N.V. PARSONS
W6CWO

INSTRUCTION MANUAL

GONSET
GSB-101
LINEAR AMPLIFIER

MODEL 3262

GONSET
DIVISION OF
YOUNG SPRING & WIRE CORP.

A2904

801 S. MAIN ST. BURBANK, CALIF.

520-441

INSTRUCTION MANUAL

GONSET GSB-101 LINEAR AMPLIFIER

MODEL 3262

The Gonset GSB-101 linear amplifier provides approximately 10 db gain for SSB, AM, and CW exciters. The amplifier is of the grounded-grid type, and the excitation power appears in the output along with the amplified signal. The linear amplifier is complete with plate power and bias supplies included in the same cabinet, thus eliminating external power wiring. An antenna change-over relay is included, with connectors for the main antenna and the receiver antenna lead.

The GSB-101 linear amplifier may be used with an exciter capable of delivering approximately 75 watts of RF drive into a nominal 50 ohm load (input) impedance. The unit forms an ideal companion amplifier for the Gonset GSB-100 transmitter used as an exciter. All of the external connections to the amplifier are provided through terminals on the back of this exciter. The GSB-101 cabinet size and styling are the same as the GSB-100; the two are physically matched units.

SPECIFICATIONS

POWER INPUT TO AMPLIFIER	1200 watts PEP (SSB) 900 watts (CW) 400 watts (AM)
POWER OUTPUT TO ANTENNA	800 watts PEP (SSB) 700 watts (CW) 160 watts carrier (AM)
POWER CONSUMPTION	1500 watts peak approx.
TUBE COMPLEMENT	(4) 811A, (2) 866A
OUTPUT IMPEDANCE	50 ohms nominal, with SWR less than 3:1
INPUT IMPEDANCE	50 ohms nominal

CAUTION

FOR MAXIMUM TUBE LIFE, LINE VOLTAGE SHOULD BE MAINTAINED AS CLOSE TO 117 VOLTS AS POSSIBLE, AND AT NO TIME ALLOWED TO DROP BELOW 110 VOLTS OR EXCEED 125 VOLTS. EQUIPMENT IS DESIGNED FOR 60 CYCLE OPERATION, AND NO ATTEMPT SHOULD BE MADE TO OPERATE ON 50 CYCLE CURRENT.

ANTENNAS

Any of the common antenna systems designed for use on the high-frequency amateur bands may be used with the GSB-101 or GSB-100 and 101 combination, providing the input impedance to the transmission line is not outside the limits of the output matching network of the units. An antenna system that reflects an SWR on 50 ohm or 70 ohm coaxial line below approximately 3:1 on the proposed operating frequency, or a system that results in a transmission line input impedance that is essentially resistive and between about 30 and 200 ohms, will take power from the GSB-101 with very little difficulty.

If "tuned" open-wire transmission line is used to excite the antenna, a suitable antenna tuner should be used between the transmitter output and the transmission line to provide a reasonable impedance match between the unbalanced coaxial output and the balanced open-wire line. Methods of constructing and operating tuners of this sort are described in detail in the ARRL Antenna Handbook and similar publications.

For operation on the 20 meter, 15 meter, and 10 meter amateur bands, the efficiency of the station will be greatly increased if a good directional rotary beam antenna is used. The Gonset 3-bander antennas, Model #3219 (2 element) and #3220 (3 element) are excellent beams for this purpose, providing exceptional gain on all three bands with a single antenna installation. For single-band operation with adequate gain in a small structure area, the Gonset Bantam series of antennas will also do an excellent job.

For operation on the 75-80 or 40 meter bands, a simple dipole antenna, cut to resonance in the most-used portions of the band, will perform satisfactorily. The height of the antenna should be great enough to prevent undue ground losses and similar effects.

INSTALLATION

The installation details are shown on the accompanying diagrams.

When the GSB-101 is installed with the GSB-100 used as an exciter, all the necessary T-R functions are provided by the exciter. Attach the antenna transmission line (RG-8/U, etc.) to the indicated connector with a type 83-1SP or equivalent connector. Interconnect the exciter and amplifier with a length of RG-8/U cable terminated at both ends with type 83-1SP connectors. The cable length should not exceed 4 feet.

Remove the shorting strap from the bias strip and interconnect the -100 terminals of the exciter and the amplifier. A connection between the ground terminals is not required when a DC ground return is provided elsewhere, as through the coaxial line shield.

