



SS-1R AMATEUR BAND RECEIVER



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The Squires-Sanders, Inc. SS-1R is a high performance communications receiver explicitly designed for amateur band operation on 80 through 10 meters. A completely new approach to front-end design produces superb freedom from cross-modulation and overload, while the frequency precision and stability sets new standards for amateur equipment - to the extent that digital display of frequency with ± 1 kc. absolute accuracy is provided.

Crystal bandpass filters with exceptional skirt selectivity are used for SSB and CW reception, with newly developed I.F. tuned circuits used to provide great ultimate attenuation and top AM performance.

The unique receiver design provides for fixed tuned WWV positions at 10 and 15 MC., with an auxiliary band from 5.0 to 5.5 MC. With these

provisions the receiver can be autocalibrated for absolute frequency accuracy on all amateur bands.

Sensitivity is far better than that usable on the HF bands due to the unique low noise front-end (7360) balanced mixers, while at the same time, both AM and SSB signals are received with a minimum of distortion at all signal levels.

The SS-1R is designed for use with an optional noise silencer (SS-1S Silencer) of extreme effectiveness on impulse noise. An optional video oscilloscope display (SS-1V Video Bandslicer) of unique design showing the full band (or any part) in use, as well as a marker indicating the exact frequency to which the receiver is tuned, can be added.

In addition, the SS-1R is designed to operate in transceiver mode with the companion SS-1T transmitter.

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OPERATING and PERFORMANCE FEATURES

Dial Calibration. Since the precision and stability of the SS-1R represents a major advance in amateur equipment, *digital readout* to the nearest kilocycle is provided. The front-end employs precision crystals for the first conversion, while a high-stability VLO (employing a precision tuning capacitor of linearity exceeding that of most frequency meters) establishes the second conversion frequency. The slide rule dial simply indicates the nearest 100 kc., while the digital display reads 0 to 99 kilocycles directly.

Selectivity. Three bandwidths are available, independent of the AM/SSB/CW function. The 5 kc. bandwidth is most useful for AM and is steep-skirted, having a -60 db bandwidth of 20 kc. The 2.5 kc. bandwidth is obtained with a bandpass crystal filter having a 60/6 db shape factor of only 2:1. The specially designed .35 kc. filter provides the narrow bandwidth needed for CW but because of careful control of bandpass ripple and skirt shape avoids the "ringing" noticed with most narrow filters.

Operational Modes. All modes are under complete control of the operator. When operating SSB, for example, the operator can select fast, slow or no AGC, any one of the three bandwidths, and can use either the correct injection frequency (USB or LSB) or inject at any other frequency using the BFO tuning. Exalted carrier reception of AM is possible using either 5.0 or 2.5 kc. bandwidths. AGC can be used for CW reception if desired, and the I.F. ANL provides adjustable threshold effective CW limiting.

AVC. A fast attack, slow release AGC can be used in all reception modes with two release time constants for optimum AM, SSB or CW performance.

ANL. The automatic noise limiter, with adjustable threshold, operates in the I.F. on all modes, AM, SSB

or CW. Unlike audio limiters, it will establish automatic threshold on SSB and CW, and can be used for CW signal limiting.

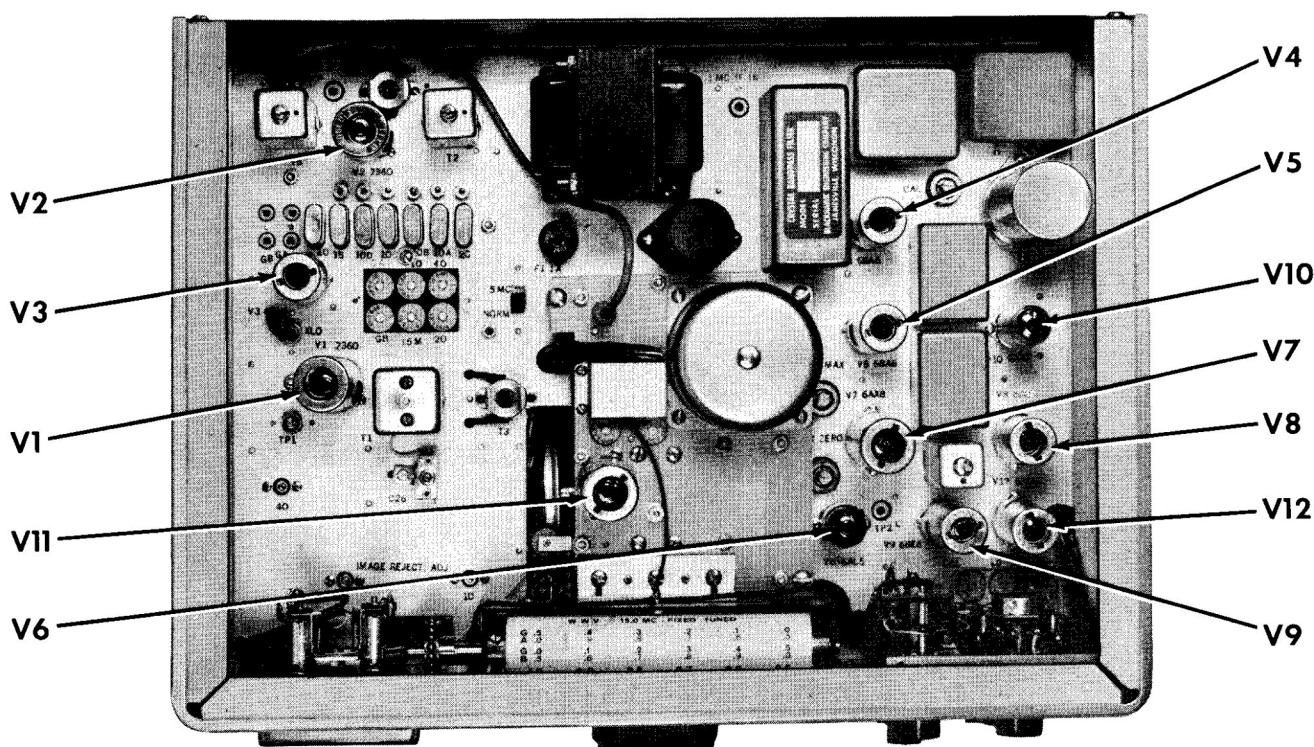
Bandswitch and Frequency Display. A twelve position, 360° continuous bandswitch controls the positioning of a drum dial in the band-in-use window of the frequency display. This drum indicates the two fixed WWV positions plus a 500 kc. scale for each of the amateur bands and the two general bands. A slide rule pointer indicates the nearest 100 kc. position. Counters are used for the digital display of kilocycles 00 to 99 and are low backlash gear driven directly from main tuning shaft.

