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UNCLASSIFIED

TECHNICAL MANUAL

for

**SINGLE SIDEBAND
ADAPTER**

MODEL GSB-1



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y.

OTTAWA, CANADA

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TABLE OF CONTENTS

SECTION I – GENERAL DESCRIPTION	Paragraph	Page
Paragraph	Page	
1. Description	1-1	B. AM Signals 3-1
2. Front Panel Controls	1-2	C. Exalted Carrier AM 3-1
3. Technical Specifications	1-2	D. CW 3-2
SECTION II – INSTALLATION		
1. Unpacking	2-1	SECTION IV – ALIGNMENT
2. Installation	2-1	1. 17 Kc Oscillator 4-1
SECTION III – OPERATION		
1. Description of Controls	3-1	2. 472 Kc Oscillator 4-1
2. Tuning Procedure	3-1	3. 438 Kc Oscillator 4-1
A. Single Sideband Signals	3-1	SECTION V – DATA
		1. Voltages and Resistances 5-1
		2. Electrical Parts List 5-3
		3. Schematic Diagram

LIST OF ILLUSTRATIONS

SECTION I – GENERAL DESCRIPTION

Figure	Page
1-1. Single Sideband Adapter, Model GSB-1	1-1
1-2. Block Diagram, Model GSB-1	1-2

SECTION II – INSTALLATION

2-1. Rear View, Model GSB-1	2-1
2-2. Connection to Receiver	2-2

SECTION IV – ALIGNMENT

4-1. Top View, Model GSB-1	4-1
4-2. Bottom View, Model GSB-1	4-2

SECTION V – DATA

5-1. Schematic Diagram	
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LIST OF TABLES

SECTION V – DATA

5-1. Tube Voltages and Resistances	5-1
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SECTION I GENERAL DESCRIPTION

1. DESCRIPTION

The TMC Model GSB, Single Sideband Adapter is a precision built unit, housed in an attractive metal cabinet to match the TMC Model GPR-90 Communication Receiver. Cable and connectors are provided with each GSB to permit shielded connection between the IF Output of the GPR-90 and the IF Input of the GSB.

The GSB is a filter type adapter designed for use with receivers having a 455 Kc IF. It permits simple and accurate tuning of single sideband signals and greatly facilitates the reception of AM and CW signals.

The 455 Kc receiver output is first amplified and then converted to the region of 17 Kc by means of the 1st Oscillator and 1st Mixer. At this lower frequency the entire shortskirt selectivity is obtained. A tuning control tunes the incoming signal for proper relation to the band-pass filter which, with a bandwidth of 2.5 Kc at the 6 db. point and a skirt width at the 50 db. point of 3.5 Kc, permits sharp rejection of unwanted signals. A product

detector follows the band-pass filter and provides carrier reinsertion for demodulation of Single Sideband, Exalted Carrier and CW signals to the best advantage. A low pass filter, with a cut-off at 5 Kc and high attenuation at 17 Kc, follows the product detector and eliminates all unwanted signals. Added protection of the first mixer against overload is provided by the use of a separate AVC system. Fast or slow, AVC is provided by a switch on the front panel. This AVC system controls the signal beyond that provided by the receiver. A built-in audio amplifier eliminates the necessity of using the receiver's audio system. Further, by paralleling the audio outputs of the GSB and the receiver, one speaker may be used for the receiver or GSB outputs by simply manipulating the audio gain controls on each unit.

An UPPER/LOWER SIDEBAND switch permits the selection of either sideband. In the reception of AM signals, the use of this switch permits selection of the sideband on which unwanted signals are least objectionable. With the AM/SSB switch in the SSB position, it is possible to re-

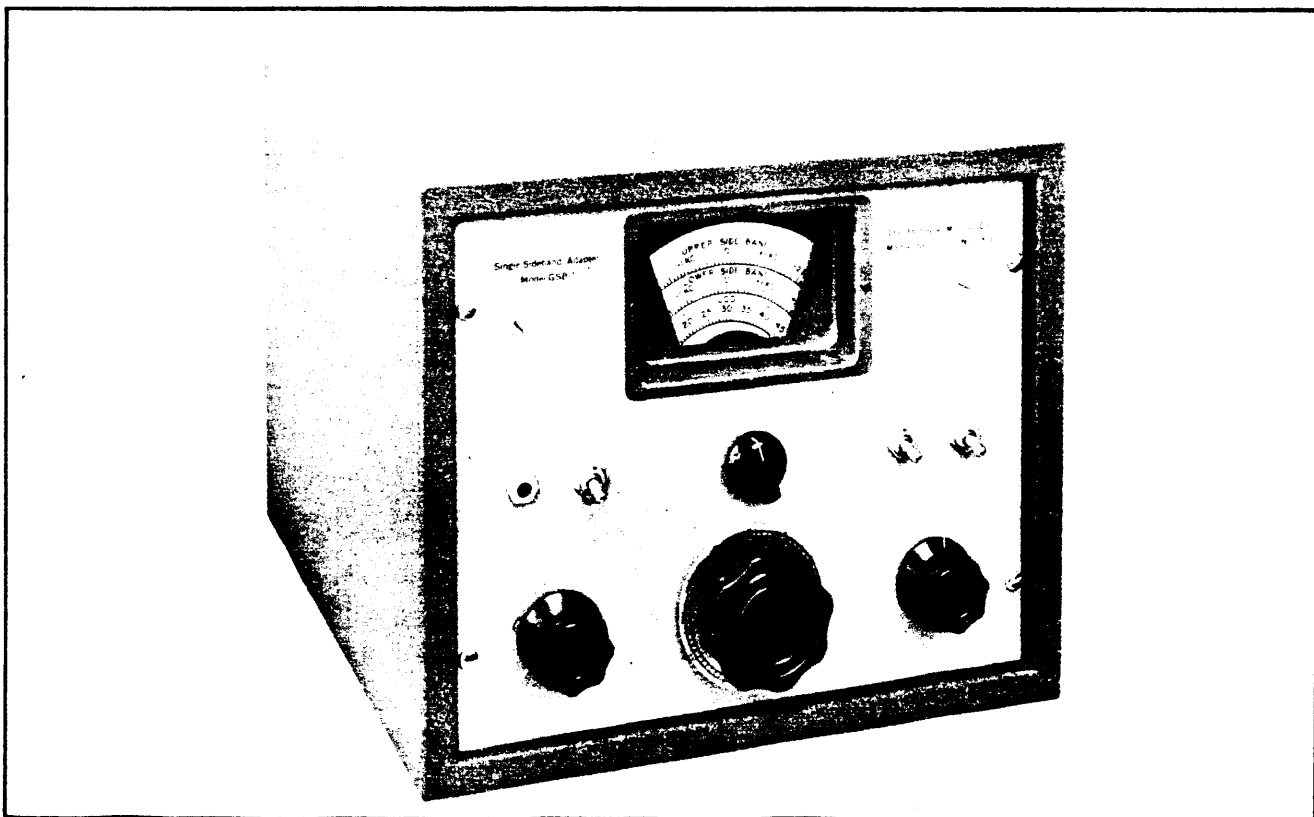


Figure 1-1. Front View, Model GSB-1.