Interconnect the ANT RELAY plug and socket on the exciter and amplifier, respectively, with the "cheater" cord supplied. Plug in the amplifier, and the installation is complete.

When the GSB-101 is installed with an exciter other than the GSB-100, the external connections may vary, depending on the facilities of the exciter. The amplifier may be completely "cut off" during receive periods by the application of approximately -100 volts between the terminals on the BIAS strip, after first removing the shorting strap. This bias is optional, and simply prevents residual rectifier "hash" from interfering with reception. In any case, if this bias is used, it must be removed during transmission periods, and the -100 terminal automatically grounded through an appropriate relay circuit.

The antenna change-over relay will actuate during transmission periods when keyed; 115 VAC line power is applied to the ANT RELAY connector via the cheater cord supplied. In many installations, the same T-R relay is used to remove the cut off bias and actuate the antenna change-over relay when operation is changed from transmit to receive.

OPERATION

To place the linear amplifier into operation perform the following steps:

(1) Turn the POWER switch on (up position). The yellow pilot lamp will light. Wait at least one full minute for the 866-A rectifier filaments to reach operating temperature. Turn the METER SWITCH to PLATE MA position (full counterclockwise).

(2) Turn the PLATE switch on (up position). The red pilot lamp will light, and the meter will read approximately 60 ma. * Switch the BAND SWITCH to the proper band. On the 80 meter band, set it to 80A position. Rotate the FINAL LOADING control to MIN.

(3) Activate the exciter and load it into the amplifier input in the normal manner until the amplifier meter reads approximately 200 ma. Be sure the antenna relay is actuated, and that any cut-off bias (external) is removed. QUICKLY rotate the FINAL TUNING control for a pronounced "dip" in meter reading, indicating resonance.

(4) Rotate the FINAL LOADING control clockwise in small increments, continually resetting the FINAI TUNING control for minimum plate current. As the LOADING control is advanced, the minimum plate current will increase steadily at resonance. Continue this procedure until the meter once again reads approximately 200 ma. On the 80 meter band, it may be necessary to advance the BAND SWITCH to the 80B or 80C position to obtain loading.

CAUTION

Do not switch the BAND SWITCH without first turning the PLATE switch to OFF.

Also, return the FINAL LOADING control to MIN position and repeat the loading procedure when the BAND SWITCH is advanced from 80A to 80B, or from 80B to 80C position.

PHONE BAND 80 C

(5) When the amplifier is loaded to approximately 200 ma., increase the excitation from the driver until the plate current increases to approximately 600 ma. Readjust the FINAL TUNING control, if necessary to maintain resonance.

(6) Turn the METER SWITCH into the OUTPUT IND range and adjust the control for a meter reading of approximately 7. Continue to increase the FINAL LOADING control clockwise, adjusting the FINAL TUNING control for MAXIMUM meter reading, until you reach the point where further increase in loading does not cause a corresponding increase in meter reading. Adjust the FINAL LOADING control just slightly clockwise beyond this "leveling off" point. Adjust the METER SWITCH control knob as necessary to keep the meter on scale during this procedure. As soon as the "slightly overloaded" point is found, remove the excitation from the driver.

CAUTION

This step must be performed as quickly as possible to avoid damage to the amplifier tubes through excessive plate dissipation.

The amplifier is now properly adjusted for class B linear operation under SSB conditions. The procedure for adjustment for AM operation is basically similar, except that the excitation must be reduced so that the plate current does not exceed 275 ma. during prolonged carrier-present operation.

For CW operation, the loading

* Without external bias. With external bias (-100 V), meter will read zero.

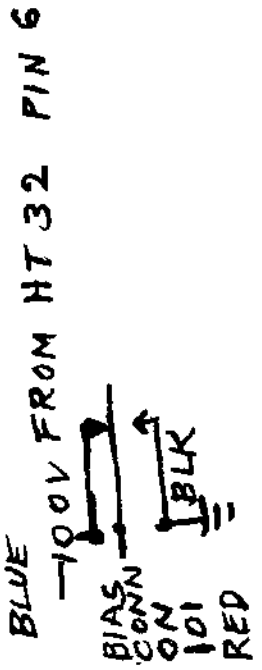
should be adjusted (loading control rotated COUNTERCLOCKWISE) until the RF level on the meter is approximately 90% of its maximum value at the "leveling off" point described above. Under no conditions should the excitation be increased beyond the point where the meter reading ceases to increase (levels off) as carrier is inserted. The output does not increase after the meter reading reaches its peak, but spurious emission increases rapidly as the drive becomes excessive. When properly tuned for CW operation, plate current will be between 550 and 600 ma.

