

(7) Set receiver BANDWIDTH switch to 10 KC position.

(8) Adjust L603 and L604 of receiver for a symmetrical response curve centered at 21.4 mc on oscilloscope screen, as shown in Figure 5-2.

(9) Adjust Hewlett-Packard 606A output for use as a 21.4-mc marker with marker output level such that marker barely appears on response curve.

(10) Check bandwidth by tuning Boonton Univerter dial so that response curve moves across oscilloscope screen. Bandwidth will be the frequency difference read from dial when 3-db curve points intersect 21.4-mc marker line as shown in Figure 5-2.

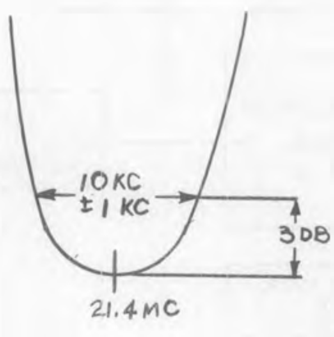


Figure 5-2. Type 501 Receiver, Typical Response Curve, V601 to V602 Interstage Alignment, 10-kc Bandwidth

Courtesy of http://BlackRadios.terryo.org

D. V601 to V602 Interstage Alignment, 300-kc Bandwidth.

(1) Set up test equipment as shown in Figure 5-3.

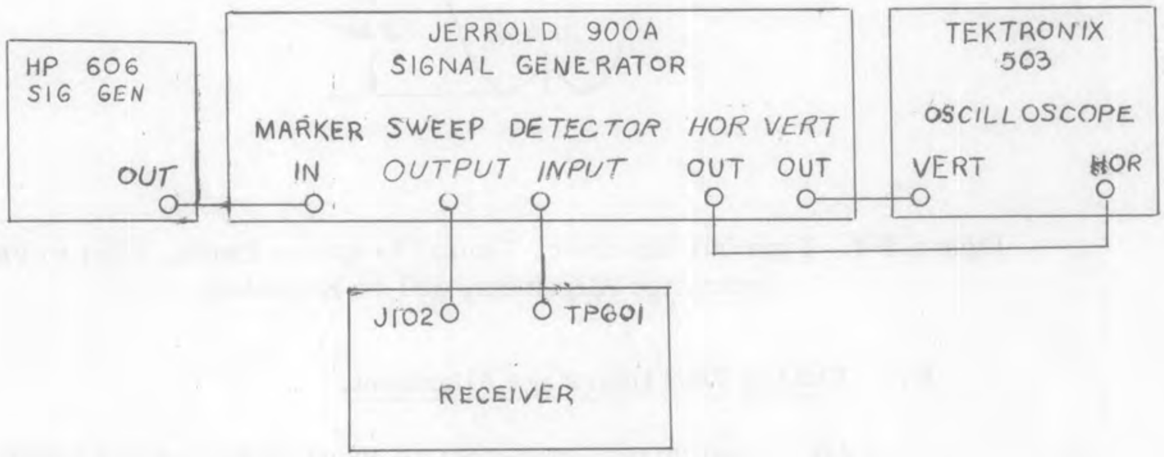


Figure 5-3. Type 501 Receiver, Equipment Setup, V601 to V602 Interstage Alignment, 300-kc Bandwidth

(2) Adjust Jerrold 900-A sweep generator near 21.4 mc for narrow sweep width with its detector switch at external detector position.

(3) Set oscilloscope vertical sensitivity at 50 mv per cm and adjust sweep generator sweep width until a response curve is well displayed on oscilloscope screen.

(4) Set receiver BANDWIDTH switch to 300 KC position.

(5) Adjust C614 and C616 for a symmetrical response centered at 21.4 mc, as shown in Figure 5-4.

(6) Using calibrated 21.4-mc signal from Hewlett-Packard 606A signal generator as a marker, check bandwidth by moving the marker along response curve, Bandwidth will be the frequency difference read from signal generator dial at points where marker intersects 3-db points of response curve, as shown in Figure 5-4.

Courtesy of http://BlackRadios.terryo.org

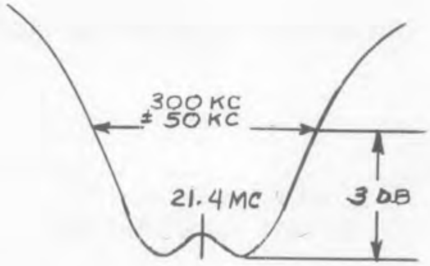


Figure 5-4. Type 501 Receiver, Typical Response Curve, V601 to V602 Interstage Alignment, 300-kc Bandwidth

E. V602 to V603 Interstage Alignment.

(1) Set up test equipment as shown in Figure 5-3 except that sweep output of sweep generator should be connected to pin 4 of V602.

(2) By removing P601 from J601, disconnect IF strip from RF tuners.

(3) Adjust Jerrold 900-A sweep generator near 21.4 mc for narrow sweep width with its detector switch at external detector position.

(4) Set oscilloscope vertical sensitivity at 50 mv per cm and adjust sweep generator sweep width until a response curve is well displayed on oscilloscope screen.

(5) Set receiver BANDWIDTH switch to 300 KC position.

(6) Adjust L605 and L606 for a symmetrical response centered at 21.4 mc, as shown in Figure 5-5.

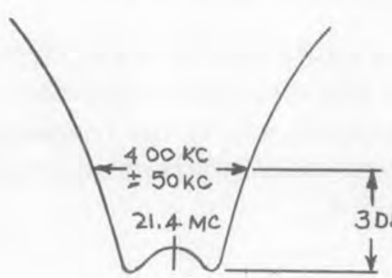


Figure 5-5. Type 501 Receiver, Typical Response Curve, V602 to V603 Interstage Alignment

Courtesy of http://BlackRadios.terryo.org

F. V603 to V604 Interstage Alignment

(1) Set up test equipment as shown in Figure 5-3 except that sweep output of sweep generator should be connected to pin 4 of V603.

(2) Adjust Jerrold 900-A sweep generator near 21.4 mc for narrow sweep width with its detector switch at external detector position.

(3) Set oscilloscope vertical sensitivity at 50 mv per cm and adjust sweep generator sweep width until a response curve is well displayed on oscilloscope screen.

(4) Set receiver BANDWIDTH switch to 300 KC position.

(5) Adjust L607 and L608 for a symmetrical response curve centered at 21.4 mc.