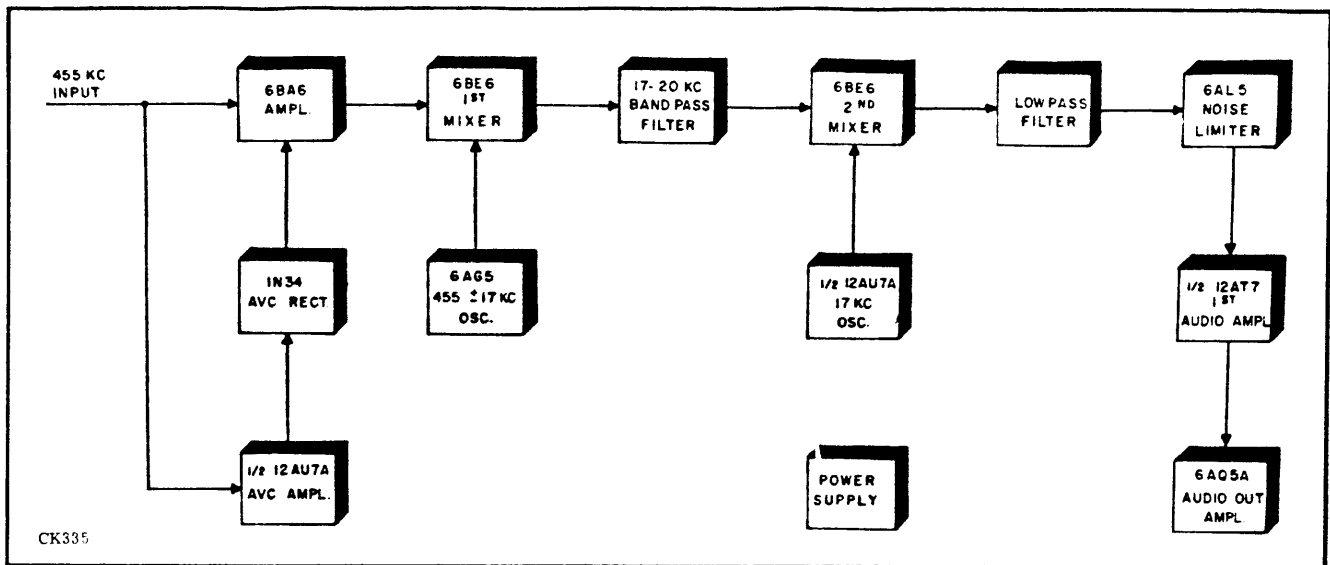


Figure 1-2. Block Diagram, Model GSB-1.

ceive AM signals with exalted carrier induced by carrier reinsertion produced in the GSB circuitry.

A noise limiter is also provided which clips both positive and negative peaks and is placed in or out of the circuitry by means of an ON-OFF switch on the front panel.

The only requirement for using the GSB, with any other receiver having 455 Kc IF, is that a shielded connection be brought out from the plate of the last IF tube for connection to the IF input of the GSB.

2. FRONT PANEL CONTROLS

- A. Power ON/OFF Switch
- B. Bandspread
- C. Upper-Lower Sideband Selector Switch
- D. SSB-AM Selector Switch
- E. AVC ON/OFF Switch
- F. AVC FAST/SLOW Switch
- G. Noise Limiter ON/OFF Switch

3. TECHNICAL SPECIFICATIONS

FREQUENCY RANGE:
452-458 Kc.

TYPE OF RECEPTION:
AM, SSB (upper or lower), CW.

IF INPUT VOLTAGE RANGE:
0.1-10 volts (rms).

INPUT IMPEDANCE:
High from IF.

AUDIO OUTPUT:

At output jack (before audio amplifier) 0.3 volts (rms) for 0.3 volts (rms) input.

Impedance to match audio grid.

At terminals (after audio amplifier) 1 watt.

Impedance-

Loudspeaker-6, 8, 16 ohms
Line- 600 ohms
Headset- High or Low

AVC CHARACTERISTICS:

With 40 db change in input, output remains constant within 9 db.

INPUT POWER:

115 volts, 50/60 cycles, 55 watts.

SIZE:

12" wide x 10" high x 15" deep.

SHIPPING DATA:

WEIGHT

NET	GROSS
27 lbs.	31 lbs.*
	57 lbs.

DIMENSIONS

*Carton- 14" wide x 13-1/2" high x 17" deep.
Export- 15" wide x 16" high x 20" deep.

COMPONENTS AND CONSTRUCTION:

Equipment manufactured in accordance with JAN specifications wherever practicable.

SECTION II INSTALLATION

1. UNPACKING

Carefully unpack the GSB and check any instructions which may be accompanying the instrument. The equipment should be checked for any damage that may have occurred during shipment or storage.

2. INSTALLATION

The Model GSB, although originally designed for use with the Model GPR-90 receiver, (which already provides proper terminals) may be used with any receiver which will provide .3 volts (rms) R.F. input at approximately 455 Kc. For connec-

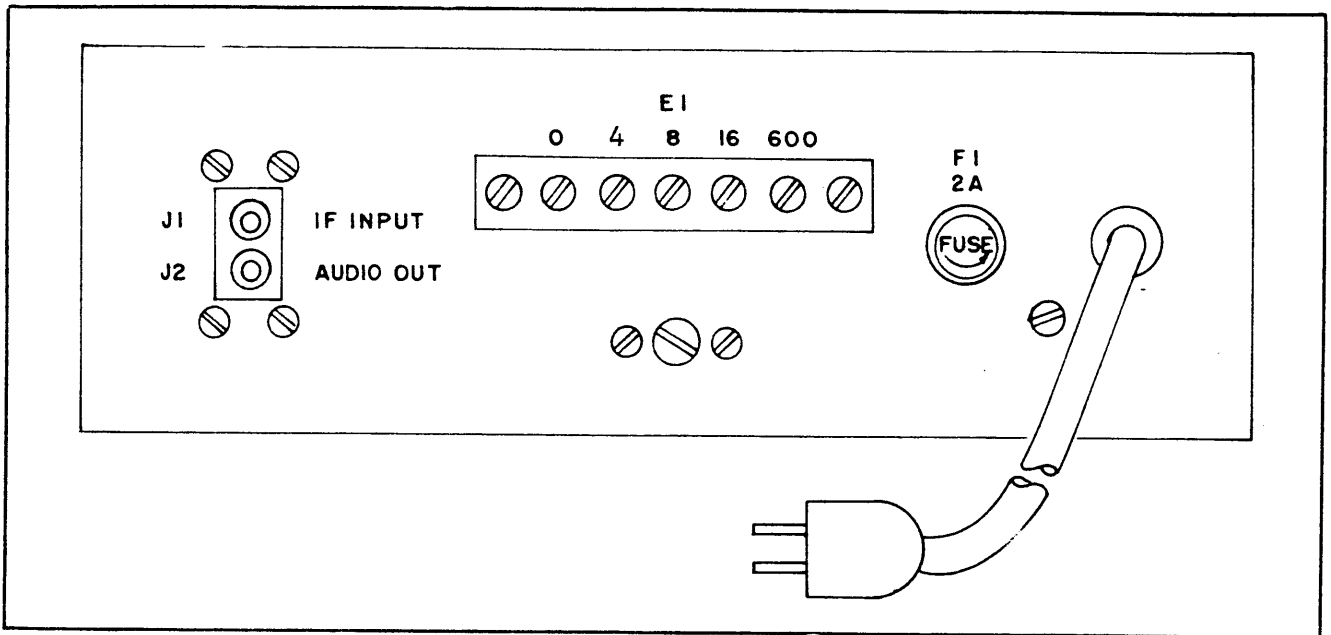


Figure 2-1. Rear View, Outside of Chassis, Model GSB-1.

