INSTRUCTION BOOK
FOR
MODEL 1500-A SERIES
SPECIAL PURPOSE
RECEIVERS

Vitro ELECTRONICS
A DIVISION OF VITRO CORPORATION OF AMERICA
919 JESUP-BLAIR DRIVE • SILVER SPRING, MARYLAND

PRODUCERS OF NEMES CLARKE EQUIPMENT

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WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised while operating this equipment.

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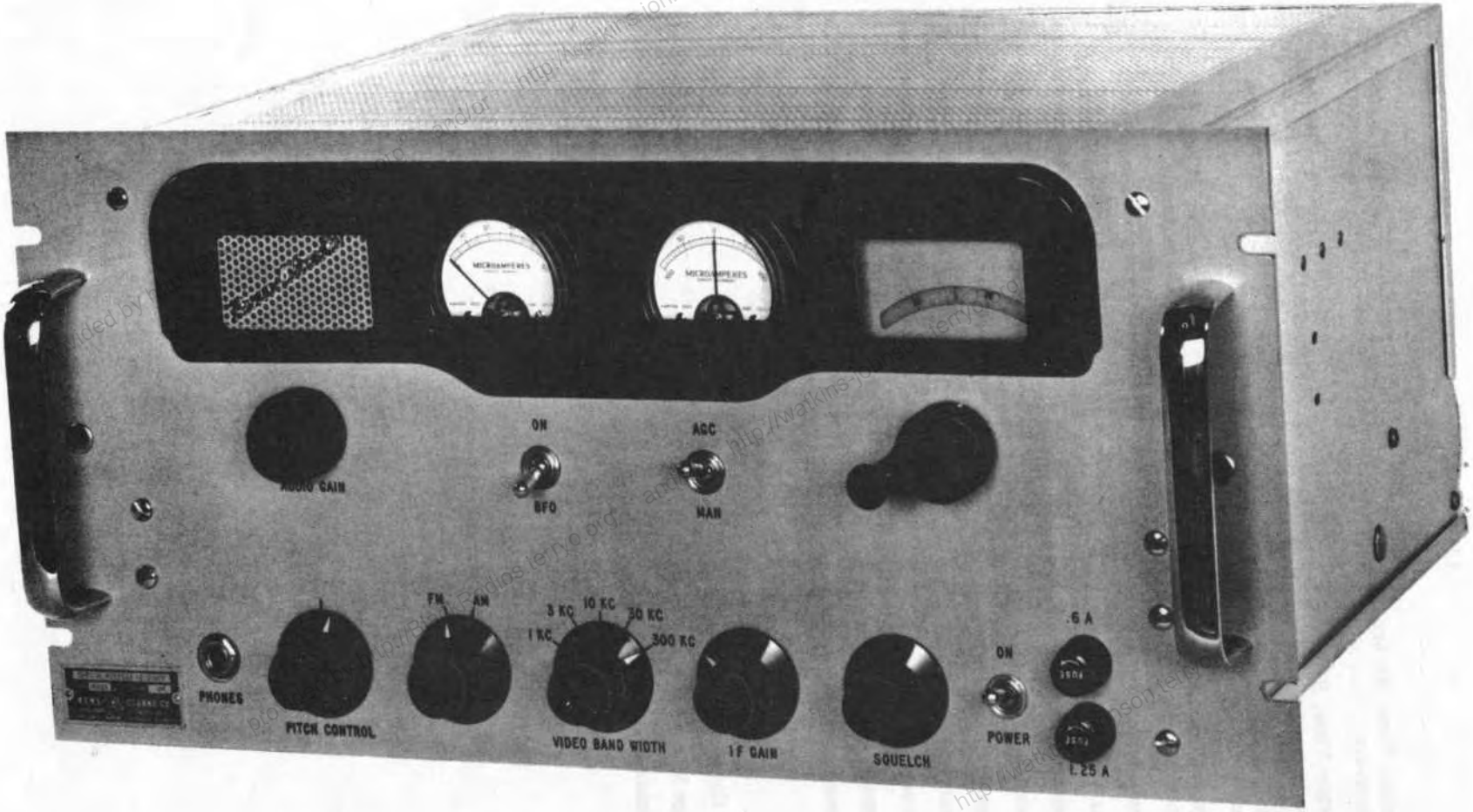


Figure 1-1. Front View 1500-A Series Special Purpose Receivers

SECTION I

GENERAL DESCRIPTION

1. Purpose of Equipment.

The Special Purpose Receivers of the Model 1500-A Series, consisting of Models 1501-A, 1502-A, 1503-A, 1509-A, 1510-A, 1511-A and 1512-A have been specifically designed to meet the requirements of a highly stable, extremely sensitive AF-FM-CW receiver for critical application in the 40-260 mc range. The receivers have self-contained power supplies and are capable of operation from a power source of 115/230 volts, ±10%, 50-60 cps ±5%, single phase, alternating current. Long life and dependability are assured by the use of Silicon Junction semiconductor rectifiers in the power supply. Selection of primary voltage is accomplished by a two-position toggle switch located on the rear apron of the chassis. The switch is equipped with a locking device which prevents accidental switching to an improper voltage range.

Among the special features of the receivers in the Model 1500 series are audio squelch with adjustable threshold, FM reception with very low distortion, AM reception, BFO for CW reception, a separate high quality 600 ohm output, and a DC voltage proportional to input signal strength suitable for use with a Dual Diversity Unit. The video output signal passes through a variable low-pass filter, allowing a greatly improved S/N ratio when the full video bandwidth is not required.

For further details concerning the capabilities and special features of the receivers of the Model 1500-A series, see Figure 2-1.

2. Description of Equipment.

The Special Purpose Receivers of the Model 1500-A Series are 8-23/32 inches high by 14-1/4 deep by 19 inches wide. They occupy approximately 1.6 cubic feet. Models 1501-A, 1503-A and 1509-A weigh approximately 32 lbs. Models 1502-A and 1510-A weigh approximately 37 lbs. Panel and chassis are of aluminum construction, and the panel is finished in smooth gray-blue enamel. The panel is designed for standard 19-inch relay rack mounting, although the receivers are equipped with dust covers and louvered side panels, and may be used independently on a shelf or table. The IF Amplifier and RF tuner are built as completely shielded subassemblies in all receivers, with most of the audio and video components mounted on two terminal boards on the underside of the main chassis.

Figure 1-1 shows a front view of a typical Model 1500-A series receiver, and Table 1-1 shows the tube complement. The primary differences in the various models is in the tuning range and IF bandwidth; consequent minor mechanical and electrical differences are fully explained and illustrated in the appropriate sections of the book.

The major differences in the various type of 1500 series Receivers are found in the tuning range, the RF amplifier, and the band-width of the IF amplifier. A low-noise grounded-grid RF amplifier, employing a 6J4, is common to all types, and an additional grounded-grid amplifier, using a 416B planar triode, is employed to precede the 6J4 in Types 1502-A, 1510-A and 1511-A where extreme sensitivity is demanded. All 1500 series Receivers provide excellent tracking throughout tuning range, gain controlled IF amplifier, dual limiters, squelch circuit with adjustable threshold, and extremely linear video-frequency response up to 300 kc. Video band-width can be switched from 1 kc to 300 kc in five steps from front panel, thus allowing an improved signal-to-noise ratio when full bandwidth is not needed. A BFO is included to facilitate reception of CW signals. Temperature compensation is incorporated in IF and discriminator transformers to insure high stability.

Two indicators are mounted on front panel. One is a zero-center meter for accurate tuning and the other is a signal strength meter indicating relative signal voltage across input terminals of receiver. Signal strength meter is so arranged that remote indicators can be connected. All receivers equipped with output provision for use with Nems-Clarke Spectrum Display Unit 200-2.

TABLE 1-1. SEMI-CONDUCTOR & TUBE COMPLEMENT

Symbol	Type	Function
V-301	6DC6	1st IF Amplifier
V-302	6DC6	2nd IF Amplifier
V-303	6CB6	3rd IF Amplifier, AM 1st Limiter, FM
V-304	6AK5	AM Detector, AM 2nd Limiter, FM
V-305	6AL5	Discriminator
V-111	6CB6	BFO
V-113	0A2	Voltage Regulator
V-114	0A2	Voltage Regulator
V-115	12AU7	Squelch
V-116	12AU7	Audio Amplifier
V-117	12AU7	1st Video Amplifier and tuning meter bridge
V-118	12AU7	Video Cathode follower output
V-201*	416B	1st RF Amplifier
V-202	6J4	2nd RF Amplifier
V-203	6AK5	Mixer
V-204	6AF4A	Local Oscillator
CR-101	1N539	1/4 Bridge Rectifier
CR-102	Same as CR-101	
CR-103	Same as CR-101	
CR-104	Same as CR-101	
CR-105	1N457	AGC Delay Diode

*

SECTION 2

THEORY OF OPERATION

1. Analysis, Model 1500-A Series Receivers.

A Block diagram of the Model 1500-A series receivers is shown in Figure 2-1. The circuit, with the function switch in the AM or FM position, is a single superheterodyne with an IF operating at a frequency of 21.4 mc.

The tuner is designed to produce the lowest possible noise figure consistent with the type tube used (Models 1501-A, 1503-A, 1509-A and 1512-A use a type 6J4 first RF amplifier, and models 1502-A, 1510-A and 1511-A use a type 416B first RF amplifier) and a practicable tuning structure capable of tuning 55 to 260 mc,(40 to 180 mc for the Model 1503,) with reasonably uniform performance over the band.

The IF amplifier, with the function switch in the FM position, uses two stages of amplification, cascade limiters, and a phase-shift discriminator. With the function switch in the AM position, AGC voltage is applied to the first two stages, and the second limiter becomes the AM detector.

The output signal of the IF strips (AM or FM) is fed through a variable low-pass filter, thus providing the maximum S/N ratio when the full video bandwidth is not needed. The output of the filter drives a two-stage direct-coupled video amplifier with cathode follower output A portion of the follower output drives a four stage squelch-audio amplifier circuit.

2. Model 1501-A, 1503-A, 1509-A and 1512-A Receivers only.

A. Antenna - The input impedance of the receiver is approximately 75 ohms over the frequency range of 55 to 260 mc. (40 to 180 mc for the Model 1503-A). The input signal is applied through a type "N" coaxial receptacle located on the rear apron of the chassis. This is UG-593/U connector, J-106.

B. RF Stage - The input signal is applied to the cathode of the 6J4 grounded grid amplifier V-202 across L-201A, one section of the Mallory type S-4 spiral inductuner. This inductuner is the basic tuning element of the entire RF section, and L-201/A is broadly resonated at the required input frequency to tune the first RF amplifier. Cathode resistor method of obtaining self-bias is utilized in this stage, 150 ohm resistor R-201 developing the bias, and capacitor C-217 providing cathode by-passing. The RF amplifier is operated at maximum gain at all times to insure optimum S/N ratio and minimum Noise Figure.

The plate of the 6J4 RF amplifier V-202, is coupled to the grid of the 6AK5 mixer, V-203, across a double-tuned band-pass filter. A capacity "T" is used to provide coupling between the primary and secondary tuned circuits of the band-pass filter. The shunt capacitive element C-224, of the capacity "T" coupling net-work is adjustable, thus providing a control over the interstage bandwidth. A small iron core inductor L-202, is provided across the variable capacitor, C-224, causing the shunt element of the capacity "T" to approach parallel resonance at the low end of the tuning range, thus increasing the coupling at the low end and providing a more uniform coupling over the entire tuning range.

C. Mixer. - A 6AK5 pentode, V-203, is used as a mixer. The local oscillator signal is injected into the grid circuit across R-205 and through R-204, developing an operational grid bias proportional to the amplitude of the local oscillator output. This minimizes effects on receiver operation due to variations in local oscillator amplitude. A decoupled test point, TP-201, at the junction of the mixer grid resistors, R-204 and R-205, provides a convenient means of observing the response of the RF circuits. The signal input from the first RF stage is applied from the double-tuned band-pass filter through the blocking capacitor, C-227, to the control grid of the mixer.

CIRCUIT DESCRIPTION

The major differences in the various types of 1500 Series Receivers are found in the tuning range, the RF amplifier, and the band-width of the IF amplifier. A low-noise grounded-grid RF amplifier, employing a 6J4, is common to all types, and an additional grounded-grid amplifier, using a 416B planar triode, is employed to precede the 6J4 in Types 1502-A, 1510, and 1511, where extreme sensitivity is demanded. All 1500 Series Receivers provide excellent tracking throughout tuning range, gain controlled IF amplifier, dual limiters, squelch circuit with adjustable threshold, and extremely linear video-frequency response up to 300kc. Video band-width can be switched from 1kc to 300kc in five steps from front panel, thus allowing an improved signal-to-noise ratio when full band-width is not needed. A BFO is included to facilitate reception of CW signals. Temperature compensation is incorporated in IF and discriminator transformers to insure high stability. Two indicators are mounted on front panel. One is a zero-center meter for accurate tuning, and the other is a signal-strength meter indicating relative signal voltage across input terminals of receiver. Signal strength meter is so arranged that remote indicators can be connected. All receivers equipped with output provision for use with Nems-Clarke Spectrum Display Unit 200-2.

SPECIFICATIONS

	TYPE 1501-A	TYPE 1502-A	TYPE 1503-A	TYPE 1509	TYPE 1510	TYPE 1511	TYPE 1512
Tuning Range	55mc to 260mc	55mc to 260mc	40mc to 180mc	55mc to 260mc	55mc to 260mc	55mc to 260mc	55mc to 260mc
Input Impedance	75 ohms, nominal	50 ohms, nominal	75 ohms, nominal	75 ohms, nominal	50 ohms, nominal	50 ohms, nominal	75 ohms, nominal
Noise Figure	11db maximum	6db maximum	13db maximum	11db maximum	6db maximum	6db maximum	11db maximum
IF Rejection	70db minimum	70db minimum	50db minimum	70db minimum	70db minimum	70db minimum	70db minimum
Image Rejection	Not less than 40db below 130mc; 30db minimum at any frequency	58db minimum	40db minimum	Not less than 40db below 130mc; 30db minimum at any frequency	58db minimum	58db minimum	Not less than 40db below 130mc; 30db minimum at any frequency
IF Band-width	300kc	300kc	300kc	175kc	500kc	175kc	500kc
AM Output	7-15v rms for 5mv input modulated 50% at 1kc	7-15v rms for 500uv input modulated 50% at 1kc	7-15v rms for 5mv input modulated 50% at 1kc	7-15v rms for 5mv input modulated 50% at 1kc	7-15v rms for 500uv input modulated 50% at 1kc	7-15v rms for 500uv input modulated 50% at 1kc	7-15v rms for 5mv input modulated 50% at 1kc
FM Output Stability	Varies less than 2db for voltages above 4uv	Varies less than 2db for voltages above 1uv	Varies less than 2db for voltages above 4uv	Varies less than 2db for voltages above 4uv	Varies less than 2db for voltages above 1uv	Varies less than 2db for voltages above 1uv	Varies less than 2db for voltages above 4uv
Sensitivity Measured without Band-restricting Filters	8uv produces at least 23db s/n with 100kc deviation, 1kc modulation	4uv produces at least 23db s/n with 100kc deviation, 1kc modulation	10uv produces at least 23db s/n with 100kc deviation, 1kc modulation	8uv produces at least 23db s/n with 75kc deviation, 1000cps modulation	4uv produces at least 21db s/n with 125kc deviation, 1000cps modulation	4uv produces at least 23db s/n with 75kc deviation, 1000cps modulation	8uv produces at least 21db s/n with 125kc deviation, 1000cps modulation
Power Input	115/230v, 50-400cps, approximately 100w	115/230v, 50-60cps, approximately 127w	115/230v, 50-400cps, approximately 100w	115/230v, 50-400cps, approximately 100w	115/230v, 50-60cps, approximately 127w	115/230v, 50-60cps, approximately 127w	115/230v, 50-400cps, approximately 100w
Weight	32 pounds (approximate)	37 pounds (approximate)	32 pounds (approximate)	32 pounds (approximate)	37 pounds (approximate)	37 pounds (approximate)	32 pounds (approximate)

SPECIFICATIONS COMMON TO ALL 1500 SERIES RECEIVERS

Type Reception — AM, FM, CW.

IF — 21.4mc.

Video Response — 10cps to 300kc.

Video Band-width Control — 5 positions — 1, 3, 10, 30, and 300kc.

FM Output—0.10v peak-to-peak per kc of deviation (approximate).

AM Output Stability — Varies not more than 7db for an input change of 40db.

Outputs Provided — 1. Signal: wide band for supplying high-impedance load (internal impedance approximately 500 ohms). **2. Monitor:** panel-mounted speaker, headphones, or 600 ohms balanced output for external use.

Spectrum Display Unit — Provisions for connecting a 21.4mc Spectrum Display Unit (NEMS-CLARKE CO., TYPE SDU-200-2).

Meters — Approximate signal strength indicator and zero-center tuning indicator.

Beat Frequency Oscillator — Adjustable front panel pitch control.

Squelch — Operates on monitor circuit.

Gain — Automatic or manual control.

Size — 8¾"x19"x15⅝".

Panel Finish — Gray enamel, MIL-E-15090; Color #26329 Federal Standard 595.

We reserve the right to make changes in specifications

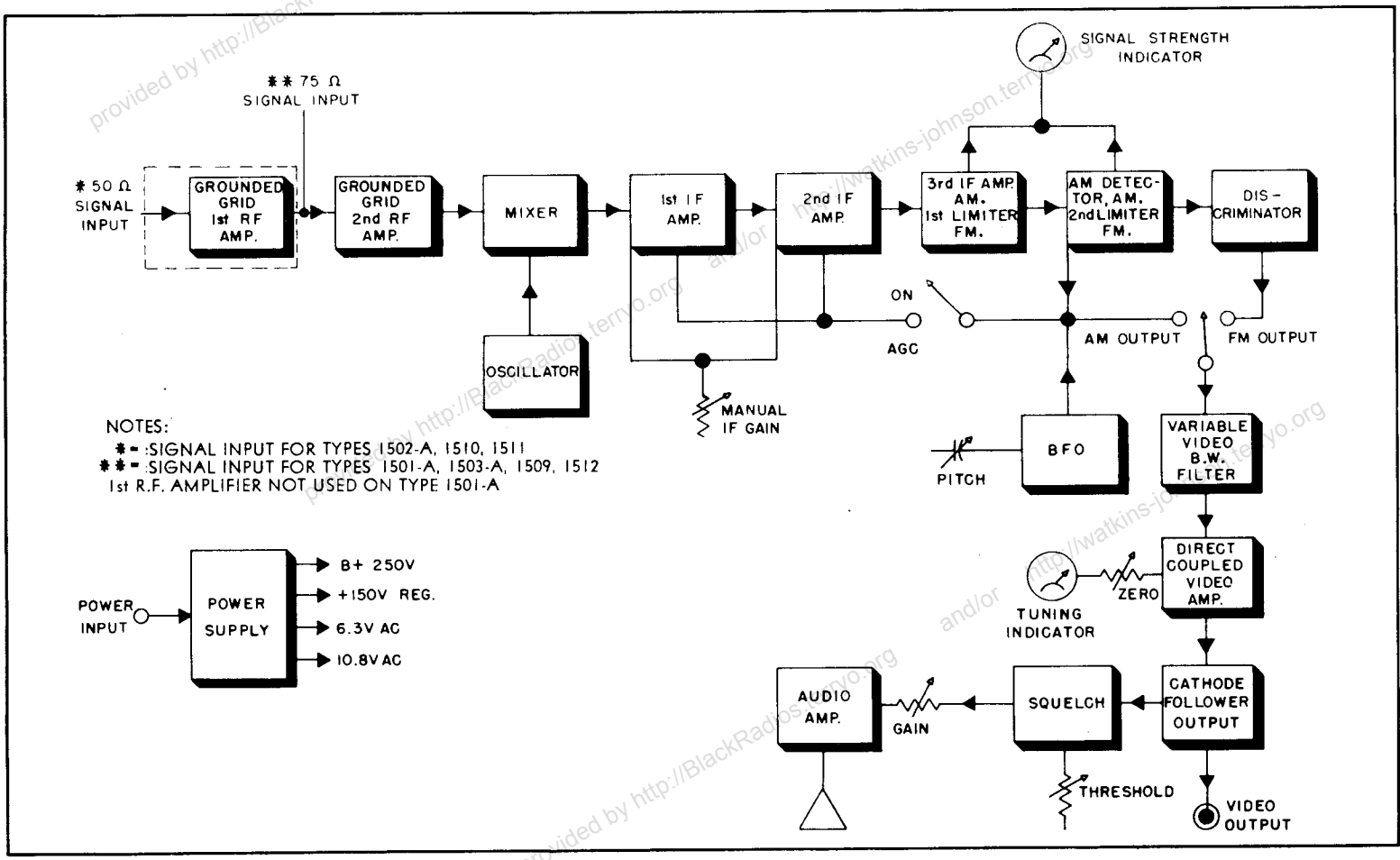


Figure 2-1. Block Diagram and Performance Specifications, 1500-A Series Special Purpose Receivers

D. Local Oscillator. - The local oscillator utilizes a 6AF4A electron tube, V-204, in a modified Colpitts configuration. The end inductors are made of heavy straps to insure frequency stability. The frequency stability of the oscillator is very high due to the use of a tube having trans-conductance, which is loosely coupled to the high-Q tank circuit.

3. Model 1502-A, 1510-A and 1511-A only.

A. Antenna. - The input impedance of the receiver is approximately 50 ohms over the frequency range of 55 to 260 mc. The input signal is applied through a type "N" 50-ohm coaxial receptacle located on the rear apron of the chassis.

B. First RF Amplifier. - The input signal is applied to the cathode of the 416B low-noise planar triode, V-201, across a coupling capacitor, C-259, through a blocking capacitor, C-239, and across a series network consisting of L-201, R-201, and R-202. Cathode resistor method of obtaining self-bias is used in this circuit, resistors R-201 and R-202 developing a bias due to the cathode current flowing through them. Cathode resistor bypassing is accomplished by capacitor, C-240. A convenient means of measuring relative cathode current is provided by a de-coupled test point (TP-201) at the junction of the two cathode resistors R-201 and R-202. A VTVM at the test point (TP-201) will read the voltage drop across 100 ohms, thus 2.0 volts indicates a cathode current of 20 ma, and a reading of 1.0 volts indicates a cathode current of 10 ma, etc. A positive voltage is applied to the grid of the 416B first RF amplifier, V-201, through the divider network consisting of R-219, R-204, and R-203. The effect of the positive voltage is to cancel the cathode self-bias, thus operating the tube with an effective bias of approximately minus 0.1 volts. If, for any reason, the grid bias is shorted or removed, the plate current is reduced, and the tube is protected from damage. The DC degeneration, due to the large cathode resistor, has a considerable stabilizing effect on the 416B and tends to minimize performance variations from one tube to the next, if replacement becomes necessary. The filament of the 416B is operated from a 12.6 volt winding on the power transformer, T-101, with a total series dropping resistance of 8.1 ohms. This produces a self-regulating effect, which tends to extend tube life expectancy. A blower motor mounted on the RF sub-assembly is used to cool the 416B tube. The blower plugs into the main chassis through a seven pin connector, J-108. A jumper between pins F and E removes B plus from the 416B first RF amplifier, V-201, and the 6J4 second RF amplifier, V-202, when the blower motor is disconnected thus protecting the 416B tube.

The plate tank circuit of the 416B first RF amplifier, V-201, takes the form of a modified pi-network and is used to couple the high impedance plate circuit of the 416B first RF amplifier, V-201, to the low input impedance of the 6J4 grounded grid second RF amplifier, V-202.

This pi-network is tuned by L-205A, one section of the Mallory type S-4 spiral inductuner.

C. Second RF Amplifier. - The output of the pi-network drives the cathode of the 6J4 grounded-grid second RF amplifier, V-202. A low-noise second RF amplifier is used so that the system noise figure (first RF, second RF , and mixer) is essentially that of the first RF stage. Capacitor C-248 serves to prevent the application of B plus to the cathode circuit of the grounded-grid amplifier, V-202. Cathode resistor method of obtaining self-bias is utilized in this RF stage, cathode resistor R-208 developing the bias voltage as a result of the cathode current flowing through it.

The plate circuit of the 6J4 second RF amplifier, V-202, is coupled to the grid of the 6AK5 pentode mixer, V-203, by a double-tuned overcoupled band-pass filter, the basic tuning elements of which are L-205 B & C, two

sections of the Mallory type S-4 Spiral Inductuner. A capacity "T" is used to provide coupling between the primary and secondary tuned circuits, consisting of C-219, C-220, and C-221. The shunt element of the "T" network, C-220, is adjustable, thus providing a control over the inter-stage bandwidth. A small iron core inductor, L-208, across C-220 approaches resonance at 55 mc, thus increasing the coupling at the low end and providing a more uniform coupling over the tuning range of 55 to 260 mc.

The single-tuned high-Q plate circuit of the 416B first RF amplifier, V-201, is used to "fill-in" the dip in the overcoupled response of the interstage network. The overall response when viewed at the mixer grid test point, TP-202, is essentially flat over the tuning range of the receiver.

D. Mixer. - A type 6AK5 pentode, V-203, is used as a frequency converter. The local oscillator, V-204, injects a signal into the grid circuit of the mixer, V-203, through the blocking capacitor, C-233, developing an operational grid leak mixer bias proportional to the amplitude of the local oscillator signal.

The high-level of the local oscillator signal compared to the level of the incoming signal from the RF stages causes minimum effect on receiver operation due to variations in local oscillator signal level. A decoupled test point, TP-202, from the junction of the mixer grid resistors, R-209, and R-210, provides a convenient means of observing the response of the RF circuits. The B plus supply for the mixer stage, V-203, is applied through the inductor, L-212, from the IF strip through the interconnecting cable at J-202.

E. Local Oscillator. - The local oscillator, V-204, utilizes a type 6AF4A tube in a modified Colpitts configuration, the main tuning element of which is one section of the Mallory type S-4 Spiral Inductuner. Frequency adjustment at the low end of the tuning range of the local oscillator is accomplished by varying the position of C-230 on the end inductor, L-210. The end inductors are made of heavy straps to insure frequency stability. The frequency stability of the local oscillator is very high due to the use of a high mutual-transconductance tube which is loosely coupled to the high-Q tank circuit.

4. Model 1500-A Series Receivers. (IF amplifier function switch in FM position)

A. First IF Amplifier. - The 6DC6 first IF amplifier, V-301, is coupled to the plate circuit of the mixer stage, V-203, through a double-tuned band-pass circuit consisting of T-301 and T-302, and a short length of RG62/U coaxial cable. The primary of the double-tuned band-pass coupling network, T-301, is capacitively coupled to the secondary, T-302, through capacitors C-304 and C-305. An automatic gain control (AGC) voltage is derived from the grid of the 6CB6 first limiter, V-303, and is applied to the first and second IF amplifiers, V-301 and V-302, respectively. The cathode resistors, of the first and second IF amplifiers and the first limiter, are not by-passed. The result is considerable cathode degeneration, which practically eliminates the detuning effect of changes in tube input capacity caused by variations in bias voltage.

B. Second IF Amplifier. - The circuitry associated with the 6DC6 second IF amplifier, V-302, is essentially the same as for the first amplifier, V-301, described above. Interstage coupling is accomplished by use of a double-tuned band pass circuit consisting of T-303 and T-304. Coupling between primary and secondary sections of this band-pass network is capacitive and is accomplished by capacitors C-316 and C-317.

C. First Limiter. - The grid of the 6CB6 first limiter, V-303, is coupled to the second IF amplifier plate circuit through the double-tuned band-pass circuit consisting of T-305 and T-306. The primary of this band-pass network, T-305, is capacitively coupled to the secondary, T-306, by C-331 and C-332. Cathode resistor method of obtaining self-bias is utilized in this limiter stage. It should be noted that this resistor is not bypassed; this is

for the purpose of allowing a large amount of cathode degeneration to exist, practically eliminating the detuning effect of changes in tube input capacity resulting from variations in bias voltage.

D. Second Limiter. - The grid of the 6AK5 second limiter, V-304, is coupled to the plate circuit of the first limiter, V-303, by a double-tuned transformer, T-307. The signal strength meter, M-101, derives a voltage from the grids of both the first and the second limiters that is proportional to the relative signal strength of the incoming signal. This meter is not calibrated in micro-volts and may be used only for the purpose of comparing relative signal levels.

E. Frequency Discriminator. - The 6AL5 frequency discriminator, V-305, produces an output voltage proportional to the variations of the carrier from the mean center frequency. The self-resonant choke, L-315, is provided for the purpose of preventing signals at the IF frequency from leaving the IF subassembly.

5. Model 1500-A Series Receivers. - (IF amplifier switch in AM position).

The discussion above applies also when the receiver is operating with the function switch in the AM position, with the exceptions noted herein. The first two high-gain 6DC6 remote cutoff amplifiers, V-301 and V-302, receive an AGC voltage developed at the grid of the 6AK5 AM detector, V-304. The third IF amplifier, V-303, which drives the AM detector, is not gain controlled, but its signal handling capabilities have been improved by increasing the screen voltage. A self-resonant choke, L-312, is connected in the AM output lead from the 6AK5 AM detector, V-304, to prevent IF signals from leaving the IF subassemblies.

With the AGC switch in the manual position, the AGC voltage is shorted to ground, and the IF gain control in the cathode circuit of the two 6DC6 IF amplifiers, V-301, and V-302 is unshorted and becomes operative. The gain-controlled stages use cathode compensation of input capacity variation with bias change.

The zero center tuning meter operates only in the FM position. Correct tuning of an AM signal may be accomplished by first tuning in the signal with the selector switch in the FM position and then switching to the AM position. The signal strength meter, M-101, is not calibrated, although it may be used as a relative indication of signal strength. The signal-strength meter is connected between the third IF amplifier and the detector when the function selector switch is in the AM position.

6. Model 1500-A Series Receivers. (IF amplifier switch in either AM or FM position).

A. Beat Frequency Oscillator. - The 6CB6 beat frequency oscillator, V-111, injects a signal at 21.4 mc into the grid of V-108. This signal is variable over the usable bandwidth of the receiver IF strip. The BFO is an electron-coupled Hartley oscillator using transformer T-109 to provide feedback. Capacitor C-193 is adjustable from the front panel for purposes of providing a variable pitch control. The BFO is a completely shielded subassembly, with a BFO switch, S-106, which removes B plus when the BFO is not in use, and simultaneously readjusts the current in the Voltage Regulator tube, V-114, to account for the additional load when the BFO is in use by inserting R-162 in parallel with the current limiting resistor, R-161.

B. Video Amplifier. - The output of the IF strip, either AM or FM, is fed to the input of a 5-position low-pass filter. The cutoff frequency may be set to either 300kc, 30 kc, 10 kc, 1.0 kc by a front-panel selector switch, S-103. The output of the filter drives one-half of a 12AU7 direct coupled video amplifier, V-117/A. A zero-center scale meter, M-102, is used as a tuning indicator and is connected in a bridge circuit consisting of the video amplifier and the other half of the 12AU7, V-117/B. A partial bypass of the cathode resistor of the first video amplifier extends the high frequency response.

The video output amplifier is a 12AU7 dual-triode parallel-connected as a direct-coupled follower. A tap on the cathode resistor of the output cathode follower video amplifier provides the signal source to drive the monitor audio amplifier.