(6) Adjust C657 for dip in center of response curve, as shown in Figure 5-6.

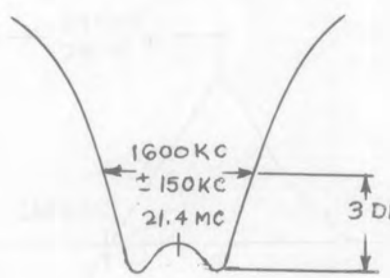


Figure 5-6. Type 501 Receiver, Typical Response Curve, V603 to V604 Interstage Alignment

G. Discriminator Alignment.

(1) Set up equipment as shown in Figure 5-3 except that sweep output of sweep generator should be connected to pin 4 of V603 and the detector input should be connected to the receiver's FM output, E602.

(2) Adjust Jerrold 900-A sweep generator near 21.4 mc for narrow sweep width with its detector switch at external detector position.

Courtesy of http://BlackRadios.terryo.org

(3) Set oscilloscope vertical sensitivity at 50 mv per cm and adjust sweep generator sweep width until a response curve is well displayed on oscilloscope screen.

(4) Set receiver BANDWIDTH switch to 300 KC position.

(5) Adjust phasing of the sweep generator.

(6) Adjust L611 for zero crossing of S-curve at 21.4 mc and adjust L610 for symmetry of S-curve, as shown in Figure 5-7.

(7) Using calibrated 21.4-mc marker from Hewlett-Packard 606A signal generator, check that the S-curve has the following characteristics:

(a) centered at 21.4 mc.

(b) equal amplitude and symmetry.

(c) Peak-to-peak separation of 750 ±30 kc, as shown in Figure 5-7.

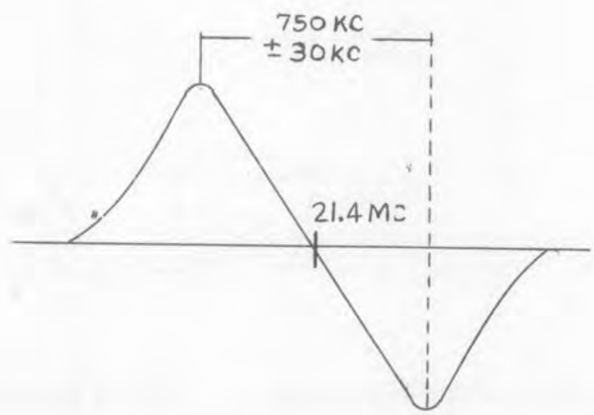


Figure 5-7. Type 501 Receiver, Typical Response Curve, Discriminator Alignment

H. <u>BFO, V605, Alignment.</u> No alignment of the BFO stage is required.

7. RF TUNER ALIGNMENT PROCEDURES

A. <u>General</u>. For each circuit of the RF tuner a separate alignment procedure is given under C, D. E, and F below. Any one of the procedures

Courtesy of http://BlackRadios.terryo.org

may be carried out without disturbing other portions of the tuner. However, all RF tuner alignment procedures are critical and should not be attempted in the field unless considered absolutely necessary, such as after replacement of a component.

B. IF Output Network Alignment.

(1) Set BANDWIDTH switch to 10 KC position.

(2) From the Hewlett-Packard 606A signal generator, feed a calibrated 21.4-mc signal to the INPUT, J101.

(3) Adjust signal generator output until receiver SIGNAL STRENGTH meter indicates at 1/2 deflection.

(4) Adjust L514 for maximum indication on the SIGNAL STRENGTH meter.

C. Local Oscillator, V504, Alignment.

(1) Set the function switch to the FM position.

(2) Set the BANDWIDTH switch to the 300 KC position.

(3) Set the FINE TUNING control at midrange.

(4) Connect the output of a Hewlett-Packard 608D VHF signal generator to the INPUT, J101.

(5) Calibrate the VHF signal generator to produce 250-mc signal.

(6) Adjust the VHF signal generator output level until the receiver SIGNAL STRENGTH meter reads approximately 3/4 deflection.

(7) Recalibrate the VHF signal exactly to 250 mc.

(8) Set the receiver dial exactly at 250 mc.

(9) Adjust C531 until the TUNING meter indicates exactly at center.

Courtesy of http://BlackRadios.terryo.org

(10) Set the dial exactly to 75 mc.

(11) Tune and calibrate the VHF signal generator to produce 75-mc signal. If the TUNING meter again indicates exactly at the center of its scale, the alignment is completed. If not, adjust C531 for center indication of TUNING meter.

(12) Repeat steps (8) through (12) until TUNING meter indicates at its center for both 75 mc and 250 mc.

D. RF Amplifier to Mixer, V502 to V503, Interstage Alignment.

(1) Remove bottom cover from the tuner chassis.

(2) Unsolder C510 from the junction of L504 and L505, carefully noting the capacitor's position so that it may later be resoldered to exactly the same point.

(3) Set up the equipment as shown in Figure 5-8.

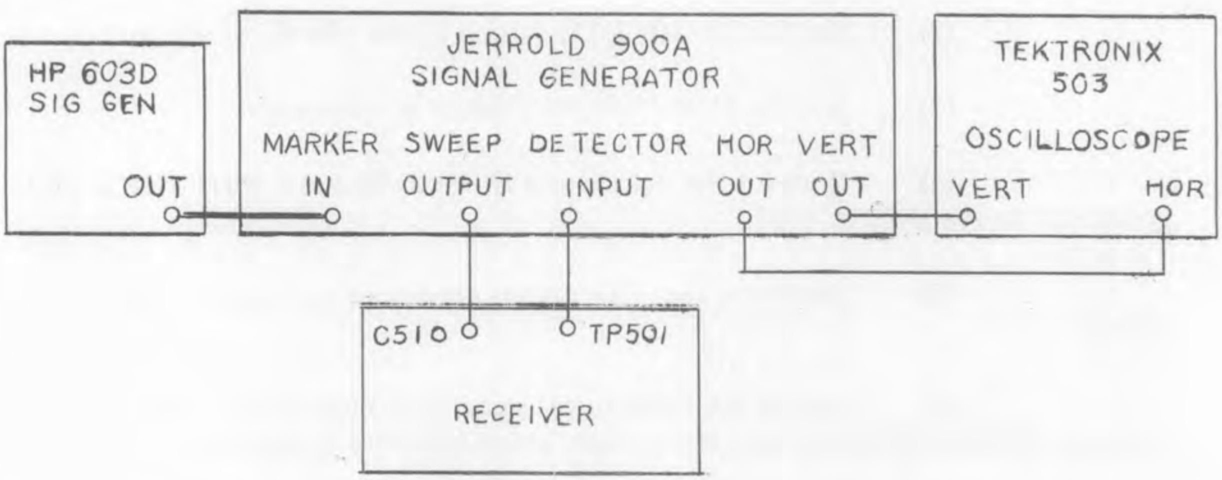


Figure 5-8. Type 501 Receiver, Equipment Setup, V502 to V503 Interstage Alignment

(4) Set the oscilloscope vertical sensitivity to 10 mv per cm and the vertical input to the ac-coupled position.