NOTE

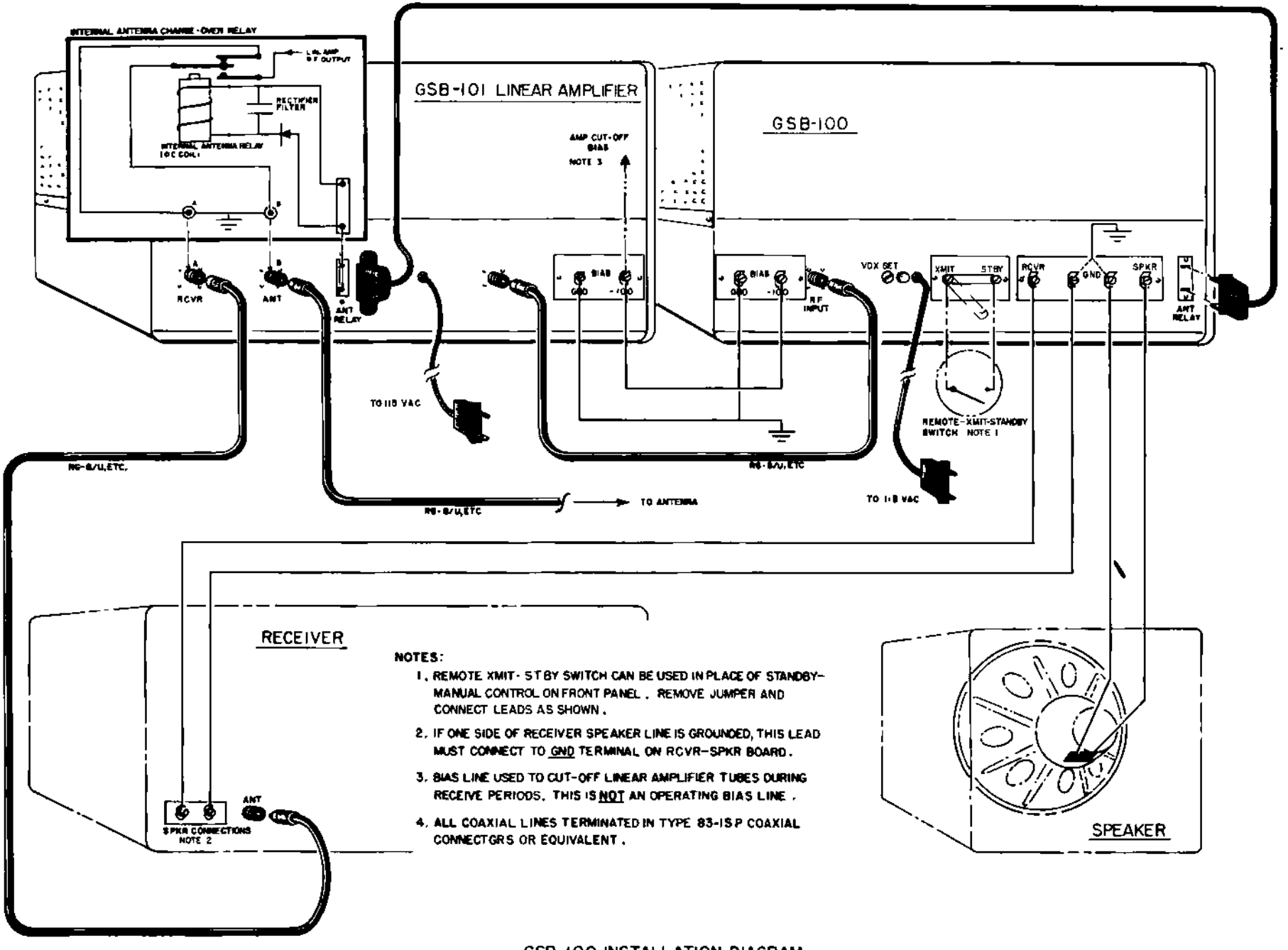
If you are unable to load the amplifier properly while performing the above steps, the antenna (or transmission line input) impedance is probably outside the limits into which the amplifier can deliver power. See paragraphs on ANTENNAS.