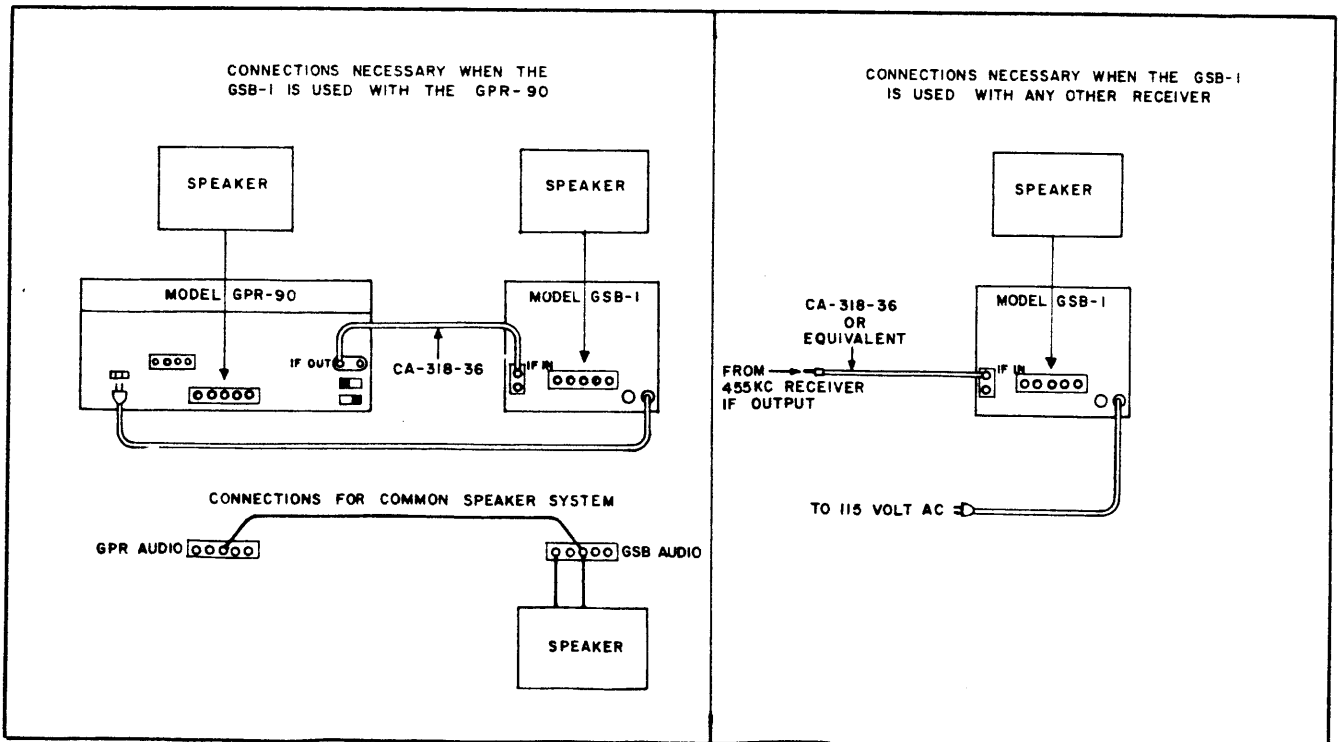


Figure 2-2. Connection to Receiver

tion to the GPR-90 receiver, refer to Figure 2-2. If there is no external provision for this connection on your receiver, it will be necessary to bring a lead out through a 10 mmfd coupling capacitor from the plate of the final I. F. stage. The use of RG-58/U low loss coaxial cable of short length, is recommended. This cable and fittings are inclosed with each unit.

The Audio Output of the Adapter is available for loudspeakers, line or headphones. Connect a loudspeaker to the proper terminals on the rear apron of the GSB. Use of a headset on the Adapter opens the loudspeaker circuit.

If desired, the output of both the GSB and re-

ceiver may be used with a single loudspeaker or headset. Connect a single lead from an Audio Output terminal on the receiver to a terminal with nearly the same impedance on the GSB. The shield of the I. F. connecting co-axial cable is the circuit ground return. The output impedance at the terminals has now been halved. Therefore, to match the loudspeaker correctly it must be connected to the next higher impedance terminal on the GSB. Inserting the headset in the GSB jack disconnects the loudspeaker as before and still permits output from both the adapter and receiver. The output of either the adapter, receiver, or both will be controlled by the proper manipulation of both Audio Gain Controls.

SECTION III OPERATION

1. DESCRIPTION OF CONTROLS

- a. Audio Gain - Power/off control; Clockwise rotation of this control first applies power to the GSB. Further rotation controls the audio output.
- b. Sideband - Upper/Lower control. This switch places the 1st oscillator in the correct position to permit either the upper or lower sideband to pass through bandpass filter.
- c. The Band Spread control varies the 1st oscillator over a limited range from the mid-frequencies of 438 and 472 Kcs. This permits a fine adjustment of the incoming signal to the bandpass filter and to the 17 Kc 2nd oscillator.
- d. The AM/SSB Switch turns on the 17 Kc 2nd oscillator in the SSB position. This oscillator is used for carrier reinsertion for SSB, exalted carrier or BFO for CW.
- e. The AVC ON/OFF Switch provides overload protection for the first mixer by controlling the gain of the first I. F. amplifier.
- f. The AVC Fast/Slow Switch provides two time constants. Fast for SSB and AM signals, slow for CW signals.
- g. Noise limiter clips both positive and negative noise peaks.

2. TUNING PROCEDURE

A. SINGLE SIDEBAND SIGNALS.

1. CONTROL POSITIONS:

SSB-AM Switch	SSB
BAND SPREAD	ON ZERO
SSB Switch	Either UPPER or LOWER, depending on which reception is desired.
AVC ON/OFF	ON
AVC SLOW/FAST	SLOW for voice
NOISE LIMITER Switch	OFF until necessary

Tune the receiver for maximum momentary deflection on the S meter. This assures that the signal is centered in the receiver I. F. pass band. Tune the Band Spread knob on the Adapter very slowly for maximum intelligibility of the received signal. If the signal sounds garbled regardless of the Band Spread position, switch to the opposite sideband. For best AVC action, the R.F. gain of the receiver should be fully advanced. However, if reception is extremely noisy, the R. F. gain setting should be reduced.

B. AM SIGNALS.

CONTROL POSITIONS:

SSB-AM	AM
BAND SPREAD	ON ZERO
SSB Switch	Upper or Lower
AVC ON/OFF	ON
AVC SLOW/FAST	FAST for voice
NOISE LIMITER Switch	OFF until necessary

Tune the receiver for maximum deflection on the S meter. Turn the Band Spread knob on the Adapter very slowly for maximum intelligibility of the signal. Correct demodulation will occur when the carrier and one sideband are placed in the filter bandpass. If interference appears on the signal, switching sidebands will eliminate its effects. Returning the Band Spread control will again be required to bring the other Sideband and carrier back into the filter pass-band.