C. The Squelch Circuit. - The squelch circuit is best described with the aid of the simplified schematic of Figure 2-2. V-115/A acts as a gated audio amplifier stage, while V-115/B serves as a DC amplifier and gate generator. The circuit is connected in such a manner that V-115/B has zero grid voltage when no signal is being received, and has a negative signal when a carrier is being received. The audio amplifier stage, V-115/A, will pass an audio signal when the DC amplifier V-115/B is nonconducting, and will not pass an audio signal when V-115/B is in a conducting condition. In this manner the audio circuit is disabled when no carrier is being received. The carrier strength necessary to make the audio section operative is adjustable by the threshold (squelch) control resistor, R-164. The operation of this circuit is detailed in the following paragraph.

The DC amplifier, V-115/B, is connected between the 150 volt supply and ground. The fixed bias on this stage is adjusted by R-164. The audio section V-115/A is connected between the 240 volt supply and the 150 volt supply. The bias on this stage is the voltage drop across the cathode resistor R-165, plus the voltage drop, if any, in R-167, the plate load resistor for V-115/B. Assuming no signal is being received, the grid of the DC amplifier is at zero potential, or at most has a very small negative voltage on it. R-164 is adjusted until the noise just disappears from the output. In this condition, the DC amplifier tube is drawing plate current, and the drop across its plate load resistor, R-167, appears as a bias to audio amplifier V-115/A. This voltage drop is sufficient to cut off V-115/A and disable the audio signal. When a carrier is tuned in, a negative voltage is supplied from the second limiter in the IF strip through an isolation resistor, R-185, to the grid of V-115/B. This voltage is sufficient to cut off V-115/B, causing the voltage to drop to zero across the V-115/B plate load resistor, R-167. V-115/A then receives its normal cathode bias only, generated in the cathode bias resistor, R-165, and audio signals are passed through to the output.

When receiving amplitude-modulated signals with a high percentage of modulation, the squelch circuit may be cut off on negative modulation peaks when the envelope amplitude becomes zero. To prevent this, a filter consisting of R-185 and C-202 is placed between the limiter and the grid of the DC amplifier. This filter has a time constant long enough to reject the lowest audio frequency likely to be received, but not long enough to noticeably delay operation of the squelch.

D. Audio Amplifier. - The output of the gated amplifier, V-115/A, is used to drive a two-stage resistance-capacitance coupled audio amplifier. The output amplifier drives a four-inch panel-mounted speaker, a phone jack, (which silences the speaker when in use) and an independent 600 ohm balanced output.

E. Spectrum Display Unit Output. - (SDU Output) An output at the 21.4 mc IF frequency is available at the SDU output jack, J-105, located on the rear apron of the receiver. This output is obtained from the 6AK5 mixer, V-203, through a capacity divider in conjunction with the transformer, T-301. Spectrum Display Units are available for all models, and may be secured from NEMS-CLARKE Company, A Division of Vitro Corporation of America, 919 Jesup-Blair Drive, Silver Spring, Maryland.

F. Power Supply. - The power supply of all Models in the 1500-A Series Special Purpose Receivers features input power line filtering at the power input jack, J-107, which effectively prevents the entrance of stray radiation into the main chassis. This power supply is suitable for operation in the 115 to 230 volt range, and to facilitate this, the power input transformer, T-110, has a tapped primary winding and a selector switch, S-105, on the rear

apron of the chassis, for selecting the proper winding ratio for the line source available. Separate fuses are provided for each of the two sections of the primary. The power transformer, T-101, has three secondaries. Pins 6 and 7 supply 12.6 volts rms to the 416B tube, V-201; pins 8 and 9 supply 6.3 volts rms for the filaments of the rest of the receiver; pins 4 and 5 supply high voltage which is rectified by silicon junction diodes CR-101 through CR-104. A standard pi section capacitive input filter is used for the high voltage supply, and two voltage regulators, V-113 and V-114, are used for supplying regulated B plus to those sections of the receiver that require it. The 0A2 regulator tube, V-113, supplies plus 150 volts to the plate of the Local Oscillator, and screen voltage to the Mixer, V-203. A small positive voltage is applied to the grid of the 416B tube, through appropriate dropping resistors, in the receivers using this tube.

The 0A2 regulator, V-114, supplies plus 150 volts (regulated) to the BFO, the IF strip and various other points in the receiver. Provision is made for reducing the value of the series current-limiting resistor associated with V-114, when the additional load of the BFO is added, by paralleling R-161 with R-162 when the BFO switch is turned on.

G. Differences between various models. - Refer to the schematics at the back of the book for specific variations between the various models. All models of the receiver use the same main chassis assembly, Model 1503-A is supplied with an RF section which tunes 40 to 180 mc; Model 1509-A is supplied with a 500 kc IF bandwidth. Refer to Figure 2-1, Block Diagram and Performance Specifications for a further comparison of the various models.

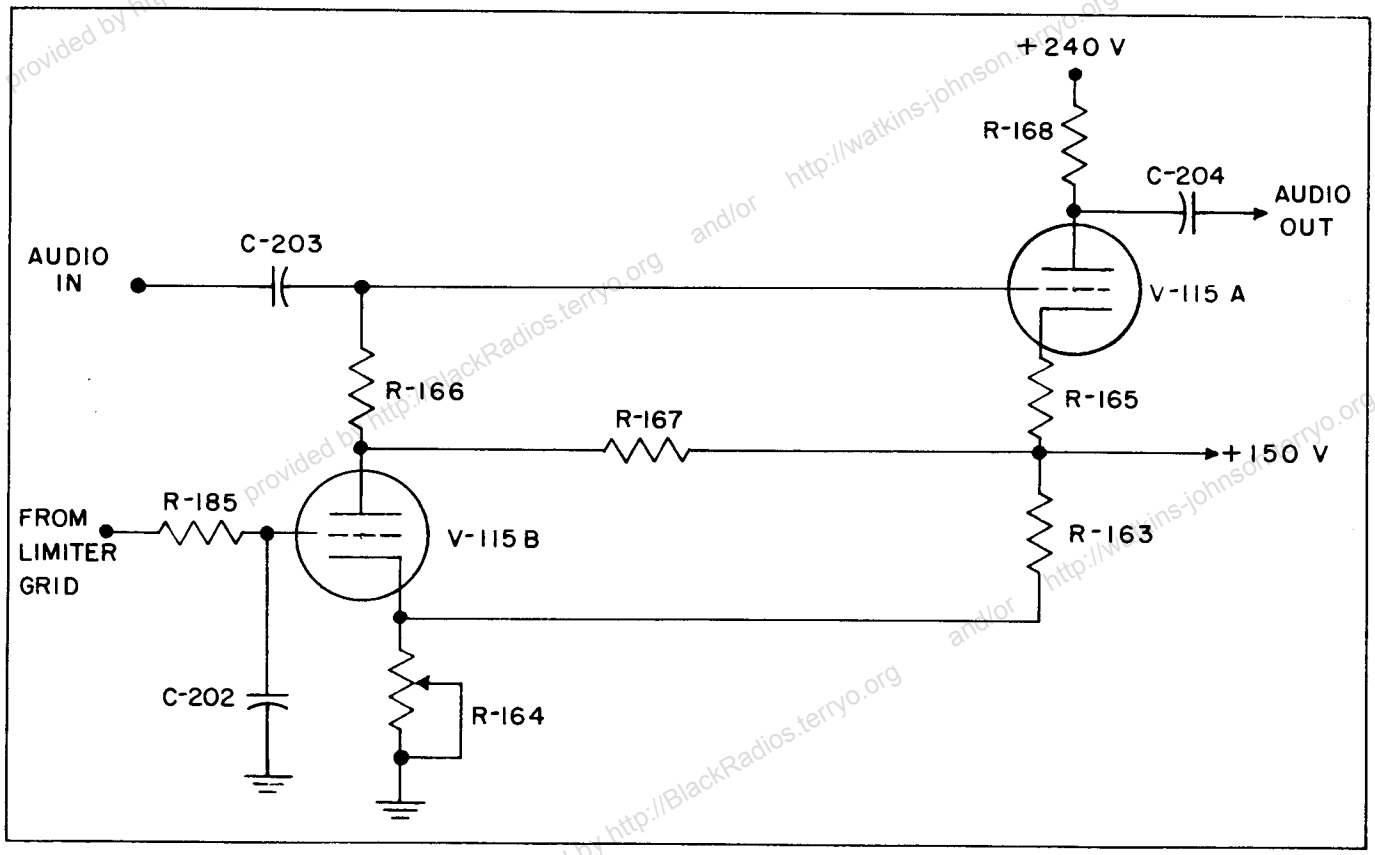


Figure 2-2. Simplified Schematic, Receiver Squelch Circuit

SECTION 3

OPERATION

1. Introduction.

Figure 1-1 shows the appearance and location of controls on the front panel of the receivers in the Model 1500 series.

2. Control Settings.

A. Set the line selector switch, S-105, to the appropriate position for the line supply available for use with the receiver. This switch is located on the rear apron of the receiver chassis and provides for either 115 or 230 volt operation. The switch has a locking device which prevents inadvertent switching to an improper position.

B. Power. - Apply either 115 or 230 volts to the power input jack, J-107, with the power cord supplied.

C. Turn on the power switch, S-104, located on the front panel of the equipment Note: The Models 1502-A and 1510-A have a time delay relay, K-201, (located on the RF subassembly) that will delay application of plate voltage to the first and second RF amplifiers for approximately 120 seconds. Plate voltage to the 416B tube, V-201, is delayed to increase the life expectancy of the tube, and, therefore, the receiver will be inoperative for approximately 2 minutes after power has been turned on.

D. Modulation. - The modulation selector switch, S-101, has two positions, AM or FM.

(1.) FM. - The function switch must be in the FM position. The IF bandwidth is 300kc for Models 1501-A, 1502-A, and 1503-A. The IF bandwidth is 175 kc for Model 1509-A and 500 kc for Model 1510-A. The BFO should be in the "OFF" position. The Manual AGC switch, S-102, and the IF gain control are inoperative in the FM position. The zero-center tuning meter is operative only in the FM position.

(2.) AM. - The function switch must be in the AM position. The Manual AGC switch should be in the AGC position, except when the BFO is used. For BFO operation the Manual IF gain control, R-105, should be adjusted to produce the loudest beat note.

E. Video Bandwidth. - The video bandwidth switch, S-103, has five positions: 300 kc, 30 kc, 10 kc, 3 kc, and 1 kc. The position resulting in the best S/N ratio should be used.

F. Squelch. - The squelch circuit is inoperative with the squelch control, R-164, turned or set counterclockwise against its stop. In the absence of a signal, rotate the squelch threshold control clockwise until the background noise just becomes inaudible. Any usable signal should then disable the squelch circuit.

G. Audio. - Adjust as needed.

SECTION 4

MAINTENANCE

1. Introduction.

The receivers of the Model 1500-A series should give comparatively trouble-free performance. If trouble occurs, however, rapid and effective trouble-shooting may be accomplished by the application of a simple effect-to-cause reasoning process, along with the data given in this section. A thorough knowledge of the theory of operation, as contained in Section 2, is essential to successful effect-to-cause reasoning. As a general statement, it may be said that frequent recurrence of a trouble usually indicates that the effect, not the cause, has been remedied, and further investigation should be made.

In time, the blower for the 416B tube, V-201, (used only in the Models 1502-A and 1510-A) may become clogged with dust collected from the atmosphere. Since this impairment of the blower's efficiency may cause the loss of a very expensive tube, it is recommended that the blower be disassembled and cleaned whenever it is found sufficiently dirty to warrant such action.

The voltage chart and the overall schematic diagram contained herein will be useful in locating trouble. Such trouble as broken leads or solder joints and loose or defective tubes will not be discussed in detail, but should be suspected and searched for in all cases where the trouble is not immediately apparent. Illustrations appearing in this section show the location of all major components and such smaller components as cannot be readily identified from adjacent stencils on the receiver.

All illustrations of an overall nature (front, top, bottom, and rear view) may be of any one of the various models. With certain reservations, therefore, any of these illustrations are applicable to any of the various models since the various models use an identical main chassis. Where differences occur, such as the RF chassis, and in certain models, the IF chassis, maintenance personnel should refer to the appropriate schematic diagram or parts list in the rear of this manual.

2. Alignment Procedure.

Function switch in FM position. Alignment and adjustment of the receivers in the Model 1500 series is accomplished according to the following outline, and should be carried out in the sequence given.

A. Second Limiter Alignment

(1.) C. W. Method

Step 1. Remove V-302

Step 2. Set the signal generator to 21.4 mc and connect to pin 1 of V-303

Step 3. Connect a high-resistance voltmeter (VTVM) to the second limiter grid return (TP-301)

Step 4. Set the signal generator output to produce approximately 2 volts on the VTVM.

Step 5. Detune the primary slug of T-307 counterclockwise against the stop.

Step 6. Increase the signal generator output to produce approximately the same value on the VTVM as in step 4 above.

Step 7. Adjust the secondary slug of T-307 for a maximum reading on the VTVM.

Step 8. Adjust the primary slug of T-307 for maximum reading, keeping the signal generator output adjusted for the same value on the VTVM as in step 4 above.

DO NOT readjust the secondary for a maximum as this will result in improper adjustment.

The second limiter transformer, T-307, has an extremely wide bandwidth compared to the overall IF bandwidth. The low circuit Q's and the heavy coupling make visual alignment of this transformer desirable but not essential. The procedure outlined above will produce less than 1 db tilt in this transformer. Thus the slope is negligible over the narrow IF bandwidth.

(2) Sweep Method

Step 1. Remove V-302

Step 2. Connect sweep generator to pin 1 of V-303

Step 3. Connect oscilloscope to second limiter grid (TP-301).

Step 4. Adjust the primary and the secondary of T-307 for maximum symmetrical output around the 21.4 mc center frequency.

B. Discriminator Alignment. - In preparation for alignment of the discrimination transformer, T-108, remove the second limiter tube V-304, and note the reading of the center frequency meter M-102. If it is off center, it should be centered by means of the potentiometer, R-180, located on the rear apron of the receiver and stenciled Disc. Bal. Difficulty in readily securing an exact reading is indicative of a defective discriminator tube, V-305, a defective audio amplifier, V-117, or their associated components, and must be corrected before proceeding further. After this adjustment, replace V-304 and proceed as follows:

(1) C. W. Method

Step 1. Remove V-302

Step 2. Set the signal generator to 21.4 mc and connect to pin 1 of V-303

Step 3. Connect a high impedance VTVM to the second limiter grid return, TP-301.

Step 4. Set the signal generator output to produce 2.0 volts on the VTVM.

Step 5. Connect the VTVM to the discriminator output lead, TP-303.

Step 6. Tune the secondary of T-308 to zero output, then counterclockwise until the VTVM shows a reading of 0.5 volts.

Step 7. Tune the primary of T-308 to give maximum reading on the VTVM.

Step 8. Retune the secondary to produce a zero (balanced) reading on VTVM.

Step 9. Detune the signal generator above and below 21.4 mc to produce a maximum positive and negative output. These voltages should be equal and have a magnitude of approximately 8 volts DC. Minor adjustment of the primary of T-308 will cause the two peak voltages to become exactly equal.

(2) Sweep Method

Step 1. Remove V-302

Step 2. Connect the sweep generator to pin 1 of V-303

Step 3. Connect the oscilloscope to the discriminator output lead (TP-303)

Step 4. Adjust the primary and secondary slugs of T-308 for maximum symmetrical output around a 21.4 mc center frequency. The peak-to-peak separation should be 750 kc.

C. IF Alignment.

(1) C. W. Method.- The characteristics of cascaded, critically coupled amplifier stages are such as to make alignment difficult; however, the advantages of response stability, gain, and adjacent channel selectivity make

this type of coupling most desirable. Alignment has been kept as simple as possible by designing the three capacitively coupled double-tuned IF transformers, comprising T-301, T-302, T-303, T-304, T-305 and T-306 to have almost identical characteristics. The primary and secondary of Q's have been kept high, and, therefore, the mutual coupling is low for the required bandwidth. These factors suggest a rather simple alignment procedure with a minimum of equipment. The resonant frequency of the primary or the secondary in the absence of the other (no coupling) is very nearly the proper tuning when the circuits are coupled. If the primary circuit is detuned, and the secondary adjusted for maximum, the overall response will be approximately correct. This procedure is as follows:

Step 1. Remove the oscillator tube (V-204) to prevent mixing at the signal generator harmonic frequencies.

Step 2. Set the receiver dial to approximately 60 mc.

Step 3. Set the generator to 21.4 mc and connect to pin 1 of V-203

Step 4. Connect a high-resistance d-c voltmeter (VTVM) to the second limiter grid return (TP-301)

Step 5. Set the generator output level to produce approximately 2V on the VTVM.

Step 6. If the IF amplifier is known to be considerably out of adjustment, it will be necessary to peak T-301, T-302, T-304, T-305, and T-306 to provide adequate gain.

Step 7. Detune the primary (T-305) counterclockwise against the stop.

Step 8. Increase the signal generator output to produce 2V on the VTVM.

Step 9. Adjust the secondary (T-306) for maximum reading on the VTVM.

Step 10. Adjust the primary (T-305) for maximum reading, keeping the signal generator output adjusted to maintain 2V on the VTVM. DO NOT readjust the secondary T-306 for a maximum as this will result in improper adjustment.

Step 11. Repeat steps 7 through 10 for T-302, T-303, T-304. NOTE: It is not necessary to follow this sequence, as any transformer may be adjusted without affecting the others. The alignment may be checked by varying the signal generator frequency ±100 KC. The output voltage should be constant within ±1 db over this range.

(2) Sweep Method. - If a sweep generator and an oscilloscope are available, they may be used to check the response; however, the above procedure should first be performed and then the response checked or retouched as required. For this test, replace the signal generator with the sweep generator and the VTVM with the oscilloscope. Slight adjustment of the transformer slugs may give some improvement in response shape.

3. BFO Adjustment. - Function switch in AM position, AGC-Man, switch in "Man" position.

Step 1. Adjust IF gain as needed.

Step 2. Connect 21.4 mc CW marker to TP-201 (1501-A, 1503-A, and 1509-A) or TP-202 (1502-A and 1510-A)

Step 3. Turn BFO on and, with pitch control on reference line, adjust T-109 for zero beat.

4. Local Oscillator Adjustment, Model 1502-A, 1510-A and 1511-A only. - The only adjustment necessary in the local oscillator is to make the tuning dial read properly. This section may be disregarded if the dial is reading correctly. If a tube has been replaced and an error is noted, it may be corrected by adjustment of C-229. This adjustment should be made with a signal generator of high accuracy at 60 mc. The high-frequency end of the dial is controlled by the location of C-230 on the end inductor, L-210. The correct adjustment is made at the factory and should not require readjustment in the field.

5. Local Oscillator Adjustment, Model 1501-A, 1503-A, 1509-A and 1512-A only. - The only adjustment necessary in the local oscillator is to make the tuning dial read properly. This section may be disregarded if the dial is reading correctly. If a tube has been replaced and an error is noted, it may be corrected by adjustment of C-233. This adjustment should be made with a signal generator of high accuracy at 55 mc. The high-frequency end of the dial is controlled by the location of C-231 on the end inductor. The correct adjustment is made at the factory and should not require readjustments in the field.

6. Mechanical Adjustments.

A. Caution. - Normally no adjustments are necessary to the gear train; however, if the above local oscillator adjustments do not produce the proper tracking of the tuning dial, refer to the following procedure:

Step 1. Loosen both gear train stops.

Step 2. Rotate dial to the extreme low-frequency end until the dial is stopped by the inductuner stop. Hairline should align with triangle on dial.

Step 3. Back up just off the inductuner stop and tighten the set screws in the dial drive low-frequency stop.

Step 4. Rotate the dial to the extreme high-frequency end until the dial is stopped by the inductuner stop. The hairline should align with the triangle on the dial; if not, loosen the screws on the inductuner shaft and align the triangle.

Step 5. Retighten the screws on the inductuner shaft.

Step 6. Back up just off the inductuner stop and tighten the set screws in the dial drive low frequency mechanical stop.

7. RF Amplifier Alignment.

A. RF Amplifier Alignment, Model 1502-A, 1510-A Only. - The RF circuits are wide band compared with the IF selectivity and are designed around the highly stable Mallory S-4 Spiral Inductuner. The end inductors are also very stable, and therefore, the unit should not require realignment. If realignment is found necessary, proceed as follows:

Step 1. Unsolder C-248 from the inductuner lug and solder to the BNC test connector.

Step 2. Connect a sweep generator with a 50 ohm source impedance to the BNC test jack.

Step 3. Connect oscilloscope to front-end test point TP-202.

Step 4. Set the dial to 70 mc.

Step 5. Adjust C-217 and C-222 for a double-tuned symmetrical response centered at 70 mc.

Step 6. Adjust C-220 for a 15% dip in the response.

Step 7. Repeat step 5 above.

Step 8. Set dial to 250 mc and bend end inductors L-207 and L-209 to produce a symmetrical response centered at 250 mc marker.

Step 9. Unsolder C-248 from the BNC test connector and resolder to the inductuner.

Step 10. Connect sweep generator to the antenna jack, J-106 or J-201.

NOTE: An accurate 50-ohm source can be established by using a 6 or 10 db 50 ohm pad between the sweep generator output and the receiver output.

Step 11. Set the dial to 70 mc.

Step 12. Adjust C-243 for a symmetrical response.

Step 13. Set the dial to 250 mc and move the position of C-244 along the end portion of end inductor, L-204 to produce a symmetrical round nose response.

B. RF Amplifier Alignment, Model 1501-A, 1503-A, 1509-A, and 1511-A only. - The RF circuits are wide band compared with the IF selectivity and are designed around the highly stable Mallory S-4 spiral inductuner. The end inductors are also very stable, and therefore, the unit should not require realignment. If realignment is found necessary, proceed in accordance with the following outline:

Step 1. Connect a sweep generator with a 75-ohm source impedance to J-106 or J-201.

Step 2. Connect oscilloscope to front-end test point TP-201.

Step 3. Set the tuning dial to 60 mc.

Step 4. Adjust C-222 and C-226 for a double-tuned symmetrical response centered at 60 mc. Use 60 mc marker.

Step 5. Adjust C-224 for a 3% dip.

Step 6. Repeat step 4.

NOTE: The RF response at the high frequency end is controlled by rigid, fixed, end inductors and should not be adjusted in the field.

VOLTAGE MEASUREMENTS										
MODEL 1502-A, 1510-A and 1511-A RECEIVER, FRONT END										
TUBE	TYPE	PIN #1	PIN #2	PIN #3	PIN #4	PIN #5	PIN #6	PIN #7	PIN #8	PIN #9
V-201	416B	Cathode	+6.95	Filaments	6.0VAC	Plate ±	195V	Grid Ring	+6.9V	
V-202	6J4	Gnd	1.1	Gnd	6.3AC	Gnd	Gnd	130		
V-203	6AK5	2.0	Gnd	6.3AC	Gnd	145	59	Gnd		
V-204	6AF4A	+53	Do Not Meas.	Gnd	6.3AC	2.5	Do Not Meas.	*53		
MODEL 1501-A, 1503-A, 1509-A and 1512-A RECEIVER, FRONT END										
V-202	6J4	Gnd	1.5	Gnd	5.75AC	Gnd	Gnd	142		
V-203	6AK5	-4.5	Gnd	Gnd	5.75AC	147	73	Gnd		
V-204	6AF4A	*59	-.51	Gnd	5.75AC	2.3	-.51	*59		
MODEL 1500-A SERIES, RECEIVER, MAIN CHASSIS										
V-113	0A2	147	N.C.	N.C.	N.C.	147	N.C.	Gnd		
V-114	0A2	147	N.C.	N.C.	N.C.	147	N.C.	Gnd		
V-115	12AU7	143	-1.08	25	Gnd	Gnd	227	133	150	5.8AC
V-116	12AU7	102	0	6.6	Gnd	Gnd	257	.1	.95	5.8AC
V-117	12AU7	143	Gnd	7.1	Gnd	Gnd	155	0	7.1	5.8AC
V-118	12AU7	257	155	158	Gnd	Gnd	257	155	158	5.8AC
MODEL 1500-A SERIES RECEIVER, IF AMPLIFIER CHASSIS, IF FUNCTION SWITCH IN AM. POS.										
V-301	6DC6	-.43	.78	6.3AC	Gnd	143	90	Gnd		
V-302	6DC6	-.43	.78	6.3AC	Gnd	143	63	Gnd		
V-303	6CB6	-.38	.14	6.4AC	Gnd	143	37	Gnd		
V-304	6AK5	-8.7	Gnd	6.4AC	Gnd	34.5	59	Gnd		
V-305	6AL5	-4.3	-5.9	Gnd	4.5AC	Gnd	Gnd	-8.5		
MODEL 1500-A SERIES RECEIVER, IF AMPLIFIER CHASSIS, FUNCTION SWITCH IN FM POS.										
V-301	6DC6	-.43	.77	6.2AC	Gnd	143	90	Gnd		
V-302	6DC6	-.43	.77	6.2AC	Gnd	143	63	Gnd		
V-303	6CB6	-.18	.36	6.4AC	Gnd	143	62	Gnd		
V-304	6AK5	-4.2	Gnd	6.4AC	Gnd	33.5	62	Gnd		
V-305	6AL5	-.19	-5.9	Gnd	4.5AC	Gnd	Gnd	-8.3		
BFO SWITCH ON										
V-111	6CB6	-10.8	0	5.6AC	Gnd	143	125	Gnd		

NOTES: Line voltages 115V AC, 60 cps; S-105 set to 115V; dial tuned to 220 mc: no signal input; squelch control and audio gain control full CCW; AGC on; BFO off except for measurements on V-111: R-180 discriminator tuning meter balance set in accordance with procedure shown in Section 4; filament voltages measured between tube pin and chassis except V-201; DC voltages taken with an 11 megohm VTVM; all voltages measured with respect to Gnd.

* Use 1 Meg isolating resistor between tube pin and meter probe.

TABLE 4-1. VOLTAGE MEASUREMENTS, MODEL 1500-A SERIES

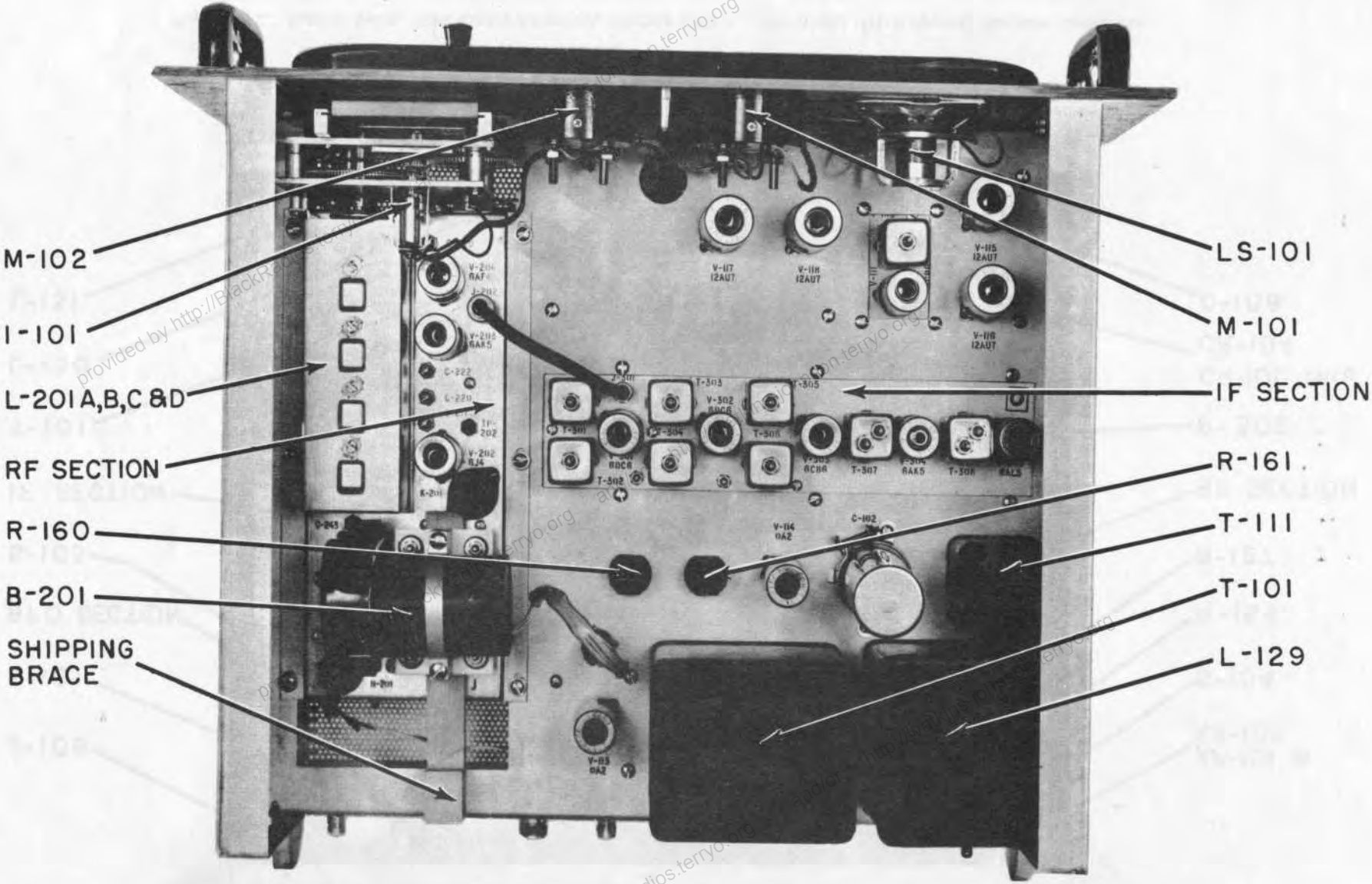


Figure 4-1. Top View, Models 1502-A, 1510-A, and 1511-A Special Purpose Receivers