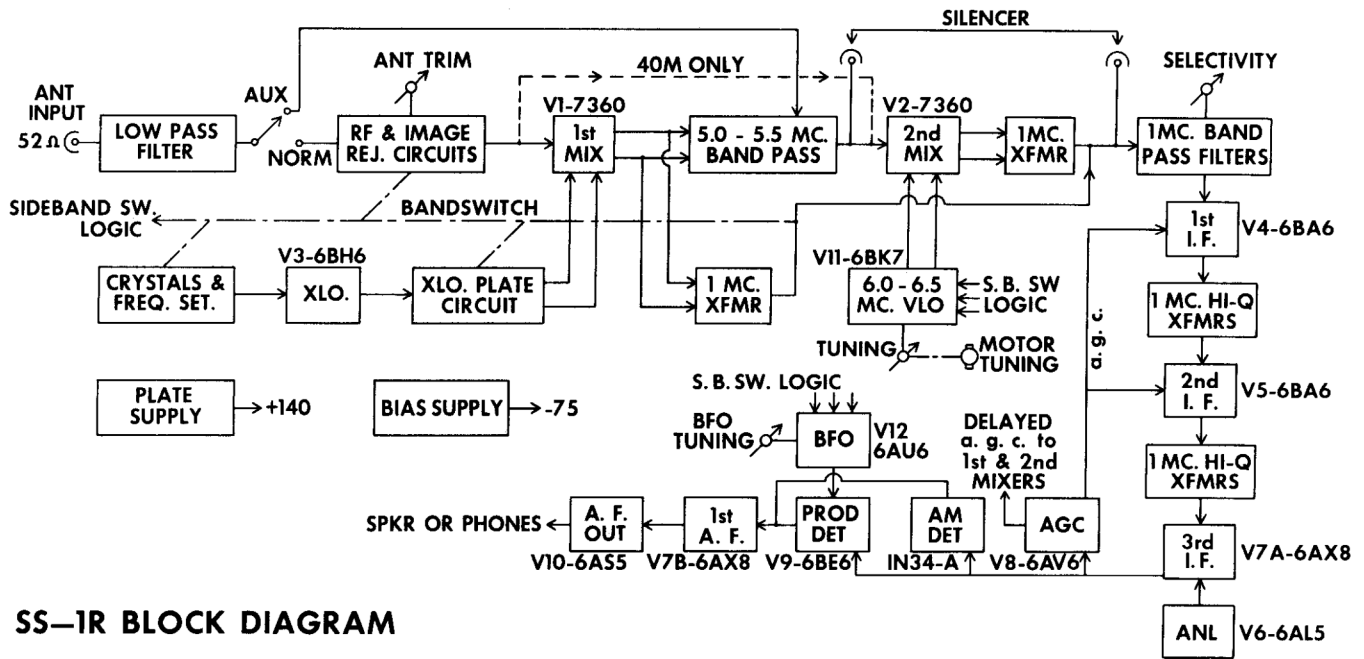
Tuning Mechanism. A very slow manual tuning rate (10 kc. per knob revolution) has been provided for easy and exact sideband tuning.

Motor Tuning. Fast traverse across the band is accomplished by push button motor drive which is disengaged from the tuning mechanism in manual mode.

Autocalibration. As a result of the unique frequency mixing scheme of the SS-1R, a minimum number of crystals is used to cover the amateur bands. The same crystals are also used in the WWV positions. Consequently, the amateur bands are automatically calibrated by the use of the three WWV signals at 5, 10 and 15 mc.