C. EXALTED CARRIER AM

1. CONTROL POSITION:

same as for SSB

2. The reception of H. F. AM signals may be accompanied by selective fading. The random fading of the carrier and its sidebands will produce considerable distortion. This can be eliminated by the demodulation of the signal with a locally generated carrier. This is accomplished in the GSB with the AM/SSB switch on SSB. Tune the Band Spread control to obtain a zero beat with the carrier. If interference is found, switching sidebands will eliminate it. No retuning of the Band Spread control is necessary.

D. CW SIGNALS.

Slow Switch on Slow.

1. CONTROL POSITIONS

Same as for SSB except AVC Fast/

2. CW may be received very simply with the GSB by simply tuning the Band Spread knob to obtain the desired audio tone.

SECTION IV ALIGNMENT

1. 17 Kc OSCILLATOR

With the AM/SSB switch on SSB the frequency of the 17 Kc second oscillator may be determined at the plate of the second mixer V5. Use of a frequency meter or E put counter will give direct readings of frequency while a lissajou pattern method using an accurate audio generator and oscilloscope will give an indirect method of measurement. Adjust C-24 until 17,000 cycles is obtained.

2. 472 Kc OSCILLATOR

Set the Sideband Switch in the UPPER position. Set the Band Spread dial at Zero. Con-

nect some frequency measuring device to the plate of V4 and adjust the slug in T1 until a frequency of 472 Kc is obtained.

3. 438 Kc OSCILLATOR

Set the Sideband Switch in the lower position. Follow the same procedure as for the 472 Kc Oscillator, but in this case C16 should be adjusted. An air test will tell if the upper and lower frequencies are correct. Tune in an AM signal with the AM/SSB Switch on SSB. Tune as for Exalted Carrier in the upper sideband position. When a zero beat is obtained switch to lower sideband. No change of zero beat should occur. If so re-adjust C16.

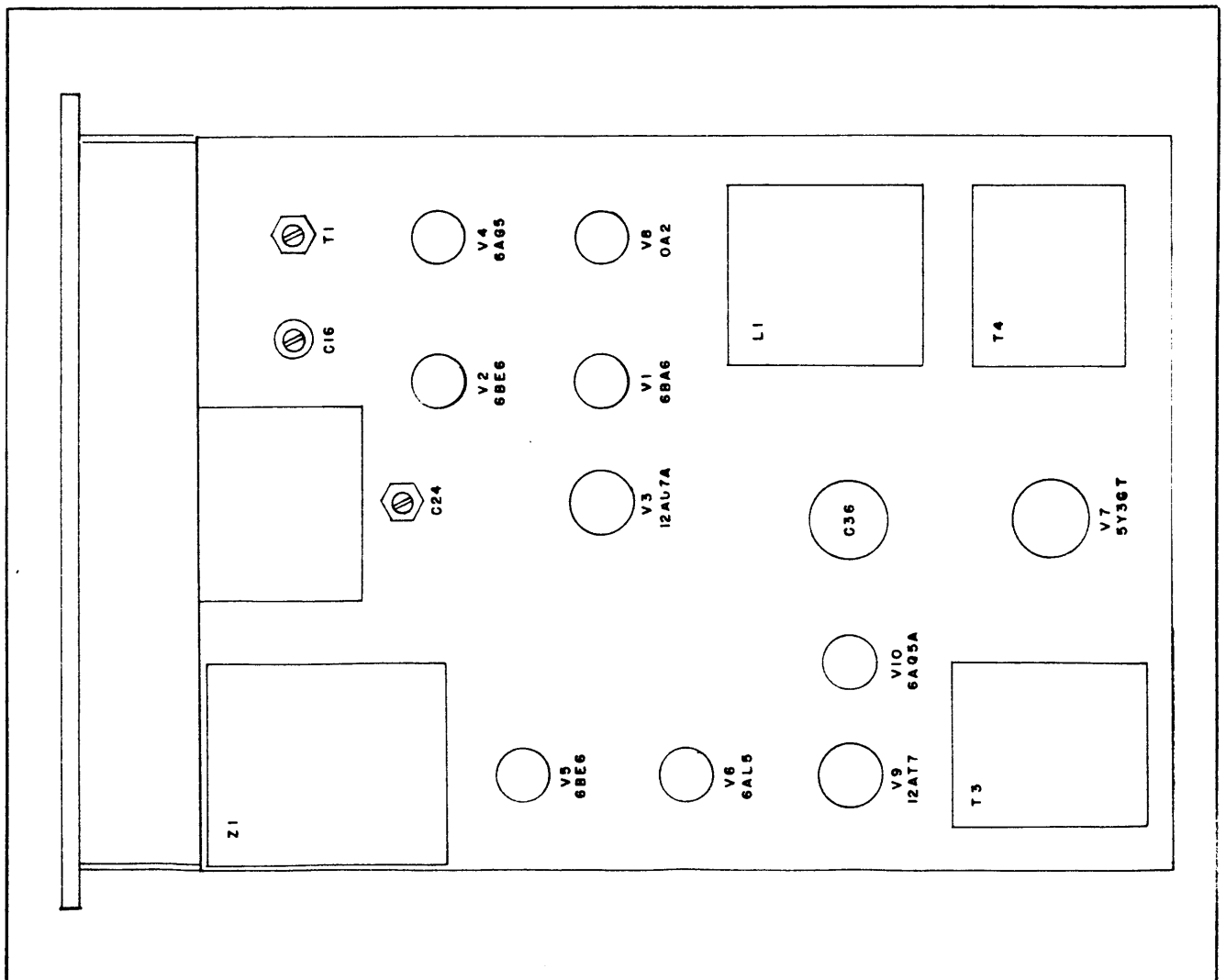


Figure 4-1. Top View, Outside of Chassis, Model GSB-1.

