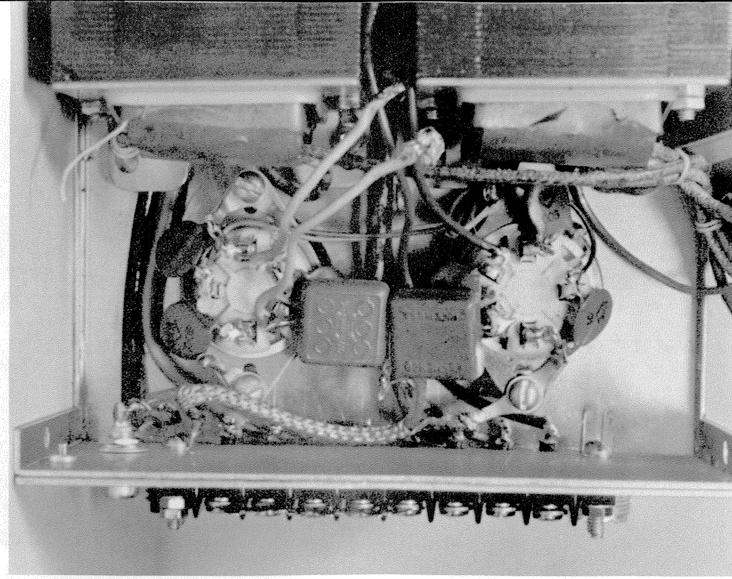
GROUNDED GRID — LINEAR AMPLIFIER — 500 WATTS OUTPUT CW

Parallel connected GL814 tubes — Design data: Min. EP 2000 Max. EP 2500, Optimum EP 2250. For SSB Linear operation load to 300 MA total IP, with 75MA total Igl.

Meter Switch Position	Reading	Position	Loading Capacity	Band
1 = watts reflected	X50	1 = fine	10 to 325	10
2 = watts forward	X500	2 = adds 300	325 to 625	15 to 20
3 = Ik MA right 814	X250	3 = adds 300	625 to 925	20
4 = Ik MA left 814	X250	4 = adds 300	925 to 1225	40
5 = Ig2 MA right 814	X50	5 = adds 300	1225 to 1525	
6 = Ig2 MA left 814	X50	6 = adds 300	1525 to 1825	75
7 = Ig1 MA right 814	X100	7 = adds 300	1825 to 2125	80
8 = Ig1 MA left 814	X100	8 = adds 300	2125 to 2425	

INFORMATION on operating conditions for the GL814 tubes in the SSB-600 grounded-grid linear amplifier. Loading capacitor data and readings obtained in various metering circuits also are given.



CLOSEUP VIEW of GL-814 tube sockets with filament r.f. choke removed. Shortest leads are used on bypass capacitors on tube sockets. Capacitors in middle are 0.01-mfd. for r.f. input coupling to tube filaments.

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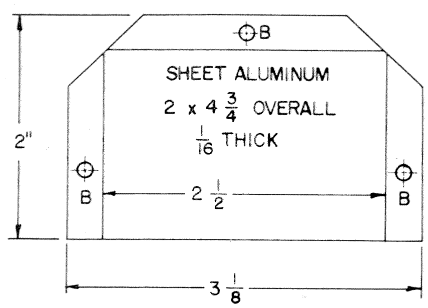
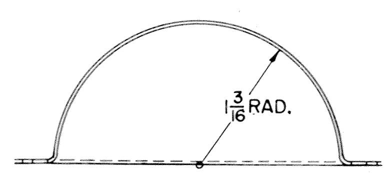
peak seen on the scope by comparing the amplitude of the deflections in inches or some arbitrary units. Most scopes have translucent graphs permanently attached to the scope face. If yours does not, then attach a temporary one.

If 10 divisions on the scope face equals the 500-watt output calibration, turn up the gain until 12.2+ divisions of clean output is read. How many peak watts output is it? Remember $\frac{E^2}{R}$=watts output and the "R" in this case is a constant so the E^2 can be related directly to watts. If the first E reading equals 10, the first E^2 equals 100. Therefore, 100—500 watts. If the second E reading equals 12.2+, the second E^2 equals 150 in round numbers. Now by the simple proportion 100:150 equals 500:X, the 12.2+ scope reading represents 750 watts peak. If your scope shows a reading on this arbitrary scale of 14+, it will be indicating a nice 1-kilowatt peak power output. Remember that when using a scope, voltage is being measured. In a given circuit, when the voltage indication doubles, the power has quadrupled. When the power in an antenna is multiplied by four, it equals 6 decibels increase in signal strength, or one big "S" unit.

All things considered, the SSB-600 linear amplifier will do a mansize job if you build it right, tune it right, and most important, operate it right!



METER SHIELD-TOP VIEW



METER SHIELD - FRONT VIEW

FIG. 4. DETAIL VIEW of the metal shield which goes over the top of the meter to protect it from the plate circuit r.f. field.

Meters having several different full-scale current ranges were tried in this circuit at W2URP. Values of the multiplier resistances required to obtain several popular full-scale voltage readings with meters rated at from 20 to 500 microamperes have been tabulated in TABLE I — METER MULTIPLIER CHART. Multipliers may be assembled from two or more resistances in series to obtain the required total resistance. Five such resistances were used for the multipliers in the model constructed by W2URP.

Precision 1-percent tolerance resistances assure the best accuracy, but inexpensive composition resistors may be combined in series to obtain the correct total resistance. By selecting values carefully, the tolerances in the inexpensive resistors can thus be made to cancel each other out, resulting in a precise total value of resistance.

Shunting resistances will range from a fraction of an ohm, to a few ohms, depending upon the full-scale current range desired. They can be made from either nichrome resistance wire, or copper wire.

The exact value of shunting resistance can be determined by plugging an insulated board into J_3 and J_5, and then connecting a short length of wire between P_3 and P_4. A current of the desired full-scale value is then passed through the meter, and the wire is shortened or lengthened until the meter shows a full-scale reading. Shunts having a few inches of wire may be wound on 47-ohm, 1-watt composition resistors.

CONSTRUCTION DETAILS are shown in the illustrations on this page. The meter cases usually have feedthru insulators already in place. Obtain a case with a hole to fit the size of meter that will be used.

All banana jacks on the rear of the case should be insulated with the fiber washers provided with the jacks. These washers are usually adequate for several hundred volts. Wiring inside the case is run with insulated hookup wire. Standard test prods are connected to J_1 and J_2 on top of the case.

Multipliers are mounted on insulated terminal boards, and fitted with banana plugs spaced to match the multiplier jacks on the meter case.

A separate multiplier board is required for each voltage range.

The meter is used in the same manner as a regular multimeter. Polarity of the meter must be observed. Before checking an unknown voltage, be sure to plug in a multiplier for a full scale reading higher than the voltage is likely to be. When storing the meter, plug in a low-resistance shunt across the meter.

This simple multimeter will provide measurements of voltage accurate to within a few percent in circuits where the circuit resistance is up to 15 percent of the full-scale resistance of the multimeter. When constructed with a meter having a full-scale sensitivity of 100 microamperes or less, it will provide useful measurements of voltage in receiver and other low-level circuits.