Cabinet. The SS-1R cabinet design is a unique combination of rugged, simple construction and conservative styling. A custom, heavy gage aluminum extrusion with substantial reinforcing is used for the one piece front panel and sides, providing unusual rigidity. The heavy chassis plate installs firmly in extruded ways and is accessible from both top and bottom when the perforated aluminum cover (top, back and bottom of the cabinet) is removed.





SS-1R BLOCK DIAGRAM

SPECIFICATIONS

Frequency Coverage

Band	Coverage
80	3.5 - 4.0 (or any 500 kc. 4.0-5.0*)
40	7.0 - 7.5
20	14.0 - 14.5 (or any 500 kc. 11.0-16.5*)
15	21.0 - 21.5 (or any 500 kc. 20.5-28.0*)
10A*	28.0 - 28.5
10B	28.5 - 29.0
10C*	29.0 - 29.5
10D*	29.5 - 30.0
WWV 10	10.0 Fixed Tuned
WWV 15	15.0 Fixed Tuned
GA*	Any 500 kc. 7.5-11.0
GB*	Any 500 kc. 16.5-20.5
WWV 5	5.0 - 5.5 (internal switch)

*with optional crystals

Selectivity (kc.):

	-6 db	-40 db	-60 db
A.	5.0	15.0	25.0
B.	2.5	4.4	5.0
C.	0.35	1.4	2.0

Sensitivity: Less than 1/2 microvolt for 10 db signal-to-noise ratio measured with 2.5 kc. bandwidth on 10 meters.

Frequency Stability: Less than 500 cps drift from cold start. Typical warm-up time is less than 5 minutes. Less than 100 cps frequency change thereafter with 105 to 125 V line voltage variation.

Frequency Accuracy: ±1 kc. maximum error.

I.F. and Image Rejection: Greater than 60 db. All amateur bands.

Internal Spurious: None at stated sensitivity.

Cross Modulation: When receiving a 10 microvolt signal with 2.5 kc. or .35 kc. selectivity, an unwanted 0.1 volt signal 20 kc. away will produce negligible cross modulation. In any mode, when receiving a 1.0 microvolt signal, an unwanted 0.1 volt signal 100 kc. away will produce not more than 3 db signal reduction.

AVC Time Constants: Attack 0.001 sec.

Release 0.1 sec., *Fast*

Release 1.0 sec., *Slow*

Audio Output: 1 watt 4 or 500 ohms. The 500 ohm output may be used either with the appropriate speaker, or for ANTI-VOX output for the transmitter. AF Auxiliary output jack may be used to drive a tape recorder or other audio amplifier. Level of this output (nominally 1.0 volt with a 50 microvolt 30% modulated AM input signal) is not affected by AF Gain Control setting. Alternatively, sidetone may be introduced into this jack.

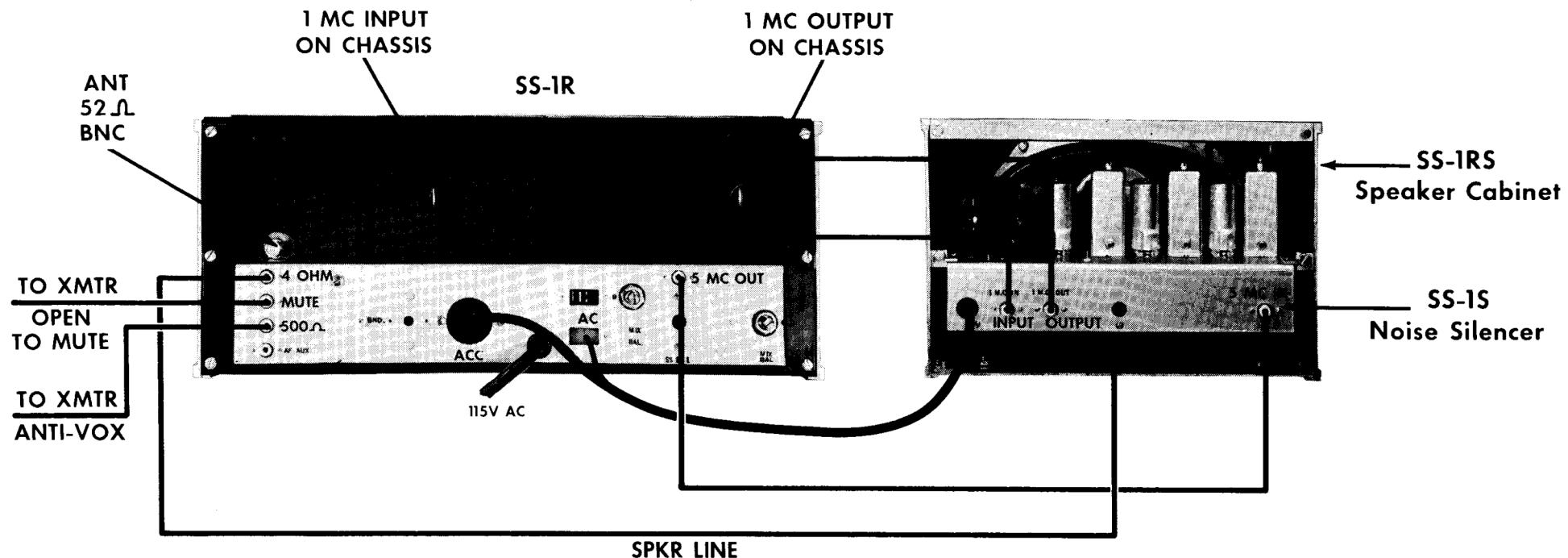
Antenna Input: 52 ohms nominal, accepts UG-88/U connector.