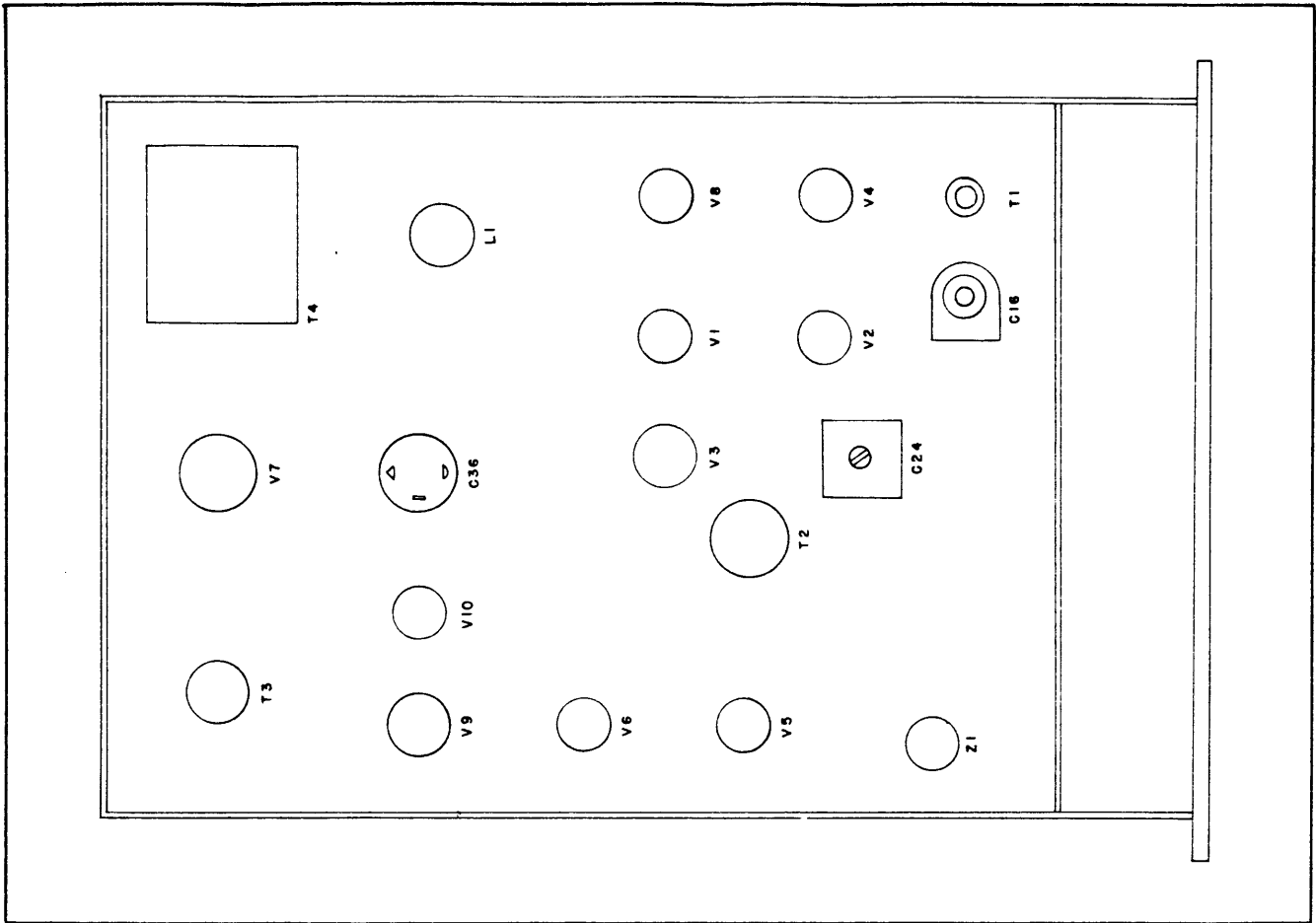


Figure 4-2. Bottom View, Inside of Chassis, Model GSB-1.

NOTE When no frequency calibration equipment is available, the GSB may be aligned to the receiver. The GSB Adapter has been aligned for use with a receiver with a 455 Kc I.F. If the receiver you are using is slightly different, but within range of 452-458 Kc, it may be aligned as follows:

Set the Band Spread dial at zero, the

Upper-lower sideband switch to Upper, the AM-SSB Switch to SSB. Tune in an AM signal on the receiver for maximum S meter deflection. Adjust the slug, in T1 for zero beat which then will give maximum intelligibility. Switch to lower sideband and adjust C16 for zero beat and maximum intelligibility. The GSB is now properly aligned.

SECTION V DATA

TABLE 5-1. TUBE VOLTAGES AND RESISTANCES

TUBE	TYPE	FUNCTION	SOCKET PIN NUMBERS								
			1	2	3	4	5	6	7	8	9
V1	6BA6	IF AMPL	-0.5	1.7	3.3*	3.3*	200	100	1.7		
V2	6BE6	1ST MIXER	-10	2.2	3.3*	3.3*	200	50	0		
V3	12AU7A	AVC AMPL - 17 KC OSC	140	-24	0	3.3*	3.3*	120	0	3.5	3.3*
V4	6AG5	1ST OSC	-12	0	3.3*	3.3*	115	90	0		
V5	6BE6	2ND MIXER	-18	0.6	3.3*	3.3*	170	85	0		
V6	6AL5	NOISE LIMITER	-0.1	-0.1	3.3*	3.3*	3.5		-1		
V7	5Y3GT	RECTIFIER	NC	260	NC	-5	NC	-5	NC	260	
V8	0A2	REGULATOR	150	NC	NC	0	NC	NC	NC		
V9	12AT7	1ST AUDIO	NC	NC	NC	3.3*	3.3*	100	0	0.8	3.3*
V10	6AQ5A	AUDIO OUTPUT	0	10	3.3*	3.3*	200	200	NC		

*=AC VOLTAGES

NC=NO CONNECTION

TUBE	TYPE	FUNCTION	SOCKET PIN NUMBERS								
			1	2	3	4	5	6	7	8	9
V1	6BA6	IF AMPL	3M	220	90	90	100K	100K	220		
V2	6BE6	1ST MIXER	22K	220	90	90	100K	100K	470K		
V3	12AU7A	AVC AMPL - 17 KC OSC	100K	100K	1	90	90	100K	470K	680	
V4	6AG5	1ST OSC	100K	0.5	90	90	100K	100K	0.5		
V5	6BE6	2ND MIXER	47K	120	90	90	100K	100K	15K		
V6	6AL5	NOISE LIMITER	200K	200K	90	90	2.2M	NC	2.2M		
V7	5Y3GT	RECTIFIER	NC	100K	NC	130	NC	130	NC	100K	
V8	0A2	REGULATOR	300K	NC	NC	0	NC	NC	NC		
V9	12AT7	1ST AUDIO	NC	NC	NC	90	90	100K	1M	220	
V10	6AQ5A	AUDIO OUTPUT	470K	300	90	90	100K	100K	NC		

CONDITIONS:

1. LINE — 115 VOLTS, 60 CPS.
2. AF GAIN CONTROL FULL CW.
3. AM/SSB SWITCH — SSB.
4. UPPER/LOWER SIDEBAND SWITCH — UPPER.
5. BANDSPREAD — ZERO.
6. AVC ON/OFF SWITCH — ON.
7. ALL MEASUREMENTS TAKEN WITH RESPECT TO GROUND USING A HEWLETT-PACKARD MODEL 410B VTVM OR EQUIVALENT.

K = THOUSAND
M = MILLION

PARTS LIST

SINGLE SIDEBAND ADAPTER, MODEL GSB-1

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
C1	CAPACITOR, fixed: ceramic; 120 mmfd., ±24 mmfd.; 500 wvdc; disc type.	IF Input Coupling Cap., V1	CC-101-4
C2	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type.	Screen Bypass Cap., V1	CC-100-16
C3	CAPACITOR, fixed: ceramic; 120 mmfd.; ±24 mmfd.; 500 wvdc; disc type. Same as C1.	Coupling Cap., V1	CC-101-4
C4	CAPACITOR, fixed: ceramic; 120 mmfd.; ±24 mmfd.; 500 wvdc; disc type. Same as C1.	IF Input Coupling Cap., V3A	CC-101-4
C5	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Cathode Bypass Cap., V3A	CC-100-16
C6	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Coupling Cap., V3A	CC-100-16
C7	CAPACITOR, fixed: ceramic; .001 mfd., ±200 mmfd., 500 wvdc; disc type.	AVC Filter Cap., V3A	CC-100-9
C8	CAPACITOR, fixed: paper; .05 mfd., +40%-20%, 400 wvdc; plastic tubular case.	AVC Filter Cap., V3A	CN-100-3
C9	CAPACITOR, fixed: ceramic; .001 mfd., ±200 mmfd., 500 wvdc; disc type. Same as C7.	Audio Coupling Cap., V19	CC-100-9
C10	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Cathode Bias Cap., V2	CC-100-16
C11	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Audio Output Coupling Cap., J2	CC-100-16
C12	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Screen Bypass Cap., V2	CC-100-16
C13	CAPACITOR, fixed: ceramic; .01 mfd., +80%-20%, 500 wvdc; disc type. Same as C2.	Decoupling Cap., V4	CC-100-16
C14	CAPACITOR, fixed: mica; 150 mmfd., ±5%, char. D; 500 wvdc.	Osc. Inj. Cap., V4	CM20D151J