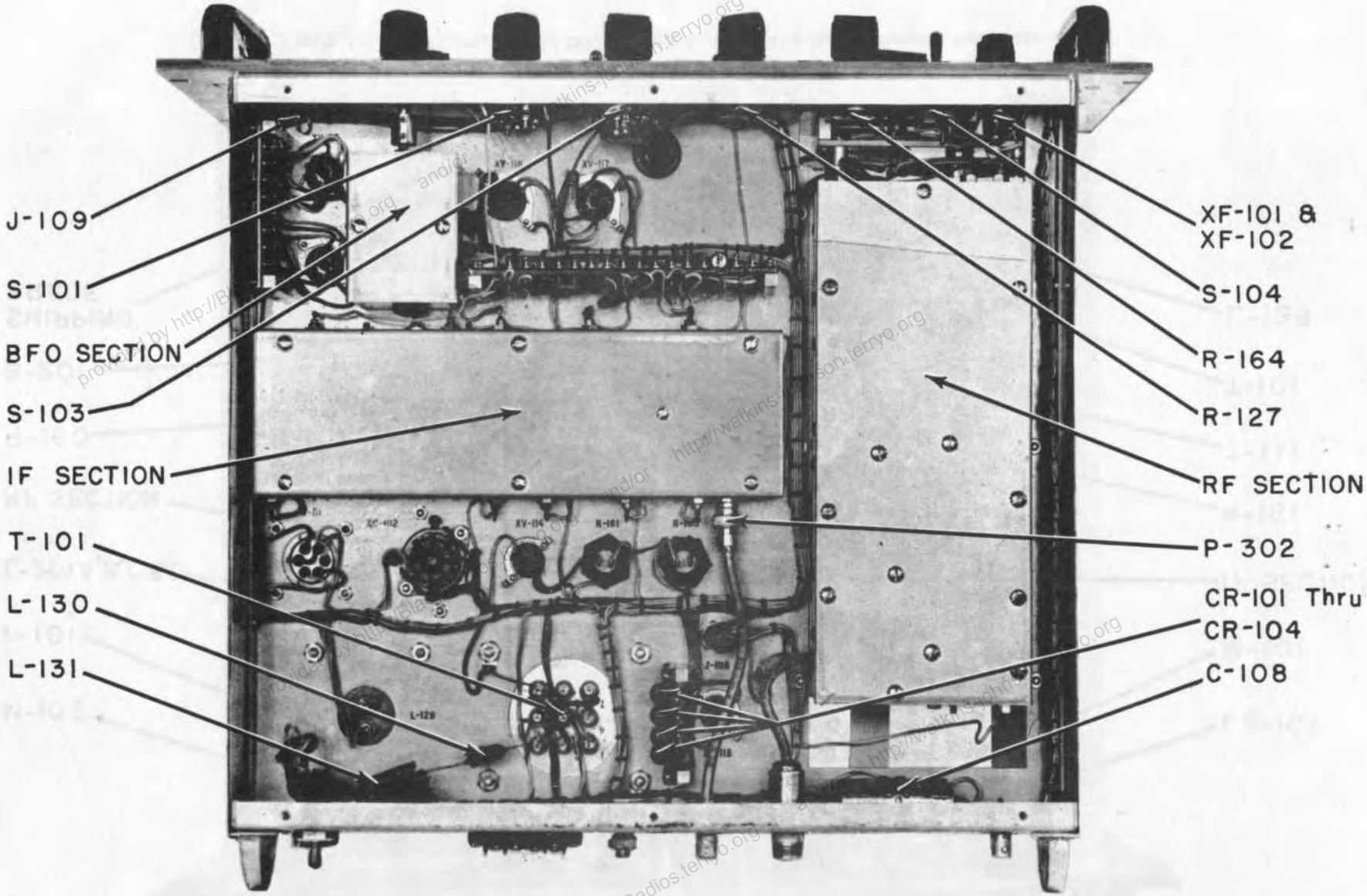


Figure 4-2. Bottom View, Dust Cover Removed, Models 1502-A, 1510-A and 1511-A Special Purpose Receivers

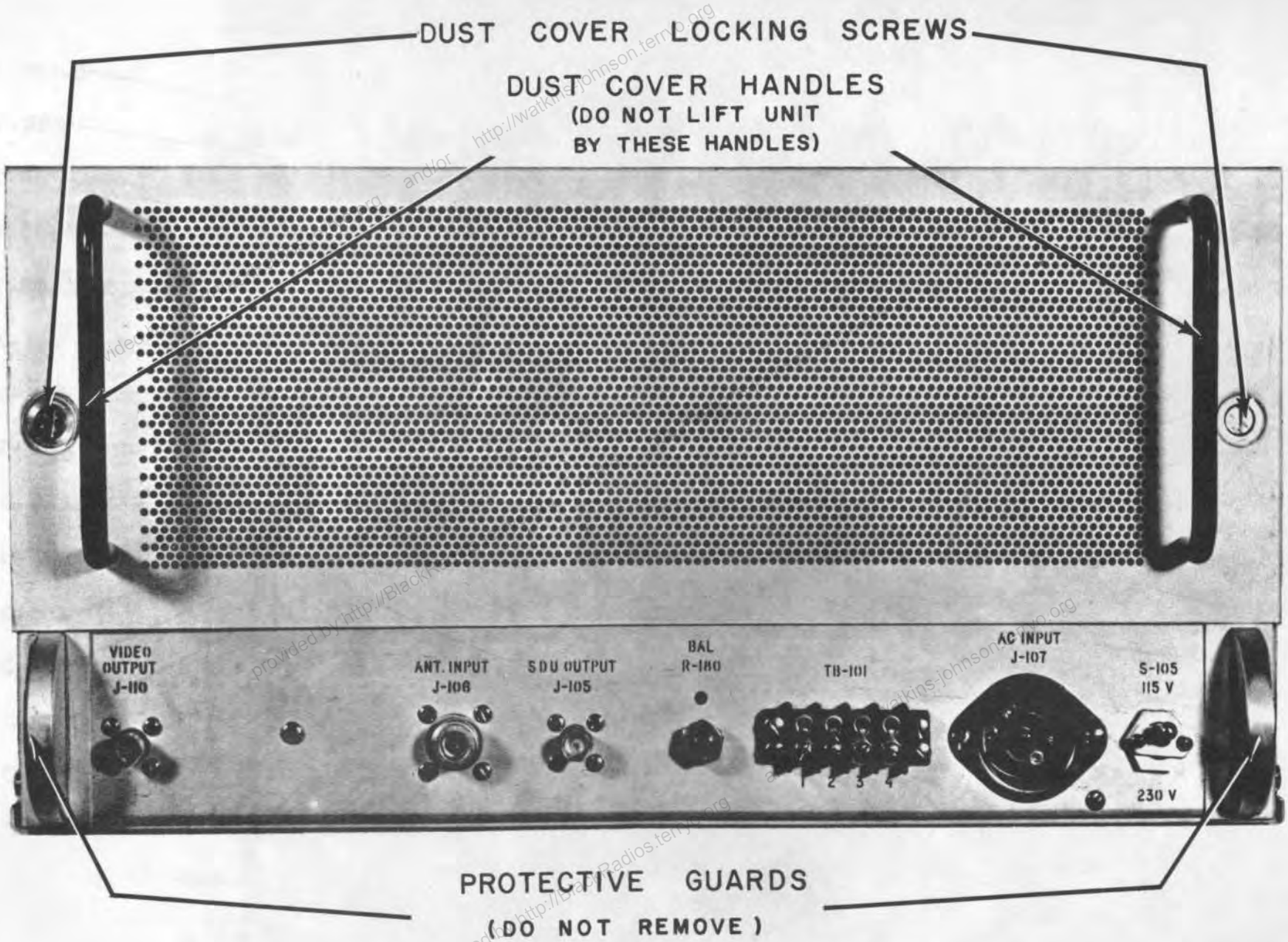


Figure 4-3. Rear View, 1500-A Series Special Purpose Receivers

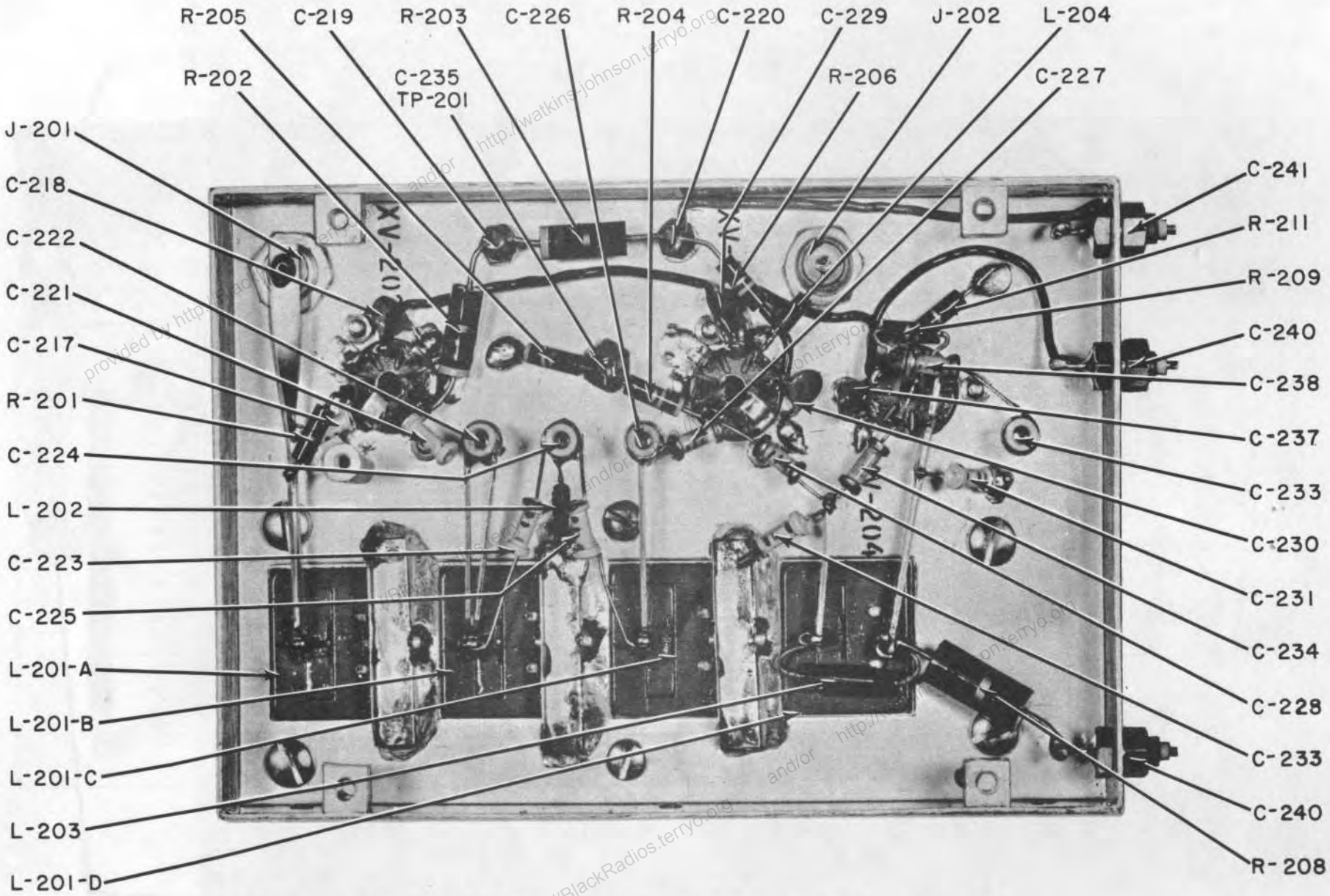


Figure 4-4. Bottom View, RF Section, Models 1501-A, 1509-A and 1512-A Special Purpose Receivers

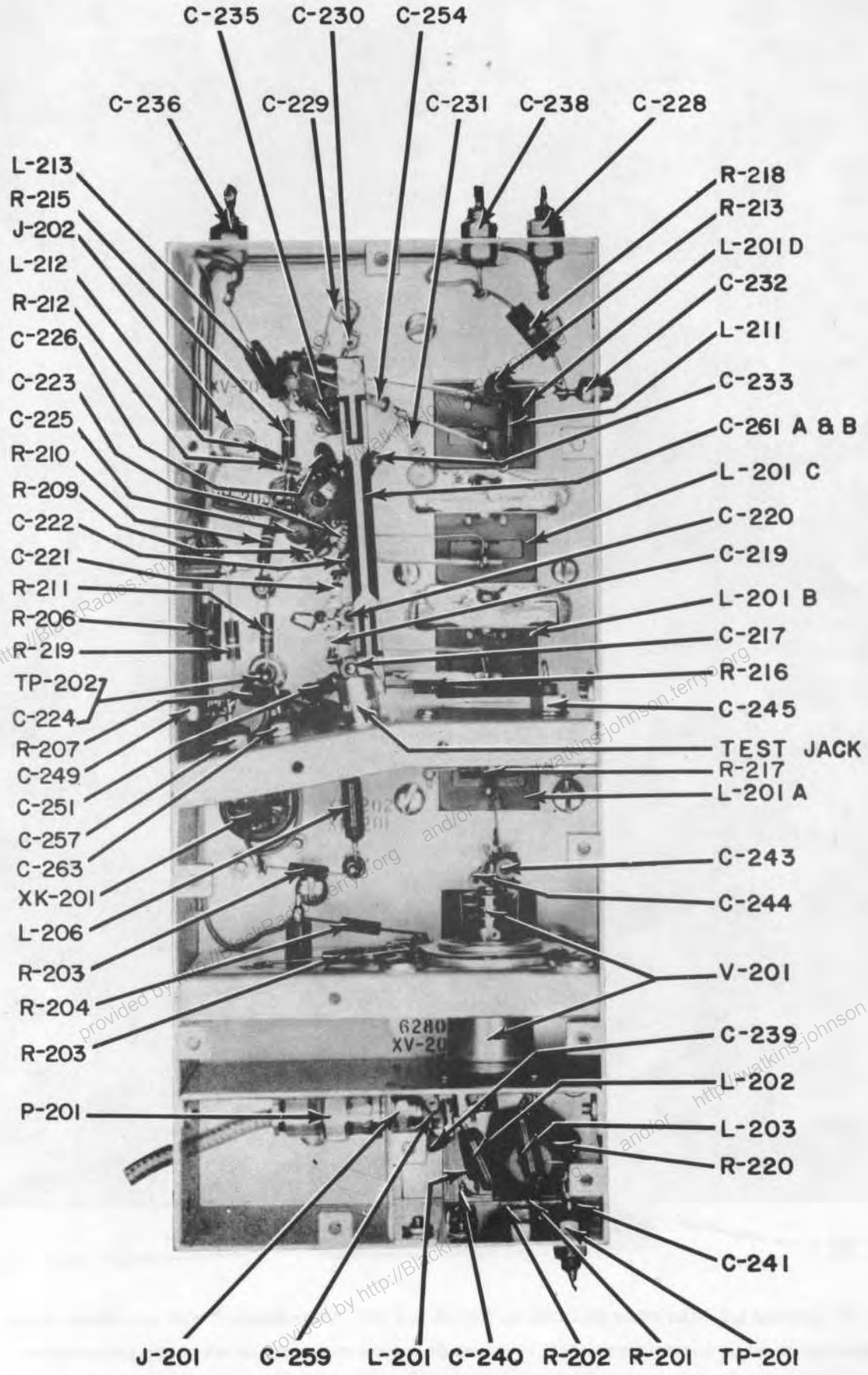
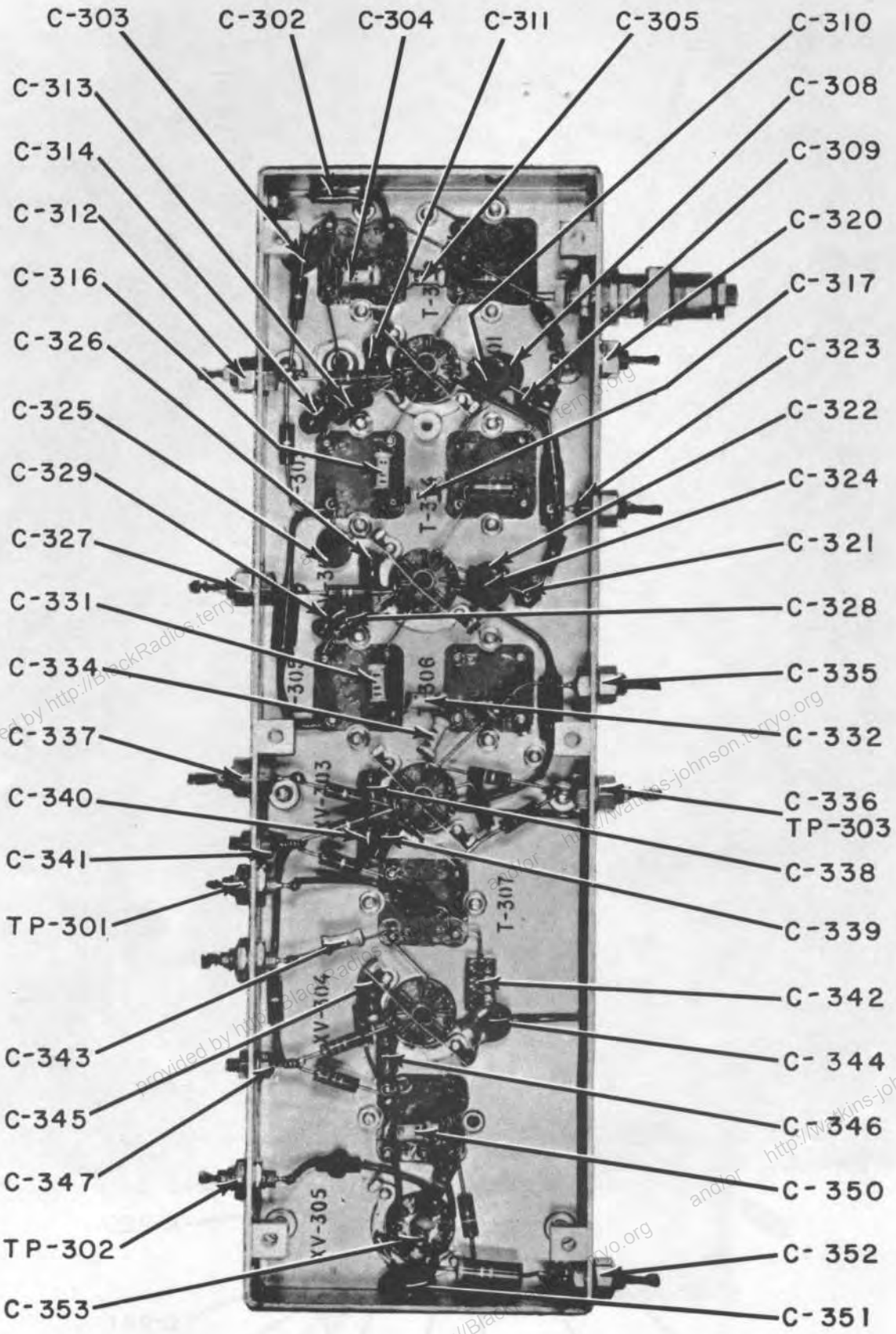
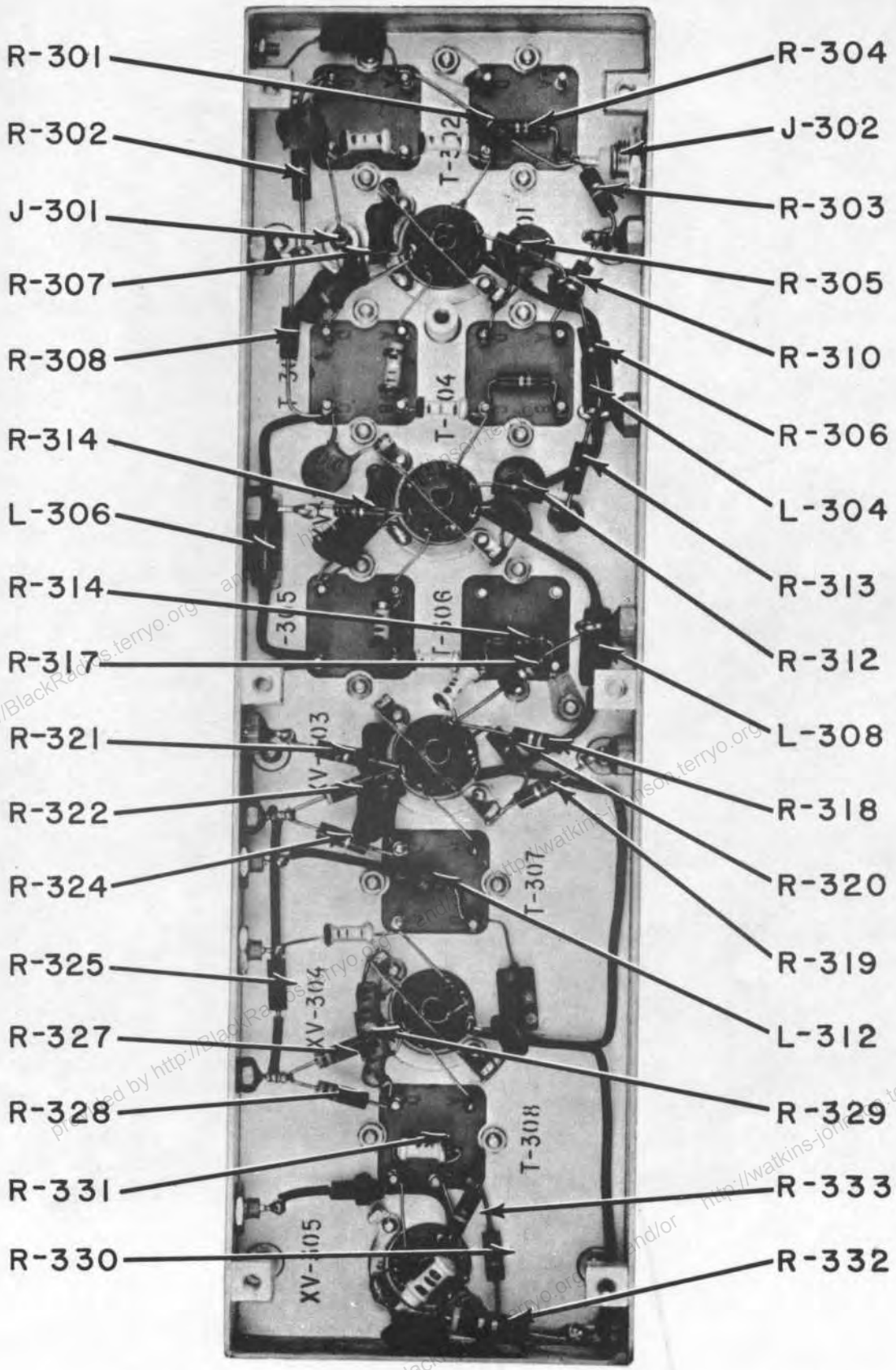


Figure 4-5. Bottom View, RF Section, Models 1502-A, 1510-A and 1511-A Special Purpose Receivers



NOTE: IF Sections for Units other than 1501-A, 1502-A and 1503-A are identical with one shown except for minor variations in component values. For specific information refer to schematic and parts list.

Figure 4-6A. Bottom View, IF Section, Models 1501-A, 1502-A and 1503-A Special Purpose Receivers, Showing Capacitor Location



NOTE: IF Sections for Units other than 1501-A, 1502-A and 1503-A are identical with one shown except for minor variations in component values. For specific information refer to schematic and parts list.

Figure 4-6B. Bottom View, IF Section, Models 1501-A, 1502-A and 1503-A Special Purpose Receivers, Showing placement of Resistors, Inductors and Jacks.

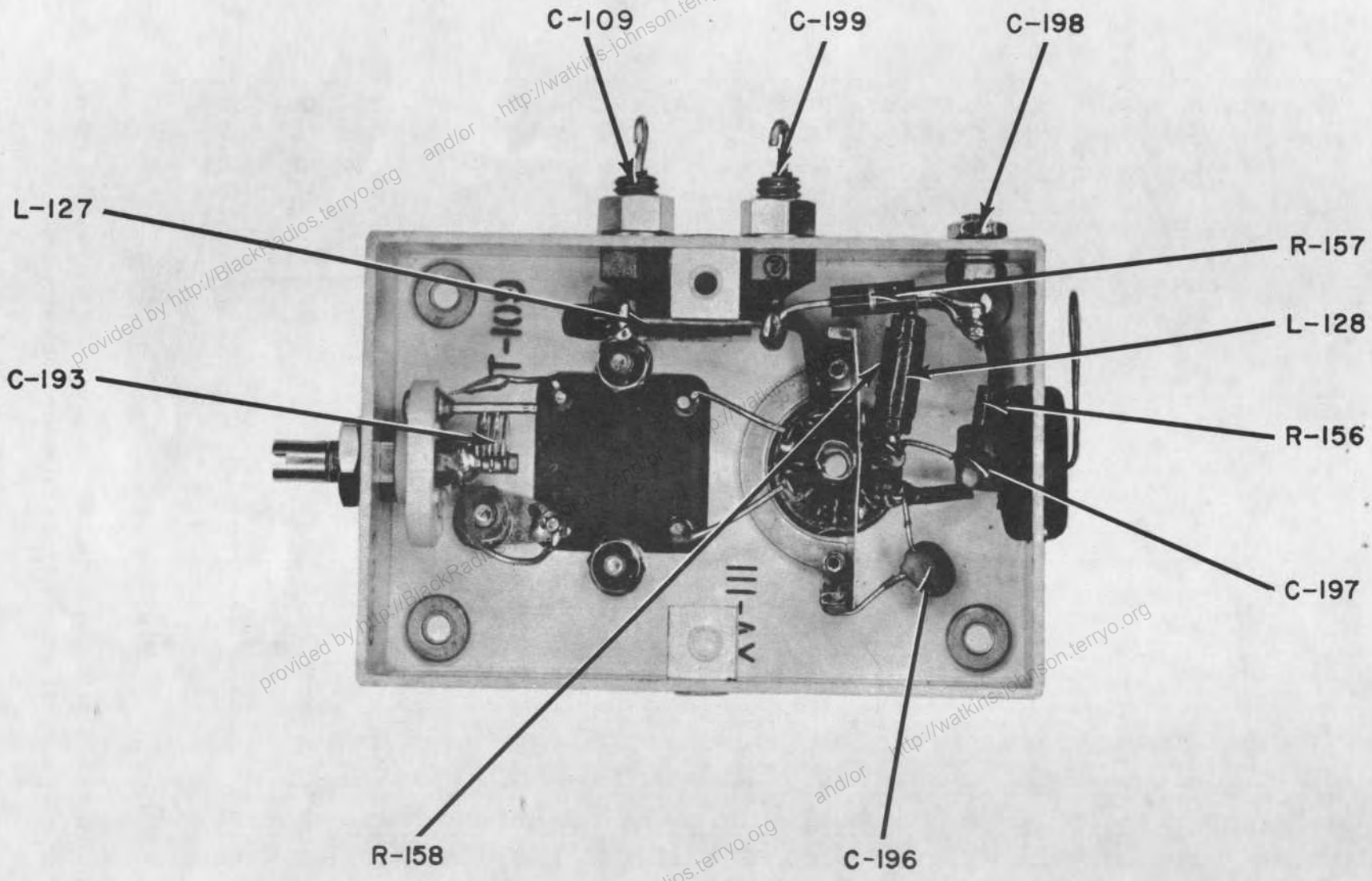


Figure 4-7. Bottom View, BFO Section, Model 1500-A Series Special Purpose Receivers

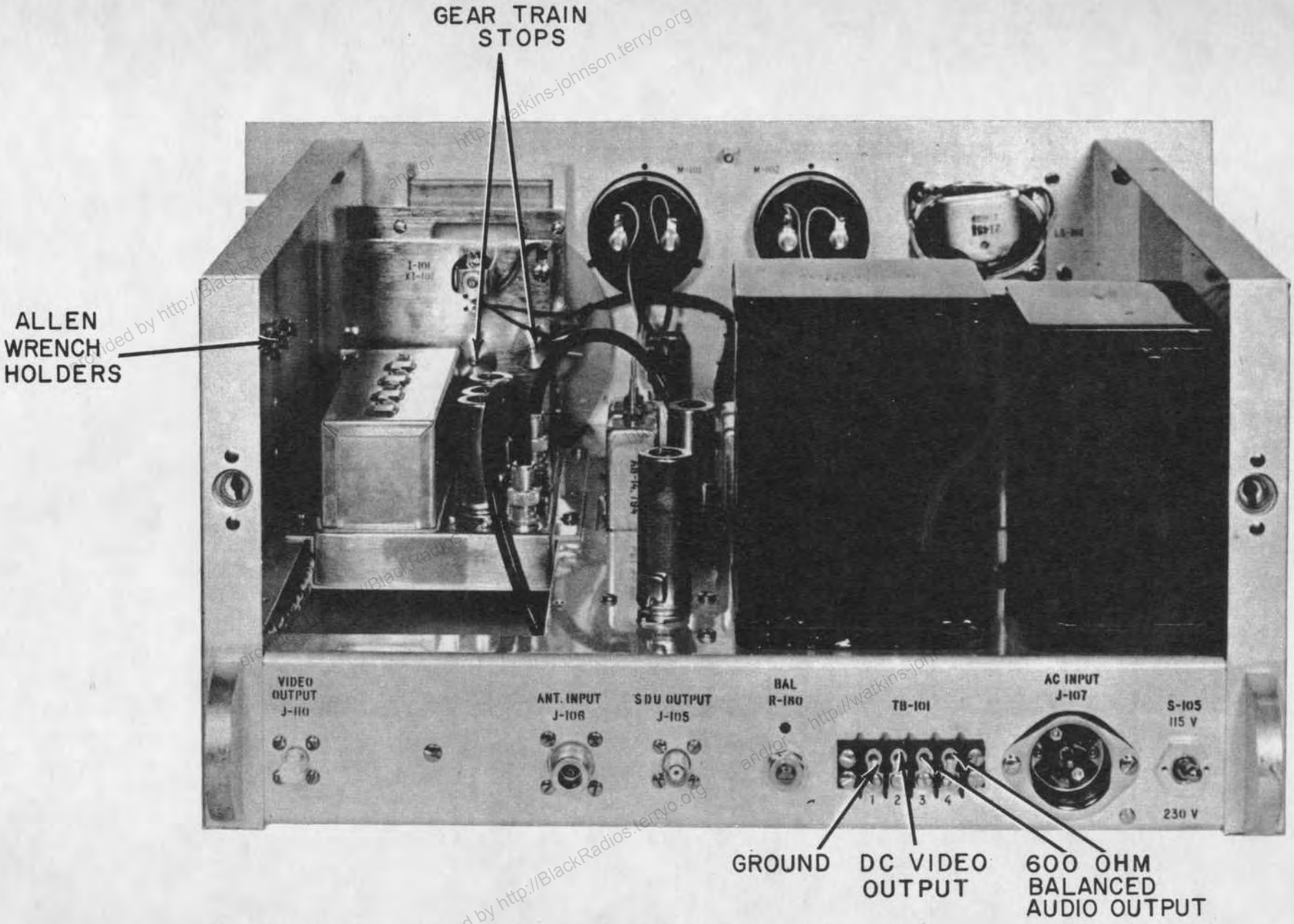


Figure 4-8. Rear View, Models 1501-A, 1503-A, 1509-A and 1512-A Special Purpose Receivers

SECTION 5

PARTS LIST

for

Model 1500-A Series Special Purpose Receivers

When ordering replacement parts, give equipment name and model number, and the symbol number and complete description of each item ordered.

Replacement parts which will be supplied against an order may not be exact duplicates of the original parts. However, only minor differences in the electrical or mechanical characteristics will be involved, and, consequently, will in no way impair the operation of the equipment.

TABLE OF CONTENTS

SUB-SECTION 5A

Parts List for Model 1500-A Series

Special Purpose Receivers

Main Chassis Components

This sub-section of the parts list contains the parts in the Model 1500-A Series bearing symbol numbers in the -100 series only, located on the main chassis of the receiver. For components in the receiver bearing symbol numbers other than -100, refer to the Table of Contents at the beginning of section 5.