Mute: Provision is made for muting the receiver on transmit. An external relay, open on transmit, is suggested.

Size and Weight: 7-3/4" high x 16-1/4" wide x 13" deep, 25 pounds.

Power Input: 105-125 volts AC, 60 cps: 55 watts.

Tubes and Diodes: 12 tubes, 7 germanium diodes, 3 silicon rectifiers.



MUTE CIRCUIT: WITH RCVR ON STANDBY, GROUNDING (SHORTING) MUTE LINE PLACES RCVR IN "OPERATE". OPENING (100K OR MORE) MUTE LINE PLACES -50 VOLTS ON MIXERS AND I.F. STAGES. CURRENT SWITCHED IS LESS THAN 1 MA. S-METER NORMALLY READS FULL SCALE WHEN "MUTED".

A.C. OUTLETS: BOTH SWITCHED, UNFUSED. RATED 1 AMP EACH.

NOTE: BE CERTAIN SILENCER PLUG IS IN ACCESSORY SOCKET BEFORE APPLYING AC TO RECEIVER AND SILENCER, SINCE THE SILENCER OBTAINS ITS BIAS VOLTAGES FROM THE RECEIVER.

NORMAL CONNECTIONS SS-1R RECEIVER with SS-1S SILENCER

Figure 2

MATCHING SYSTEM COMPONENTS

SS-1V, Video Bandscanner. This unique oscilloscope display unit, when used with the SS-IBS, shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the receiver signals displayed *do not move* as the receiver is tuned, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier. In addition provision is made for transmitter monitoring or analysis with automatic switching on "transmit".



SS-1V

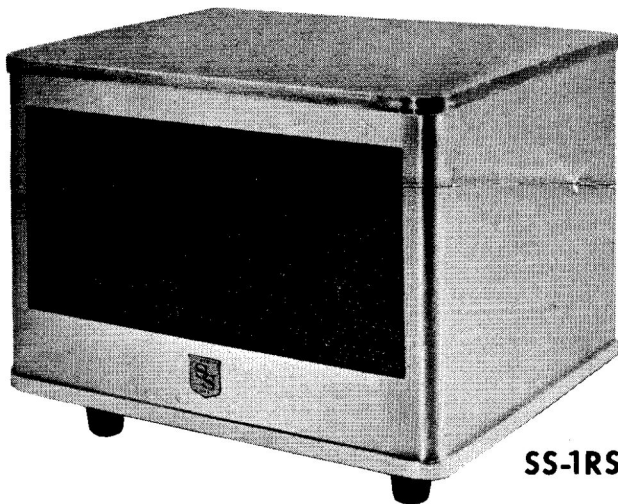


RACK MOUNT

Rack Mount. The Rack Mount provides an easy and efficient method for mounting the SS-IBS or the SS-1V in a standard 19" mounting rack. The mount is a drawer type mount and care should be taken to see that antenna and other interconnecting cables will reach even when the drawer is pulled out. The SS-IBS Receiver (or the SS-1V Bandscanner) mounts in the rack drawer without removal of dust cover.



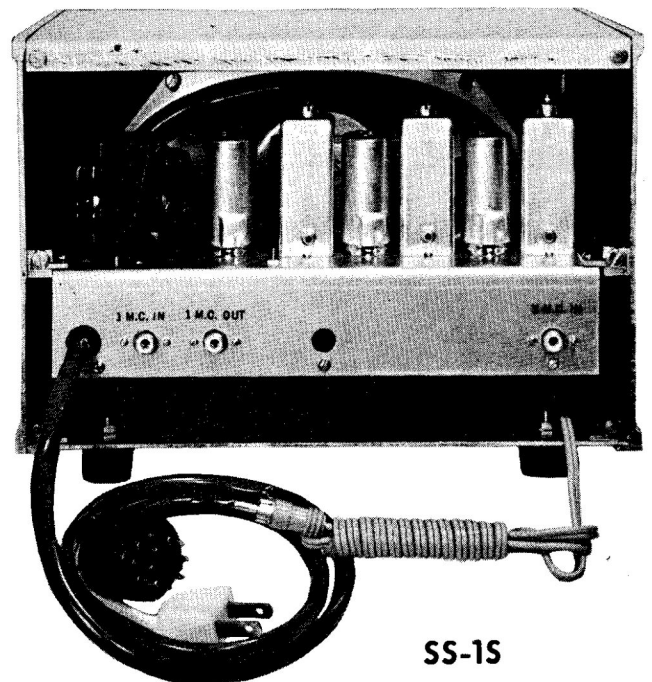
Broadband Antenna Matcher. The Broadband Antenna Matcher matches the impedances of a wide range of antennas to the receiver 50 ohm input. Antenna connection (balanced or unbalanced) provides for BNC, twinlead or wire. Output BNC connector mates with receiver antenna input.