(5) Set the oscilloscope horizontal sensitivity so that the total trace of the horizontal sweep is 10 cm.

Courtesy of http://BlackRadios.terryo.org

(6) Set the receiver dial to 250 mc and sweep generator to a 250-mc center frequency.

(7) Using a calibrated 250-mc marker from the Hewlett-Packard 608D signal generator as a marker, adjust C518, C525, and C528 for a symmetrical flat-topped response with the 250-mc marker appearing 6% down on the higher frequency slope as shown in Figure 5-9.

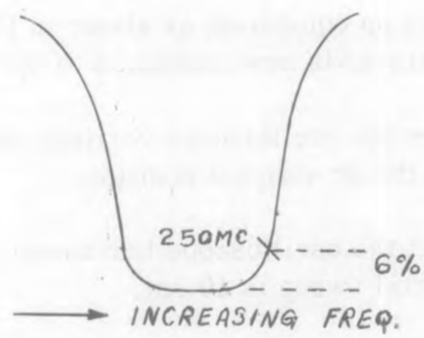


Figure 5-9. Type 501 Receiver Typical Response Curve, V502 to V503 Interstage Alignment, Receiver Dial at 250 mc, Bottom Cover On

(8) Set the receiver dial to 75 mc and sweep generator to a 100-mc center frequency.

(9) Using a calibrated 75-mc marker from the Hewlett-Packard 608D signal generator, adjust C518 and C528 for a symmetrical double-tuned response with the 100-mc marker appearing at the low frequency peak as shown in Figure 5-10.

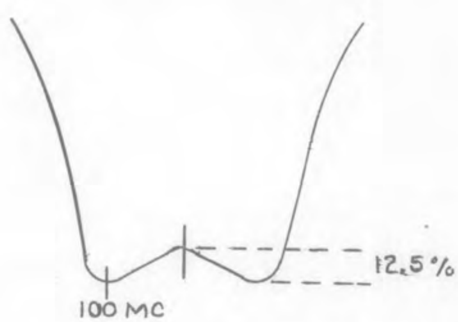


Figure 5-10. Type 501 Receiver Typical Response Curve, V502 to V503 Interstage Alignment, Receiver Dial at 75 mc, Bottom Cover On

Courtesy of http://BlackRadios.terryo.org

(10) Adjust C523 for 12.5% center dip as shown in Figure 5-10.

(11) Repeat steps (9) and (10) until the final response curve assumes the proper shape with the bottom cover on.

E. RF Tuner Input Circuit Alignment.

(1) If C510 has been unsoldered from the junction of L504 and L505, resolder it to the exact position from which it was taken.

(2) Set up equipment as shown in Figure 5-8, except that the output of the sweep generator is now connected to the INPUT, J101.

(3) Set the oscilloscope vertical sensitivity to 10 mv per cm and the vertical input to the ac-coupled position.

(4) Set the oscilloscope horizontal sensitivity so that the total trace of the horizontal sweep is 10 cm.

(5) Set the receiver dial to 250 mc and the sweep generator to approximately 250 mc.

(6) Adjust C503 for maximum gain and symmetrical response.

(7) Set the receiver dial to 75 mc and the sweep generator to 75-mc center frequency.

(8) If the response is symmetrical, the alignment is completed. If not, adjust C503 for a symmetrical response.

(9) Repeat step (6) through (8) as necessary.