SUB-SECTION 5A

MAIN CHASSIS COMPONENTS

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-101	NOT USED
C-102A	CAPACITOR, ELECTROLYTIC: 2 sec., 35 mfd, 450V, Sprague CE52F350R
C-102B	p/o C-102A
C-103	CAPACITOR, PAPER: .05 mfd, ±20%, 200V, Aerovox P-82
C-104	CAPACITOR, CERAMIC: .01 mfd, GMV, 500V, Sprague 29C9B8
C-105	Same as C-104
C-106	Same as C-104
C-107	CAPACITOR, MICA: 300 μμf, ±5%, 500V, Elmenco CM15E301J
C-108	CAPACITOR, PAPER: 1 mfd, ±20%, 400V, Sprague 88P10504T13
C-109	CAPACITOR, CERAMIC: .001 mfd, GMV, 500V, Sprague 514C1
C-110	CAPACITOR, CERAMIC: .0047 mfd, MRC, 500V, Sprague 20C8
C-111	Same as C-110
C-112 thru C-185	NOT USED
C-186	CAPACITOR, CERAMIC: .1 mfd, ±20%, 200V, Aerovox P-82
C-187	Same as C-104
C-188	CAPACITOR, MICA: 56 μμf ±5%, 500V, Elmenco CM15E560J
C-189	CAPACITOR, MICA: 43 μμf, ±5%, 500V, Elmenco CM15E430J
C-190	CAPACITOR, MICA: 220 μμf, ±5%, 500V, Elmenco CM15E221J
C-191	CAPACITOR, MICA: 750 μμf ±5%, 500V, Elmenco CM20C751J
C-192	CAPACITOR, PAPER: 2200 μμf, ±10%, 400V, Aerovox P88N
C-193	CAPACITOR, VARIABLE: 1.5-5 μμf, 1250V, E. F. Johnson 160-102
C-194	CAPACITOR, MICA: 82 μμf, ±5%, 500V, not separately replaceable, part of T-109.
C-195	CAPACITOR, CERAMIC: 47 μμf, ±10%, 500V, not separately replaceable, part of T-109.
C-196	CAPACITOR, CERAMIC DISC: .001 mfd, MRC, 500V, Sprague 19C1
C-197	CAPA CITOR, MICA: 51 μμf, ±5%, 500V, Elmenco CM15E510J
C-198	CAPACITOR, CERAMIC: .001 mfd, MRC, 500V, Sprague 507C2
C-199	Same as C-109
CR-101	DIODE, RECTIFIER SILICON: 1N539
CR-102	Same as CR-101
CR-103	Same as CR-101
CR-104	Same as CR-101
CR-105	DIODE, RECTIFIER GERMANIUM: 1N457
F-101	FUSE: Slo-Blo, 1.25 amp, Bussman MDL

SUB-SECTION 5A

MAIN CHASSIS COMPONENTS

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
F-102	FUSE: Slo-Blo, .60 amp, Bussman MDL
I-101	LAMP, INCANDESCENT: 6-8V, .15 amp, GE #47
J-101 thru J-104	NOT USED
J-105	CONNECTOR, RECEPTACLE: UG-291/U
J-106	CONNECTOR, RECEPTACLE: UG-593/U
J-107	CONNECTOR, RECEPTACLE: Hubbell 7486
J-108	CONNECTOR, RECEPTACLE: Winchester M7S-LRN
J-109	CONNECTOR, RECEPTACLE: Telephone jack, Switchcraft C-12A
J-110	CONNECTOR, RECEPTACLE: UG-290/U
L-101 thru L-125	NOT USED
L-126A	COIL WINDING: not separately replaceable, p/o T-109
L-126B	COIL WINDING: not separately replaceable, p/o T-109
L-127	CHOKE, R.F. Nems-Clarke AA-14, 805
L-128	CHOKE, R.F. Nems-Clarke AA-14, 807
L-129	CHOKE: Nems-Clarke AB-17, 117
L-130	CHOKE: Nems-Clarke AA-15, 060
L-131	Same as L-130
LS-101	SPEAKER: RCA 214S1
M-101	METER: 0-50 μa, Marion Electric 52N
M-102	METER: 100-0-100 μa, Marion Electric 52N
P-101 thru P-106	NOT USED
P-107	CONNECTOR, PLUG: Hubbell #7484
P-108	NOT USED
P-109	NOT USED
P-110	NOT USED
P-111	CONNECTOR, PLUG: molded, p/o Cornish 3533
R-101 thru R-126	NOT USED
R-127	POTENTIOMETER: Composition, 10K ±20%, 2W, Allen Bradley JA1N048P103UA
R-128	RESISTOR, FIXED COMPOSITION: 330K ±10%, 1/2W, Allen Bradley EB-3341

SUB-SECTION 5A

MAIN CHASSIS COMPONENTS

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
R-129	NOT USED
R-130	NOT USED
R-131	RESISTOR, FIXED COMPOSITION: 20 meg, ±5%, 1/2W, Allen Bradley EB-2065
R-132 thru R-137	NOT USED
R-138	RESISTOR, FIXED COMPOSITION: 47K ±10%, 1/2W, Allen Bradley EB-4731
R-139 thru R-141	NOT USED
R-142	RESISTOR, FIXED COMPOSITION: 470K ±10%, 1/2W, Allen Bradley EB-4741
R-143	NOT USED
R-144	RESISTOR, FIXED COMPOSITION: 24K ±5%, 1/2W, Allen Bradley EB-2435
R-145	Same as R-128
R-146	NOT USED
R-147	NOT USED
R-148	NOT USED
R-149	RESISTOR, FIXED COMPOSITION: 100K ±10%, 1/2W, Allen Bradley EB-1041
R-150 thru R-153	NOT USED
R-154	RESISTOR, FIXED COMPOSITION: 220K, ±10%, 1/2W, Allen Bradley EB-2241
R-155	Same as R-138, except not separately replaceable, part of T-109
R-156	RESISTOR, FIXED COMPOSITION: 10K ±10%, 1/2W, Allen Bradley EB-1031
R-157	RESISTOR, FIXED COMPOSITION: 1K ±10%, 1/2W, Allen Bradley EB-1021
R-158	Same as R-156
R-159	NOT USED
R-160	RESISTOR, WIREWOUND: 6K ±3%, 25W, Dalohm PH-25
R-161	RESISTOR, WIREWOUND: 2.5K ±3%, 25W, Dalohm PH-25
R-162	RESISTOR, FIXED COMPOSITION: 20K ±5%, 1W, Allen Bradley GB-2035
R-163	RESISTOR, FIXED COMPOSITION: 47K ±10%, 2W, Allen Bradley HB-4731
R-164	Same as R-127
R-165	RESISTOR, FIXED COMPOSITION: 2K ±5%, 1/2W, Allen Bradley EB-2025
R-166	RESISTOR, FIXED COMPOSITION: 1 meg ±10%, 1/2W, Allen Bradley EB-1051
R-167	RESISTOR, FIXED COMPOSITION: 240K, ±5%, 1/2W, Allen Bradley EB-2445
R-168	RESISTOR, FIXED COMPOSITION: 22K ±10%, 1/2W, Allen Bradley EB-2231

SUB-SECTION 5A

MAIN CHASSIS COMPONENTS

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
R-169	Same as R-142
R-170	POTENTIOMETER, COMPOSITION: 250K, ±20%, 2W, Allen Bradley JU-2542
R-171	Same as R-156
R-172	Same as R-157
R-173	Same as R-166
R-174	Same as R-154
R-175	RESISTOR, FIXED COMPOSITION: 3.3K ±5%, 1/2W, Allen Bradley EB-3325
R-176	RESISTOR, FIXED COMPOSITION: 15K ±10%, 1/2W, Allen Bradley EB-1531
R-177	Same as R-138
R-178	Same as R-175
R-179	Same as R-168
R-180	POTENTIOMETER, COMPOSITION: 50K ±10%, 2W, Allen Bradley JAIL040S503UC
R-181	RESISTOR, FIXED COMPOSITION: 10K ±10%, 1W, Allen Bradley GB-1031
R-182	RESISTOR, FIXED COMPOSITION: 6.8K ±10%, 1W, Allen Bradley GB-6821
R-183	Same as R-149
R-184	Same as R-166
R-185	Same as R-166
R-186 thru R-189	NOT USED
R-190	RESISTOR, FIXED COMPOSITION: 33K ±5%, 1/2W, Allen Bradley EB-3335
S-101	SWITCH, ROTARY: 4 pole, 2 position Nems-Clarke A-14, 800-2
S-102	SWITCH, TOGGLE: S.P.D.T. Smith #521
S-103	SWITCH, ROTARY: 2 pole, 5 positions, Nems-Clarke A-14, 801
S-104	SWITCH, TOGGLE: S.P.S.T. Smith #520
S-105	Same as S-102
S-106	SWITCH, TOGGLE: D.P.S.T. Smith #522
T-101 thru T-108	NOT USED
T-109	TRANSFORMER, IF: Nems-Clarke AB-14, 798
T-110	TRANSFORMER, POWER: Nems-Clarke AC-18, 227
T-111	TRANSFORMER, AUDIO: Nems-Clarke AB-14, 487
V-101 thru V-110	NOT USED

SUB-SECTION 5A

MAIN CHASSIS COMPONENTS

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
V-111	TUBE, ELECTRON: 6CB6
V-112	NOT USED
V-113	TUBE, ELECTRON: 0A2
V-114	Same as V-113
V-115	TUBE, ELECTRON: 12AU7
V-116	Same as V-115
V-117	Same as V-115
V-118	Same as V-115
W-101	POWER CORD: Cornish 3533
XF-101	FUSEHOLDER: Bussman HKP
XF-102	Same as XF-101
XI-101	LAMPHOLDER: #236U32AH, Drake 219
XV-101 thru XV-110	NOT USED
XV-111	SOCKET, TUBE: 7 pin miniature, Elco BR-151-BC-.125
XV-112	NOT USED
XV-113	Same as XV-111
XV-114	Same as XV-111
XV-115	SOCKET, TUBE: 9 pin miniature, Elco BR-151-BC
XV-116	Same as XV-115
XV-117	Same as XV-115
XV-118	Same as XV-115

SUB-SECTION 5B

MAINTENANCE PARTS LIST

for

RF Section, Models 1501-A, 1509-A and 1512-A

SUB-SECTION 5B

RF Section, Models 1501-A, 1509-A and 1512-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-200 thru C-212	NOT USED
C-213	CAPACITOR, CERAMIC: .01 μμf, Erie 811-.01
C-214 thru C-216	NOT USED
C-217	CAPACITOR, CERAMIC: 470 μμf, 10%, Erie GP2-A
C-218	CAPACITOR, CERAMIC, DISC: .001 mfd, Sprague 40C214
C-219	Same as C-198
C-220	Same as C-198
C-221	Same as C-217
C-222	CAPACITOR, CERAMIC TRIMMER: .5-3 μμf, Erie 3115-P-120
C-223	CAPACITOR, CERAMIC: 2.2 μμf ± .25 μμf, Erie NPO-A
C-224	CAPACITOR, CERAMIC, TRIMMER: 2-6 μμf, Erie 3119-P-120
C-225	Same as C-223
C-226	CAPACITOR, CERAMIC, TRIMMER: 1-3.8 μμf, Erie 3115-P-120
C-227	CAPACITOR, CERAMIC: 10 μμf, ±1 μμf, Erie NPO-A
C-228	CAPACITOR, CERAMIC: .5 μμf, .1 μμf, Erie NPO-A
C-229	Same as C-218
C-230	Same as C-218
C-231	CAPACITOR, CERAMIC: 8.2 μμf ±.5 μμf, Erie NPO-A
C-232	CAPACITOR, CERAMIC: 6.8 μμf ±.5 μμf, Erie NPO-A
C-233	Same as C-224
C-234	CAPACITOR, CERAMIC: 3.3 μμf ±.25 μμf, Erie NPO-A
C-235	CAPACITOR, CERAMIC, FEEDTHRU: 47 μμf, Sprague 514C11A
C-236	Same as C-109
C-237	Same as C-218
C-238	Same as C-228
C-239	NOT USED
C-240	Same as C-109
C-241	Same as C-109
J-201	CONNECTOR, RECEPTACLE: UG-1094/U
J-202	Same as J-201
L-201A	INDUCTUNER: 4 section, UHF Mallory, per Nems-Clarke dwg. B-18,325
L-201B	Same as L-201A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
L-201C	Same as L-201A
L-201D	Same as L-201A
L-202	CHOKE, R.F. 1.67 μh, Nems-Clarke A-14,737
L-203	CHOKE, R.F. 1.15 μh, Nems-Clarke A-14,806
L-204	Same as L-202
P-201	CONNECTOR, PLUG: UG-260/U
P-202	CONNECTOR, PLUG: UG-88/U
R-201	RESISTOR, COMPOSITION: 120 ohm, 5%, 1/2W, Allen Bradley EB-1215
R-202	RESISTOR, COMPOSITION: 4.7K, 5%, 1W, Allen Bradley GB-4725
R-203	Same as R-202
R-204	Same as R-142
R-205	Same as R-142
R-206	RESISTOR, COMPOSITION: 270K, 10%, 1/2W, Allen Bradley EB-2741
R-207	NOT USED
R-208	RESISTOR, COMPOSITION: 8.2K, 10%, 2W, Allen Bradley HB-8221
R-209	RESISTOR, COMPOSITION: 27K, 10%, 1/2W, Allen Bradley EB-2731
R-210	NOT USED
R-211	RESISTOR, COMPOSITION: 220 ohm 10%, 1/2W, Allen Bradley EB-2211
V-201	NOT USED
V-202	TUBE, ELECTRON: 6J4
V-203	TUBE, ELECTRON: 6AK5
V-204	TUBE, ELECTRON: 6AF4A
XV-201	NOT USED
XV-202	SOCKET, TUBE: 7 pin miniature, Elco BR-151-BC-.125
XV-203	Same as XV-202
XV-204	Same as XV-202

SUB-SECTION 5C

MAINTENANCE PARTS LIST

for

RF Section, Models 1502-A, 1510-A and 1511-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
B-201	MOTOR: A. C. fan, centrifugal, 50-60 cps, Air Marine A-1321-50
C-212	NOT USED
C-213	CAPACITOR, CERAMIC DISC: .01 mfd, Erie 811-.01
C-214	NOT USED
C-215	NOT USED
C-216	NOT USED
C-217	CAPACITOR, VARIABLE, CERAMIC: .5 to 3 μμf, Centralab 829-3
C-218	CAPACITOR, CERAMIC DISC: .001 mfd, Sprague 40C214
C-219	CAPACITOR, CERAMIC: 2 μμf, ±.25 μμf, Erie NPO-A
C-220	CAPACITOR, VARIABLE, CERAMIC: 1 to 6 μμf, Centralab 829-6
C-221	Same as C-219
C-222	CAPACITOR, VARIABLE, CERAMIC: 1 to 4 μμf, Centralab 829-4
C-223	CAPACITOR, CERAMIC: 10 μμf, ±10%, Erie NPO-A
C-224	CAPACITOR, CERAMIC, FEEDTHRU: 47 μμf, Sprague 514C11
C-225	Same as C-218
C-226	Same as C-218
C-227	CAPACITOR, STAND-OFF, CERAMIC: .001 mfd, 500V, modified by A-14,842 Sprague 507C2
C-228	Same as C-109
C-229	Same as C-220
C-230	CAPACITOR, CERAMIC: 8.2 μμf, ±.5 μμf, Erie NPO-A
C-231	CAPACITOR, CERAMIC: 6.8 μμf ± .5 μμf, Erie NPO-A
C-232	Same as C-227
C-233	CAPACITOR, CERAMIC: .5 μμf Centralab TCZ
C-234	CAPACITOR, CERAMIC: 3.3 μμf ±.25 μμf, Erie NPO-A
C-235	Same as C-218
C-236	Same as C-109
C-237	Same as C-233
C-238	Same as C-218
C-239	Same as C-218
C-240	Same as C-227
C-241	Same as C-109
C-242	Same as C-109
C-243	Same as C-217
C-244	Same as C-231

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-245	Same as C-109
C-246	CAPACITOR, CERAMIC: 33 μμf, ±10%, Erie NPO-T
C-247	CAPACITOR, CERAMIC: 22 μμf, ±10%, Erie NPO-A
C-248	CAPACITOR, CERAMIC: .001 mfd, 600V, Centralab D6-102
C-249	Same as C-227
C-250	Same as C-227
C-251	CAPACITOR, CERAMIC: 500 μμf, ±20%, Erie GP-2-331
C-252	CAPACITOR, CERAMIC: 200 μμf, ±10% , Erie 370-FA
C-253	Same as C-252
C-254	Same as C-252
C-255	Same as C-252
C-256	Same as C-252
C-257	Same as C-109
C-258	Same as C-109
C-259	Same as C-230
C-260	NOT USED
C-261	CAPACITOR, SPECIAL: Nems-Clarke A-17, 729
C-262	Same as C-218
C-263	Same as C-109
J-201	CONNECTOR, RECEPTACLE: UG-290/U
J-202	CONNECTOR, RECEPTACLE: UG-1094/U
K-201	RELAY: Time delay, SPST, 6V ac
L-201	COIL WINDING: 7.2 μh, Nems-Clarke A-14, 734
L-202	CHOKE, R.F. 14 μh, Nems-Clarke A-14, 735
L-203	Same as L-202
L-204	INDUCTOR: Fixed, Nems-Clarke A-14, 759
L-205	INDUCTUNER: 4 section, Mallory, per Nems-Clarke dwg. B-18, 325
L-206	Same as L-202
L-207	COIL WINDING: Nems-Clarke A-14, 754
L-208	CHOKE: 1.67 μh, Nems-Clarke A-14, 737
L-209	COIL WINDING: Nems-Clarke A-14, 749-1
L-210	COIL WINDING: Nems-Clarke A-14, 767
L-211	COIL WINDING: 1.15 μh, Nems-Clarke A-14, 806
L-212	Same as L-208

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
L-213	CHOKE, R.F. 2.8 μh, Nems-Clarke A-16,625
P-201	CONNECTOR, PLUG: UG-88/U
P-202	Same as P-105
R-201	RESISTOR, COMPOSITION: 160 ohms, 5%, 1/2W, Allen Bradley EB-1615
R-202	RESISTOR, COMPOSITION: 100 ohms, 5%, 1/2W, Allen Bradley EB-1015
R-203	RESISTOR, COMPOSITION: 8.2 K, 5%, 1/2W, Allen Bradley EB-8225
R-204	RESISTOR, COMPOSITION: 51K, 5%, 1/2W, Allen Bradley EB-5135
R-205	RESISTOR, COMPOSITION: 1.5K, 5%, 2W, Allen Bradley HB-1525
R-206	RESISTOR, COMPOSITION: 5.6K, 5%, 1W, Allen Bradley GB-5625
R-207	RESISTOR, COMPOSITION: 6.2K, 5%, 1W, Allen Bradley GB-6225
R-208	RESISTOR, COMPOSITION: 120 ohms, 5%, 1/2W, Allen Bradley EB-1215
R-209	Same as R-142
R-210	Same as R-142
R-211	RESISTOR, COMPOSITION: 27K, 10%, 1/2W, Allen Bradley EB-2731
R-212	RESISTOR, COMPOSITION: 150K, 10%, 1/2W, Allen Bradley EB-1541
R-213	RESISTOR, COMPOSITION: 8.2K, 10%, 2W, Allen Bradley EB-8221
R-214	Same as R-211
R-215	RESISTOR, COMPOSITION: 220 ohms, 10%, 1/2W, Allen Bradley EB-2211
R-216	Same as R-202
R-217	RESISTOR, COMPOSITION: 510 ohms, 5%, 1W, Allen Bradley GB-5115
R-218	RESISTOR, COMPOSITION: 150K, 5%, 1/2W, Allen Bradley GB-1545
R-219	RESISTOR, COMPOSITION: 150K, 5%, 1/2W, Allen Bradley EB-1545
R-220	RESISTOR, W.W. 5.1K, 3%, 25W, Dalohm PH-25
V-201	TUBE, ELECTRON: 6280
V-202	TUBE, ELECTRON: 6J4
V-203	TUBE, ELECTRON: 6AK5
V-204	TUBE, ELECTRON: 6AF4A
XV-201	SOCKET, TUBE: Cinch 14F14078
XV-202	Same as XV-111
XV-203	Same as XV-111
XV-204	Same as XV-111

SUB-SECTION 5D

MAINTENANCE PARTS LIST

FOR

RF Section, Model 1503-A

SUB-SECTION 5D

RF Section, Model 1503-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-201 thru C-212	NOT USED
C-213	CAPACITOR, CERAMIC: 0.01 μf, ±20%, 500 WVDC, Erie 811-.01
C-214	NOT USED
C-215	NOT USED
C-216	NOT USED
C-217	CAPACITOR, CERAMIC: 470 μμf, ±10%, 500 WVDC, Erie GP2A470
C-218	CAPACITOR, CERAMIC: 1000 μμf, MRC, 1000V, Sprague 40C230A
C-219	CAPACITOR, CERAMIC: 1000 μμf, MRC, 500V, Sprague 507C2
C-220	Same as C-219
C-221	Same as C-217
C-222	CAPACITOR, VARIABLE, CERAMIC: 0.5-3.0 μμf, 500V, Erie #3115-P-120
C-223	CAPACITOR, CERAMIC: 2.2 μμf, ±0.25 μμf, 500V, Erie NPO-A
C-224	Same as C-222
C-225	Same as C-223
C-226	CAPACITOR, VARIABLE, CERAMIC: 0.1-3.8 μμf, Erie #3115-P-120
C-227	CAPACITOR, CERAMIC: 10 μμf, ±10%, 500V, Erie NPO-A
C-228	CAPACITOR, CERAMIC: 0.5 μμf ±0.1 μμf, 500V, Erie NPO-A
C-229	Same as C-218
C-230	Same as C-218
C-231	Same as C-227
C-232	CAPACITOR, CERAMIC: 7.5 μμf ±0.5 μμf, 500V, Erie NPO-A
C-233	CAPACITOR, CERAMIC, VARIABLE: 2-6 μμf, 500V, Erie #3119-P-120
C-234	CAPACITOR, CERAMIC: 3.3 μμf ±0.25 μμf, 500V, Erie NPO-A
C-235	CAPACITOR, CERAMIC, FEEDTHRU: 47 μμf, ±20%, 500V, Sprague 514C11A
C-236	CAPACITOR, CERAMIC, FEEDTHRU: 1000 μμf, GMV, 500V, Sprague 514C1
C-237	Same as C-218
C-238	Same as C-228
C-239	CAPACITOR, CERAMIC: 8.2 μμf ±0.5 μμf, 500V, Erie NPO-A
C-240	Same as C-236
C-241	Same as C-227
C-242	Same as C-227
C-243	CAPACITOR, CERAMIC: 1.5 μμf ±0.25 μμf, 500V, Erie NPO-A
C-244	Same as C-227

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-245	Same as C-243
C-246	CAPACITOR, CERAMIC: 6.2 μμf ±0.5 μμf, 500V, Erie NPO-A
C-247	Same as C-227
J-201	CONNECTOR: UG-1094/U
J-202	Same as J-201
L-201 A, B, C &D	INDUCTUNER: Modified per Nems-Clarke Dwg. #B-18, 325
L-202	INDUCTOR: 6.3 μh, per Nems-Clarke Dwg. #A-18,195
L-203	INDUCTOR: 0.89 μh, per Nems-Clarke Dwg. #A-18,196
L-204	INDUCTOR: 1.67 μh, per Nems-Clarke Dwg. #A-14, 737
R-201	RESISTOR, FIXED COMPOSITION: 120 ohms, ±5%, 1/2W, Allen Bradley EB-1215
R-202	RESISTOR, FIXED COMPOSITION: 4700 ohms, ±5%, 1W, Allen Bradley GB-4725
R-203	Same as R-202
R-204	RESISTOR, FIXED COMPOSITION: 470K ohms, ±10%, 1/2W, Allen Bradley EB-4741
R-205	Same as R-204
R-206	RESISTOR, FIXED COMPOSITION: 270K ohms, ±10%, 1/2W, Allen Bradley EB-2741
R-207	NOT USED
R-208	RESISTOR, FIXED COMPOSITION: 8200 ohms, ±10% 2W, Allen Bradley HB-8221
R-209	RESISTOR, FIXED COMPOSITION: 27K ohms, ±10%, 1/2W, Allen Bradley EB-2731
R-210	NOT USED
R-211	RESISTOR, FIXED COMPOSITION: 220 ohms, ±10%, 1/2W, Allen Bradley EB-2211
V-201	NOT USED
V-202	TUBE, ELECTRON: Type 6J4, Sylvania
V-203	TUBE, ELECTRON: Type 6AK5
V-204	TUBE, ELECTRON: Type 6AF4A
XV-202	SOCKET, TUBE: Elco #BR-151-BC
XV-203	Same as XV-202
XV-204	Same as XV-202

SUB-SECTION 5E

MAINTENANCE PARTS LIST

FOR

IF Sections, Models 1501-A, 1502-A and 1503-A

SUB-SECTION 5E

IF Sections, Models 1501-A, 1502-A and 1503-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-301	CAPACITOR, CERAMIC: 4.7 μμf, ±5%, Erie NPO-A, not separately replaceable, part of T-301
C-302	Same as C-190
C-303	Same as C-110
C-304	Same as C-223
C-305	Same as C-223
C-306	CAPACITOR, CERAMIC: 39 μμf, ±5%, Erie N030T, not separately replaceable, part of T-302
C-307	CAPACITOR, CERAMIC: 500 μμf, ±20%, Erie GP2-331, not separately replaceable, part of T-302
C-308	Same as C-110
C-309	Same as C-198
C-310	Same as C-110
C-311	Same as C-307
C-312	Same as C-109
C-313	Same as C-307
C-314	CAPACITOR, CERAMIC: 390 μμf, ±10%, Erie GP2-331
C-315	Same as C-231, not separately replaceable, part of T-303
C-316	CAPACITOR, CERAMIC: 1.5 μμf ±.1 μμf, Erie NPO-A
C-317	CAPACITOR, CERAMIC: 1.8 μμf ±.1 μμf, Erie NPO-A
C-318	Same as C-306, not separately replaceable, part of T-304
C-319	Same as C-207, not separately replaceable, part of T-304
C-320	Same as C-109
C-321	Same as C-198
C-322	Same as C-110
C-323	Same as C-109
C-324	Same as C-110
C-325	Same as C-110
C-326	Same as C-307
C-327	Same as C-109
C-328	Same as C-307
C-329	Same as C-314
C-330	Same as C-231, not separately replaceable, part of T-305
C-331	Same as C-316
C-332	Same as C-317

SUB-SECTION 5E

IF Section, Models 1501-A, 1502-A and 1503-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-333	Same as C-306, not separately replaceable, part of T-306
C-334	CAPACITOR, CERAMIC: 22 μμf, ±10%, Erie NPO-A
C-335	Same as C-109
C-336	Same as C-109
C-337	Same as C-109
C-338	Same as C-307
C-339	Same as C-307
C-340	Same as C-307
C-341	Same as C-198
C-342	CAPACITOR, MICA: 33 μμf , ±5%, 300V, CM15E330J
C-343	CAPACITOR, CERAMIC: 1 μμf ±. 25 μμf, Erie NPO-A
C-344	Same as C-110
C-345	CAPACITOR, CERAMIC: . 001 mfd, 600V, Centralab D6-102
C-346	Same as C-345
C-347	Same as C-198
C-348	Same as C-342, not separately replaceable, part of T-308.
C-349	CAPACITOR, CERAMIC: 22 μμf, ±5%, Erie NPO-A not separately replaceable, part of T-308
C-350	Same as C-306
C-351	Same as C-187
C-352	Same as C-109
C-353	CAPACITOR, CERAMIC: 27 μμf, ±10%, Erie N220-T
J-301	CONNECTOR, RECEPTACLE: UG-291/U
J-302	Same as J-201
L-301	COIL WINDING: not separately replaceable, part of T-301
L-302	COIL WINDING: not separately replaceable, part of T-302
L-303	COIL WINDING: not separately replaceable, part of T-303
L-304	CHOKE, R.F. 2.8 μh, Nems-Clarke A-16,625
L-305	Same as L-301, not separately replaceable, part of T-304
L-306	CHOKE, R.F. 2.5 μh, Nems-Clarke A-14,805
L-307	COIL WINDING: not separately replaceable, part of T-305
L-308	Same as L-304
L-309	Same as L-301, not separately replaceable, part of T-306
L-310	COIL WINDING: not separately replaceable, part of T-307
L-311	COIL WINDING: not separately replaceable, part of T-307

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
L-312	CHOKE, R. F. 28 μh, Nems-Clarke A-14, 804
L-313	COIL WINDING: not separately replaceable, part of T-308
L-314A	COIL WINDING: not separately replaceable, part of T-308
L-314B	COIL WINDING: not separately replaceable, part of T-308
L-315	Same as L-312
P-301	NOT USED
P-302	CONNECTOR, PLUG: UG-88/U
R-301	RESISTOR, COMPOSITION: 51 ohm ±5%, 1/2W, Allen Bradley EB-5105
R-302	Same as R-157
R-303	Same as R-154
R-304	RESISTOR, COMPOSITION: 10K, ±5%, 1/2W, Allen Bradley EB-1035
R-305	RESISTOR, COMPOSITION: 82 ohm, ±5%, 1/2W, Allen Bradley EB-8205
R-306	Same as R-305
R-307	Same as R-142
R-308	RESISTOR, COMPOSITION: 100 ohm, ±10%, 1/2W, Allen Bradley EB-1011
R-309	Same as R-157, not separately replaceable, part of T-303
R-310	Same as R-154
R-311	RESISTOR, COMPOSITION: 20K, ±5%, 1/2W, Allen Bradley EB-2035
R-312	Same as R-305
R-313	Same as R-305
R-314	RESISTOR, COMPOSITION: 150K, ±10%, 1/2W, Allen Bradley EB-1541
R-315	Same as R-157, not separately replaceable, part of T-305
R-316	RESISTOR, COMPOSITION: 30K, ±5%, 1/2W, Allen Bradley EB-3035
R-317	RESISTOR, COMPOSITION: 820K, 10%, 1/2W, Allen Bradley EB-8241
R-318	Same as R-149
R-319	Same as R-156
R-320	Same as R-301
R-321	Same as R-168
R-322	Same as R-138
R-323	Same as R-190, not separately replaceable, part of T-307
R-324	Same as R-157
R-325	Same as R-157
R-326	Same as R-323, not separately replaceable, part of T-307
R-327	Same as R-323

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
R-328	Same as R-323
R-329	Same as R-138
R-330	RESISTOR, COMPOSITION: 100K, ±5%, 1/2W, Allen Bradley EB-1045
R-331	Same as R-304
R-332	RESISTOR, COMPOSITION: 4.7 ohm, ±5%, 1W, Allen Bradley GB-4R75
R-333	Same as R-330
T-301	TRANSFORMER, I. F. Nems-Clarke AB-14, 796
T-302	TRANSFORMER, I. F. Nems-Clarke AB-14, 794
T-303	TRANSFORMER, I. F. Nems-Clarke AB-14, 797
T-304	TRANSFORMER, I. F. Nems-Clarke AB-14, 795
T-305	Same as T-303
T-306	TRANSFORMER, I. F. Nems-Clarke AB-14, 793
T-307	TRANSFORMER, LIMITER: Nems-Clarke AB-14, 799
T-308	TRANSFORMER, DISCRIMINATOR: Nems-Clarke AB-14, 976
V-301	TUBE, ELECTRON: 6DC6
V-302	Same as V-301
V-303	Same as V-111
V-304	Same as V-203
V-305	TUBE, ELECTRON: 6AL5
XV-301	Same as XV-111
XV-302	Same as XV-111
XV-303	Same as XV-111
XV-304	Same as XV-111
XV-305	Same as XV-111