SS-1RS

SS-1RS, Matching Speaker. A 4 ohm, 4 x 8 speaker, housed in matching extruded cabinet.

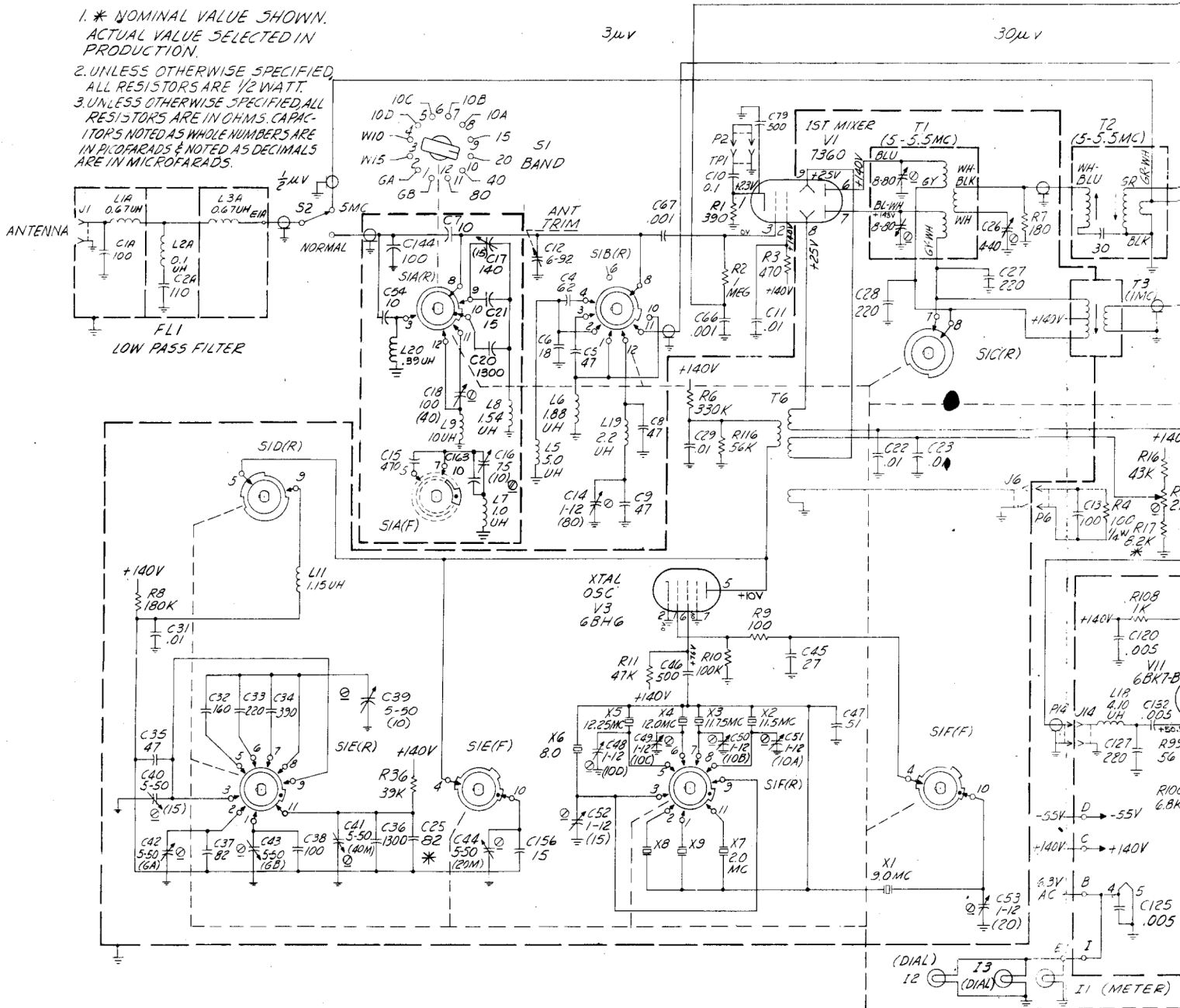
SS-1S, Noise Silencer. The SS-1S Noise Silencer provides for virtually complete elimination of impulse noise. This radically new development makes possible solid copy of barely detectable signals (S2 or less) even in the presence of S9 or greater impulse noise caused by ignition, neon signs, switches, power leaks, etc. Provision is made for neatly housing the silencer unit in matching speaker cabinet.



SS-1S

NOTES:

1. * NOMINAL VALUE SHOWN. ACTUAL VALUE SELECTED IN PRODUCTION.
2. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/2 WATT.
3. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS. CAPACITORS NOTED AS WHOLE NUMBERS ARE IN PICOFARADS & NOTED AS DECIMALS ARE IN MICROFARADS.