(7) When loading is complete, the amplifier is ready for service. During SSB operation, the plate current should "kick up" to approximately 300 ma. on max voice peaks. When the OUTPUT IND control has been adjusted for a full-scale reading (8) with full carrier inserted, the meter should "kick up" to approximately 6 on voice peaks.

During AM linear operation, the plate current should remain substantially constant, but the output meter should move upward by a slight but perceptable amount during modulation.



TYPICAL CONNECTIONS FOR GSB-100 USED AS AN EXCITER
FOR GSB-101 LINEAR AMPLIFIER



NOTES:

1. REMOTE XMIT-STBY SWITCH CAN BE USED IN PLACE OF STANDBY-MANUAL CONTROL ON FRONT PANEL. REMOVE JUMPER AND CONNECT LEADS AS SHOWN.
2. IF ONE SIDE OF RECEIVER SPEAKER LINE IS GROUNDED, THIS LEAD MUST CONNECT TO GND TERMINAL ON RCVR-SPKR BOARD.
3. BIAS LINE USED TO CUT-OFF LINEAR AMPLIFIER TUBES DURING RECEIVE PERIODS. THIS IS NOT AN OPERATING BIAS LINE.
4. ALL COAXIAL LINES TERMINATED IN TYPE 83-1SP COAXIAL CONNECTORS OR EQUIVALENT.

GSB-100 INSTALLATION DIAGRAM

505-071

CIRCUIT DESCRIPTION

Refer to the schematic diagram, Drawing #510-054. The amplifier uses four type 811A triodes connected in parallel, with the grids by-passed for RF with capacitors C2 - C5. Excitation is fed to the filament circuit through C6 and L3 from RF input connector J1. Reactance L3 provides an impedance match to the input to permit full drive on the higher bands. RF chokes RFC-1 and RFC-2 isolate the tube filaments for the RF excitation, but pass 60 cycle AC filament current to light the tubes. Iron core chokes are used to gain maximum inductances while limiting the I^2R power loss developed by the filament current. A separate link inductance on RFC-1 together with capacitor C_N provide a feedback path from the plate circuit of proper phase to stabilize the amplifier.

A Pi-network output circuit (C9, L1, L2, C10-C13 and S3) matches a wide range of load impedances by switching both the inductance and parallel capacitance with a single control. On the 75-80 meter band, capacitors C11, C12, and C13 are in parallel with C10 on the lowest-impedance position, with C13 and C12 dropped in sequence as the bandswitch is advanced. Capacitor C11 remains in parallel with C10 in the 80C and 40 meter positions, but is dropped out in the 20, 15, and 10 meter positions. This arrangement results in single-knob switching control of both the band of operation and the "coarse" loading adjustment.

Diode V5 (9006) samples RF through capacitor C14, rectifies this voltage, and feeds the resulting DC through to front panel meter M1 via potentiometer R9 and meter switch S4. The resultant meter reading provides a measure of relative output level as an aid while tuning and loading the amplifier.

Operating bias (-4 volts approximately) for the grids is developed by CR-1 from a bias winding on T1. The voltage, filtered by C1, is stabilized by bleeder R5. The bias ground return is strapped across BIAS strip TB1 on the back panel of the amplifier. Additional bias to cut off the amplifier tubes during reception may be applied externally across the terminal strip, as explained in the installation instructions.

Antenna change-over relay RLY-1 is externally actuated via 115 VAC applied to RLY strip J4. DC operating voltage for the relay is developed from the keyed AC input by the rectifier-filter circuit CR2, C16, R7, R8. The DC operation results in a quiet relay action. The relay contacts ground the receiver antenna lead during transmission, thus preventing excessive RF voltage from developing across the receiver input.

Primary power switches S1 and S2 are connected so that it is impossible to inadvertantly apply plate voltage to the 866-A rectifier tubes before the filament voltage has been applied, or to remove the filament voltage before plate voltage has been removed, regardless of the switch sequence used.

CHASSIS REMOVAL

To remove the chassis and panel assembly from the cabinet, perform the following steps:

(1) Remove the 8 screws holding the front panel to the cabinet.

(2) Remove the 4 screws holding the chassis to the cabinet back-plate.

(3) Disconnect all leads on the rear of the GSB-101 cabinet. Unplug the power cord and make sure the cord and plug are free to slide as the chassis is withdrawn.