SUB-SECTION 5F

MAINTENANCE PARTS LIST

FOR

IF Section, Models 1509- A and 1511-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-301	CAPACITOR, CERAMIC: 4.7 μμf, ±5%, Erie NPO-A, not separately replaceable, part of T-301
C-302	Same as C-190
C-303	Same as C-110
C-304	CAPACITOR, CERAMIC: 1.2 μμf ±0.1 μμf, Erie NPO-A
C-305	CAPACITOR, CERAMIC: 1.5 μμf ±0.1 μμf, Erie NPO-A
C-306	CAPACITOR, CERAMIC: 39 μμf, ±5%, Erie N030-T, not separately replaceable, part of T-302
C-307	CAPACITOR, CERAMIC: 500 μμf, ±20%, Erie GP2-331, not separately replaceable, part of T-302
C-308	Same as C-110
C-309	Same as C-198
C-310	Same as C-110
C-311	Same as C-307
C-312	Same as C-109
C-313	Same as C-307
C-314	CAPACITOR, CERAMIC: 390 μμf, ±10%, Erie GP2-331
C-315	Same as C-231, not separately replaceable, part of T-303
C-316	Same as C-304
C-317	Same as C-304
C-318	Same as C-306, not separately replaceable, part of T-304
C-319	Same as C-307, not separately replaceable, part of T-304
C-320	Same as C-109
C-321	Same as C-198
C-322	Same as C-110
C-323	Same as C-109
C-324	Same as C-110
C-325	Same as C-110
C-326	Same as C-307
C-327	Same as C-109
C-328	Same as C-307
C-329	Same as C-314
C-330	Same as C-231, not separately replaceable, part of T-305
C-331	Same as C-304
C-332	Same as C-304

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-333	Same as C-306, not separately replaceable, part of T-306
C-334	CAPACITOR, CERAMIC: 22 μμf, ±10%, Erie NPO-A
C-335	Same as C-109
C-336	Same as C-109
C-337	Same as C-109
C-338	Same as C-307
C-339	Same as C-307
C-340	Same as C-307
C-341	Same as C-198
C-342	CAPACITOR, MICA: 33 μμf, ±5%, 300V, CM15E330J
C-343	CAPACITOR, CERAMIC: 1 μμf, ±.25 μμf, Erie NPO-A
C-344	Same as C-110
C-345	CAPACITOR, CERAMIC: .001 mfd, 600V, Centralab D6-102
C-346	Same as C-345
C-347	Same as C-198
C-348	Same as C-342, not separately replaceable, part of T-308
C-349	CAPACITOR, CERAMIC: 22 μμf, ±5%, Erie NPO-A, not separately replaceable, part of T-308
C-350	Same as C-306
C-351	Same as C-187
C-352	Same as C-109
C-353	CAPACITOR, CERAMIC: 27 μμf ±10%, Erie N220-T
J-301	CONNECTOR, RECEPTACLE: Type UG-291/U
J-302	Same as J-201
L-301	COIL WINDING: not separately replaceable, part of T-301
L-302	COIL WINDING: not separately replaceable, part of T-302
L-303	COIL WINDING: not separately replaceable, part of T-303
L-304	CHOKE, R.F. 2.8 μh, Nems-Clarke A-16,625
L-305	Same as L-301, not separately replaceable, part of T-304
L-306	CHOKE, R.F. 2.5 μh, Nems-Clarke A-14,805
L-307	COIL WINDING: not separately replaceable, part of T-305
L-308	Same as L-304
L-309	Same as L-301, not separately replaceable, part of T-306
L-310	COIL WINDING: not separately replaceable, part of T-307
L-311	COIL WINDING: not separately replaceable, part of T-307

SUB-SECTION 5F

IF Section, Models 1509-A and 1511-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
L-312	CHOKE, R.F. 28 μh, Nems-Clarke A-14,804
L-313	COIL WINDING: not separately replaceable, part of T-308
L-314A	COIL WINDING: not separately replaceable, part of T-308
L-314B	COIL WINDING: not separately replaceable, part of T-308
L-315	Same as L-312
P-301	NOT USED
P-302	CONNECTOR, PLUG: UG-88/U
R-301	RESISTOR, COMPOSITION: 51 ohm, ±5%, 1/2W, Allen Bradley EB-5105
R-302	Same as R-157
R-303	Same as R-154
R-304	NOT USED
R-305	RESISTOR, COMPOSITION: 82 ohm, ±5%, 1/2W, Allen Bradley EB-8205
R-306	Same as R-305
R-307	Same as R-142
R-308	RESISTOR, COMPOSITION: 100 ohm, ±10%, 1/2W, Allen Bradley EB-1011
R-209	Same as R-157, not separately replaceable, part of T-303
R-310	Same as R-154
R-311	NOT USED
R-312	Same as R-305
R-313	Same as R-305
R-314	RESISTOR, COMPOSITION: 150K, ±10%, 1/2W, Allen Bradley EB-1541
R-315	Same as R-157, not separately replaceable, part of T-305
R-316	NOT USED
R-317	RESISTOR, COMPOSITION: 820K, ±10%, 1/2W, Allen Bradley EB-8241
R-318	Same as R-149
R-319	Same as R-156
R-320	Same as R-301.
R-321	Same as R-168
R-322	Same as R-138
R-323	Same as R-190, not separately replaceable, part of T-307
R-324	Same as R-157
R-325	Same as R-157
R-326	Same as R-323, not separately replaceable, part of T-307
R-327	Same as R-323

SUB-SECTION 5F

IF Section, Models 1509-A and 1511-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
R-328	Same as R-323
R-329	Same as R-138
R-330	RESISTOR, COMPOSITION: 100K, ±5%, 1/2W, Allen Bradley EB-1045
R-331	Same as R-304
R-332	RESISTOR, COMPOSITION: 4.7 ohm, ±5%, 1W, Allen Bradley GB-4R75
R-333	Same as R-330
T-301	TRANSFORMER, I. F. Nems-Clarke AB-14, 796
T-302	TRANSFORMER, I. F. Nems-Clarke AB-14, 794
T-303	TRANSFORMER, I. F. Nems-Clarke AB-14, 797
T-304	TRANSFORMER, I. F. Nems-Clarke AB-14, 795
T-305	Same as T-303
T-306	TRANSFORMER, I. F. Nems-Clarke AB-14, 793
T-307	TRANSFORMER, I. F. Nems-Clarke AB-14, 799
T-308	TRANSFORMER, I. F. Nems-Clarke AB-14, 976
V-301	TUBE, ELECTRON: 6DC6
V-302	Same as V-301
V-303	Same as V-111
V-304	Same as V-203
V-305	TUBE, ELECTRON: 6AL5
XV-301	Same as XV-111
XV-302	Same as XV-111
XV-303	Same as XV-111
XV-304	Same as XV-111
XV-305	Same as XV-111

SUB-SECTION 5G

MAINTENANCE PARTS LIST

FOR

IF Section, Models 1510-A and 1512-A

SUB-SECTION 5G

IF Section, Models 1510-A and 1512-A

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-301	CAPACITOR: not separately replaceable, part of T-301
C-302	CAPACITOR, MICA: 220 μμf, ±5%, 500 WVDC, Arco CM15E221J
C-303	CAPACITOR, CERAMIC: 4700 μμf, MRC, 500 WVDC, Sprague 20C8
C-304	CAPACITOR, CERAMIC: 2.7 μμf ±1%, 500 WVDC, Erie NPO-A
C-305	Same as C-304
C-306	CAPACITOR: not separately replaceable, part of T-302
C-307	CAPACITOR: not separately replaceable, part of T-302
C-308	Same as C-303
C-309	CAPACITOR, CERAMIC: 1000 μμf, MRC, 500 WVDC, Sprague 507C2
C-310	Same as C-303
C-311	CAPACITOR, CERAMIC: 500 μμf, ±10%, 500 WVDC, Erie GP2-331
C-312	CAPACITOR, CERAMIC FEEDTHRU: 1000 μμf, GMV, 500 WVDC, Sprague 514C1
C-313	Same as C-311
C-314	CAPACITOR, CERAMIC: 390 μμf, ±10%, 500 WVDC, Erie GP2-331
C-315	CAPACITOR: not separately replaceable, part of T-303
C-316	Same as C-304
C-317	CAPACITOR, CERAMIC: 2.2 μμf, ±1%, 500 WVDC, Erie NPO-A
C-318	CAPACITOR: not separately replaceable, part of T-304
C-319	CAPACITOR: not separately replaceable, part of T-304
C-320	Same as C-312
C-321	Same as C-309
C-322	Same as C-303
C-323	Same as C-312
C-324	Same as C-303
C-325	Same as C-303
C-326	Same as C-311
C-327	Same as C-312
C-328	Same as C-311
C-329	Same as C-314
C-330	CAPACITOR: not separately replaceable, part of T-305
C-331	Same as C-304
C-332	Same as C-317
C-333	CAPACITOR: not separately replaceable, part of T-306
C-334	CAPACITOR, CERAMIC: 22 μμf, ±10%, 500 WVDC, Erie CC20CH220K

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
C-335	Same as C-312
C-336	Same as C-312 , part of TP-303
C-337	Same as C-312
C-338	Same as C-311
C-339	Same as C-311
C-340	Same as C-311
C-341	Same as C-309
C-342	CAPACITOR, MICA: 33 μμf, ±5%, 500 WVDC, Arco CM15E330J
C-343	CAPACITOR, CERAMIC: 1.0 μμf ±0.1 μμf, 500 WVDC, Erie NPO-A
C-344	Same as C-303
C-345	CAPACITOR, CERAMIC: 1000 μμf, ±20%, 600 WVDC, Centralab D6-102
C-346	Same as C-345
C-347	Same as C-309
C-348	CAPACITOR, not separately replaceable, part of T-308
C-349	CAPACITOR, not separately replaceable, part of T-308
C-350	CAPACITOR, CERAMIC: 39 μμf, ±5%, 500 WVDC, Erie CC20TH390J
C-351	CAPACITOR, CERAMIC: 0.01 μf, GMV, 500 WVDC, Sprague 29C9B8
C-352	Same as C-312
C-353	CAPACITOR, CERAMIC: 27 μμf, ±10%, 500 WVDC, Erie CC20RH270K
J-301	CONNECTOR, RECEPTACLE: Type UG-291/U
J-302	CONNECTOR, RECEPTACLE: RF Type UG-1094/U
L-301	CONNECTOR, not separately replaceable, part of T-301
L-302	CONNECTOR, not separately replaceable, part of T-302
L-303	CONNECTOR, not separately replaceable, part of T-303
L-304	INDUCTOR, CHOKE: Per Nems-Clarke Dwg. #A-16,625
L-305	CONNECTOR, not separately replaceable, part of T-304
L-306	INDUCTOR, CHOKE: Per Nems-Clarke Dwg. #A-14,805
L-307	CONNECTOR, not separately replaceable, part of T-305
L-308	Same as L-304
L-309	CONNECTOR, not separately replaceable, part of T-306
L-310	CONNECTOR, not separately replaceable, part of T-307
L-311	CONNECTOR, not separately replaceable, part of T-307
L-312	INDUCTOR, CHOKE: per Nems-Clarke Dwg. #A-14,804
L-313	CONNECTOR, not separately replaceable, part of T-308

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
L-314 A&B	CONNECTOR, not separately replaceable, part of T-308
L-315	Same as L-312
R-301	RESISTOR, FIXED COMPOSITION: 51 ohms, ±5%, 1/2W, Allen Bradley EB-5105
R-302	RESISTOR, FIXED COMPOSITION: 1000 ohms, ±10%, 1/2W, Allen Bradley EB-1021
R-303	RESISTOR, FIXED COMPOSITION: 220 K ohms, ±10%, 1/2W, Allen Bradley EB-2241
R-304	RESISTOR, FIXED COMPOSITION: 8.2K ohms, ±5%, 1/2W, Allen Bradley EB-8225
R-305	RESISTOR, FIXED COMPOSITION: 82 ohms, ±5%, 1/2W, Allen Bradley EB-8205
R-306	Same as R-305
R-307	RESISTOR, FIXED COMPOSITION: 47 K ohms, ±10%, 1/2W, Allen Bradley EB-4731
R-308	RESISTOR, FIXED COMPOSITION: 100 ohms, ±10%, 1/2W, Allen Bradley EB-1011
R-309	RESISTOR, not separately replaceable, part of T-303
R-310	Same as R-303
R-311	RESISTOR, FIXED COMPOSITION: 10 K ohms, ±5%, 1/2W, Allen Bradley EB-1035
R-312	Same as R-305
R-313	Same as R-305
R-314	RESISTOR, FIXED COMPOSITION: 150 K ohms, ±10%, 1/2W, Allen Bradley EB-1541
R-315	RESISTOR, not separately replaceable, part of T-305
R-316	Same as R-304
R-317	RESISTOR, FIXED COMPOSITION: 820 K ohms , ±10%, 1/2W, Allen Bradley EB-8241
R-318	RESISTOR, FIXED COMPOSITION: 100 K ohms, ±10%, 1/2W, Allen Bradley EB-1041
R-319	RESISTOR, FIXED COMPOSITION: 10 K ohms, ±10%, 1/2W, Allen Bradley EB-1031
R-320	Same as R-301
R-321	RESISTOR, FIXED COMPOSITION: 22 K ohms, ±10%, 1/2W, Allen Bradley EB-2231
R-322	Same as R-307
R-323	RESISTOR, not separately replaceable, part of T-307
R-324	Same as R-302
R-325	RESISTOR, COMPOSITION: 1000 Ω, ±10%, 1/2W, Allen Bradley EB-1021
R-326	RESISTOR, not separately replaceable, part of T-307
R-327	RESISTOR, FIXED COMPOSITION: 33K ohms, ±5%, 1/2W, Allen Bradley EB-3335
R-328	Same as R-327
R-329	Same as R-307
R-330	RESISTOR, FIXED COMPOSITION: 100 K ohms ±5%, 1/2W, Allen Bradley EB-1045
R-331	RESISTOR, FIXED COMPOSITION: 4.7 ohms, ±5%, 1.0W, GB 4R75

SYMBOL NUMBER	NAME OF PART AND DESCRIPTION
R-332	RESISTOR, COMPOSITION: 4.7 ohm, 1W, 5%, Allen Bradley GB-4R75
R-333	Same as R-330
T-301	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,796
T-302	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,794
T-303	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,797
T-304	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,795
T-305	Same as T-303
T-306	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,793
T-307	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,799
T-308	TRANSFORMER, I.F. Per Nems-Clarke Dwg. #AB-14,796
V-301	TUBE, ELECTRON: 7 pin miniature, Type 6DC6
V-302	Same as V-301
V-303	TUBE, ELECTRON: 7 pin miniature, Type 6CB6
V-304	TUBE, ELECTRON: 7 pin miniature, Type 6AK5
V-305	TUBE, ELECTRON: 7 pin miniature, Type 6AL5
XV-301	SOCKET, TUBE: 7 pin miniature, Elco #BR-151-BC
XV-302	Same as XV-301
XV-303	Same as XV-301
XV-304	Same as XV-301
XV-305	Same as XV-301

NOTE:

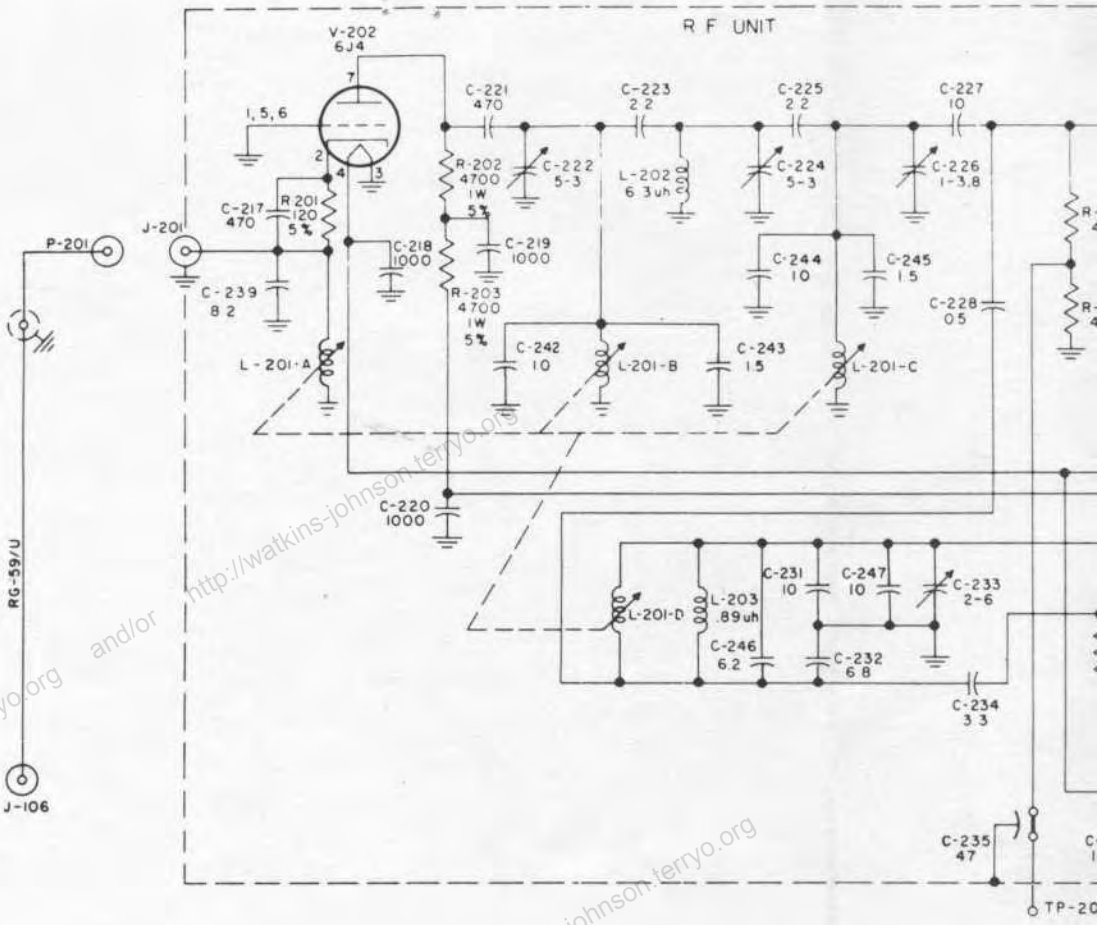
We regret that Schematic Diagrams for the Models 1511-A and 1512-A Receivers (Shown in the table of contents as figures 5-6 and 5-7) were not available at the time of printing. However, schematic reference may be made as follows:

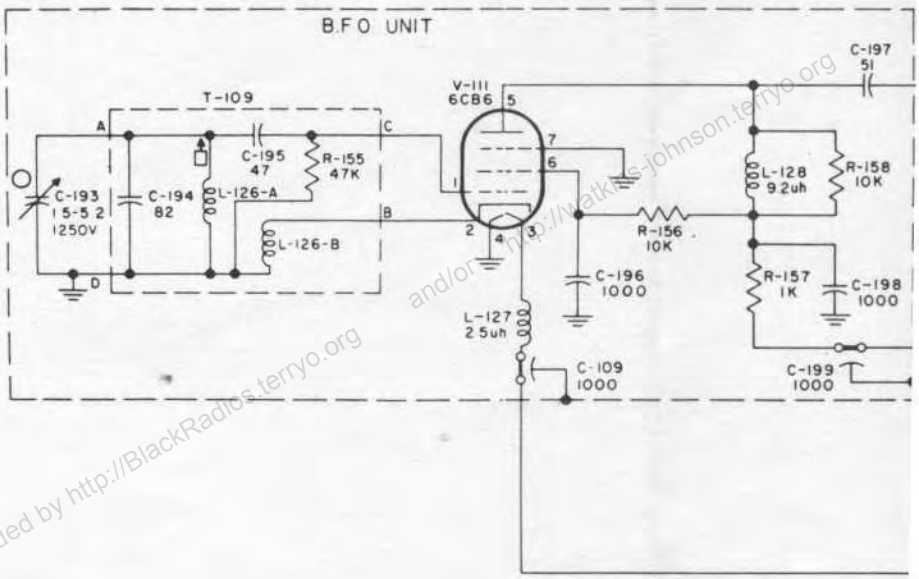
1511-A Receiver:

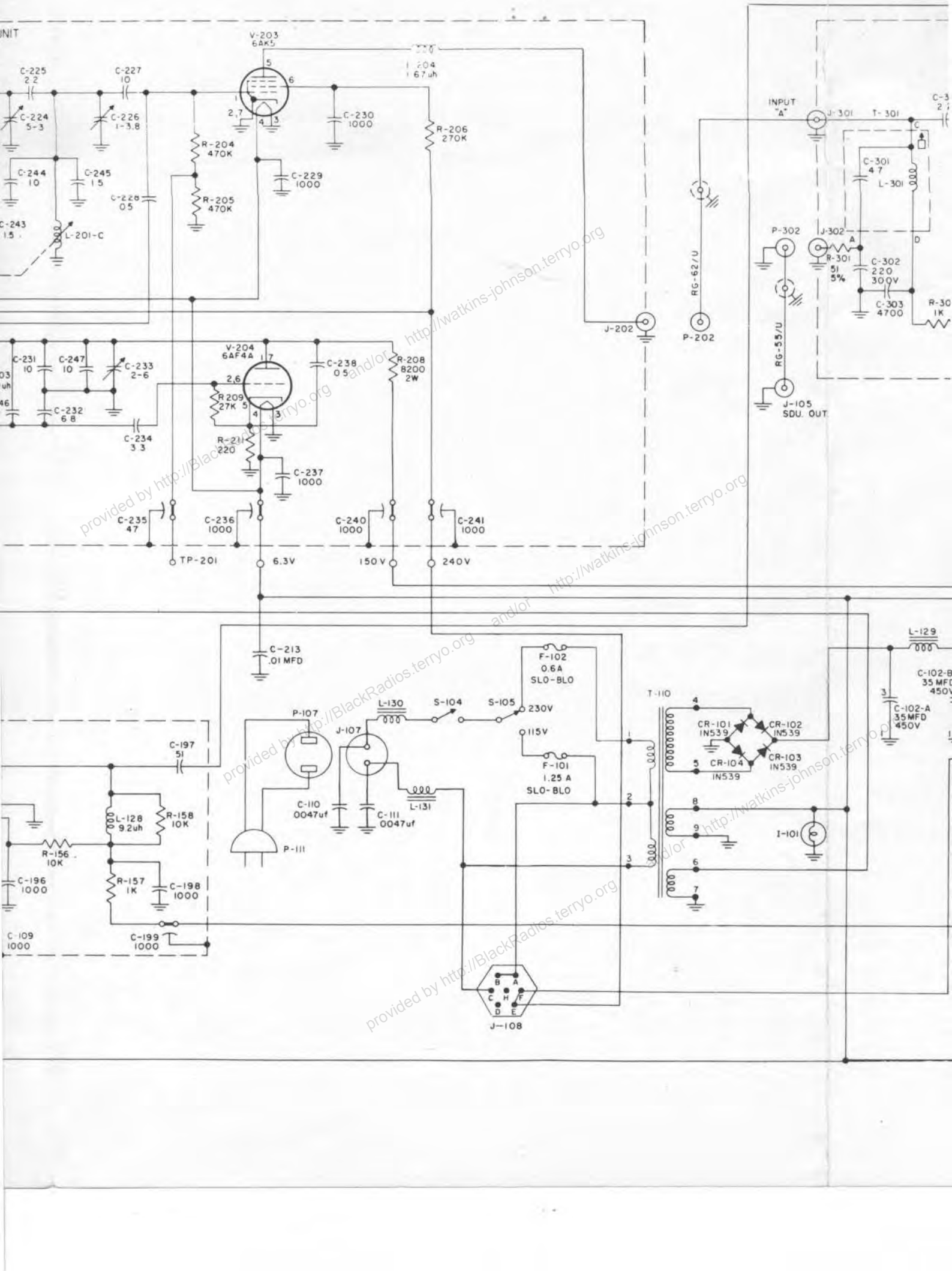
1. Main chassis is common to all 1500 series receivers. Refer to any Schematic herein.
2. R. F. Section is same as 1502-A or 1510-A. Refer to figures 5-2 or 5-5
3. I. F. Section is same as 1509-A. Refer to figure 5-4.

1512-A Receiver:

1. Main chassis is common to all 1500 series receivers. Refer to any Schematic herein.
2. R. F. Section is same as 1501-A or 1509-A. Refer to figures 5-1 or 5-4.
3. I. F. Section is same as 1510-A. Refer to figure 5-5.






V-203 6AK5
C-225 2.2
C-227 10
C-224 5-3
C-226 1-3.8
C-244 10
C-245 1.5
C-243 1.5
L-201-C
C-228 .05
R-204 470K
R-205 470K
C-229 1000
C-230 1000
L-204 1.67uh
R-206 270K
J-202
INPUT "A"
J-301
T-301
C-301 47
L-301
P-302
J-302
R-301 51 5%
C-302 220 300V
C-303 4700
RG-62/U
P-202
RG-55/U
J-105 SDU. OUT
V-204 6AF4A
C-231 10
C-247 10
C-233 2-6
C-232 6.8
C-234 3.3
R-209 27K
R-211 220
C-238 .05
R-208 8200 2W
C-237 1000
C-235 47
C-236 1000
C-240 1000
C-241 1000
TP-201
6.3V
150V
240V
C-213 .01 MFD
F-102 0.6A SLO-BLO
S-104
S-105
230V
115V
F-101 1.25 A SLO-BLO
T-110
CR-101 IN539
CR-102 IN539
CR-103 IN539
CR-104 IN539
L-129
C-102-A 35 MFD 450V
C-102-B 35 MFD 450V
P-107
J-107
L-130
L-131
C-110 0047uf
C-111 0047uf
P-111
I-101
C-197 51
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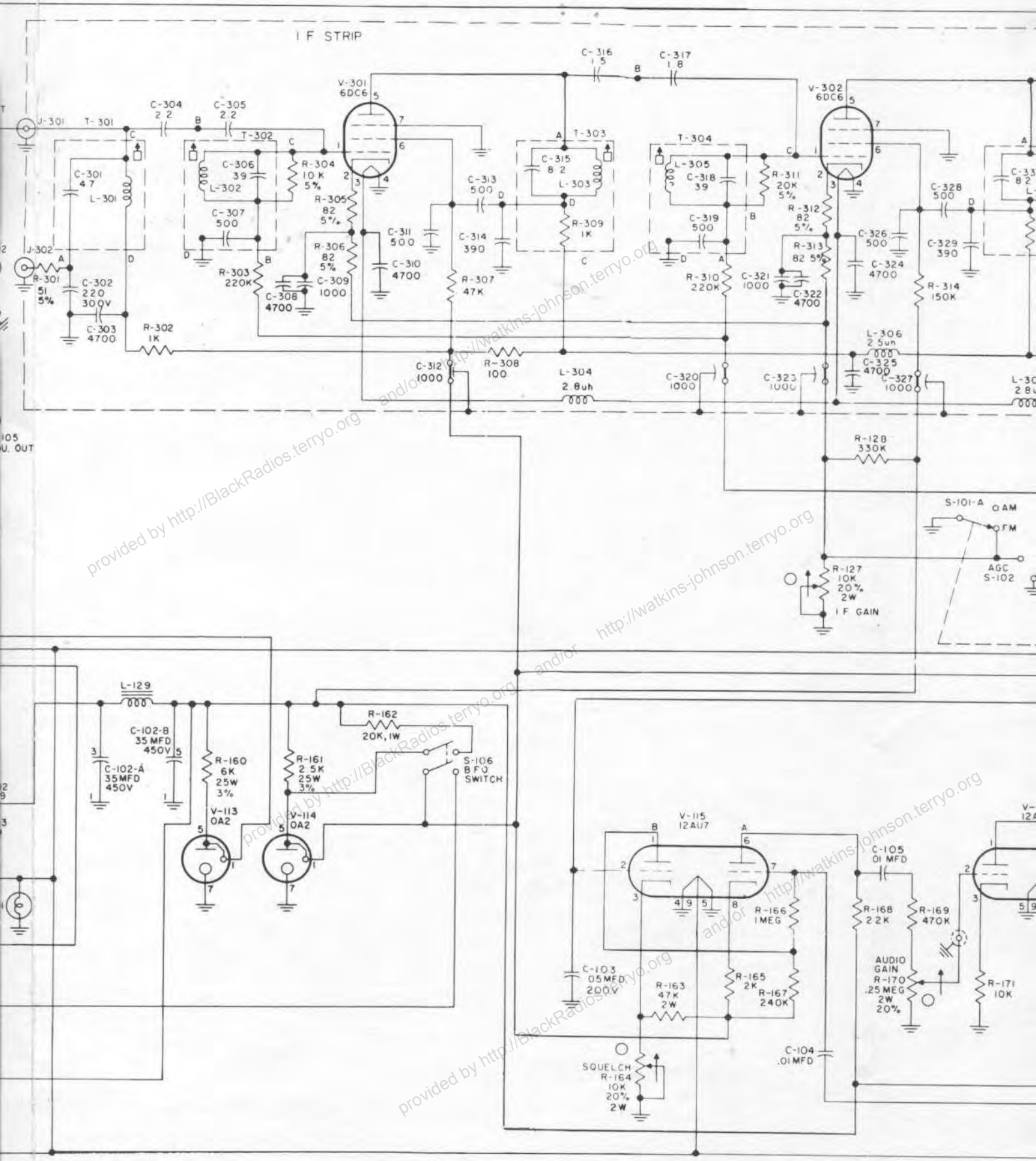
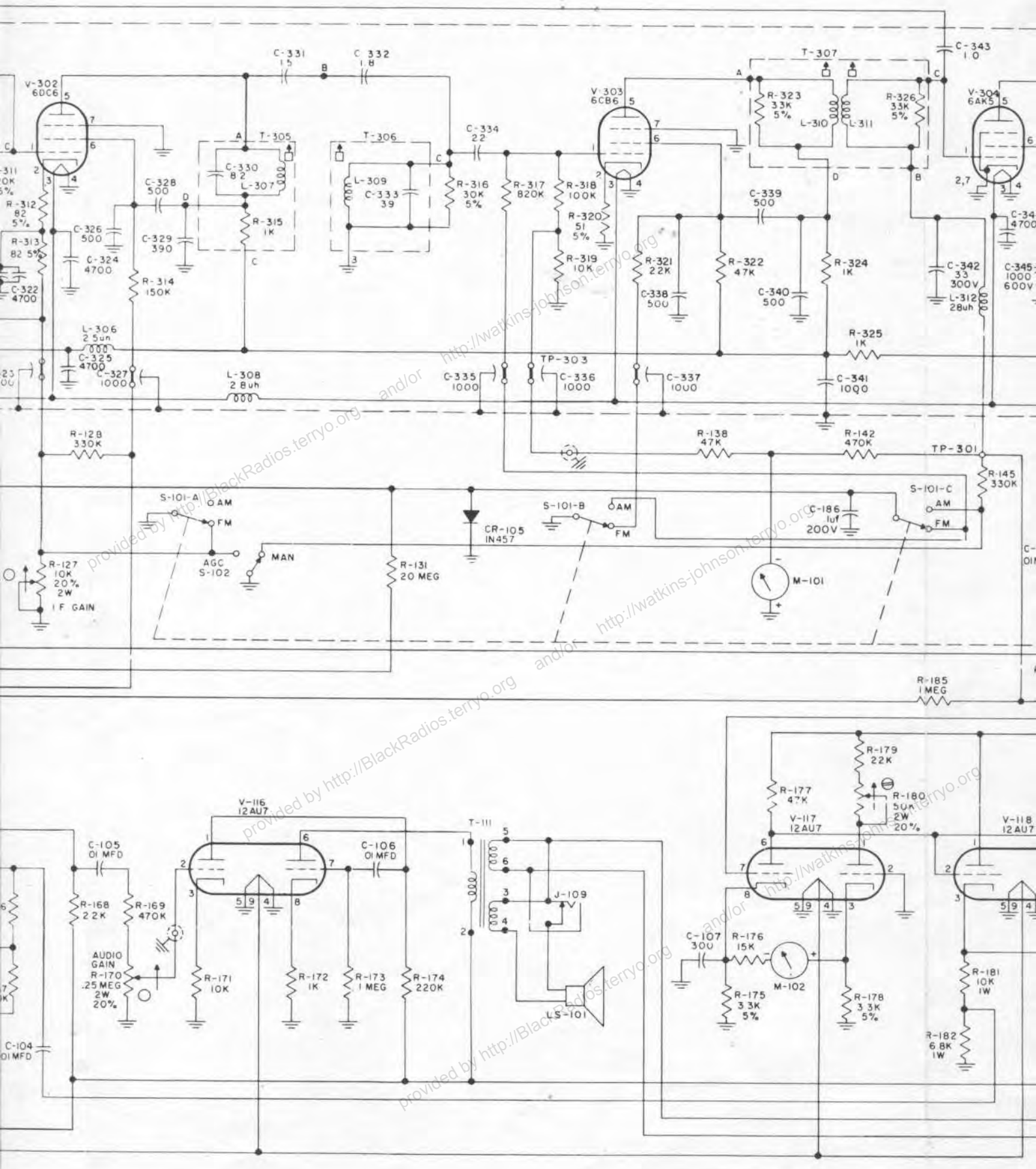
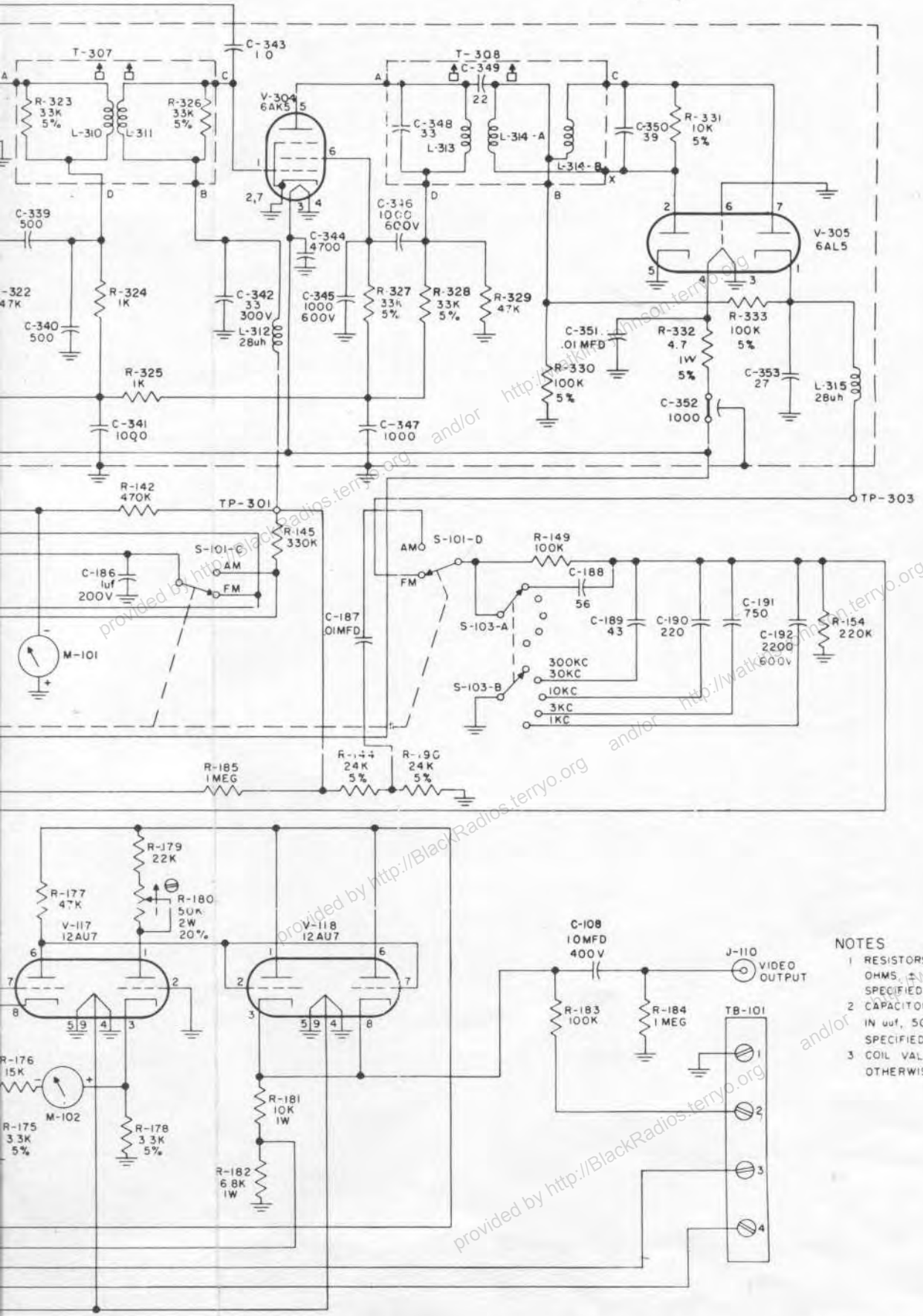
C-196 1000
C-198 1000
C-199 1000
C-109 1000
J-108