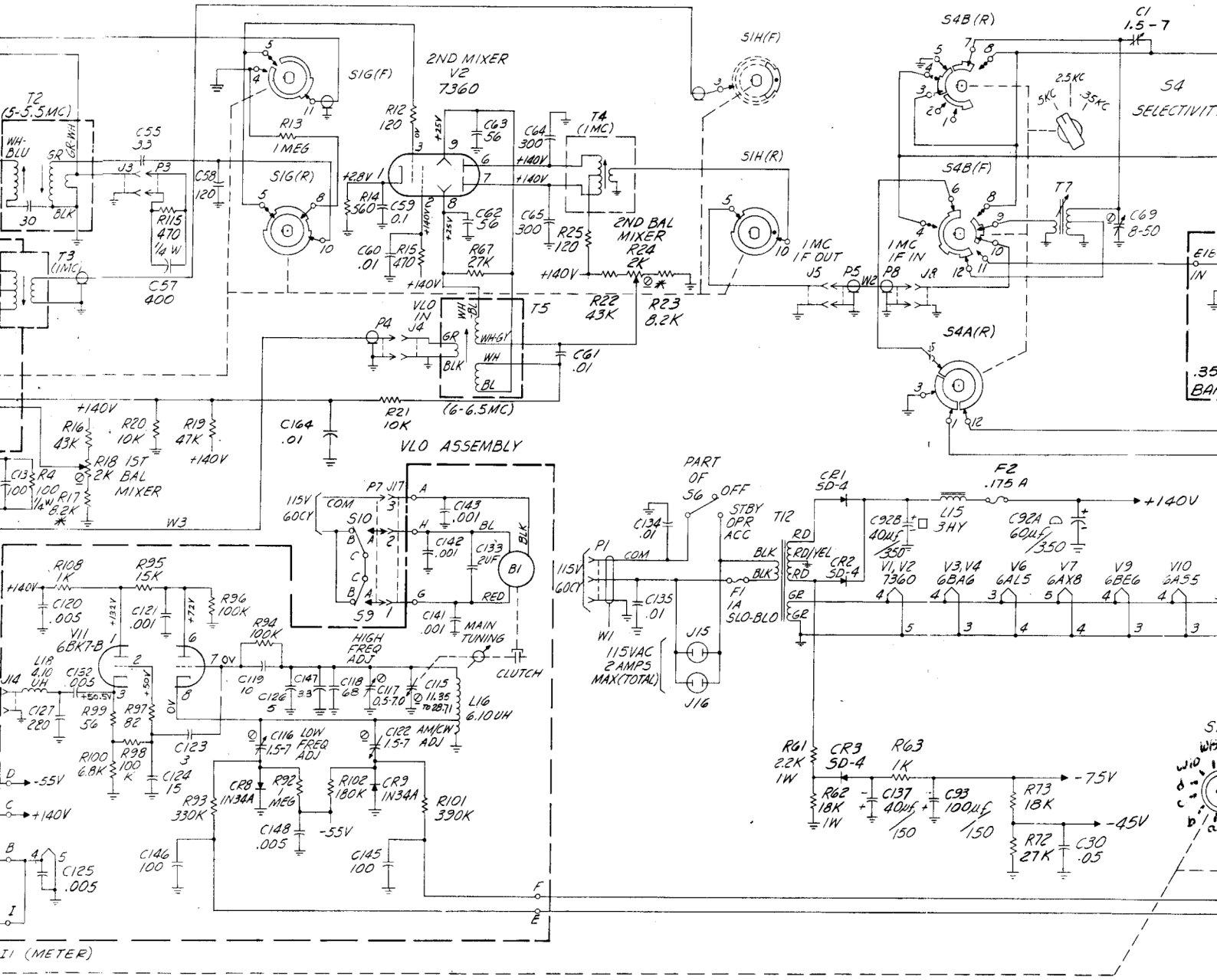


(DELAYED AGC)