Courtesy of http://BlackRadios.terryo.org

SECTION VI

PARTS LIST, TYPE 501 RECEIVER

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
1.	MAIN CHASSIS	
A101	ASSEMBLY, AUDIO MODULE: CEI 1044A	1
A102	ASSEMBLY, VIDEO MODULE: CEI 1355	1
A103	ASSEMBLY, SQUELCH MODULE: CEI 1124	1
C101, A, B	CAPACITOR, ELECTROLYTIC: 15 μf-15 μf 350 wvdc Sprague TVL2625	2
C102A, B	Same as C101A, B	
C103A, B	CAPACITOR, ELECTROLYTIC: 100 μf-100 μf 50 wvdc Sprague TVL2326	2
C104	CAPACITOR, ELECTROLYTIC: 50 μf 50 wvdc Sprague TE1307	2
C105	Same as C104	
C106	Same as C103A	
C107	CAPACITOR, ELECTROLYTIC, TANTALUM: 10 μf 20% 20 wvdc, Sprague 150D106X0020B0	1
C108	CAPACITOR, DIPPED MICA: 120 μμf 5% 500 wvdc Elmenco DM-10-121J	1
C109	CAPACITOR, DIPPED MICA: 1600 μμf 5% 500 wvdc Elmenco DM-19-162J	1
C110	CAPACITOR, DIPPED MICA: 5600 μμf 5% 500 wvdc Elmenco DM-19-562J	1
C111	CAPACITOR, VITAMIN "Q": 0.018 μf 10% 50 wvdc Sprague 231P5639R5S3	1
C112	CAPACITOR, VITAMIN "Q": 0.056 μf 10% 50 wvdc Sprague 231P5639R5S3	1
CP101	ADAPTER: Microdot 53-82	1
CR101	DIODE, SILICON, RECTIFIER: 750 ma 600 piv, Motorola 1N2615	4
CR102	Same as CR101	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
CR103	Same as CR101	
CR104	Same as CR101	
CR105	DIODE, SILICON, RECTIFIER: 750 ma 100 piv Motorola 1N3193	6
CR106	Same as CR105	
CR107	Same as CR105	
CR108	Same as CR105	
CR109	Same as CR105	
CR110	Same as CR105	
CR111	DIODE, ZENER: PSF 1N979A	1
DS101	DIAL LAMP: 6-8V 0.15 amp, GE #47	1
F101	FUSE: 3/8 amp Slow-Blow, Bussman MDL 3/8	1
F102	FUSE: 3/16 amp Slow-Blow, Bussman MDL 3/16	1
J101	JACK, BNC ADAPTER: Chassis mount BNC to BNC Amphenol UG-492A/U	1
J102	JACK: Chassis mount, Amphenol UG-1094/U	2
J103	Same as J102	
J104	JACK, PHONE: Open circuit type, Switchcraft C12A	1
K101	RELAY, DPDT: 1000 Ω coil, Sigma 22AJCC-1000-G/SIL	1
L101	CHOKE, FILTER: 6 hy 60 ma, CEI 1070	1
LS101	LOUDSPEAKER: 2" square, 3.2 Ω voice coil, Oxford 2CMS	1
M101	METER, SIGNAL STRENGTH: 0-50 μf SL7858, Marion MM-1	1
M102	METER, TUNING: 100-0-100 μa, zero center, SL-7858 Marion MM-1	1
P101	PLUG, CABLE, BNC: Amphenol UG-88/U	3
P102	Same as P101	
P103	Same as P101	
P104	NOT USED	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
P105	POWER CORD AND PLUG ASSEMBLY: Cornish 3532	1
R101	RESISTOR, FIXED COMPOSITION: 24K 5% 2W, AB HB2435	1
R102	RESISTOR, FIXED COMPOSITION: 2K 5% 1W, AB GB2025	1
R103	RESISTOR, DEPOSITED CARBON: 130K 1% 1/2W, Electra DCM 1/2	1
R104	RESISTOR, DEPOSITED CARBON: 2.7K 1% 1/2W, Electra DCM 1/2	1
R105	RESISTOR, FIXED COMPOSITION: 82 Ω 5% 1/2W, AB EB8205	1
R106	RESISTOR, FIXED COMPOSITION: 820 Ω 5% 1/2W, AB EB8215	1
R107	RESISTOR, VARIABLE, COMPOSITION: 500K 1/2W linear AB RV6NAYSD504A	1
R108	RESISTOR, FIXED COMPOSITION: 270 Ω 1/2W 5%, AB EB2715	1
R109	RESISTOR, VARIABLE COMPOSITION: 10K 20% 1W, CTS KB22141	1
R110	RESISTOR, FIXED COMPOSITION: 390Ω 5% 1/2W, AB EB3915	1
R111	RESISTOR, VARIABLE, COMPOSITION: 10K 2W Ohmite CU1031	2
R112	RESISTOR, FIXED COMPOSITION: 5.1K 5% 1/2W AB EB5125	2
R113	RESISTOR, VARIABLE, COMPOSITION: w/SPST switch 100K 2W, Ohmite CA1041	1
R114	RESISTOR, FIXED COMPOSITION: 100K 5% 1/2W AB EB1045	1
R115	NOT USED	
R116	Same as R111	
R117	RESISTOR, VARIABLE, COMPOSITION: 100K 2W, Ohmite CU1041	1
R118	Same as R112	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
S101	SWITCH, SPST: p/o R113, potentiometer switch Ohmite CS-1	1
S102	SWITCH, TOGGLE: DPDT, Cutler-Hammer 8363-K7	1
S103	SWITCH, TOGGLE, SPDT: Cutler-Hammer 8282-K14	1
S104	SWITCH; 2 pole 3 position, 221765-A3 Oak	1
S105	SWITCH, SPDT: p/o R109	
S106	SWITCH, ROTARY: Shorting, 2P-6T, Oak 399206-A	1
T101	TRANSFORMER, POWER: CEI 1059	1
TB101	TERMINAL STRIP: 3 screw terminals, Cinch 3-140-Y	2
TB102	Same as TB101	
2.	VIDEO MODULE	
C201	CAPACITOR, TANTALUM: 0.47 μf 20%, 20 wvdc, Sprague 150D474X0020A2	1
C202	NOT USED	
C203	CAPACITOR, TANTALUM: 22 μf 20%, 35 wvdc Sprague 150D226X0035R0	1
C204	CAPACITOR, TANTALUM: 10 μf 20% 20 wvdc Sprague 150D106X0020B0	1
CR201	DIODE, ZENER: 12V 5%, PSI 1N759A	1
Q201	TRANSISTOR, SILICON NPN: 2N335, Texas Inst. 2N335	4
Q202	Same as Q201	
Q203	Same as Q201	
Q204	Same as Q201	
R201	RESISTOR, FIXED, COMPOSITION: 3.9 meg 5% 1/2W AB EB 3955	1
R202	RESISTOR, FIXED, COMPOSITION: 5.1K 5% 1/2W AB EB5125	1
R203	RESISTOR, FIXED, COMPOSITION: 8.2K 5% 1/2W AB EB8225	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
R204	RESISTOR, FIXED, COMPOSITION: 100K 5% 1/2W AB EB1045	3
R205	RESISTOR, FIXED, COMPOSITION: 1 meg 5% 1/2W AB EB1055	1
R206	RESISTOR, FIXED, CARBON FILM: Texas Inst. CG 1/8 4.75K 1% 1/2W	2
R207	Same as R206	
R208	Same as R204	
R209	RESISTOR, FIXED, COMPOSITION: 5.6K 5% 1/2W AB EB5625	2
R210	Same as R209	
R211	Same as R204	
R212	RESISTOR, FIXED, COMPOSITION: 680 Ω 5% 1/2W AB EB6815	1
3.	AUDIO MODULE	
C301	CAPACITOR, TANTALUM: 0.47 µf 20% 20 wvdc Sprague 150D474X0020A2	1
C302	CAPACITOR, TANTALUM: 10 µf 20% 20 wvdc Sprague 150D106X0020B0	1
CR301	TRANSISTOR, SILICON NPN: Texas Inst. 2N335	2
CR302	Same as CR301	
Q303	TRANSISTOR, SILICON NPN: RCA 2N1700	1
R301	RESISTOR, FIXED, COMPOSITION: 10K 5% 1/2W AB EB1035	2
R302	RESISTOR, FIXED, CARBON FILM: 68.1K 1% 1/8W Texas Inst. CG 1/8	1
R303	Same as R301	
R304	RESISTOR, FIXED, CARBON FILM: 6.81K 1% 1/8W Texas Inst. CG 1/8	1
R305	RESISTOR, FIXED, CARBON FILM: 619 Ω 1% 1/8W Texas Inst. CG 1/8	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
R306	RESISTOR, FIXED, COMPOSITION: 3.9K 5% 1/2W AB EB3925	1
R307	RESISTOR, FIXED, COMPOSITION: 100K 5% 1/2W AB EB1045	1
R308	RESISTOR, FIXED, COMPOSITION: 620 Ω 5% 1/2W AB EB6215	2
R309	Same as R308	
R310	RESISTOR, FIXED, CARBON FILM: 68.1 Ω 1% 1/8W Texas Inst. CG 1/8	1
T301	TRANSFORMER, AUDIO OUTPUT: 600 Ω -4 Ω outputs CEI 1170*	1
4.	SQUELCH MODULE	
C401	CAPACITOR, TANTALUM: 1.0 μf 20% 20 wvdc Sprague 150D105X0020A2	1
CR401	DIODE, SILICON: Texas Inst. 1N462	3
CR402	Same as CR401	
CR403	Same as CR401	
Q401	TRANSISTOR, SILICON: NPN Texas Inst. 2N335	2
Q402	Same as Q401	
Q403	TRANSISTOR, SILICON: NPN RCA 2N1700	1
R401	RESISTOR, FIXED, COMPOSITION: 6.2K 5% 1/2W AB EB6255	1
R402	RESISTOR, FIXED, COMPOSITION: 560K 5% 1/2W AB EB5645	1
R403	RESISTOR, FIXED, COMPOSITION: 4.7K 5% 1/2W AB EB4725	1
R404	RESISTOR, FIXED, COMPOSITION: 2.2K 5% 1/2W AB EB2225	1
R405	RESISTOR, FIXED, COMPOSITION: 1.2K 5% 1/2W AB EB1225	1
R406	RESISTOR, FIXED, COMPOSITION: 20K 5% 1/4W AB CB2035	1
5.	RF TUNER	
C501	CAPACITOR, DIPPED MICA: 15 μμf ±5%, Elmenco DM-10-150J	1
C502	CAPACITOR, CERAMIC, FEEDTHRU: 1000 μμf GMV AB FA5C102W	6
C503	CAPACITOR, VARIABLE, TRIMMER: 0.8-4.5 μμf, JFD VC21G	1
C504	CAPACITOR, DIPPED MICA: 12 μμf ±5%, Elmenco DM-10-120J	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
C505	CAPACITOR, DIPPED MICA: 47 μμf ±5% Erie NPOA	1
C506	CAPACITOR, CERAMIC DISC: 0.001 μf, type JL RMC	4
C507	CAPACITOR, CERAMIC TUBULAR: 2.7 μμf ±0.25 μμf, Erie NPOA	1
C508	CAPACITOR, DIPPED MICA: 18 μμf 5%, Elmenco DM10-180J	1
C509	CAPACITOR, CERAMIC, STANDOFF: 1000 μμf GMV AB SS5A102W	5
C510	CAPACITOR, DIPPED MICA: 500 μμf ±5%, Elmenco DM15-501J	1
C511	Same as C502	
C512	CAPACITOR, CERAMIC DISC: 1000μμf 20%, Sprague 40C214A	7
C513	Same as C509	
C514	Same as C502	
C515	CAPACITOR, CERAMIC TUBULAR: 0.5 μμf ±0.25 μμf Erie NPOA	2
C516	CAPACITOR: (See schematic)	
C517	Same as C509	
C518	CAPACITOR, VARIABLE TRIMMER: 0.7-9.0 μμf JFD VC1G	4
C519	Same as C506	
C520	Same as C502	
C521	Same as C506	
C522	CAPACITOR, CERAMIC TUBULAR: 2.0 μμf ±0.25 μμf Erie NPOA	2
C523	Same as C518	
C524	Same as C522	
C525	CAPACITOR, CERAMIC TUBULAR: 4.7 μμf ±0.25 μμf Erie NPOA	1
C526	CAPACITOR, CERAMIC TUBULAR: 5.6 μμf ±0.25 μμf Erie N330A	1
C527	CAPACITOR, CERAMIC TUBULAR: 5.0 μμf ±0.25 μμf Erie NPOA	1
C528	Same as C518	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
C529	CAPACITOR, CERAMIC TUBULAR: 3.3 μμf ±0.25 μμf Erie NPOA	2
C530	Same as C515	
C531	Same as C518	
C532	NOT USED	
C533	CAPACITOR, DIPPED MICA: 10 μμf ±5% Elmenco DM10-100J	1
C534	Same as C509	
C535	Same as C529	
C536	Same as C502	
C537	Same as C512	
C538	VARICAP, HIGH "Q": PSI PC115-10	1
C539	Same as C512	
C540	Same as C502	
C541	CAPACITOR, CERAMIC FEEDTHRU: 330 μμf 10% AB FA5C3311	1
C542	Same as C512	
C543	Same as C512	
C544	Same as C512	
C545	Same as C512	
C546	Same as C509	
C547	Same as C506	
J501	JACK, RECEPTACLE, BNC: IPC UG-1094/U	1
J502	JACK, RECEPTACLE: Amphenol 27-3	1
L501	INDUCTOR: CEI 1226	1
L502A, B C, D	INDUCTUNER: Four section VHF CEI HT-201-1	1
L503	INDUCTOR: CEI 1200	1
L504	CHOKE: CEI 1129-03	1
L505	CHOKE: 1.0 μh, Wilco W10G	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
L506	CHOKE: CEI 1131-01	1
L507	INDUCTOR: CEI 1097	2
L508	CHOKE: CEI 1131-28	1
L509	CHOKE: CEI 1031-02	1
L510	INDUCTOR: CEI 1107	1
L511	INDUCTOR: CEI 1106-02	1
L512	Same as L507	
L513	NOT USED	
L514	COIL: CEI 1472-3	1
L515	CHOKE: CEI 1131-04	2
L516	Same as L515	
L517	CHOKE: CEI 1131-05	1
L518	Same as L513	
P501	PLUG: IPC UG-88/U	1
P502	PLUG: Amphenol 27-1	1
R501	RESISTOR, FIXED, COMPOSITION: 100K ±5% 1/2W AB EB1045	1
R502	RESISTOR, FIXED, COMPOSITION: 33K ±5% 1/4W AB CB3335	1
R503	RESISTOR, FIXED, COMPOSITION: 47K ±5% 1/2W AB EB4735	1
R504	RESISTOR, FIXED, COMPOSITION: 47K ±5% 1/4W AB CB4735	2
R505	RESISTOR, FIXED, COMPOSITION: 470 Ω ±5% 1/4W AB CB4215	1
R506	NOT USED	
R507	RESISTOR, FIXED, COMPOSITION: 560 Ω ±5% 1/4W AB CB5615	1
R508	RESISTOR, FIXED, COMPOSITION: 15K ±5% 1W AB GB1535	1
R509	RESISTOR, FIXED, COMPOSITION: 100Ω ±5% 1/2W AB EB1015	2
R510	RESISTOR, FIXED, COMPOSITION: 12K ±5% 1/2W AB EB1235	1
R511	RESISTOR, FIXED, COMPOSITION: 3.3K ±5% 1W AB GB3325	1
R512	RESISTOR, FIXED, COMPOSITION: 470K ±5% 1/4W AB CB4745	2