NOTES

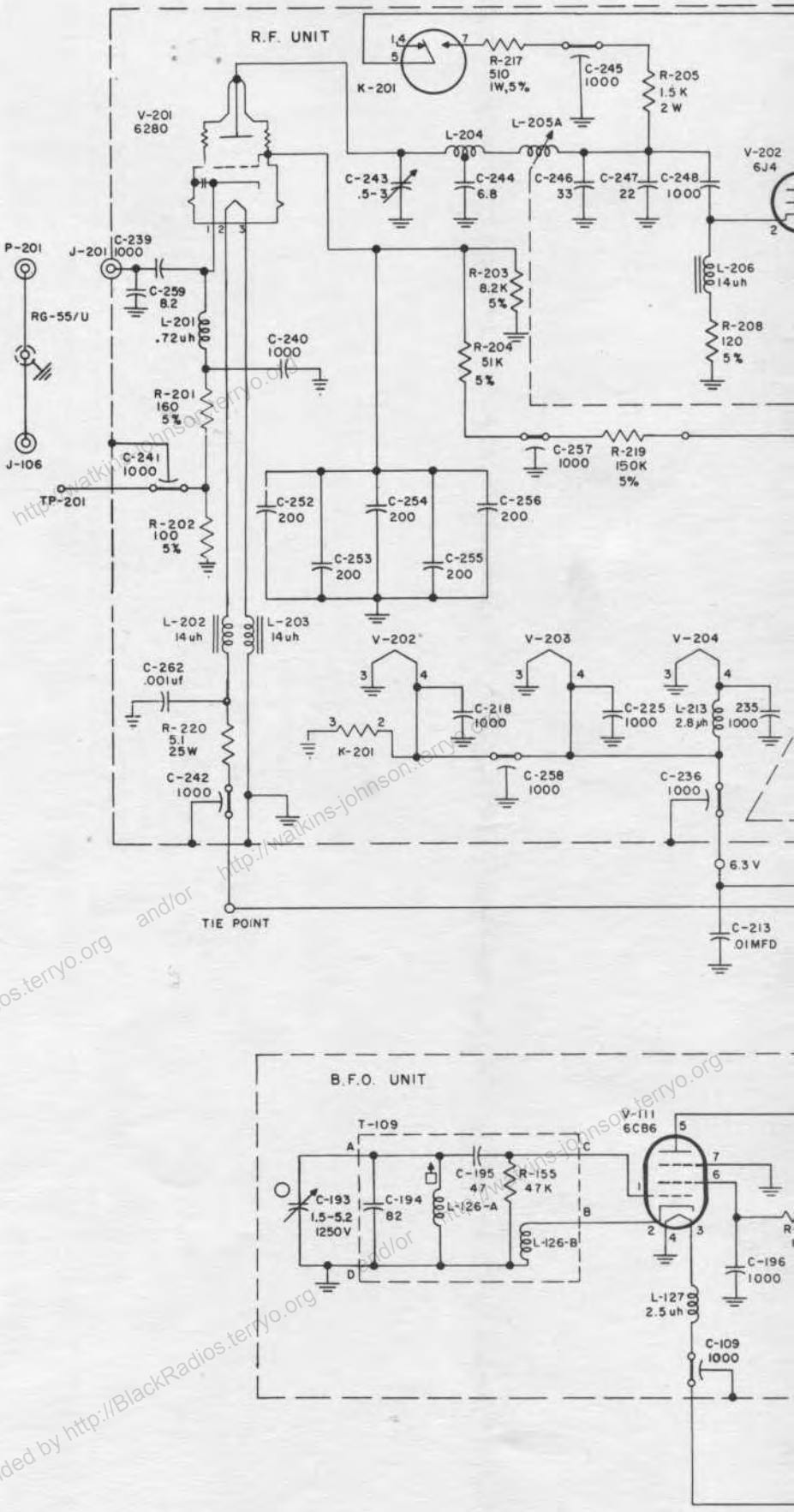
1 RESISTORS ARE FIXED, MEASURED IN OHMS, ±10% 1/2W UNLESS OTHERWISE SPECIFIED

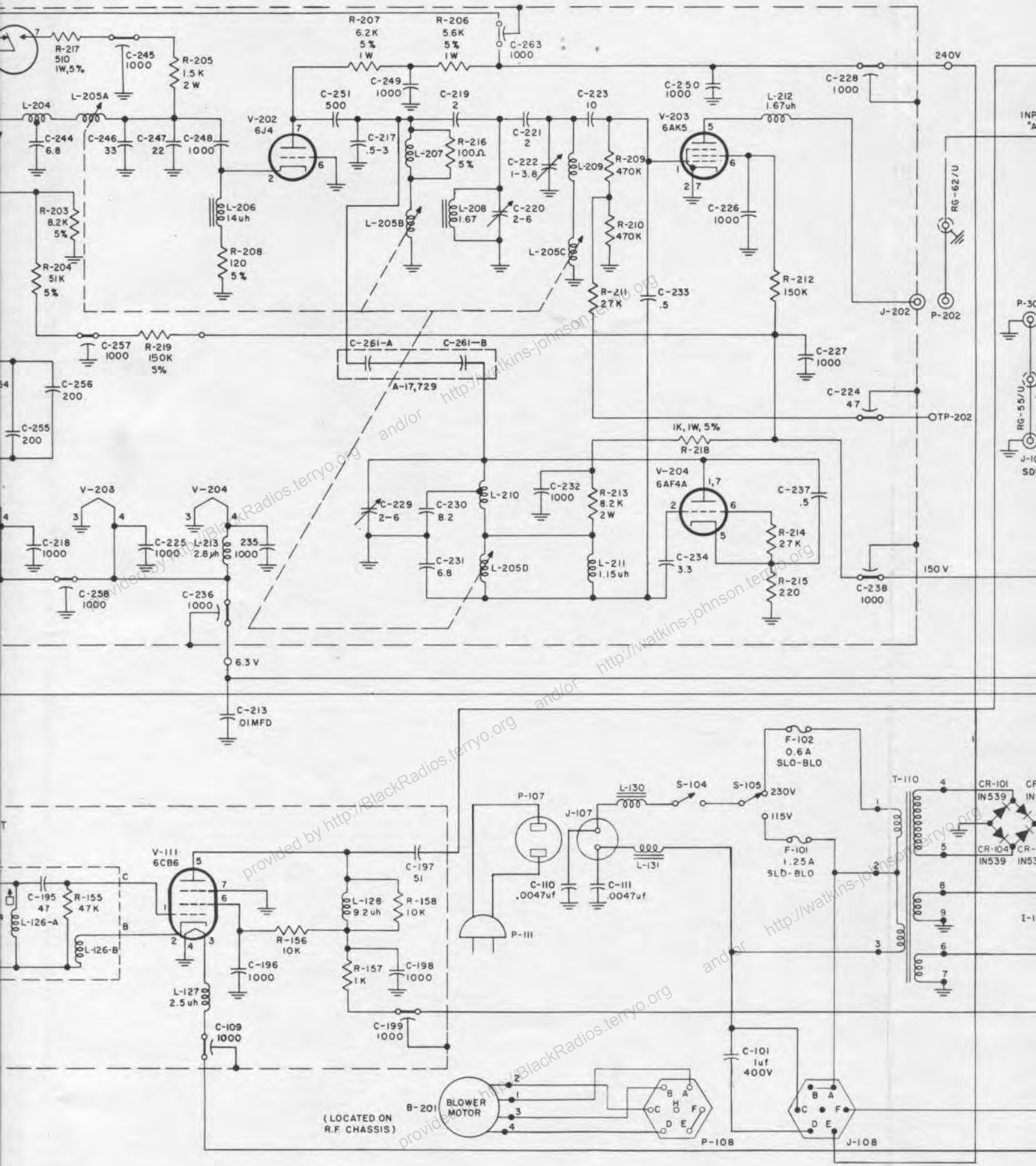
2 CAPACITORS ARE FIXED, B MEASURED IN uuf, 500V UNLESS OTHERWISE SPECIFIED

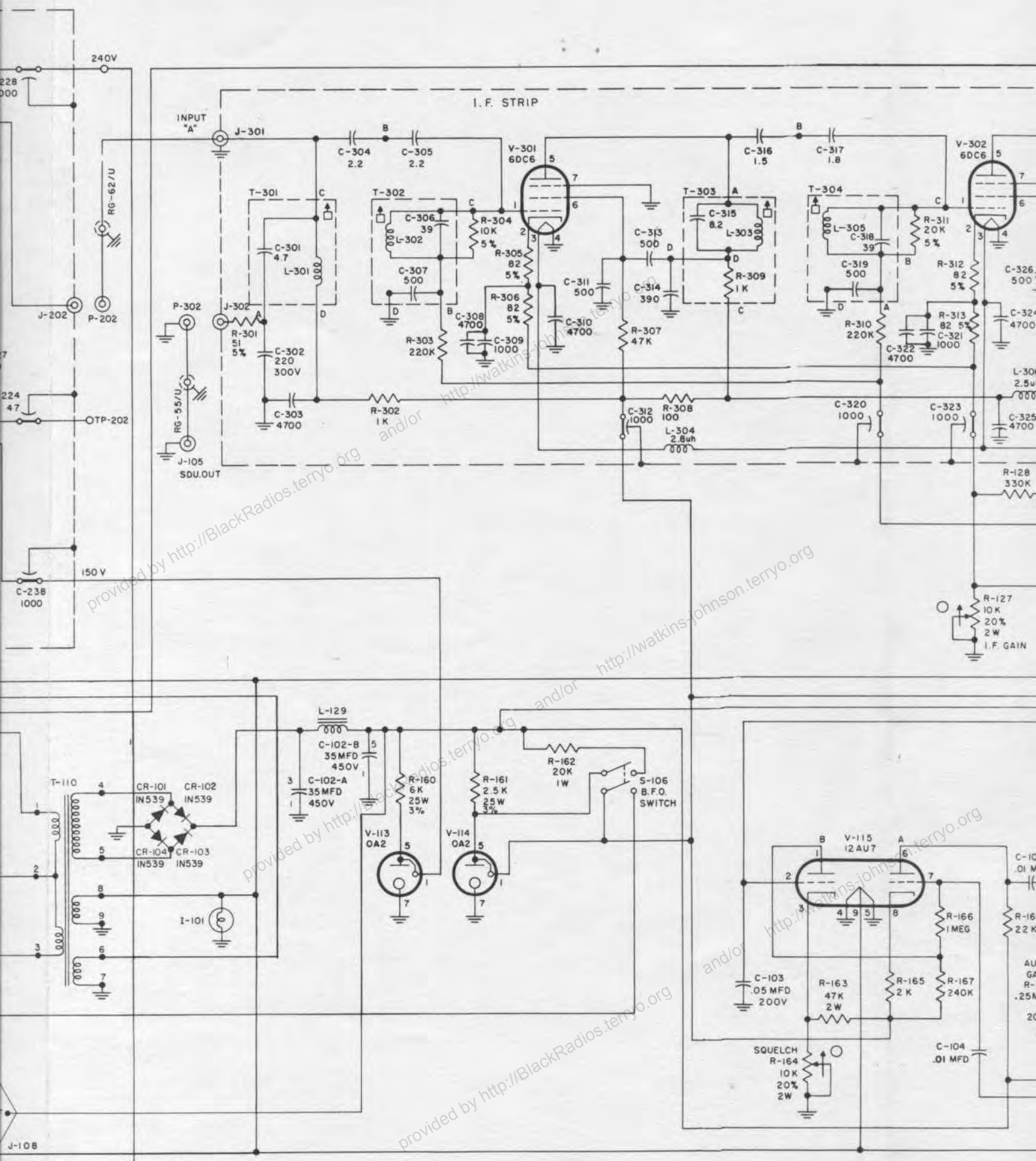
3 COIL VALUES ARE IN uh UNLESS OTHERWISE SPECIFIED

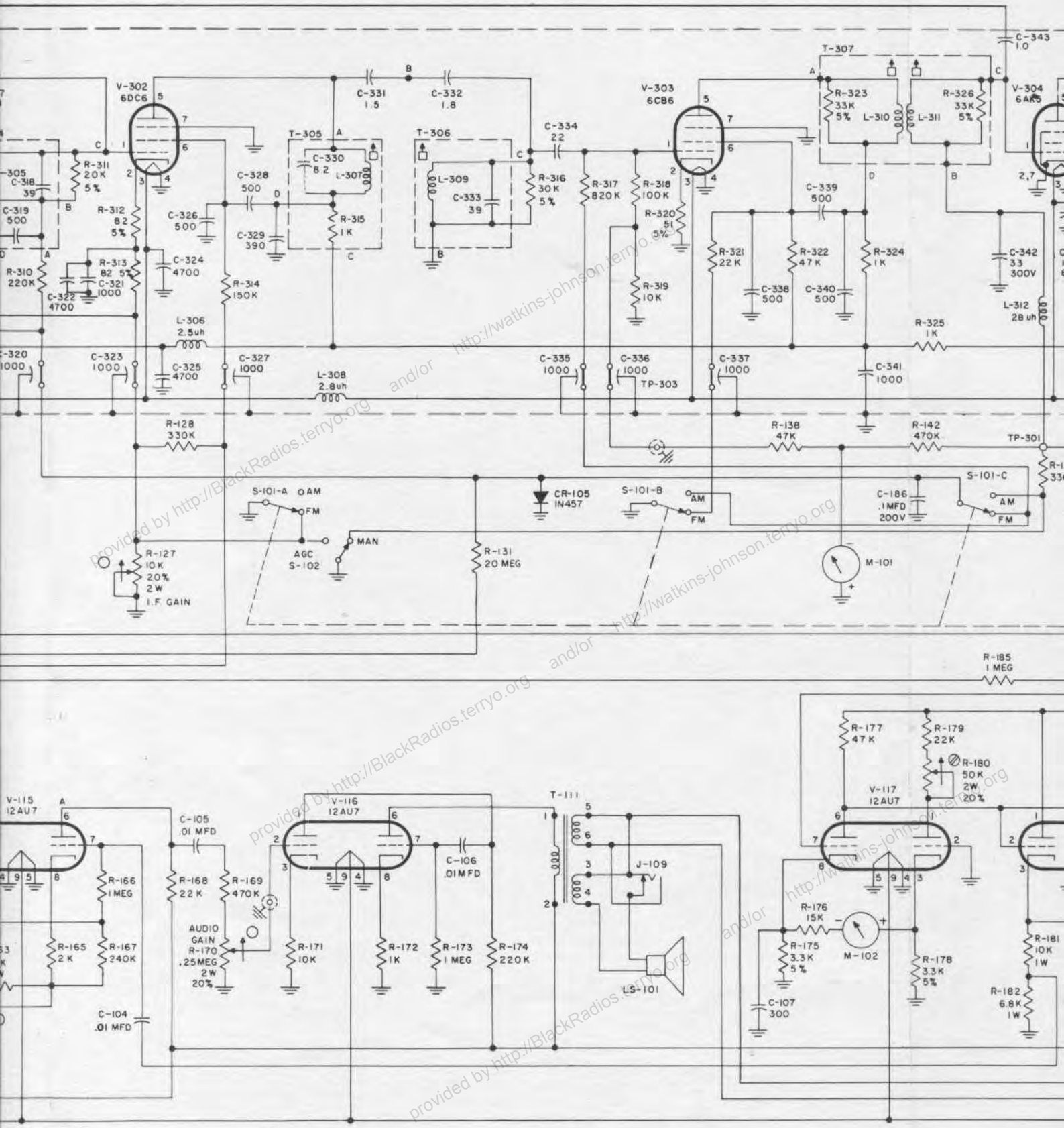
H-19, 703-E

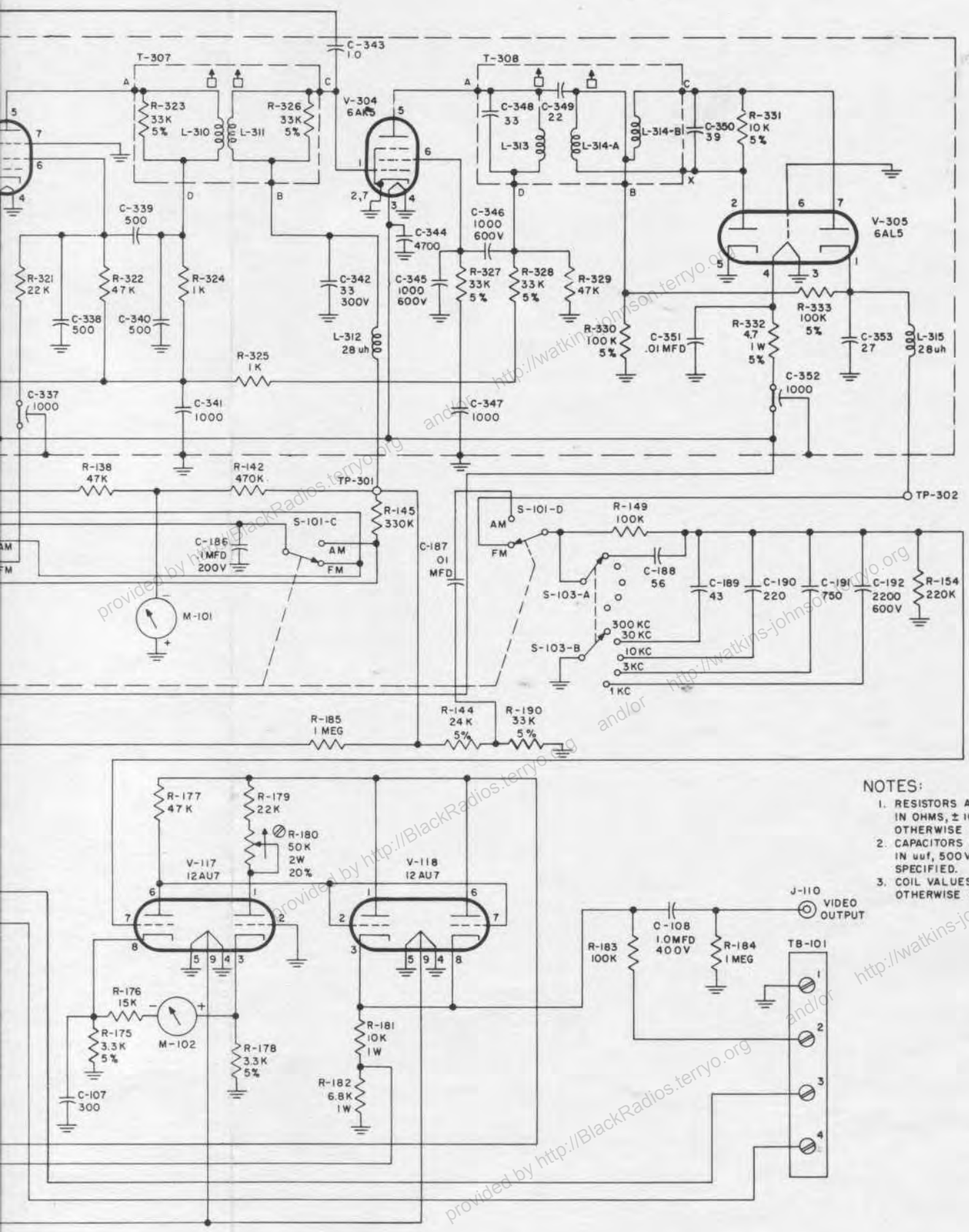
Figure 5-1. Schematic Diagram Model 1501-A Special Purpose Receiver




R-207 6.2K 5% 1W
R-206 5.6K 5% 1W
C-263 1000
240V
R-217 510 1W,5%
C-245 1000
R-205 1.5K 2W
L-205A
L-204
C-244 6.8
C-246 33
C-247 22
C-248 1000
C-249 1000
C-251 500
C-219 2
C-223 10
C-250 1000
C-228 1000
L-212 1.67uh
V-202 6J4
V-203 6AK5
C-217 .5-3
L-207
R-216 100Ω 5%
C-221 2
C-222 1-3.8
L-209
R-209 470K
L-206 14uh
R-208 120 5%
L-205B
L-208 1.67
C-220 2-6
L-205C
R-210 470K
C-226 1000
R-203 8.2K 5%
R-204 51K 5%
R-211 27K
C-233 .5
R-212 150K
RG-62/U
J-202
P-202
C-257 1000
R-219 150K 5%
C-261-A
C-261-B
A-17,729
C-227 1000
C-256 200
C-255 200
C-224 47
TP-202
1K, 1W, 5%
R-218
V-203
V-204 6AF4A
C-229 2-6
C-230 8.2
L-210
C-232 1000
R-213 8.2K 2W
C-237 .5
C-218 1000
C-225 1000
L-213 2.8μh
235 1000
C-231 6.8
L-205D
L-211 1.15uh
C-234 3.3
R-214 27K
R-215 220
150 V
C-238 1000
C-258 1000
C-236 1000
6.3 V
C-213 .01MFD
F-102 0.6A SLO-BLO
P-107
L-130
S-104
S-105
230V
115V
J-107
T-110
CR-101 IN539
CR-104 IN539
F-101 1.25A SLO-BLO
L-131
C-110 .0047uf
C-111 .0047uf
P-111
V-111 6CB6
C-195 47
R-155 47K
L-126-A
L-126-B
C-197 51
L-128 9.2uh
R-158 10K
R-156 10K
C-196 1000
R-157 1K
C-198 1000
L-127 2.5uh
C-109 1000
C-199 1000
C-101 1uf 400V
B-201 BLOWER MOTOR
(LOCATED ON R.F. CHASSIS)
P-108
J-108





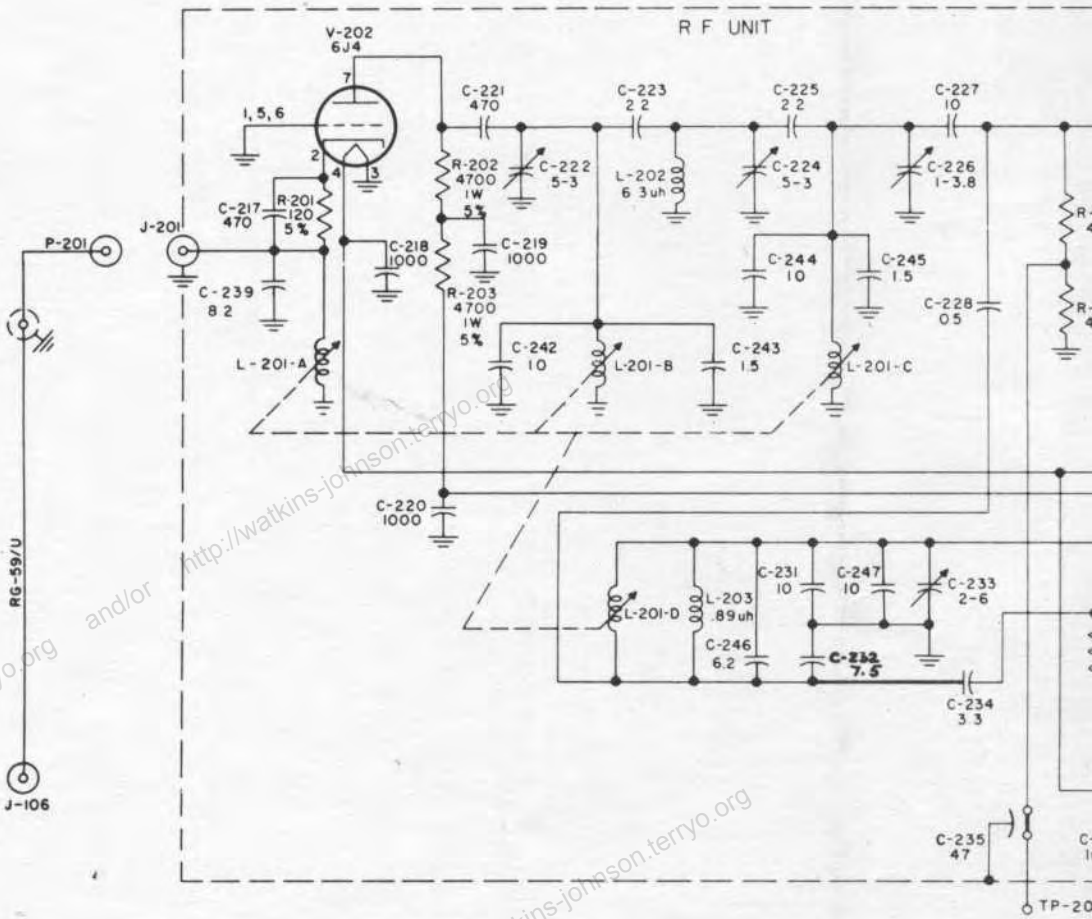


NOTES:

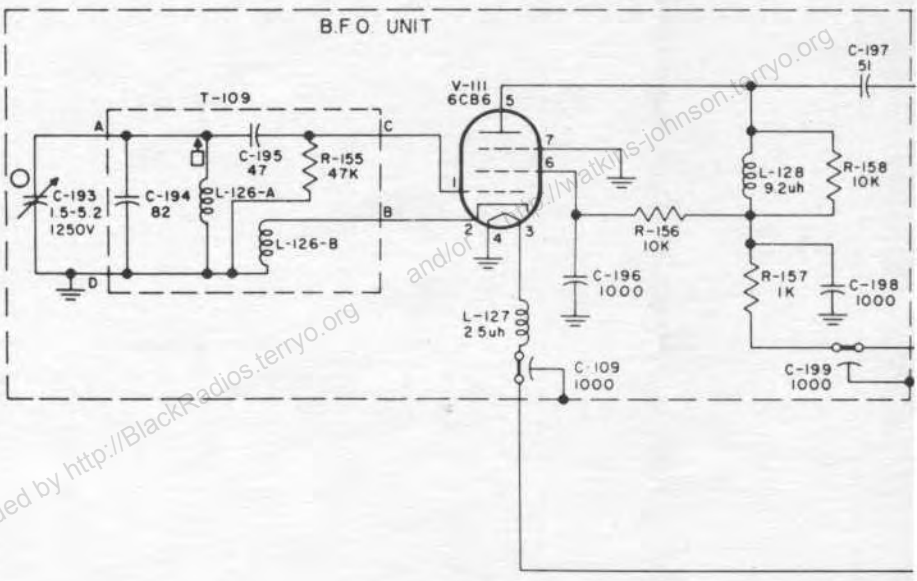
1. RESISTORS ARE FIXED, MEASURED IN OHMS, ± 10% 1/2 W UNLESS OTHERWISE SPECIFIED.
2. CAPACITORS ARE FIXED, & MEASURED IN uuf, 500 V UNLESS OTHERWISE SPECIFIED.
3. COIL VALUES ARE IN uh UNLESS OTHERWISE SPECIFIED.