(4) Carefully slide the chassis forward free of the cabinet, letting the power cord slide through the cabinet.

(5) To replace the chassis and panel assembly, reverse the above steps.

NEUTRALIZING ADJUSTMENT

The only required alignment procedure on the GSB-101 is the neutralizing adjustment. This adjustment is pre-set at the factory, and ordinarily will not require attention throughout the normal life of the amplifier. If the neutralizing adjustment must be re-set for any reason, use the following procedure:

(1) Remove the GSB-101 chassis from the cabinet.

CAUTION

High voltage that may cause severe injury or death is exposed when power is applied while the GSB-101 chassis is out of the cabinet. Use extreme care while working on the chassis when power is applied. Be particularly careful to avoid contact with the 811A or 866A plate caps or surrounding circuitry.

(2) Reconnect leads as necessary, and set up the amplifier for operation on the 10 meter band. Excite and load the amplifier in the normal manner.

(3) With the METER SWITCH in the PLATE MA position, rotate the FINAL TUNING control for minimum plate current. If necessary, back off (reduce) the loading slightly and re-resonate the circuit for definite, positive indication of resonance.

(4) Switch the METER SWITCH into the OUTPUT IND range and adjust for approximate full-scale reading.

(5) Readjust the FINAL TUNING control, this time for MAXIMUM meter reading. If the amplifier requires neutralization, the setting of the FINAL TUNING control for maximum output will not exactly correspond to the setting for minimum plate current.

(6) Using an insulated (preferably fiber or polystyrene) screwdriver, adjust the neutralizing capacitor (adjacent to the plate tuning capacitor, near the front panel) approximately 1/2 turn in either direction.

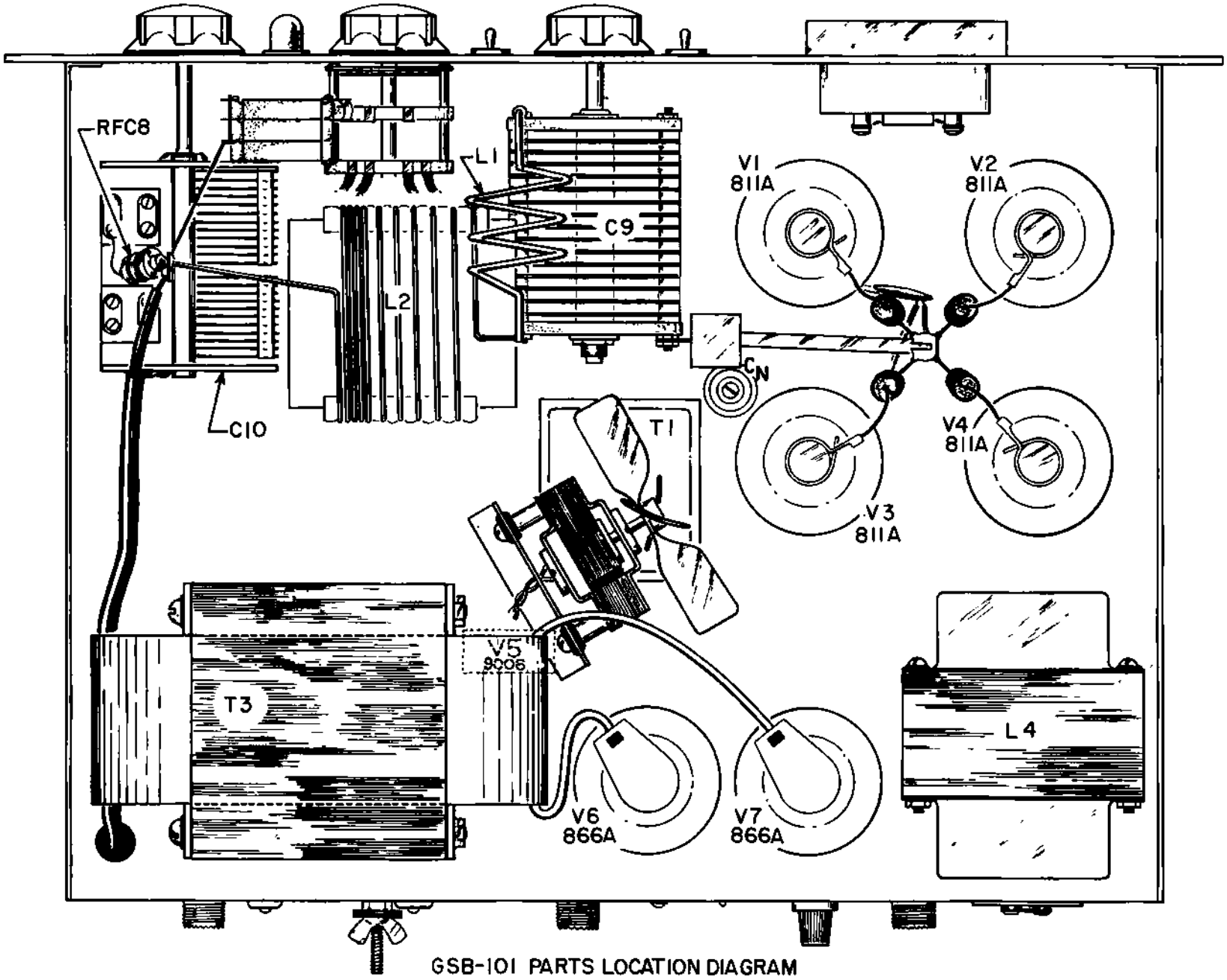
(7) Repeat steps 3, 4, and 5. If the neutralizing capacitor was adjusted in the proper direction, the setting of the FINAL TUNING capacitor for minimum plate current will more nearly coincide with the setting for maximum RF output.