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
R513	Same as R512	
R514	Same as R504	
R515	RESISTOR, FIXED, COMPOSITION: 220K ±5% 1/2W AB EB2245	1
R516	RESISTOR, FIXED, COMPOSITION: 3.9K ±5% 1/4W AB CB3925	1
R517	RESISTOR, FIXED, COMPOSITION: 1K ±5% 1/2W AB EB1025	2
R518	Same as R517	
R519	RESISTOR, FIXED, COMPOSITION: 2.7K ±5% 1/2W AB EB2725	1
R520	Same as R509	
TP501	TEST POINT: Sealectro SKT2BC	1
V501	ELECTRON TUBE, CERAMIC TRIODE: GE 7077	2
V502	Same as V501	
V503	ELECTRON TUBE, NUVISTOR TETRODE: RCA 7587	1
V504	ELECTRON TUBE, NUVISTOR TRIODE: RCA 6CW4	1
6.	IF STRIP	
C601	CAPACITOR, CERAMIC DISC: 0.001 μf 20% 500 wvdc Sprague 20C114A2	7
C602	CAPACITOR, CERAMIC, STANDOFF: 1000 μμf GMV AB FA5C-102W	15
C603	CAPACITOR, ELECTROLYTIC, TANTALUM: 0.47 μf 20% 35 wvdc Sprague 150D474X0035A2	1
C604	Same as C602	
C605	Same as C601	
C606	CAPACITOR, DIPPED MICA: 120 μμf 5% 500 wvdc Arco DM-10-121J	1
C607	Same as C601	
C608	CAPACITOR, CERAMIC, BUTTONHEAD: 0.001 μf GMV AB SS5A-102W	4
C609	Same as C608	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
C610	Same as C602	
C611	CAPACITOR, DIPPED MICA: 56 μμf 5% 500 wvdc Arco DM-10-560J	2
C612	CAPACITOR: 180 μμf ±5%, Elmenco DM-10-181J	1
C613	CAPACITOR, DIPPED MICA: 100 μμf 5% 500 wvdc Arco DM-10-101J	4
C614	CAPACITOR, VARIABLE: 1-28 μμf, JFD MC-603	2
C615	CAPACITOR, CERAMIC, TUBULAR: 10 μμf ±0.25 μμf Elmenco DM-10-100J	1
C616	Same as C614	
C617	CAPACITOR, DIPPED MICA: 91 μμf 5% 500 wvdc Arco DM-10-910J	1
C618	CAPACITOR, DIPPED MICA: 180 μμf 5% 500 wvdc Arco DM-19-181J	1
C619	Same as C602	
C620	Same as C611	
C621	CAPACITOR, DIPPED MICA: 51 μμf 5% 500 wvdc Arco DM-10-510J	1
C622	CAPACITOR, CERAMIC DISC: 0.0047 μf 20% 1000 wvdc Sprague 29C203A	1
C623	Same as C602	
C624	CAPACITOR, CERAMIC DISC: 470 μμf 20% 1000 wvdc Sprague 40C209A	5
C625	Same as C601	
C626	Same as C624	
C627	CAPACITOR, DIPPED MICA: 15 μμf 5% 500 wvdc Arco DM-10-150J	3
C628	CAPACITOR, CERAMIC TUBULAR: 0.75 μμf 10% QC MC 0.75	1
C629	CAPACITOR, DIPPED MICA: 33 μμf 5% 500 wvdc Arco DM-10-330J	3