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
C15	CAPACITOR, variable: air dielectric; one section, seven plates; 6.5 to 50 mmfd; round shaft, 19/32 in. lg., char. S.	Bandsread Tuning Cap.	CB118SRX050
C16	CAPACITOR; variable: ceramic; 7-45 mmfd., char. C; 500 wvdc.	438 Kc. Osc. Tank Trimmer, V4	CV11C450
C17	CAPACITOR, fixed: mica; 1300 mmfd., $\pm 2\%$; char. E; 500 wvdc.	p/o First Osc. Tank, V4	CM20E132G
C18	CAPACITOR, fixed: mica; 200 mmfd., $\pm 2\%$; char. E; 500 wvdc.	p/o 138 Kc. Osc. Tank, V4	CM20E201G
C19	CAPACITOR, fixed: mica; 1000 mmfd., $\pm 5\%$; char. E; 500 wvdc.	Osc. Grid Coupling	CM20E102J
C20	CAPACITOR, fixed: ceramic; .01 mfd., $+80\%-20\%$, 500 wvdc; disc type. Same as C2.	Screen Bypass Cap., V4	CC-100-16
C21	CAPACITOR, fixed: mica; 1000 mmfd., $\pm 5\%$; char. E; 500 wvdc. Same as C19.	17 Kc. Osc. Inj. Cap.	CM20E102J
C22	CAPACITOR, fixed: mica; 560 mmfd., $\pm 5\%$; char. B; 500 wvdc.	p/o Low Pass Filter	CM20B561J
C23	CAPACITOR, fixed: mica; 1500 mmfd., $\pm 2\%$; char. E; 500 wvdc.	p/o 17 Kc Osc. Tank	CM20E152G
C24	CAPACITOR, variable: mica; 100 to 550 mmfd., 4 plates; 500 wvdc.	17 Kc. Osc. Tank Trimmer	CV-100-304
C25	CAPACITOR, fixed: mica; 1000 mmfd., $\pm 5\%$; char. E; 500 wvdc. Same as C19.	Osc. Grid Coupling Cap.	CM20E102J
C26	CAPACITOR, fixed: ceramic; .01 mfd., $+80\%-20\%$; 500 wvdc; disc type. Same as C2.	Plate Bypass Cap., V3B	CC-100-16
C27	CAPACITOR, fixed: ceramic; .01 mfd., $+80\%-20\%$, 500 wvdc; disc type. Same as C2.	Cathode Bypass Cap., V5	CC-100-16
C28	CAPACITOR, fixed: ceramic; .01 mfd., $+80\%-20\%$, 500 wvdc; disc type. Same as C2.	Screen Bypass Cap., V5	CC-100-16
C29	CAPACITOR, fixed: ceramic; .01 mfd., $+80\%-20\%$, 500 wvdc; disc type. Same as C2.	Second Mixer Coupling Cap., V5	CC-100-16
C30	CAPACITOR, fixed: mica; 560 mmfd., $\pm 5\%$; char. B; 500 wvdc. Same as C22	p/o Low Pass Filter, V5	CM20B561J
C31	CAPACITOR, fixed: mica; 560 mmfd., $\pm 5\%$; char. B; 500 wvdc. Same as C22.	p/o Low Pass Filter, V5	CM20B561J

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
C32	CAPACITOR, fixed: ceramic; .001 mfd., ± 200 mmfd., 500 wvdc; disc type. Same as C7.	Filter Cap., V6	CC-100-9
C33	CAPACITOR, fixed: ceramic; .001 mfd., ± 200 mmfd., 500 wvdc; disc type. Same as C7.	Filter Cap., V6	CC-100-9
C34A, B	CAPACITOR, fixed: ceramic; two section; .01 mfd. G.M.V. 500 wvdc; disc type.	AC Line Bypass Cap.	CC-100-23
C35	CAPACITOR, fixed: ceramic; 5,000 uuf, GMV; 500 wvdc; disc type.	Audio Bypass Cap., Input, V10.	CC-100-15
C36A, B,C,D	CAPACITOR, fixed: electrolytic; quad. unit 10/30/15/30 mmfd.; 450 wvdc.	P.S. Filter Cap.	CE-104-1
CR1	CRYSTAL UNIT, rectifying: germanium.	AVC Rect.	1N34
E1	TERMINAL STRIP: feed-thru; five 6-32 binder head machine screws with solder lugs; phenolic body.	Output Terminals, T3	TM-116-5
F1	FUSE, cartridge: 2 amp.	Power Fuse	FU-100-2
I1	LAMP, incandescent: miniature; 6-8 volts, 250 ma. DC; T-3-1/4 frost bulb; bayonet base.	Power Indicator	BI-101-44 (AF)
J1,2	CONNECTOR, receptacle: electrical; female; dual contact; phono type.	IF Input & Audio Output Jack	JJ-144
J3	JACK, telephone: five contacts; six solder lug terminals; normally closed.	Phone Jack	JJ-132
L1	REACTOR, filter: 11.4 henries, 125 ma. max. current, DC. res. approx. 250 ohms; insulated for 2500 volts, RMS.	P.S. Filter	TF-158
R1	RESISTOR, fixed: composition; 220 ohms, $\pm 10\%$; 1/2 watt.	Cathode Res., V1	RC20GF221K
R2	RESISTOR, fixed: composition; 1,000 ohms, $\pm 10\%$; 1/2 watt.	Plate Load Res., V1	RC20GF102K
R3	RESISTOR, fixed: composition; 1 megohm, $\pm 10\%$; 1/2 watt.	T.C. Res., AVC Rect.	RC20GF105K
R4	RESISTOR, fixed: composition; 68,000 ohms, $\pm 10\%$; 1 watt.	Screen Grid Res., V1	RC32GF683K
R5	RESISTOR, fixed: composition; 470,000 ohms, $\pm 10\%$; 1/2 watt.	Grid Res., V1	RC20GF474K