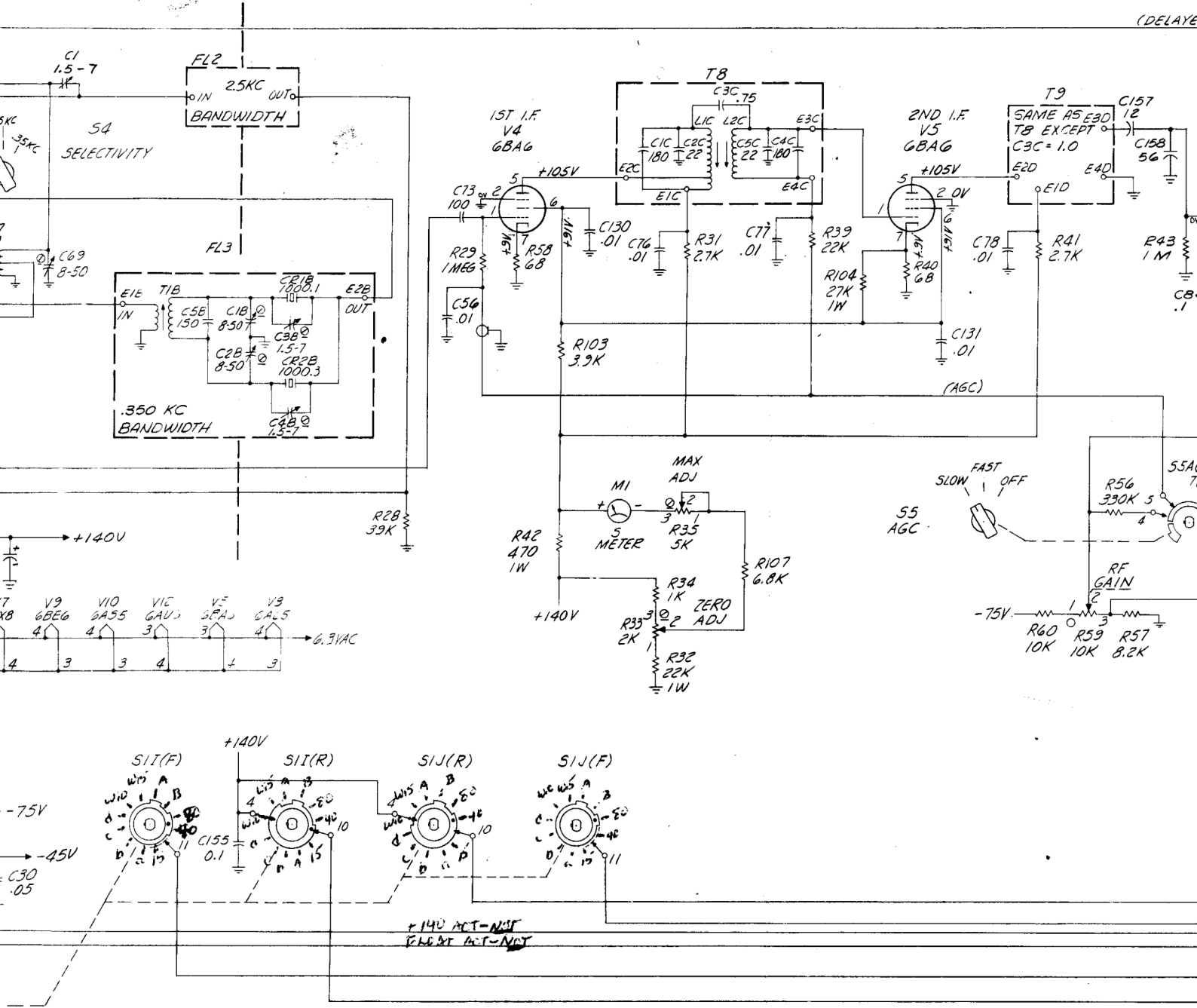
100μV

100μV

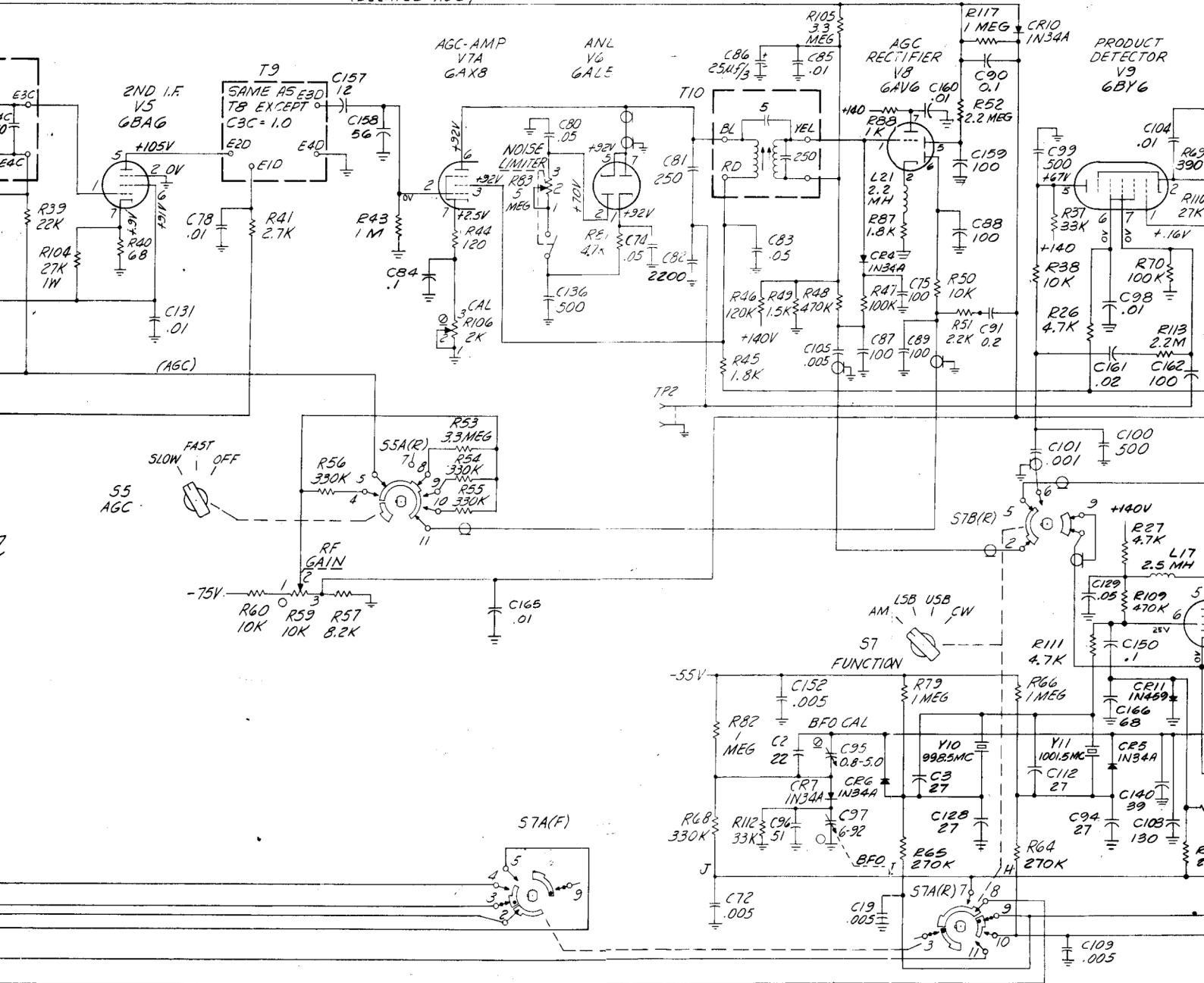
30μV

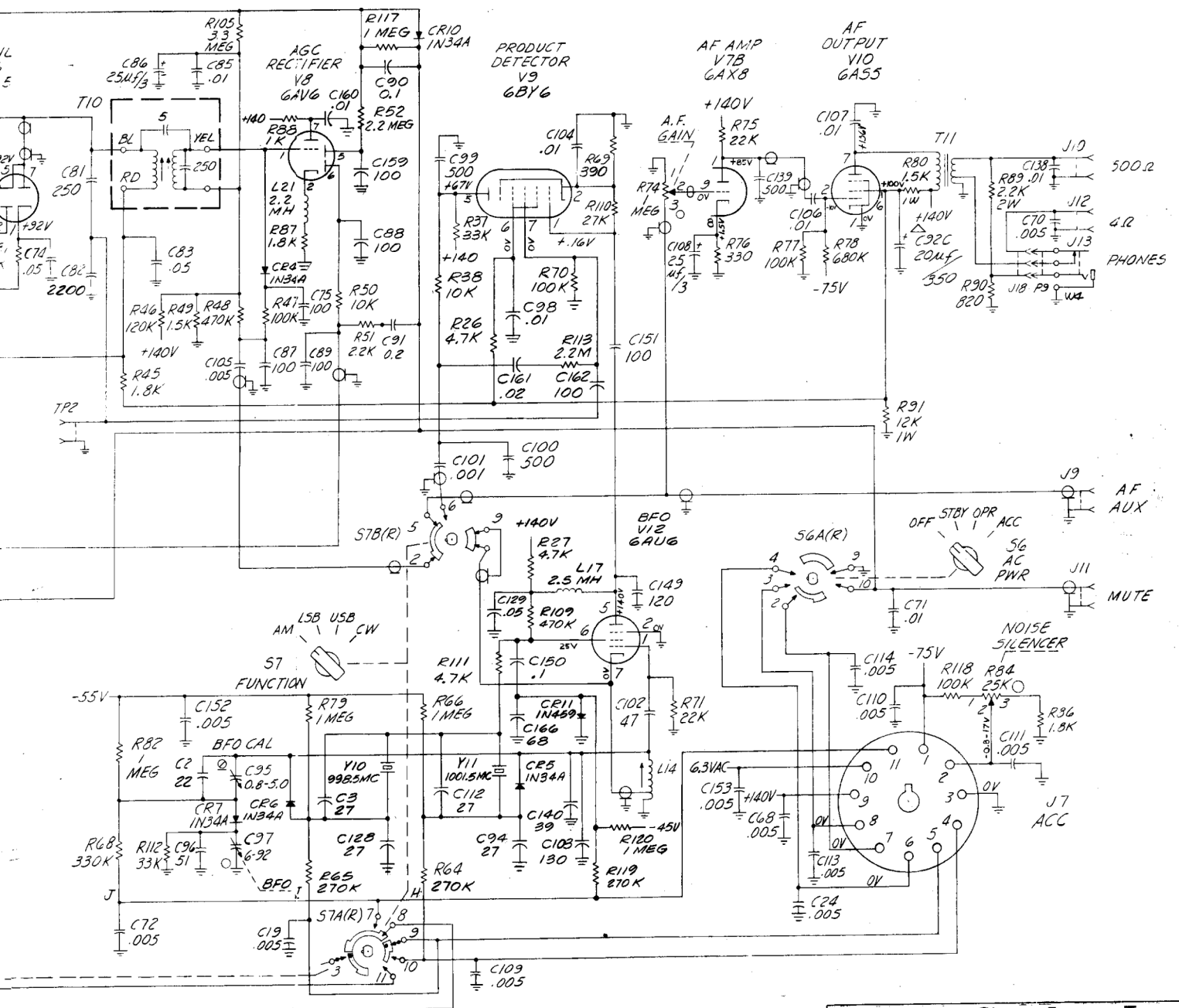


(DELAYE



(DELAYED AGC)





Squires-Sanders, Inc.

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APPROVED: [Signature]		ISSUE 10	8-2-65
DATE: 11/15/63		ISSUE 11	5-2-62
		ISSUE 12	
		ISSUE 13	

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