(8) Continue adjusting the neutralizing capacitor in the proper direction while repeating steps 3, 4, and 5 until the FINAL TUNING capacitor setting for minimum plate current exactly coincides with the setting for maximum RF output. When this occurs, the amplifier is properly neutralized. Close the lid and replace the four front panel mounting screws.

LUBRICATION AND MAINTENANCE

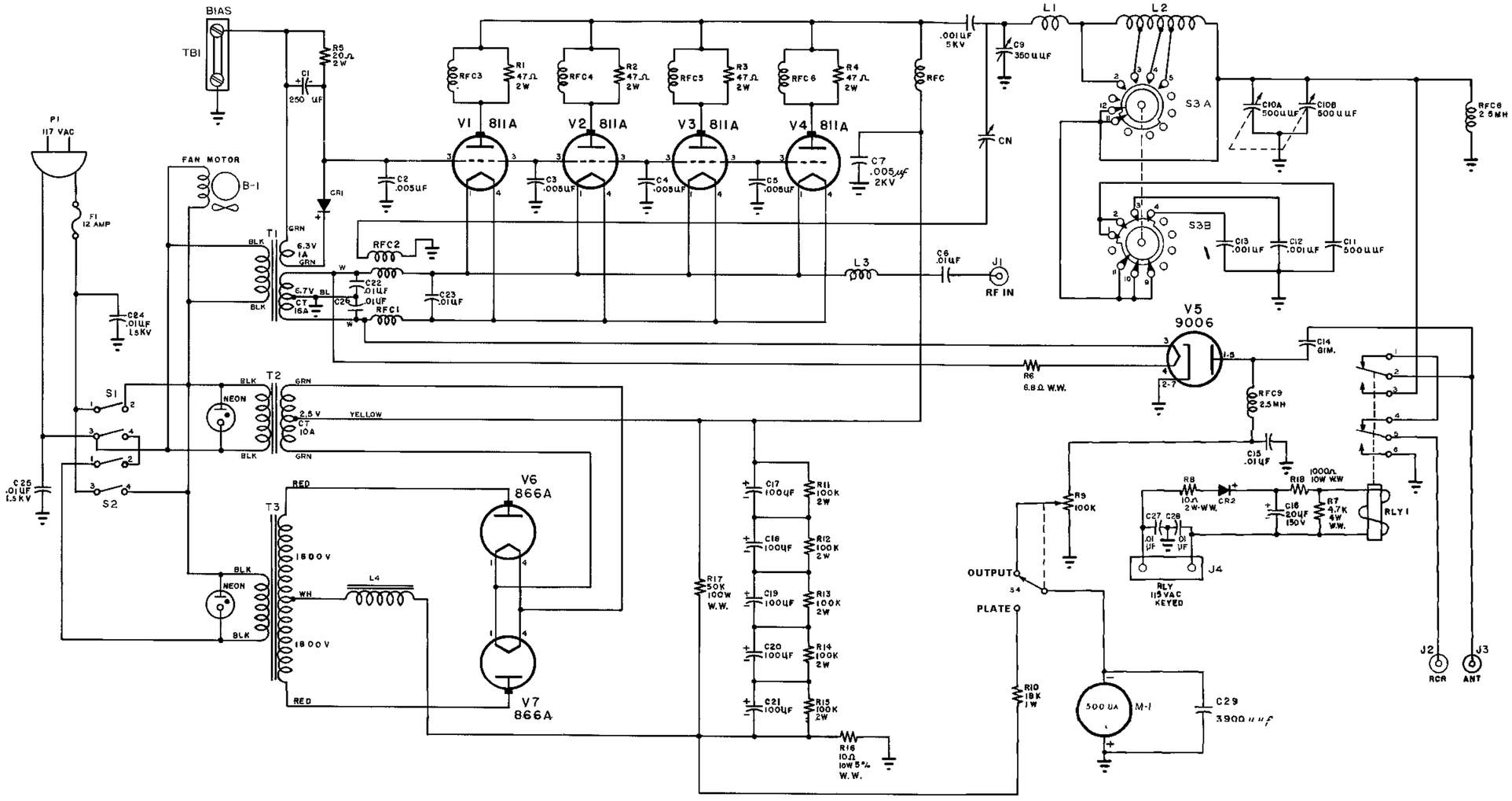
The blower motor should be lubricated approximately once every sixty days during normal operation; it may be lubricated less frequently if the unit is used only occasionally. Before lubricating the motor, turn off all power to the unit. Remove the chassis from the cabinet. Drip two or three drops of medium light machine oil through the oil holes above the front and rear motor shaft bearings to saturate the felt oil retaining pads.