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
C630	Same as C613	
C631	Same as C602	
C632	Same as C602	
C633	Same as C624	
C634	Same as C624	
C635	Same as C624	
C636	CAPACITOR, CERAMIC, TUBULAR: 4.7 μμf ±0.25 μμf Erie NPOA	2
C637	Same as C629	
C638	Same as C608	
C639	Same as C602	
C640	Same as C602	
C641	Same as C602	
C642	CAPACITOR, CERAMIC DISC: 0.1 μf +80% -20% 50 wvdc Sprague 33C41	1
C643	Same as C636	
C644	Same as C601	
C645	Same as C601	
C646	CAPACITOR, CERAMIC, TUBULAR: 22 μμf 5%, Erie N150A	1
C647	CAPACITOR, CERAMIC TUBULAR: 0.82 μμf 10% QC MC 0.82	1
C648	CAPACITOR, DIPPED MICA: 22 μμf 5% 500 wvdc Arco DM-10-220J	3
C649	Same as C613	
C650	Same as C613	
C651	Same as C629	
C652	Same as C602	
C653	Same as C602	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
C654	Same as C602	
C655	Same as C608	
C656	Same as C627	
C657	CAPACITOR, CERAMIC, VARIABLE: CTC CST-50	1
C658	Same as C648	
C659	Same as C648	
C660	Same as C627	
C661	Same as C601	
C662	CAPACITOR, CERAMIC, TUBULAR: 10 $\mu\mu$f ±0.25 $\mu\mu$f temperature compensated, Erie N750A	1
C663	Same as C602	
C664	CAPACITOR, CERAMIC DISC: 0.005 μf 20% 50 wvdc Sprague TG-D50	4
C665	Same as C664	
C666	Same as C664	
C667	Same as C664	
C668	CAPACITOR, DIPPED MICA: 62 $\mu\mu$f ±5% Elmenco DM-10-620J	1
C669	Same as C602	
CR601	DIODE, SILICON ZENER: 8.2V 5% Texas Inst. 1N756A	2
CR602	DIODE, GERMANIUM, GLASS: Sylvania 1N198A	2
CR603	Same as CR602	
CR604	Same as CR601	
CR605	NOT USED	
CR606	DIODE, GERMANIUM: Sylvania 1N463	1
J601	JACK, RF: Connector, subminax, Amphenol 27-3	2
J602	Same as J601	
K601	RELAY, DPDT: Elgin MS-24250-6	2
K602	Same as K601	
L601	p/o T601	
L602	p/o T601	