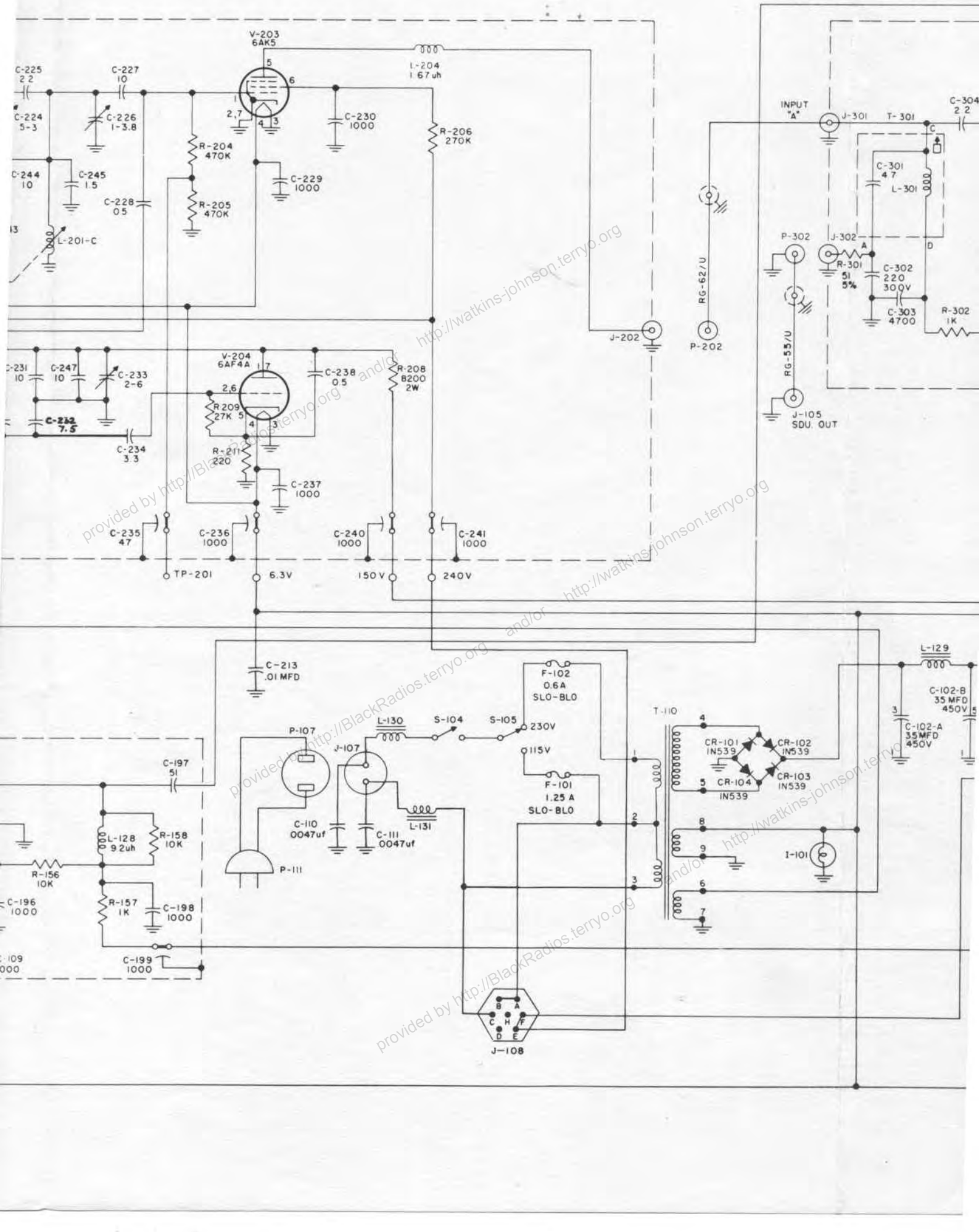
H-19, 704-E

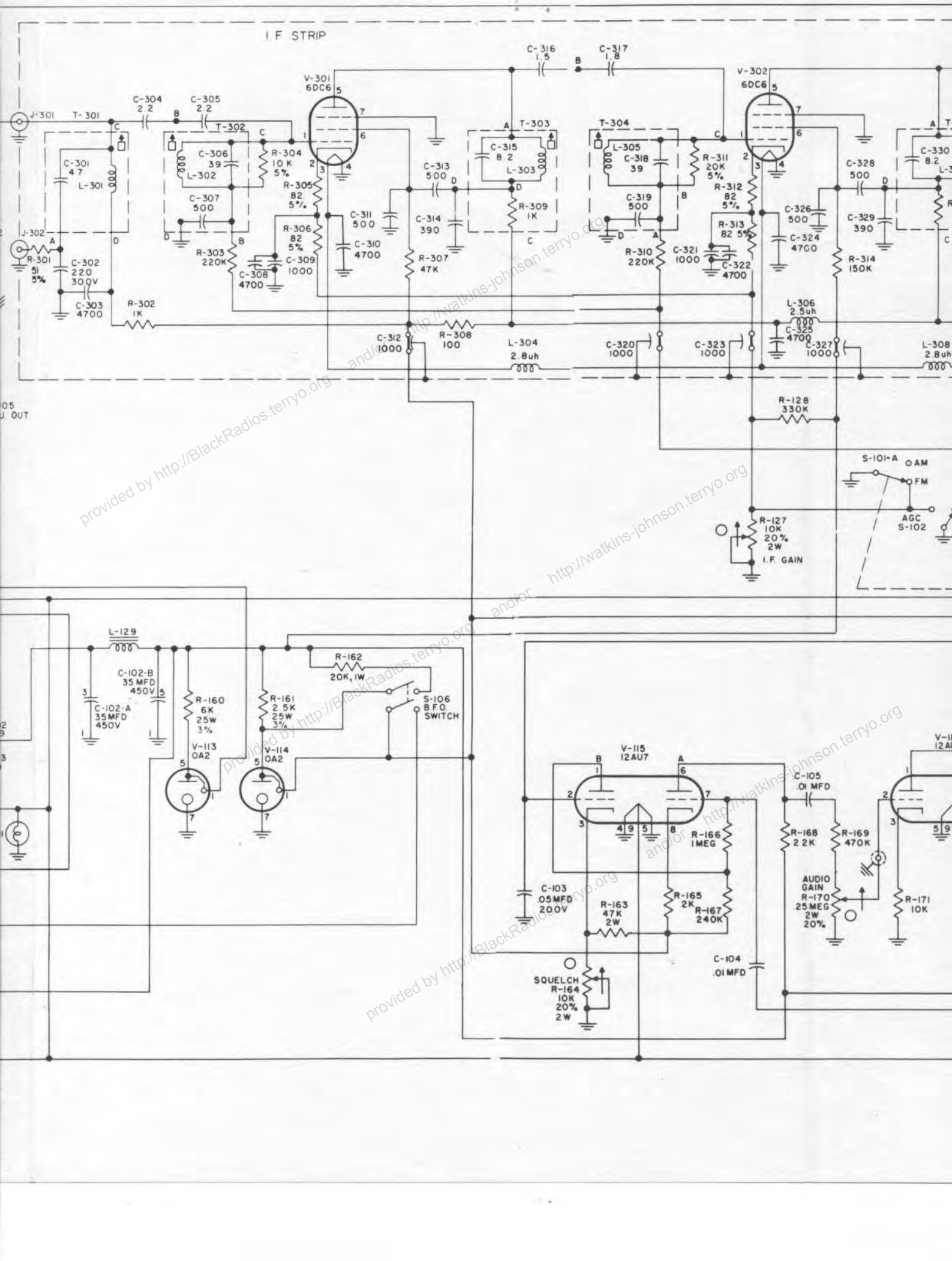
Figure 5-2. Schematic Diagram Model 1502-A Special Purpose Receiver

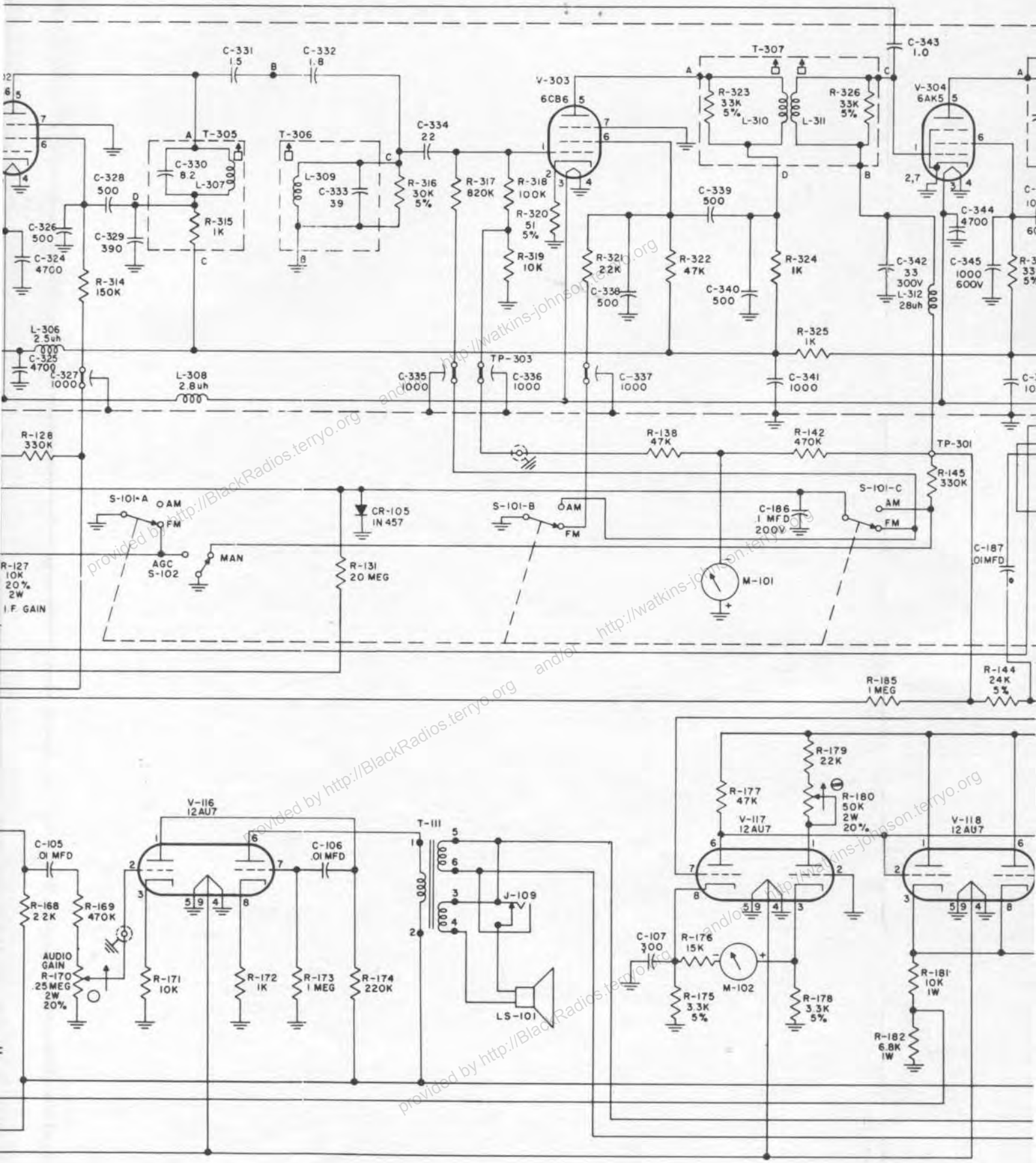


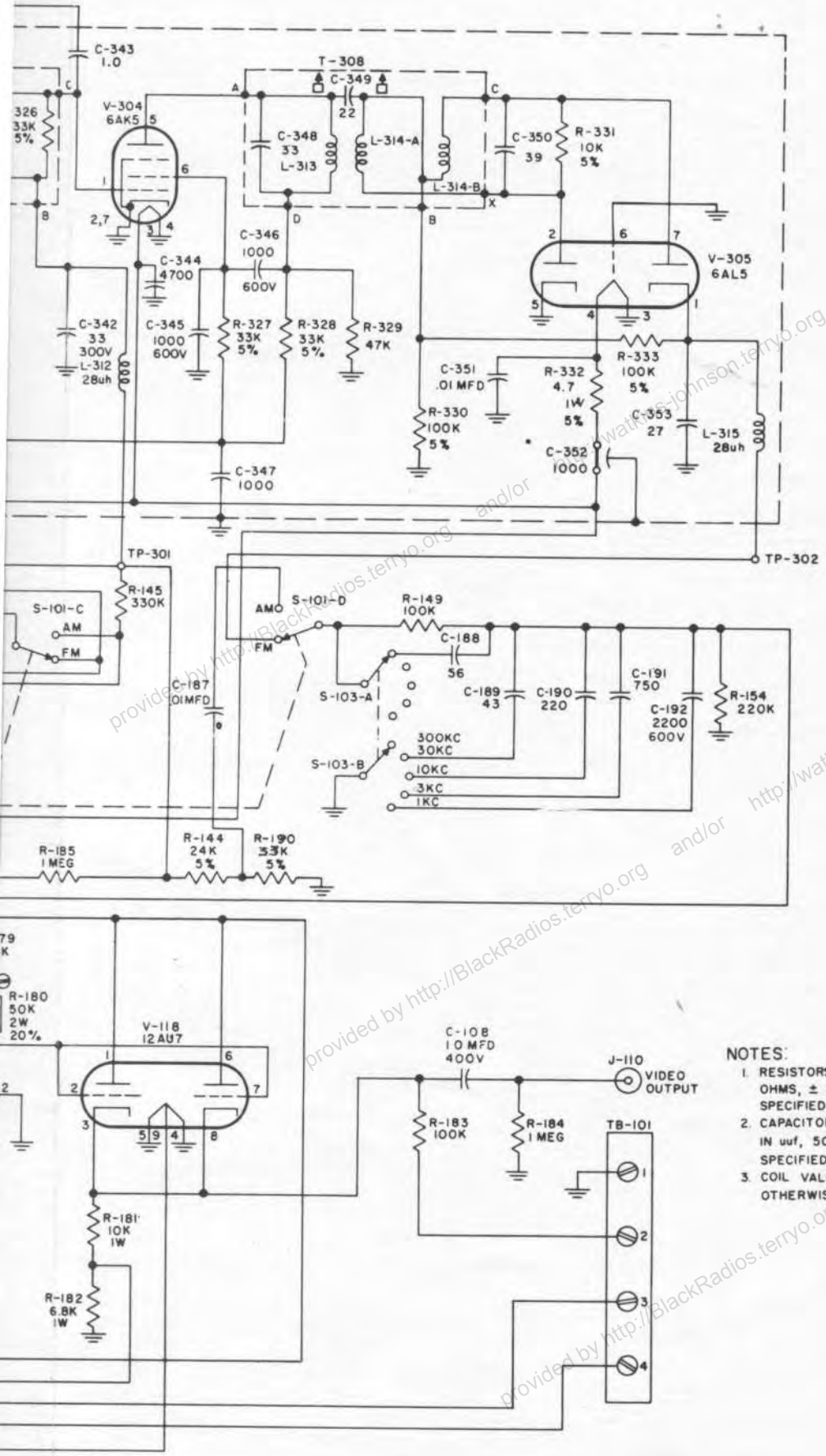
TIE POINT
CONNECTED TO R.F. UNIT
ON 1502 RCVR ONLY




V-203
6AK5
C-225
2.2
C-227
10
C-224
5-3
C-226
1-3.8
L-204
1.67 uh
C-230
1000
R-206
270K
R-204
470K
C-229
1000
C-244
10
C-245
1.5
C-228
.05
R-205
470K
L-201-C
J-202
INPUT
"A"
J-301
T-301
C-304
2.2
C-301
47
L-301
P-302
J-302
R-301
51
5%
C-302
220
300V
C-303
4700
R-302
1K
RG-62/U
P-202
RG-55/U
J-105
SDU. OUT
C-231
10
C-247
10
C-233
2-6
C-232
7.5
C-234
3.3
V-204
6AF4A
R-209
27K
R-211
220
C-238
.05
R-208
8200
2W
C-237
1000
C-235
47
C-236
1000
C-240
1000
C-241
1000
TP-201
6.3V
150V
240V
C-213
.01 MFD
F-102
0.6A
SLO-BLO
P-107
J-107
L-130
S-104
S-105
230V
115V
F-101
1.25 A
SLO-BLO
T-110
CR-101
IN539
CR-102
IN539
CR-103
IN539
CR-104
IN539
L-129
C-102-B
35 MFD
450V
C-102-A
35 MFD
450V
I-101
C-197
51
L-128
9.2uh
R-158
10K
R-156
10K
R-157
1K
C-198
1000
C-196
1000
C-199
1000
C-110
.0047uf
C-111
.0047uf
L-131
P-111
J-108


I F STRIP
J-301
T-301
J-302
C-301 47
L-301
C-302 220 300V
C-303 4700
R-301 51 5%
R-302 1K
C-304 2.2
C-305 2.2
T-302
C-306 39
L-302
C-307 500
R-303 220K
C-308 4700
R-304 10K 5%
R-305 82 5%
R-306 82 5%
C-309 1000
C-310 4700
C-311 500
V-301 6DC6
C-312 1000
R-308 100
C-313 500
C-314 390
R-307 47K
C-316 1.5
C-317 1.8
T-303
C-315 8.2
L-303
R-309 1K
L-304 2.8uh
T-304
L-305
C-318 39
C-319 500
R-310 220K
C-320 1000
C-321 1000
V-302 6DC6
R-311 20K 5%
R-312 82 5%
R-313 82 5%
C-322 4700
C-323 1000
C-324 4700
C-325 4700
C-326 500
C-327 1000
L-306 2.5uh
C-328 500
C-329 390
R-314 150K
L-308 2.8uh
R-128 330K
S-101-A
AM
FM
AGC
S-102
R-127 10K 20% 2W
I.F. GAIN
L-129
C-102-B 35 MFD 450V
C-102-A 35MFD 450V
R-160 6K 25W 3%
R-161 2.5K 25W 3%
V-113 0A2
V-114 0A2
R-162 20K, 1W
S-106 B.F.O. SWITCH
V-115 12AU7
C-103 .05MFD 200V
R-163 47K 2W
R-165 2K
R-166 1MEG
R-167 240K
SQUELCH R-164 10K 20% 2W
C-104 .01MFD
C-105 .01 MFD
R-168 2.2K
R-169 470K
AUDIO GAIN R-170 .25MEG 2W 20%
R-171 10K


C-331 1.5
C-332 1.8
T-305
T-306
C-330 8.2
L-307
L-309
C-333 39
C-334 22
V-303 6CB6
T-307
R-323 33K 5%
L-310
L-311
R-326 33K 5%
C-343 1.0
V-304 6AK5
C-328 500
C-326 500
C-329 390
C-324 4700
R-315 1K
R-316 30K 5%
R-317 820K
R-318 100K
R-320 51 5%
R-319 10K
C-339 500
R-321 22K
C-338 500
R-322 47K
C-340 500
R-324 1K
C-342 33 300V
L-312 28uh
C-344 4700
C-345 1000 600V
R-314 150K
L-306 2.5uh
C-325 4700
C-327 1000
L-308 2.8uh
TP-303
C-335 1000
C-336 1000
C-337 1000
R-325 1K
C-341 1000
R-128 330K
R-138 47K
R-142 470K
TP-301
R-145 330K
S-101-A
AM
FM
AGC
S-102
MAN
CR-105 IN457
S-101-B
S-101-C
C-186 1 MFD 200V
M-101
C-187 .01MFD
R-127 10K 20% 2W
I.F. GAIN
R-131 20 MEG
R-185 1 MEG
R-144 24K 5%
V-116 12AU7
C-105 .01 MFD
C-106 .01MFD
T-111
J-109
R-168 2.2K
R-169 470K
AUDIO GAIN
R-170 .25MEG 2W 20%
R-171 10K
R-172 1K
R-173 1 MEG
R-174 220K
LS-101
R-179 22K
R-177 47K
R-180 50K 2W 20%
V-117 12AU7
V-118 12AU7
C-107 300
R-176 15K
M-102
R-175 3.3K 5%
R-178 3.3K 5%
R-181 10K 1W
R-182 6.8K 1W

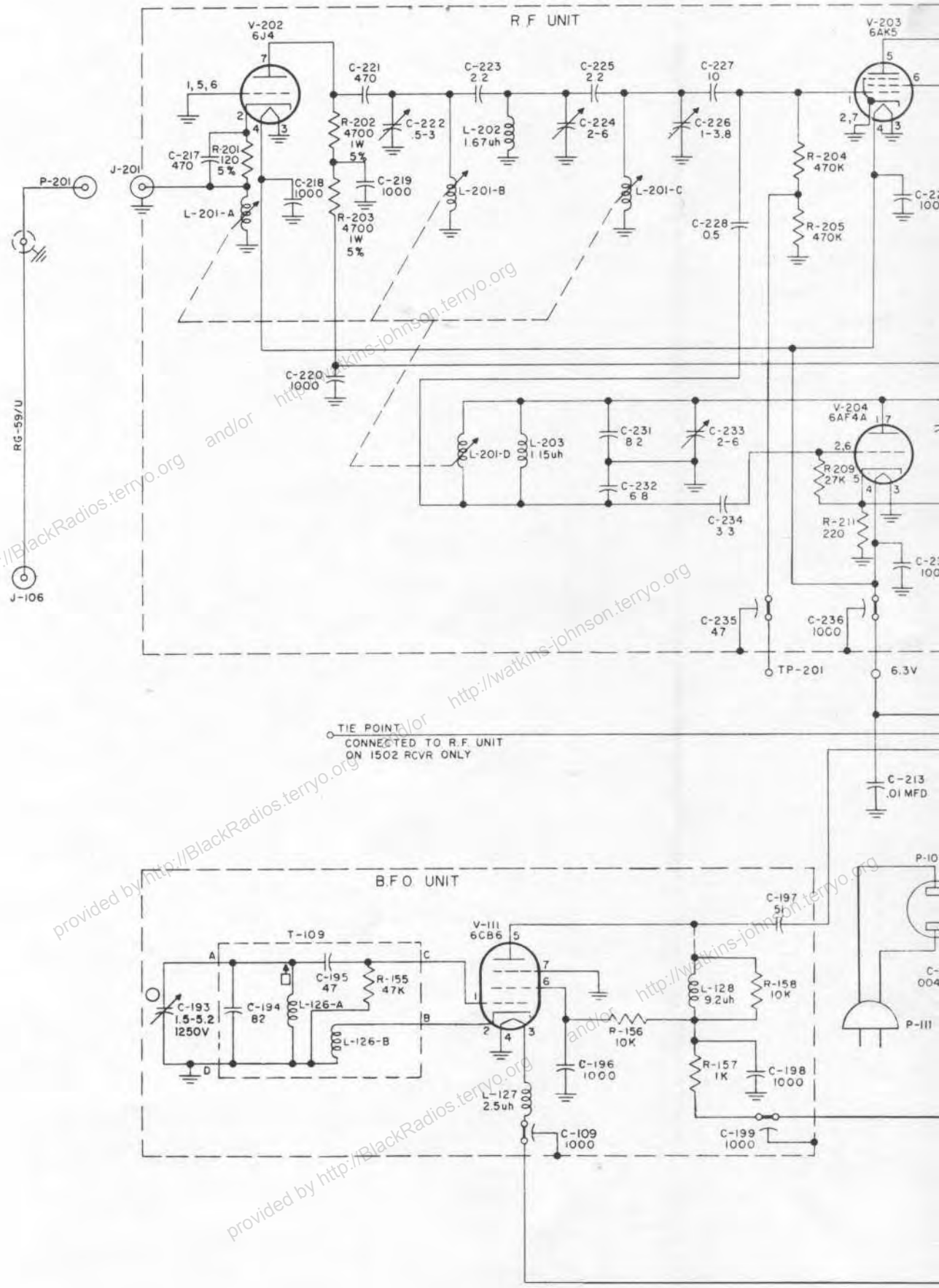


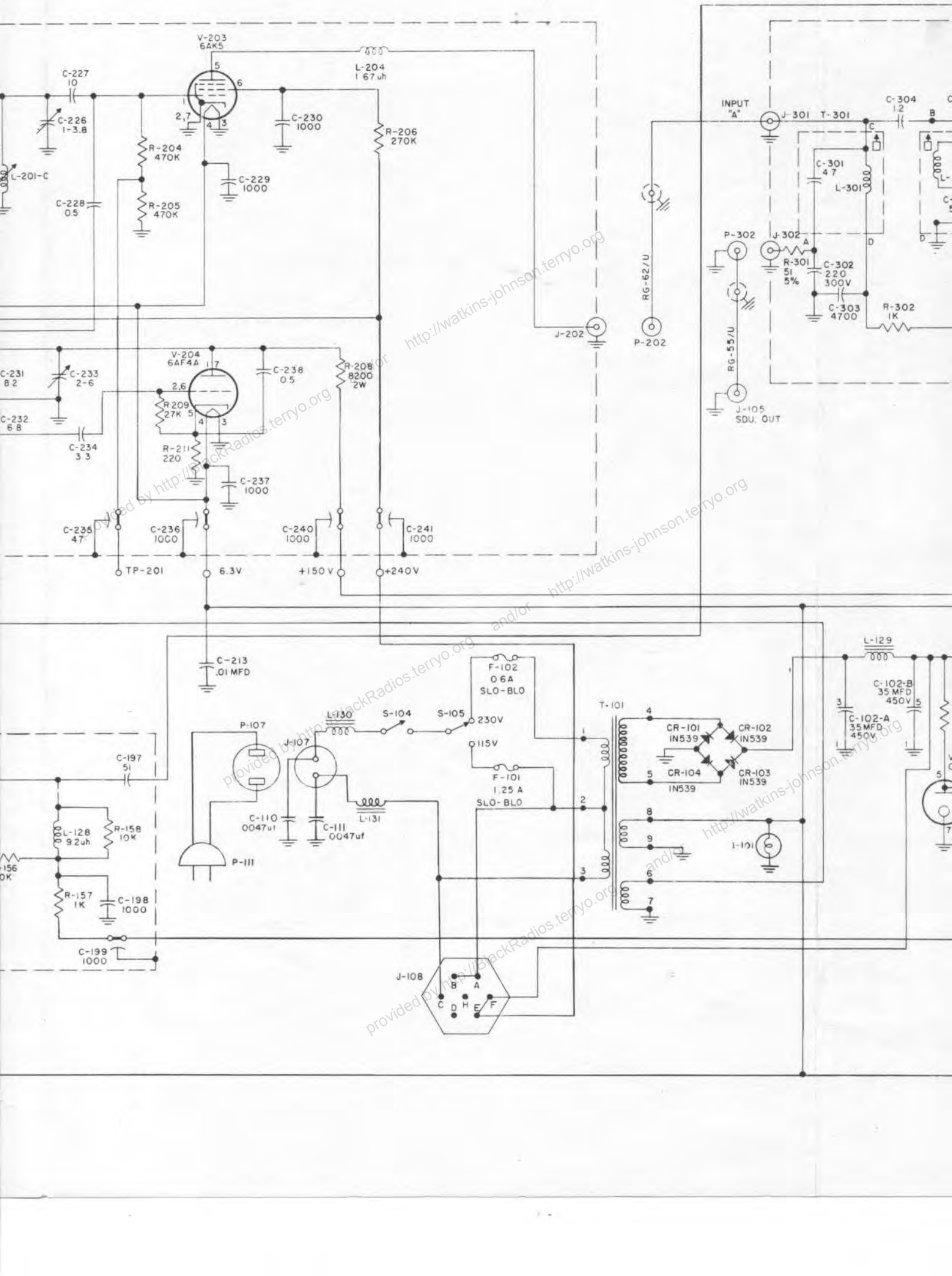
NOTES:

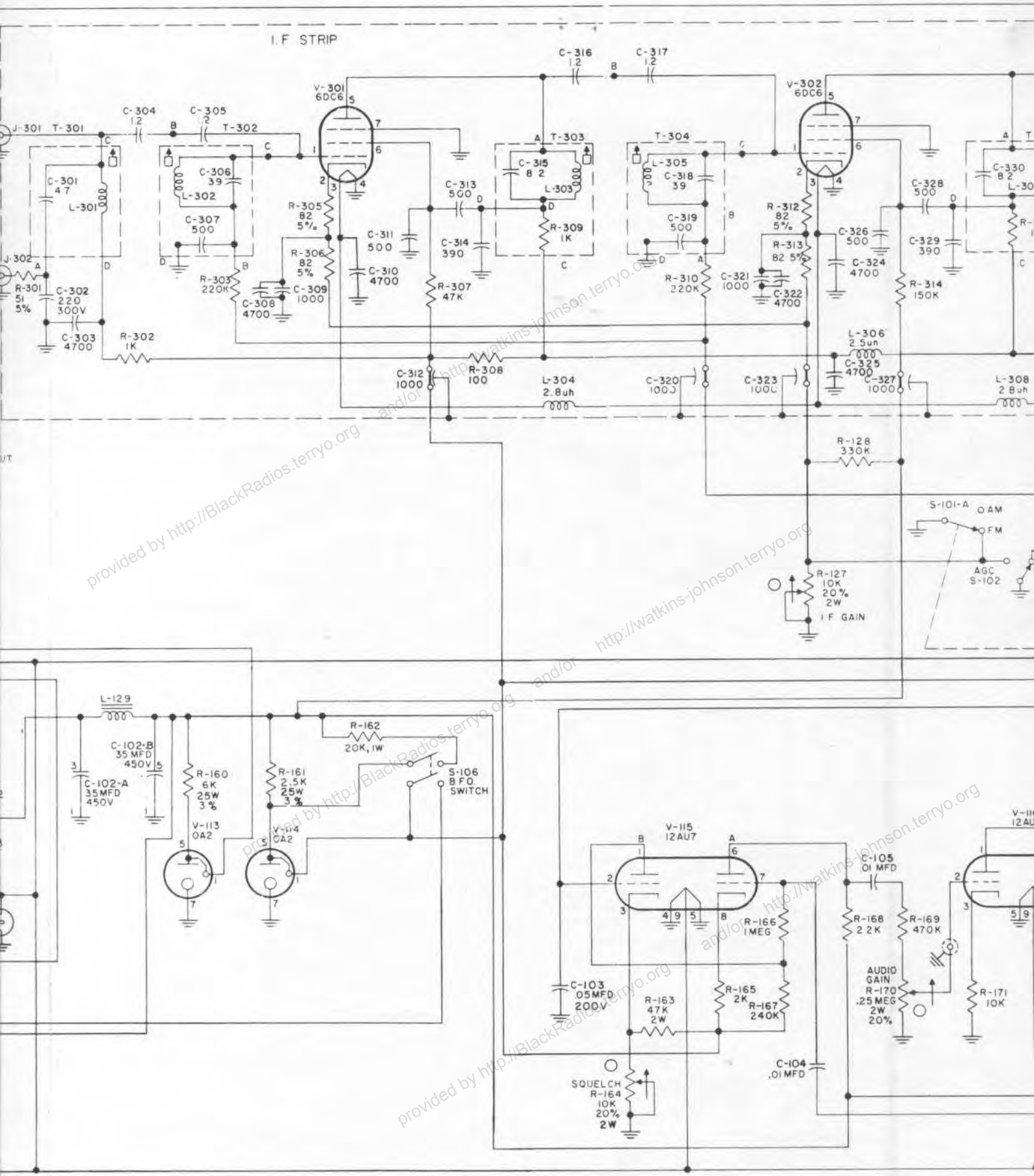
1. RESISTORS ARE FIXED, MEASURED IN OHMS, ± 10% 1/2W UNLESS OTHERWISE SPECIFIED.
2. CAPACITORS ARE FIXED, & MEASURED IN uuf, 500V UNLESS SPECIFIED.
3. COIL VALUES ARE IN uh UNLESS OTHERWISE SPECIFIED.