Whenever the chassis is removed from the cabinet, the fan blade, motor, 811A tubes, and surrounding components should be wiped clean of accumulated dust and other foreign material. This can be done conveniently during the regular blower lubrication procedure.



GSB-101 PARTS LOCATION DIAGRAM
TOP VIEW

505-118



NOTES:

1. BAND SWITCH VIEWED FROM THE REAR WITH KNOB IN THE 80 "A" POSITION
2. ALL RESISTORS ARE ½ WATT UNLESS OTHERWISE SPECIFIED.
3. ALL RESISTORS ARE COMPOSITION UNLESS OTHERWISE SPECIFIED.

GONSET BURBANK, CALIF		
ENG CH/K	SCHEMATIC LINEAR AMP. MODEL NO. 3262	PROJ. 212
DWN TL		510-054
CKD WD 10-16-59		
APP CH/K		

SCHEMATIC NO.		GONSET PART NO.
C1	250 µF @ 15 WVDC ELECTROLYTIC	073-078
C2	.005 µF MICA 500 WVDC ±20%	087-018
C3	.005 µF MICA 500 WVDC ±20%	087-018
C4	.005 µF MICA 500 WVDC ±20%	087-018
C5	.005 µF MICA 500 WVDC ±20%	087-018
C6	.01 µF DISC GMV	072-103
C7	.005 µF DISC @ 2 KVDC	072-179
C8	.001 µF CYLINDRICAL 5 KVDC	077-014
C9	350 µµF VARIABLE, FINAL PLATE	074-089
C10-A	500 µµF	
C10-B	500 µµF DUAL VARIABLE, FINAL LOAD	074-090
C11	500 µµF MICA ±10%	087-062
C12	.001 µF MICA ±10%	087-063
C13	.001 µF MICA ±10%	087-063
C14	WIRE GIMMICK	-
C15	.01 µF DISC GMV	072-103
C16	20 µF @ 150 WVDC ELECTROLYTIC	073-010
C17	100 µF @ 450 WVDC ELECTROLYTIC	073-077
C18	100 µF @ 450 WVDC ELECTROLYTIC	073-077
C19	100 µF @ 450 WVDC ELECTROLYTIC	073-077
C20	100 µF @ 450 WVDC ELECTROLYTIC	073-077
C21	100 µF @ 450 WVDC ELECTROLYTIC	073-077
C22	.01 µF DISC GMV	072-103
C23	.01 µF DISC GMV	072-103
C24	.01 µF DISC @ 1500 WVDC	072-123
C25	.01 µF DISC @ 1500 WVDC	072-123
C26	.01 µF DISC GMV	072-103
C27	.01 µF DISC @ 1500 WVDC	072-123
C28	.01 µF DISC @ 1500 WVDC	072-123
C29	3900 µµF SILVER MICA ±5%	088-125
C_N	NEUTRALIZING CAPACITOR	074-098