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
L603	COIL, VARIABLE: CEI 1111-04	1
L604	COIL, VARIABLE: CEI 1111-05	1
L605	COIL, VARIABLE: CEI 1111-06	1
L606	COIL, VARIABLE: CEI 1111-03	1
L607	COIL, VARIABLE: CEI 1111-01	1
L608	COIL, VARIABLE: CEI 1111-07	1
L609	COIL, FIXED: CEI 1115, 43 μh	2
L610	COIL, VARIABLE: CEI 1111-02	1
L611	COIL, VARIABLE: CEI 1109	1
L612	Same as L609	
L613	CHOKE: 2.2 μh, Wilco W22G	1
L614	CHOKE: 75 μh, Wilco 1075-15	1
L615	CHOKE: 2.7 μh, CEI 1114	2
L616	Same as L615	
P601	PLUG, CHASSIS MOUNT, RF: Subminax connector, Amphenol 27-1	2
P602	Same as P601	
R601	RESISTOR, FIXED, COMPOSITION: 24 Ω 5% 1/4W AB CB2405	2
R602	Same as R601	
R603	RESISTOR, FIXED, COMPOSITION: 33 Ω 5% 1/4W AB CB3305	1
R604	RESISTOR, FIXED, COMPOSITION: 330K 10% 1/4W AB CB3341	1
R605	RESISTOR, FIXED, COMPOSITION: 220K 10% 1/4W AB CB2241	1
R606	NOT USED	
R607	RESISTOR, FIXED, COMPOSITION: 110K 5% 1/2W AB EB1145	2
R608	RESISTOR, FIXED, COMPOSITION: 1K 10% 1/4W AB CB1021	5
R609	Same as R608	
R610	RESISTOR, FIXED, COMPOSITION: 36 Ω 5% 1/4W AB CB3605	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
R611	Same as R607	
R612	RESISTOR, FIXED, COMPOSITION: 1K 10% 1/2W AB EB1021	1
R613	Same as R608	
R614	RESISTOR, FIXED, COMPOSITION: 100K 10% 1/4W AB CB1041	2
R615	Same as R614	
R616	RESISTOR, FIXED, COMPOSITION: 47K 5% 1/4W AB CB4735	1
R617	RESISTOR, FIXED, COMPOSITION: 30 Ω 5% 1/4W AB CB3005	1
R618	RESISTOR, FIXED, COMPOSITION: 16K 5% 1/2W AB EB1635	1
R619	RESISTOR, FIXED, COMPOSITION: 51K 5% 1/2W AB EB5135	1
R620	RESISTOR, FIXED, COMPOSITION: 27K 5% 1/4W AB CB2735	3
R621	Same as R608	
R622	RESISTOR, FIXED, COMPOSITION: 300K 5% 1/4W AB CB3045	1
R623	RESISTOR, FIXED, COMPOSITION: 1.5 meg 5% 1/4W AB CB1555	1
R624	RESISTOR, FIXED, COMPOSITION: 150K 10% 1/4W AB CB1541	1
R625	RESISTOR, FIXED, COMPOSITION: 20K 5% 1/4W AB CB2035	1
R626	Same as R620	
R627	Same as R620	
R628	RESISTOR, FIXED, COMPOSITION: 39K 5% 1/2W AB EB1045	1
R629	RESISTOR, FIXED, COMPOSITION: 24K5% 1/2W AB EB6835	1
R630	RESISTOR, FIXED, COMPOSITION: 75K 5% 1/4W AB CB7535	2
R631	Same as R630	
R632	Same as R608	
R633	RESISTOR, FIXED, COMPOSITION: 3K 5% 1/2W AB EB3025	1
R634	RESISTOR, FIXED, COMPOSITION: 10K 5% 1/4W AB CB1035	1
R635	RESISTOR, FIXED, COMPOSITION: 100K 10% 1/2W AB EB1041	1

Courtesy of http://BlackRadios.terryo.org

Symbol Number	DESCRIPTION AND MANUFACTURER	Units Per Assembly
R636	RESISTOR, FIXED, COMPOSITION: 10K 10% 1/2W AB EB1031	1
R637	RESISTOR, FIXED, COMPOSITION: 1 meg 5% 1/4W AB CB1055	1
R638	RESISTOR, FIXED, COMPOSITION: 750K 5% 1/4W AB CB7545	1
R639	RESISTOR, FIXED, COMPOSITION: 430K 5% 1/4W AB CB4345	1
T601	TRANSFORMER, IF INPUT: CEI 1126	1
TP601	TEST POINT: Sealectra SKT-2BC	1
V601	TUBE, ELECTRON: Nuvistor tetrode, RCA 7587	4
V602	Same as V601	
V603	Same as V601	
V604	Same as V601	
V605	TUBE, ELECTRON: Nuvistor triode, RCA 6CW4	1
Y601	CRYSTAL FILTER: 10 KC bandwidth 21.4 mc center frequency, McCoy 40B3	1
Y602	CRYSTAL: 21.4 mc CR18/U configuration	1