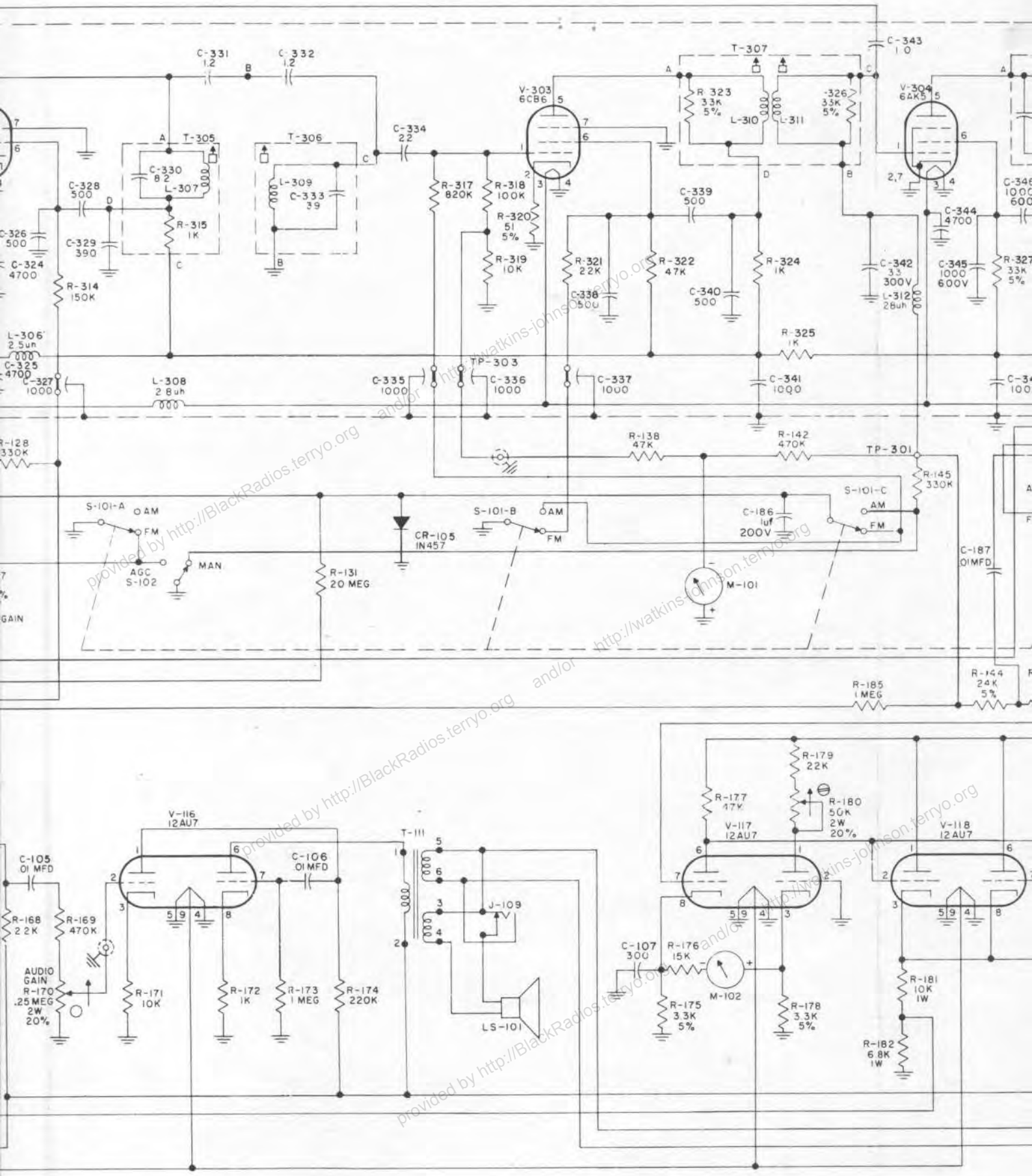
H-19, 705-E

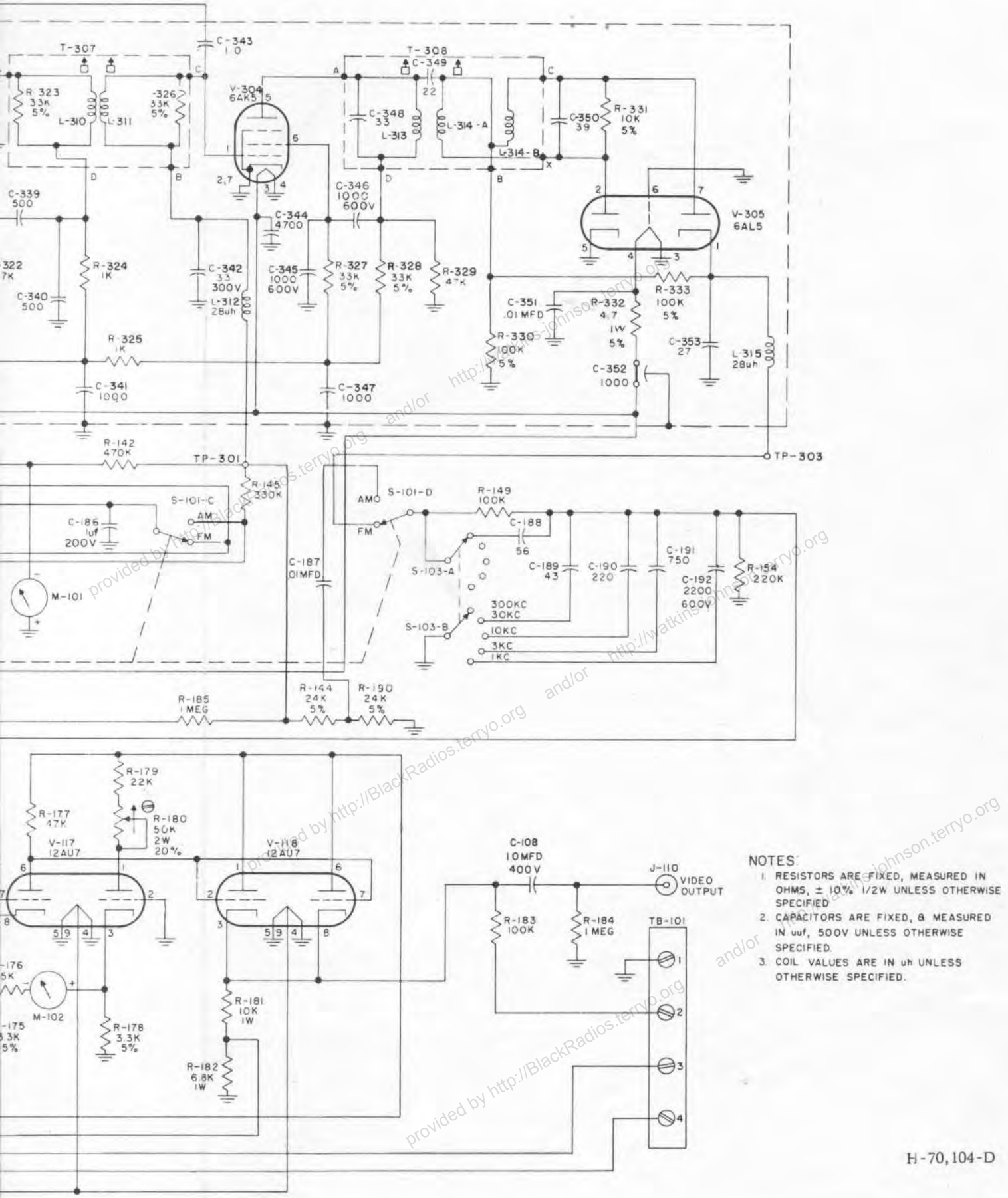
Figure 5-3. Schematic Diagram Model 1503-A Special Purpose Receiver




V-203
6AK5
L-204
1.67 uh
C-227
10
C-226
1-3.8
L-201-C
C-228
0.5
R-204
470K
R-205
470K
C-229
1000
C-230
1000
R-206
270K
J-202
RG-62/U
P-202
INPUT
"A"
J-301
T-301
C-304
1.2
C-301
4.7
L-301
P-302
J-302
R-301
51
5%
C-302
220
300V
C-303
4700
R-302
1K
RG-55/U
J-105
SDU. OUT
V-204
6AF4A
C-231
8.2
C-233
2-6
C-232
6.8
C-234
3.3
R-209
27K
R-211
220
C-238
0.5
R-208
8200
2W
C-237
1000
C-235
47
C-236
1000
C-240
1000
C-241
1000
TP-201
6.3V
+150 V
+240V
C-213
.01 MFD
F-102
0.6A
SLO-BLO
L-130
S-104
S-105
230V
115V
F-101
1.25 A
SLO-BLO
T-101
CR-101
IN539
CR-102
IN539
CR-103
IN539
CR-104
IN539
L-129
C-102-B
35 MFD
450V
C-102-A
35 MFD
450V
P-107
J-107
P-111
C-110
0047uf
C-111
0047uf
L-131
I-101
C-197
51
L-128
9.2uh
R-158
10K
R-157
1K
C-198
1000
C-199
1000
J-108
B
A
C
D
H
E
F





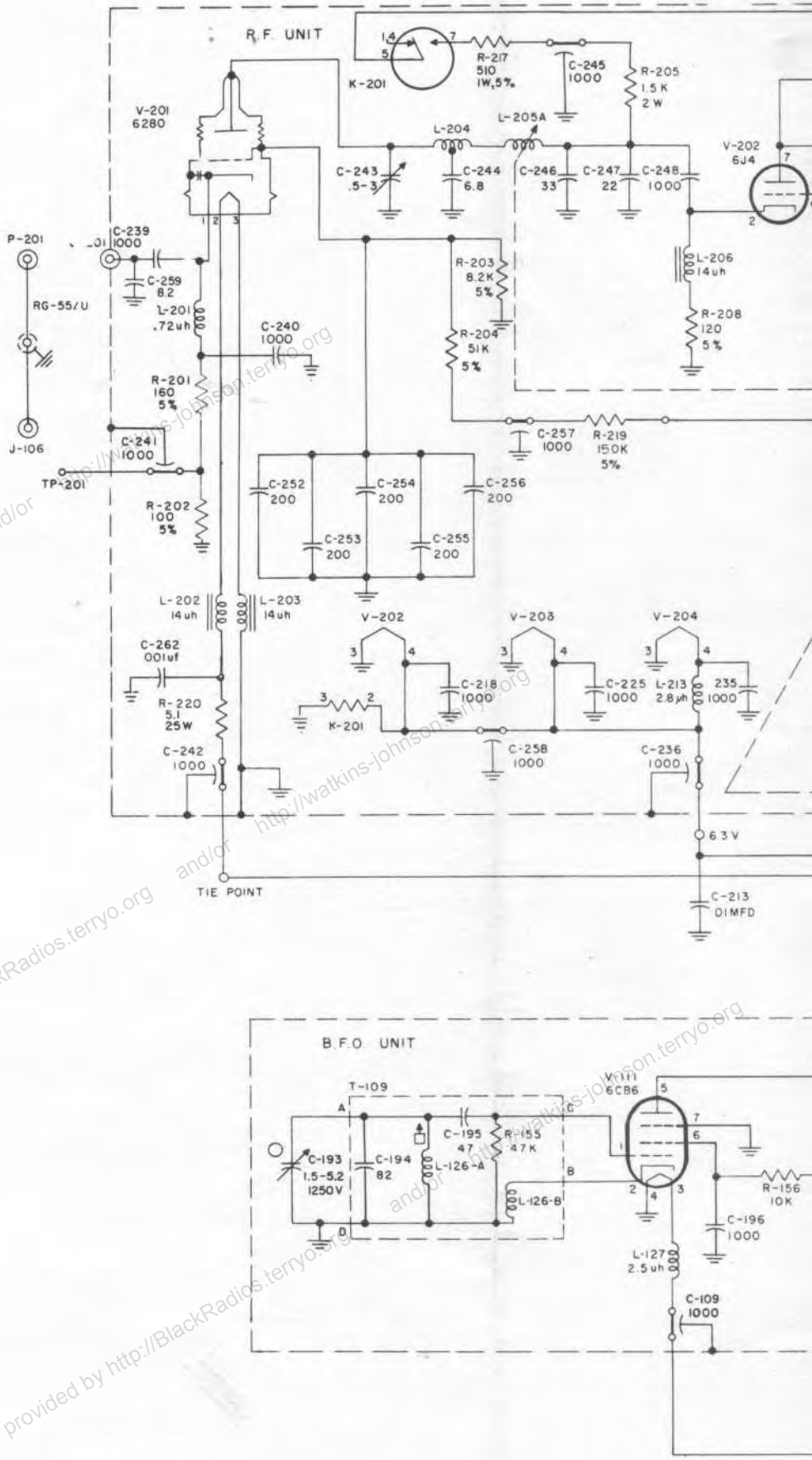


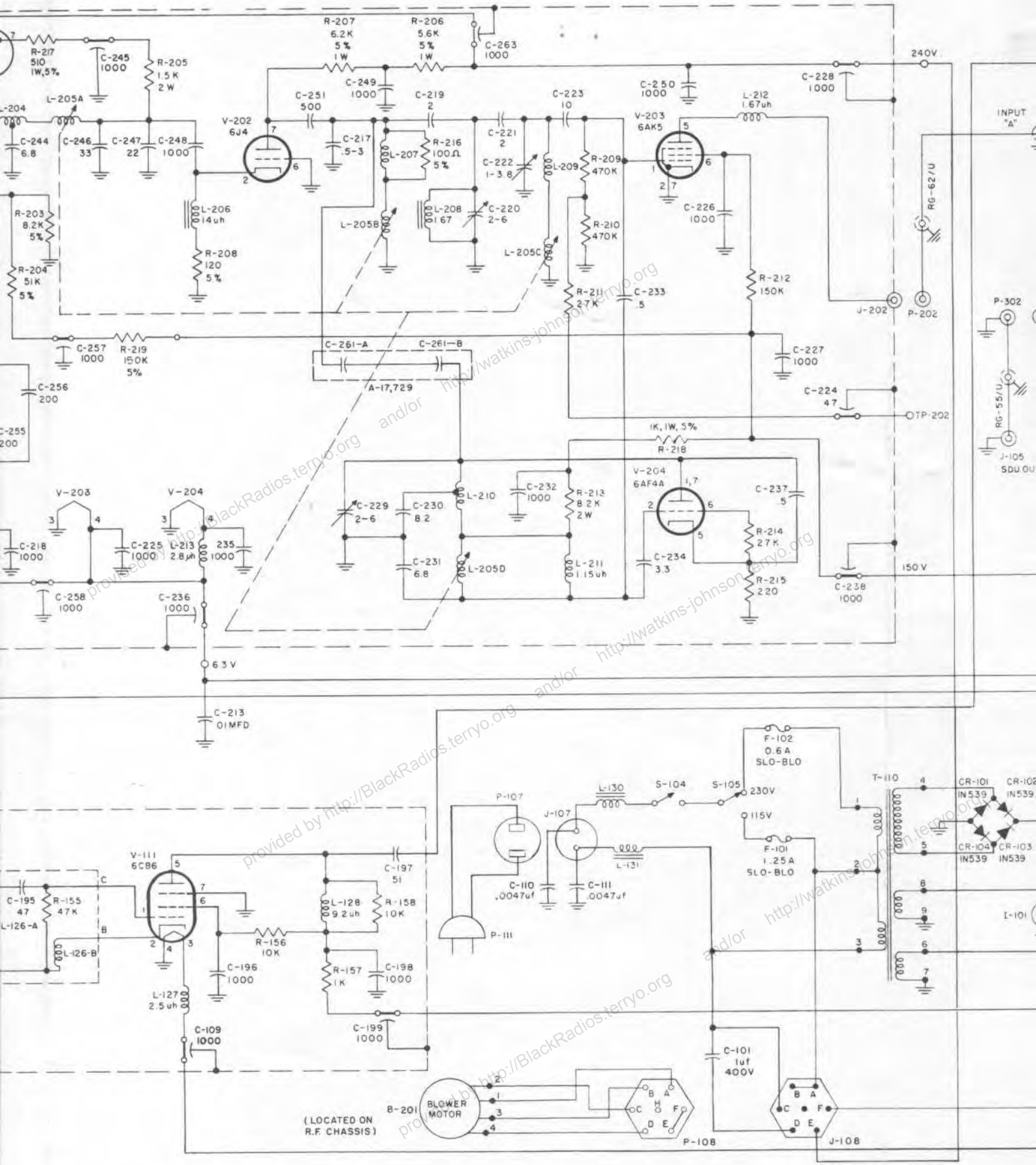
NOTES:

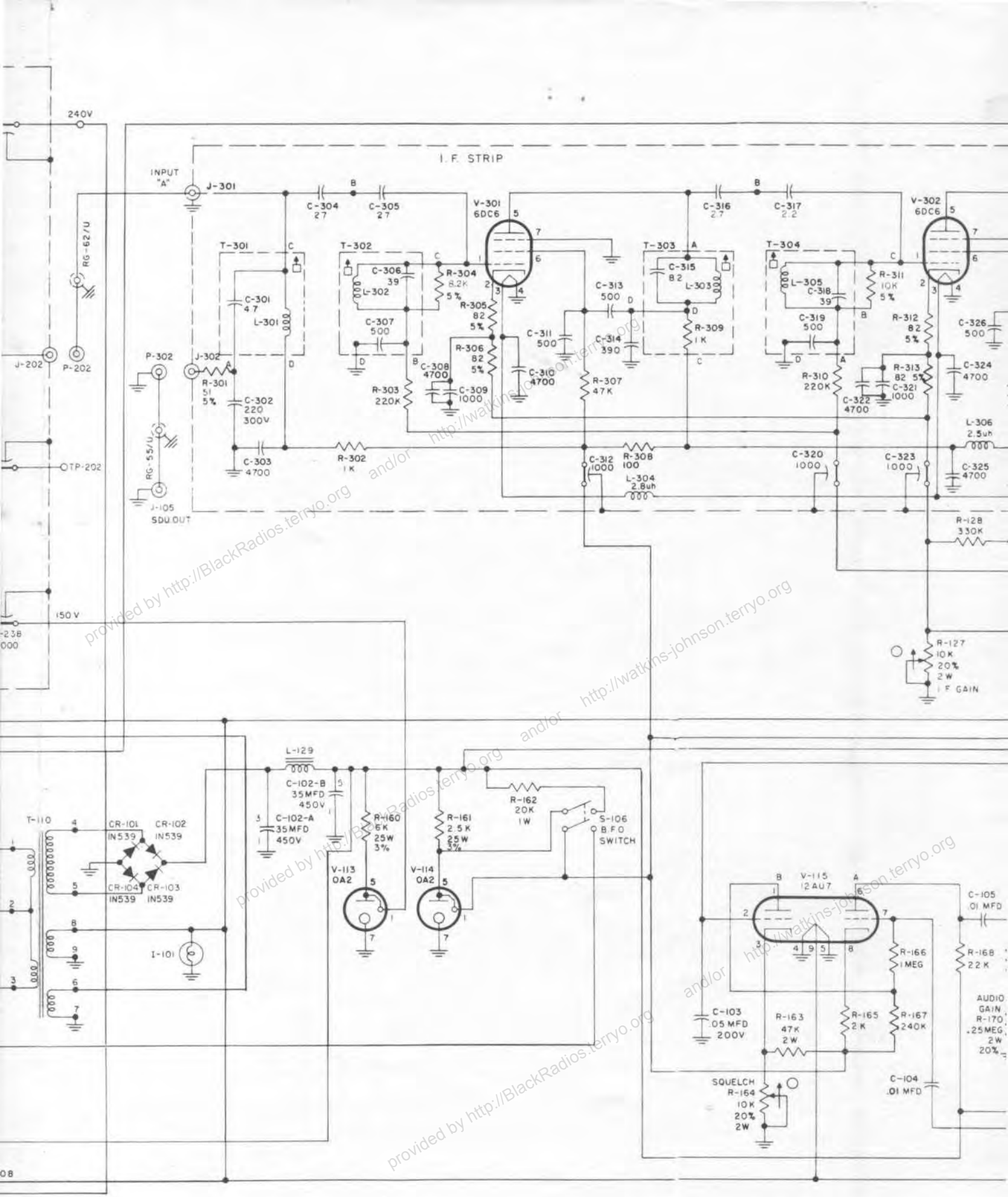
1. RESISTORS ARE FIXED, MEASURED IN OHMS, ± 10% 1/2W UNLESS OTHERWISE SPECIFIED.
2. CAPACITORS ARE FIXED, & MEASURED IN uuf, 500V UNLESS OTHERWISE SPECIFIED.
3. COIL VALUES ARE IN uh UNLESS OTHERWISE SPECIFIED.

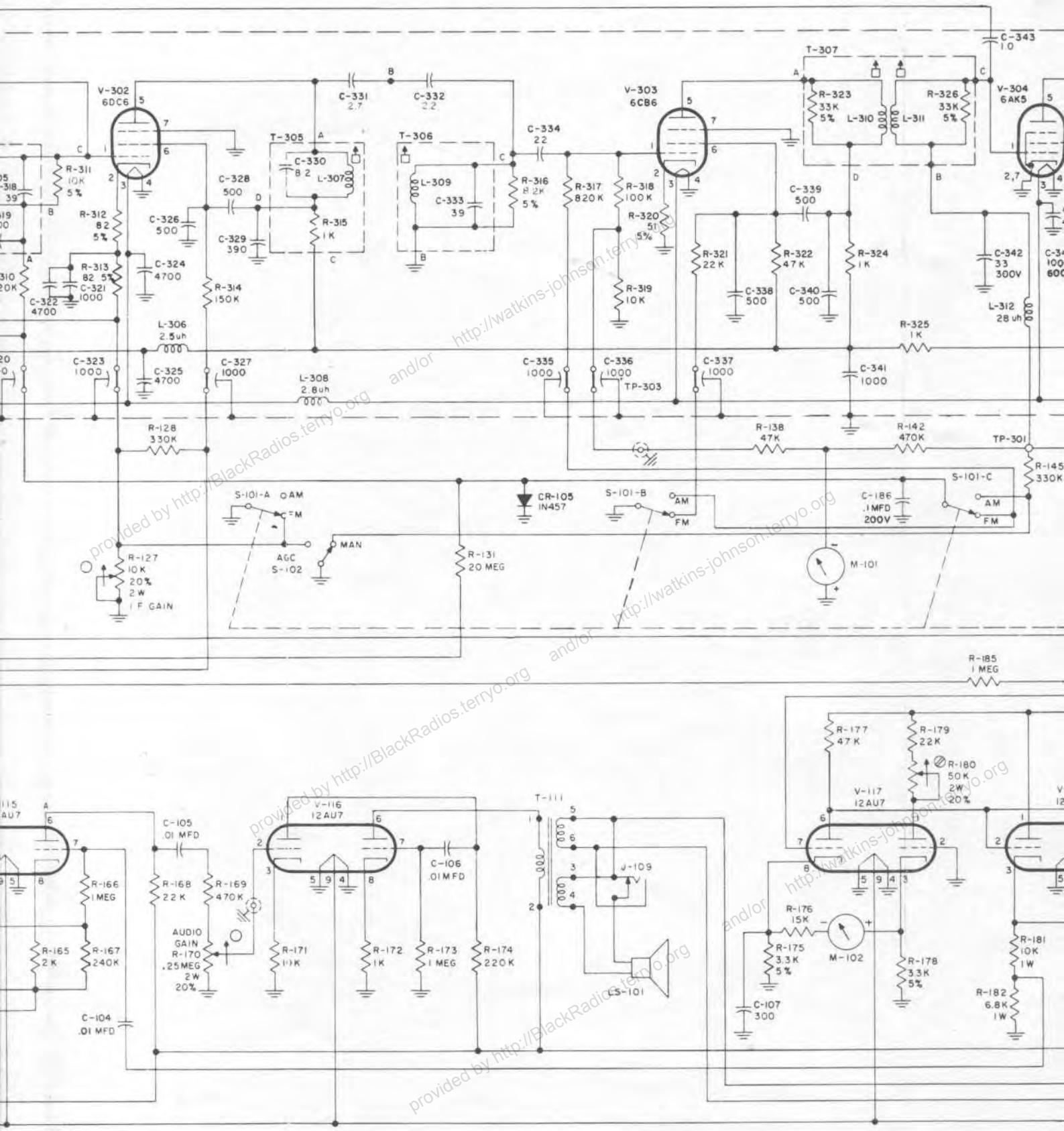
H-70,104-D

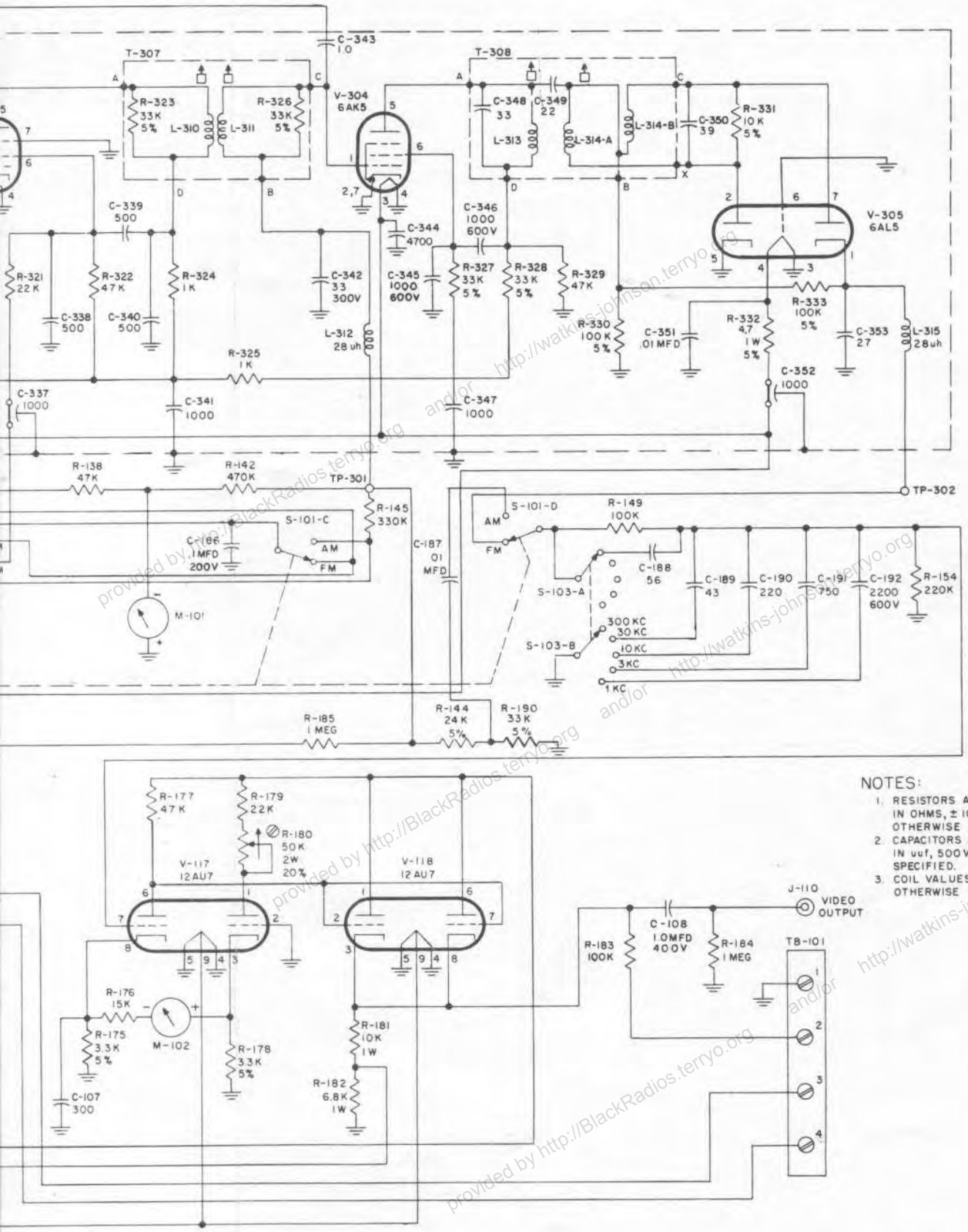
Figure 5-4. Schematic Diagram Model 1509-A Special Purpose Receiver






I. F. STRIP
INPUT "A"
J-301
V-301 6DC6
V-302 6DC6
T-301
T-302
T-303
T-304
C-304 27
C-305 27
C-316 2.7
C-317 2.2
C-301 47
L-301
C-306 39
L-302
R-304 8.2K 5%
R-305 82 5%
C-307 500
C-313 500
C-315 82
L-303
R-309 1K
L-305
C-318 39
C-319 500
R-311 10K 5%
R-312 82 5%
C-326 500
C-324 4700
R-313 82 5%
C-321 1000
C-322 4700
R-310 220K
C-311 500
C-314 390
R-307 47K
R-306 82 5%
C-310 4700
C-308 4700
C-309 1000
R-303 220K
P-302
J-302
R-301 51 5%
C-302 220 300V
C-303 4700
R-302 1K
RG-55/U
J-105 SDU OUT
RG-62/U
J-202
P-202
TP-202
240V
150 V
C-312 1000
R-308 100
L-304 2.8uh
C-320 1000
C-323 1000
L-306 2.5uh
C-325 4700
R-128 330K
R-127 10K 20% 2W I.F GAIN
L-129
C-102-B 35MFD 450V
C-102-A 35MFD 450V
R-160 6K 25W 3%
R-161 2.5K 25W 3%
R-162 20K 1W
S-106 B.F.O SWITCH
V-113 0A2
V-114 0A2
T-110
CR-101 IN539
CR-102 IN539
CR-103 IN539
CR-104 IN539
I-101
V-115 12AU7
C-105 .01 MFD
R-166 1 MEG
R-168 22K
AUDIO GAIN R-170 .25MEG 2W 20%
C-103 .05 MFD 200V
R-163 47K 2W
R-165 2K
R-167 240K
SQUELCH R-164 10K 20% 2W
C-104 .01 MFD





NOTES:

1. RESISTORS ARE FIXED, MEASURED IN OHMS, ± 10% 1/2 W UNLESS OTHERWISE SPECIFIED.
2. CAPACITORS ARE FIXED, & MEASURED IN uuf, 500 V UNLESS OTHERWISE SPECIFIED.
3. COIL VALUES ARE IN uh UNLESS OTHERWISE SPECIFIED.

H-70,105-C

Figure 5-5. Schematic Diagram Model 1510-A Special Purpose Receiver