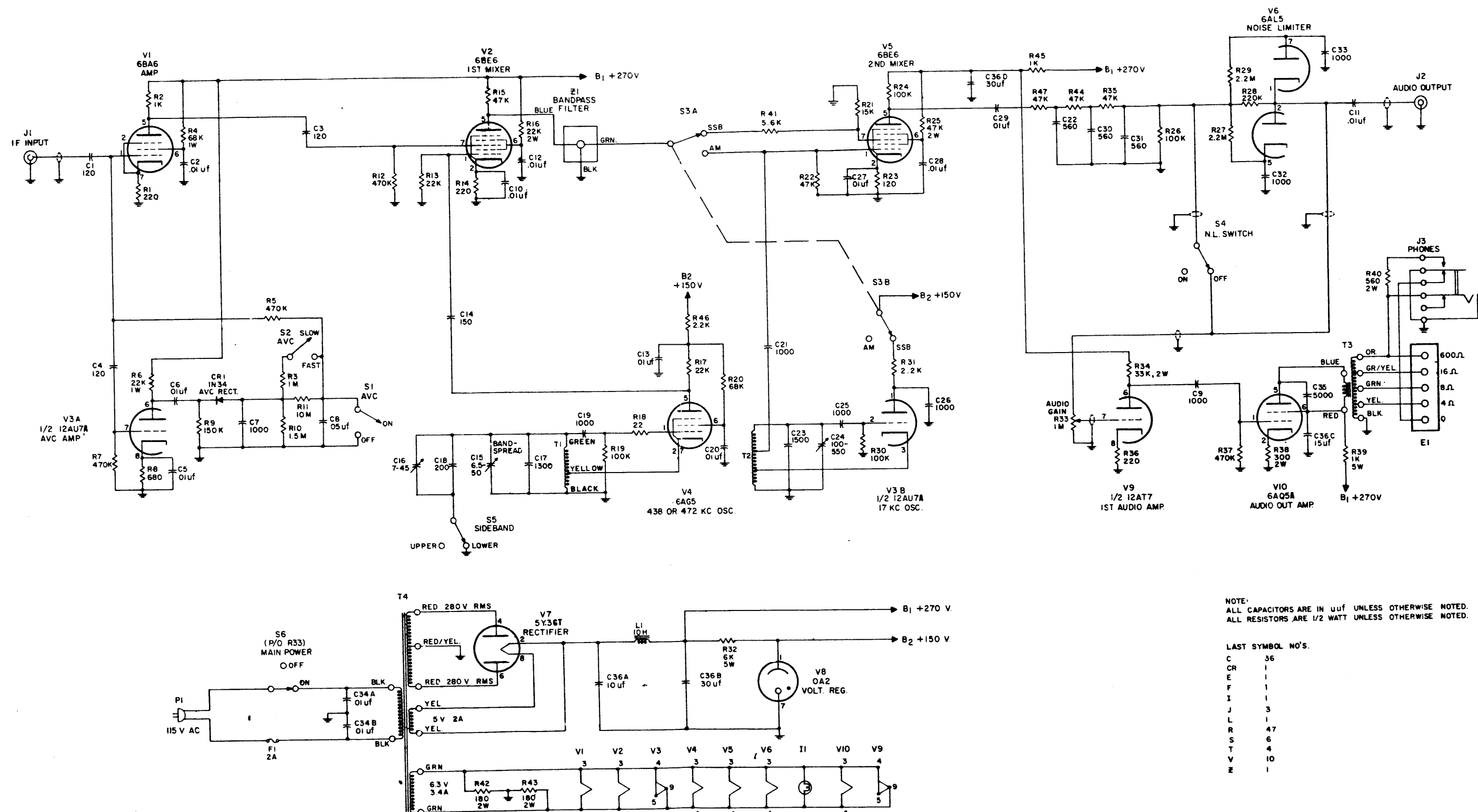
SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
R6	RESISTOR, fixed: composition; 22,000 ohms, $\pm 10\%$; 1 watt.	Plate Load Res., V3A	RC32GF223K
R7	RESISTOR, fixed: composition; 470,000 ohms, $\pm 10\%$; 1/2 watt. Same as R5.	Grid Res., V3A	RC20GF474K
R8	RESISTOR, fixed: composition; 680 ohms, $\pm 10\%$; 1/2 watt.	Cath. Bias Res., V3A	RC20GF681K
R9	RESISTOR, fixed: composition; 150,000 ohms, $\pm 10\%$; 1/2 watt.	Input Res., AVC Rect.	RC20GF154K
R10	RESISTOR, fixed: composition; 1.5 megohm, $\pm 10\%$; 1/2 watt.	Load Res., AVC Rect.	RC20GF155K
R11	RESISTOR, fixed: composition; 10 megohm, $\pm 10\%$; 1/2 watt.	T.C. Res., AVC Rect.	RC20GF106K
R12	RESISTOR, fixed: composition; 470,000 ohms, $\pm 10\%$; 1/2 watt. Same as R5.	Signal Grid Res., V2	RC20GF474K
R13	RESISTOR, fixed: composition; 22,000 ohms, $\pm 10\%$; 1/2 watt.	Osc. Inj. Grid Res., V2	RC20GF223K
R14	RESISTOR, fixed: composition; 220 ohms, $\pm 10\%$; 1/2 watt. Same as R1.	Cath. Bias Res., V2	RC20GF221K
R15	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 1/2 watt.	Plate Load Res., V2	RC20GF473K
R16	RESISTOR, fixed: composition; 22,000 ohms, $\pm 10\%$; 2 watts.	Screen Grid Res., V2	RC42GF223K
R17	RESISTOR, fixed: composition; 22,000 ohms, $\pm 10\%$; 1/2 watt. Same as R13.	Plate Load Res., V4	RC20GF223K
R18	RESISTOR, fixed: composition; 22 ohms, $\pm 10\%$; 1/2 watt.	Grid Limiting Res., V4	RC20GF220K
R19	RESISTOR, fixed: composition; 100,000 ohms, $\pm 10\%$; 1/2 watt.	Grid Res., V4	RC20GF104K
R20	RESISTOR, fixed: composition; 68,000 ohms, $\pm 10\%$; 1/2 watt.	Screen Grid Res., V4	RC20GF683K
R21	RESISTOR, fixed: composition; 15,000 ohms, $\pm 10\%$; 1/2 watt.	Grid Res., V5	RC20GF153K
R22	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 1/2 watt. Same as R15.	Grid Res., V5	RC20GF473K
R23	RESISTOR, fixed: composition; 120 ohms, $\pm 10\%$; 1/2 watt.	Cath. Bias Res., V5	RC20GF121K
R24	RESISTOR, fixed: composition; 100,000 ohms, $\pm 10\%$; 1/2 watt. Same as R19.	Plate Load Res., V5	RC20GF104K

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
R25	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 2 watts.	Screen Res., V5	RC42GF473K
R26	RESISTOR, fixed: composition; 100,000 ohms, $\pm 10\%$; 1/2 watt. Same as R19.	Low Pass Filter Load Res.	RC20GF104K
R27	RESISTOR, fixed: composition; 2.2 megohms, $\pm 10\%$; 1/2 watt.	Noise Limiter Filter Res., V6	RC20GF225K
R28	RESISTOR, fixed: composition; 220,000 ohms, $\pm 10\%$; 1/2 watt.	Noise Limiter Filter Res., V6	RC20GF224K
R29	RESISTOR, fixed: composition; 2.2 megohms, $\pm 10\%$; 1/2 watt. Same as R27.	Noise Limiter Filter Res., V6	RC20GF225K
R30	RESISTOR, fixed: composition; 100,000 ohms, $\pm 10\%$; 1/2 watt. Same as R19.	Grid Res., V3B	RC20GF104K
R31	RESISTOR, fixed: composition; 2,200 ohms, $\pm 10\%$; 1/2 watt.	Plate Decoupling Res., V3B	RC20GF222K
R32	RESISTOR, fixed: wire wound; 6,000 ohms, $\pm 5\%$; 5 watts.	Current Limiting Res., V8	RW-107-48
R33	RESISTOR, variable: composition; 1 megohm, $\pm 20\%$; 2 watts; W/ ON-OFF switch; 7/8 in. long, round shaft.	Audio Gain V9	RV4NBYSB105D
R34	RESISTOR, fixed: composition; 33,000 ohms, $\pm 10\%$; 2 watts.	Plate Load Res., V9	RC42GF333K
R35	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 1/2 watt. Same as R15.	p/o Low Pass Filter, V5	RC20GF473K
R36	RESISTOR, fixed: composition; 220 ohms, $\pm 10\%$; 1/2 watt. Same as R1.	Cath. Res., V9	RC20GF221K
R37	RESISTOR, fixed: composition; 470,000 ohms, $\pm 10\%$; 1/2 watt. Same as R5.	Grid Res., V10	RC20GF474K
R38	RESISTOR, fixed: composition; 300 ohms, $\pm 10\%$; 2 watts.	Cath. Bias Res., V10	RC42GF301K
R39	RESISTOR, fixed: wire wound; 1000 ohms, $\pm 5\%$; 5 watts.	Plate Decoupling Res., V10	RW-107-34
R40	RESISTOR, fixed: composition; 560 ohms, $\pm 10\%$; 2 watts.	Imp. Matching Res., J3	RC42GF561K
R41	RESISTOR, fixed: composition; 5600 ohms, $\pm 10\%$; 1/2 watt.	Grid Voltage Divider, V5	RC20GF562K
R42	RESISTOR, fixed: composition; 180 ohms, $\pm 10\%$; 2 watts.	Filament Balance Res.	RC42GF181K
R43	RESISTOR, fixed: composition; 180 ohms, $\pm 10\%$; 2 watts. Same as R42.	Filament Balance Res.	RC42GF181K