Courtesy of http://BlackRadios.terryo.org

LIST OF MANUFACTURERS

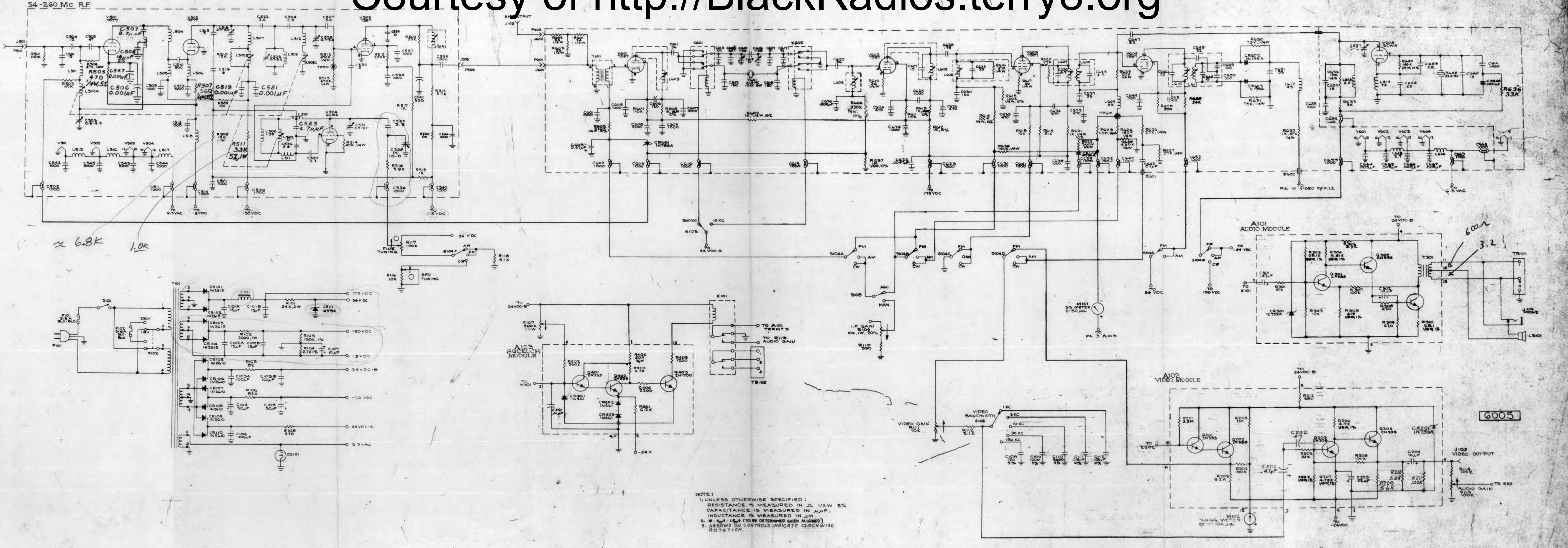
Abbreviation	Name and Address
CEI	Communication Electronics, Inc. 4900 Hampden Lane Bethesda 14, Maryland
Sprague	Sprague Electric Company 91 Marshall Street North Adams, Mass.
Elmenco	The Electro Motive Mfg. Co. South Park and John St. Willimantic, Connecticut
Motorola	Motorola Semiconductor Products, Inc. 5005 East McDowell Road Phoenix, Arizona
GE	General Electric Company 777 14th Street, N. W. Washington, D. C.
Bussmann	Bussmann Manufacturing Div. McGraw-Edison Company University at Jefferson St. Louis 7, Missouri
Amphenol	Amphenol-Borg Electronics Corp. 1830 South 54th Avenue Chicago, Illinois
Switchcraft	Switchcraft, Inc. 5555 North Elston Avenue Chicago, Illinois
Sigma	Sigma Instruments, Inc. 70 Pearl Street South Braintree, Mass.
Oxford	Oxford Electric Corporation 3911 South Michigan Avenue Chicago, Illinois
Marion	Marion Instrument Division Minneapolis-Honeywell Reg. Co. Manchester, New Hampshire

Abbreviation	Name and Address
Cornish	Cornish Wire Company 50 Church Street New York, New York
AB	Allen-Bradley Company 136 W. Greenfield Ave. Milwaukee, Wisconsin
Electra	Electra Mfg. Company 4051 Broadway Kansas City, Missouri
CTS	Chicago Telephone Supply Corp. 1142 W. Beardsley Avenue Elkhart, Indiana
Ohmite	Ohmite Manufacturing Co. 3601 Howard Street Skokie, Illinois
Cutler	Cutler-Hammer, Inc. 321 North 12th Street Milwaukee, Wisconsin
Oak	Oak Mfg. Company Crystal Lake, Illinois
Cinch	Cinch Manufacturing Co. 1026 S. Homan Avenue Chicago, Illinois
PSI	Pacific Semiconductors, Inc. 10451 W. Jefferson Boulevard Culver City, California
Texas Inst.	Texas Instrument, Inc. 6000 Lemmon Avenue Dallas, Texas
RCA	Radio Corporation of America Electron Tube Division 415 South Fifth Street Harrison, New Jersey

Courtesy of http://BlackRadios.terryo.org

Erie	Erie Resistor Corporation Erie, Pennsylvania
JFD	JFD Electronics Corporation 6101 16th Avenue Brooklyn, New York
QC	Quality Components, Inc. St. Marys, Pennsylvania
Cannon	Cannon Electric Company 3208 Humboldt Street Los Angeles, California
Mallory	P. R. Mallory & Company 80 South Gray Street Indianapolis, Indiana
Wilco	Wilco Corporation 546 Drover Street Indianapolis, Indiana
CTC	Cambridge Thermionic Corp. 445 Concord Avenue Cambridge, Massachusetts
Sealectro	Sealectro Corporation 610 Fayette Avenue Mamaroneck, New York
Arco	Arco Electronics, Inc. Community Drive Great Neck, New York
Sylvania	Sylvania Electric Products, Inc. 1740 Broadway New York, New York
Elgin	Elgin National Watch Company Electronics Division 2435 North Naomi Street Burbank, California
McCoy	McCoy Electronics Company Mt. Holly Spring, Pa.
E. F. Johnson	E. F. Johnson Company 116 Second Avenue Waseca, Minnesota
Sage	Sage Electronics Corp. Country Club Road East Rochester, New York
Piezo	Piezo Crystal Co. 265 E. Pomfret St. Carlisle, Pennsylvania
Microdot	Microdot, Inc. 220 Pasadena Avenue South Pasadena, California
RF Products	RF Products 33 East Franklin Street Danbury, Connecticut
Littelfuse	Littelfuse, Inc. 1865 Miner Street Des Plaines, Illinois

Courtesy of http://BlackRadios.terryo.org



NOTE:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE IS MEASURED IN Ω 1/2W 5%.
CAPACITANCE IS MEASURED IN μμF.
INDUCTANCE IS MEASURED IN μH.
2. * .2μμf - 1.5μμf (TO BE DETERMINED WHEN ALIGNED)
3. ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION

COMMUNICATION ELECTRONICS, INC.
BETHESDA 14, MD.
TYPE 501 RCVR