R1	47 Ω 2 WATT ±10%	044-470
R2	47 Ω 2 WATT ±10%	044-470
R3	47 Ω 2 WATT ±10%	044-470
R4	47 Ω 2 WATT ±10%	044-470
R5	20 Ω 2 WATT ±5%	048-200
R6	6.8 Ω 1/2 WATT ±5% WIRE WOUND	058-688
R7	4700 Ω 4 WATT ±10% WIRE WOUND	049-015
R8	10 Ω 2 WATT ±5% WIRE WOUND	061-100
R9	100K Ω POTENTIOMETER (W. SWITCH)	052-017
R10	19K Ω 1 WATT ±5%	047-183
R11	100K Ω 2 WATT ±10%	044-104
R12	100K Ω 2 WATT ±10%	044-104
R13	100K Ω 2 WATT ±10%	044-104
R14	100K Ω 2 WATT ±10%	044-104
R15	100K Ω 2 WATT ±10%	044-104
R16	10 Ω 10 WATT ±5% WIRE WOUND	049-029
R17	50K Ω 100 WATT WIRE WOUND	049-036
RFC-1	FILAMENT CHOKE	027-043
RFC-2	FILAMENT CHOKE W. NEUTRALIZING COIL	027-044
RFC-3	PARASITIC CHOKE	026-007
RFC-4	PARASITIC CHOKE	026-007
RFC-5	PARASITIC CHOKE	026-007
RFC-6	PARASITIC CHOKE	026-007
RFC-7	FINAL RF CHOKE	027-046
RFC-8	RF CHOKE 2.5 MH	027-047
RFC-9	RF CHOKE 2.5 MH	027-047
R18	1000 Ω 5 WATT ±10% WIRE WOUND	049-034

L1	FINAL TANK COIL 10 METERS	011-092
L2	FINAL TANK COIL 80 - 15 METERS	012-067
L3	CATHODE COIL	011-096
L4	FILTER CHOKE	274-012
M1	METER 500 µA MOVEMENT	112-008
T1	FILAMENT TRANSFORMER	275-002
T2	RECTIFIER FILAMENT TRANSFORMER	275-001
T3	PLATE TRANSFORMER	271-024
B1	FAN MOTOR	115-001
F1	FUSE, TYPE 3AB 12A @ 250 V	482-021
J1	COAXIAL RECEPTACLE (AMPHENOL 83-1R)	344-011
J2	COAXIAL RECEPTACLE (AMPHENOL 83-1R)	344-011
J3	COAXIAL RECEPTACLE (AMPHENOL 83-1R)	344-011
J4	CHASSIS INTERLOCK RECEPTACLE	344-020
S1	TOGGLE SWITCH DPST 15A @ 125 V	172-016
S2	TOGGLE SWITCH DPST 15A @ 125 V	172-016
S3	BAND SWITCH	171-064
S4	PART OF R9 POTENTIOMETER	-
CR-1	SILICON RECTIFIER 140 V @ 500 MA	474-001
CR-2	SILICON RECTIFIER 140 V @ 500 MA	474-001
RLY1	ANTENNA RELAY DPDT 120 VDC COIL	111-020
TB1	TERMINAL BOARD	147-013
P1	AC PLUG WITH LINE CORD (#16 WIRE)	696-011
NEON	NEON GLOW LAMP (G-E #NE-51)	481-002

REPLACEMENT PARTS LIST

GONSET PART NO.	DESCRIPTION	NO. REQ.
211-023	KNOB, 2 INCH DIA.	3
211-020	KNOB, 1 INCH DIA.	1
505-072	FRONT PANEL	1
258-213	SCREWS FOR FRONT PANEL (PAINTED)	8
311-006	STAND-OFF INSULATOR 1/2 INCH	4
311-016	STAND-OFF INSULATOR 2 1/2 INCH	2
352-010	PLATE CAP, CERAMIC	2
352-011	PLATE CLIP	4
115-004	FAN BLADE	1
338-002	PLUG-IN BASE SILICON RECTIFIER	2
337-008	FUSE HOLDER	1
341-538	TUBE SOCKET, 4 PIN CERAMIC	6
455-045	MOUNTING BOARD, FILTER CAPACITORS	1
222-001	RUBBER FEET	4
465-053	CABINET ASSEMBLY	1