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
R44	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 1/2 watt. Same as R15.	p/o Low Pass Filter, V5	RC20GF473K
R45	RESISTOR, fixed: composition; 1000 ohms, $\pm 10\%$; 1/2 watt. Same as R2.	Plate Decoupling Res., V5	RC20GF102K
R46	RESISTOR, fixed: composition; 2200 ohms, $\pm 10\%$; 1/2 watt. Same as R31.	Plate Decoupling Res., V4	RC20GF222K
R47	RESISTOR, fixed: composition; 47,000 ohms, $\pm 10\%$; 1/2 watt. Same as R15.	p/o Low Pass Filter, V5	RC20GF473K
S1	SWITCH, toggle: SPST; 3 amps at 250 v., 6 amps at 125 v.; bat type toggle.	AVC ON/OFF Switch	ST-103-1-62
S2	SWITCH, toggle: SPST; 3 amps at 250 v., 6 amps at 125 v., bat type toggle. Same as S1.	AVC FAST/SLOW Switch	ST-103-1-62
S3 A,B	SWITCH, rotary: one section; three positions, two pole; phenolic insulation; contacts and wipers silver plated; 1/4 in. dia. shaft, flatted; 2-7/8 in. long.	AM-SSB Switch	SW-198
S4	SWITCH, toggle: SPST; 3 amps at 250 v., 6 amps at 125 v.; bat type toggle. Same as S1.	Noise Limiter	ST-103-1-62
S5	SWITCH, rotary: one section; two positions; one pole; phenolic insulation; contacts and wipers silver plated; 1/4 in. dia. shaft, flatted; 2-7/8 in. long.	Sideband Switch	SW-197
S6	SWITCH, ON-OFF: part of R33.	Power ON-OFF Switch	P/O R33
T1	TRANSFORMER, RF: 438 Kc and 472 Kc; 78 microhenries, ± 6 microhenries; $Q=60$ or greater; tapped at 29 microhenries, ± 2 microhenries, DC res. approx. 2 ohms.	1st Osc. Tank Transformer	A-1413
T2	TRANSFORMER, AF: 17 Kc; 43.5 millihenries, ± 1 millihenry; $Q=20$ or greater tapped at 100 and 250 turns; DC res. approx. 10 ohms.	17 Kc Osc. Tank Transformer	A-1382
T3	TRANSFORMER, AF: output; primary, 5000 ohms, 55 ma. DC current; secondary, 600 ohms, tapped at 16 ohms, 8 ohms, and 4 ohms; 4 audio watts max. output; insulated for 1000 volts.	Output Transformer	TF-159

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
T4	TRANSFORMER, power and filament: primary, 105/125 volts, 50/60 cps, single phase, three secondary windings; sec. #1, 5 volts, 2.0 amps; sec. #2, 280-0-280 volts, 90 ma; sec. #3, 6.3 volts, 3.4 amps; all windings insulated for 1000 volts.	Power Transformer	TF-168
V1	TUBE, electron: remote cut off RF pentode; 7 pin miniature.	IF Amplifier	6BA6
V2	TUBE, electron: heptode converter; 7 pin miniature.	First Mixer	6BE6
V3 A,B	TUBE, electron: medium mu duo triode; 9 pin miniature.	AVC Amp. & 17 Kc Osc.	12AU7A
V4	TUBE, electron: sharp cut off RF pentode; 7 pin miniature.	438 or 472 Kc Osc.	6AG5
V5	TUBE, electron: heptode converter; 7 pin miniature. Same as V2.	Second Mixer	6BE6
V6	TUBE, electron: duo diode; 7 pin miniature.	Noise Limiter	6AL5
V7	TUBE, electron: full-wave rectifier; octal socket.	Rectifier	5Y3GT
V8	TUBE, electron: voltage regulator; 7 pin miniature.	Voltage Regulator	OA2
V9	TUBE, electron: duo triode; 9 pin miniature.	First Audio Amp.	12AT7
V10	TUBE, electron: beam power amplifier; 7 pin miniature.	Audio Output Amp.	6AQ5A
W1	CABLE ASSEMBLY: power; consists of moulded non-polarized, two contact, male plug and six feet of 18/2SJ rubber covered cable; opposite end stripped.	Power Cable	CA-102-2
W2	CABLE ASSEMBLY: GSB-1 to GRP-90 interconnect; consists of two plugs, PL-147-2, and 36 in. of cable, RG-58A/U. (Supplied as a loose item)	Interconnect Cable	CA-318-36
XF1	HOLDER, fuse: extractor post type for single AGC type fuse; stationary end terminal.	Socket for F1	FH-100-2
XI1	SOCKET, bracket: for miniature bayonet base T3-1/4 bulb; right angle, down turned.	Socket for I1	TS-107-2
XV1	SOCKET, tube: 7 pin miniature.	Socket for V1	TS-130-MPW

SYM.	DESCRIPTION	FUNCTION	TMC PART NO.
XV2	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V2	TS-130-MPW
XV3	SOCKET, tube: 9 pin miniature.	Socket for V3.	TS-131-MPW
XV4	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V4	TS-130-MPW
XV5	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V5	TS-130-MPW
XV6	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V6	TS-130-MPW
XV7	SOCKET, tube: octal; ceramic.	Socket for V7	TS-101-P01
XV8	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V8	TS-130-MPW
XV9	SOCKET, tube: 9 pin miniature. Same as XV3.	Socket for V9	TS-131-MPW
XV10	SOCKET, tube: 7 pin miniature. Same as XV1.	Socket for V10	TS-130-MPW
Z1	FILTER, bandpass: output flat within 6 db from 17.3 Kc to 19.8 Kc; less than 3 db insertion loss at 18.6 Kc; input-output nominal impedance 20,000 ohms, steel case.	Bandpass Filter	FX-151



NOTE:
ALL CAPACITORS ARE IN uuf UNLESS OTHERWISE NOTED.
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE NOTED.

LAST SYMBOL NO'S.

C	36
CR	1
E	1
F	1
I	1
J	3
L	1
R	47
S	6
T	4
V	10
Z	1

Figure 5-1. Schematic Diagram, Model GSB-1