# Model 4300 Receiver

RME

Electro-Voice®

RME DIVISION • ELECTRO-VOICE, INC. • BUCHANAN, MICHIGAN

# INTRODUCTION

The material and information compiled in the following pages has been assembled for the purpose of providing the user of an RME 4300 receiver with information which will acquaint him with the communication performance and operation of the instrument. Most questions which arise in connection with the use of the receiver will be answered in these pages. Correct procedures for adjustment during operation and for service purposes are presented. The instructions should be read carefully before using the instrument.

# GENERAL DESCRIPTION

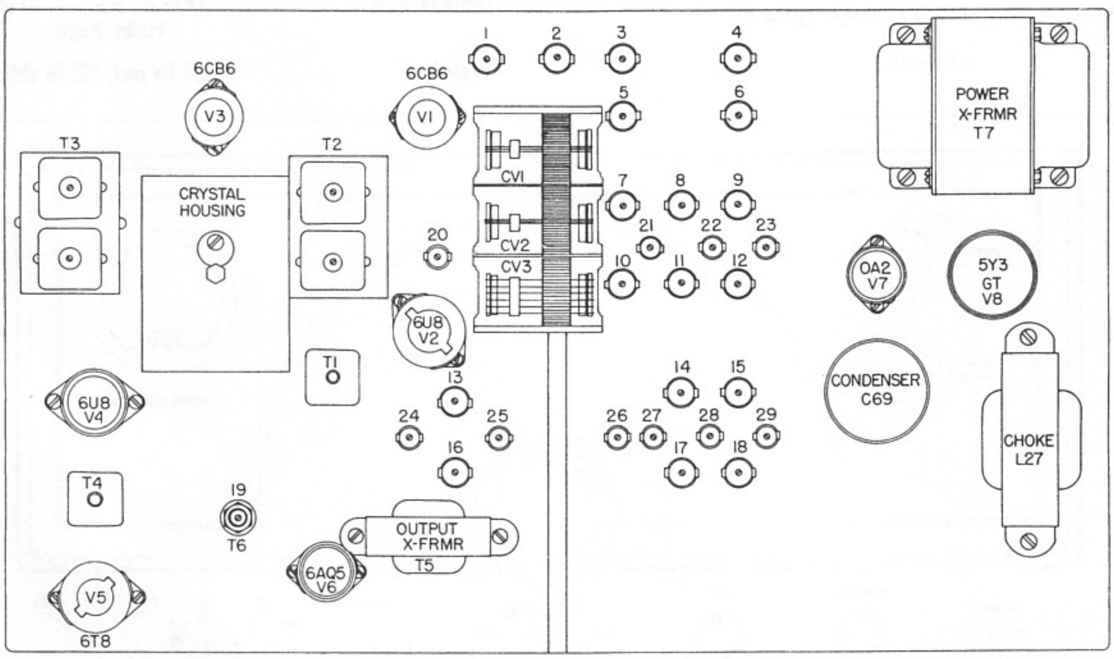
The RME 4300 is a receiver designed for the amateur communication bands in the frequency range of 1750 kc to 30 mc. The receiver provides facilities for the reception of CW, MCW, AM phone and SSBSC. It employs six multi-purpose tubes doing the work of ten individual tubes. It also employs a vacuum tube rectifier and a voltage regulator tube. A view of the top chassis layout, Fig. 1, gives the position of the top adjusted circuit components, referenced in the portion of these instructions applying specifically to servicing of the instrument.

The circuit employs a tuned radio-frequency amplifier stage followed in order by a tuned detector, oscillator, crystal filter, two high-selectance IF amplifier stages, a combination second detector, ANL stage and audio voltage amplifier, and a power audio output amplifier. The second IF amplifier tube is a multi-purpose tube which provides elements for use in a beat frequency oscillator circuit to provide for CW and single sideband suppressed carrier receptions.

The power output is supplied from a 4-ohm winding for direct connection to the matching RME 4302 speaker or a standard radio receiver dynamic speaker. Receiver input power requirements are 117 volts, 65 watts, at 50/60 cycles, alternating current only.

The receiver is designed for continuous operation in room temperatures up to 100°F. and is temperature compensated to provide stable operation relative to constant ambient temperature after approximately twenty minutes of warmup. The average initial drift is given in the general specifications.

A frequency correction control is brought out on the panel for the purpose of setting the frequency exactly at any scale point. An antenna trimmer is provided for peaking the antenna input tuned circuit to exact resonance with practically any type of connected antenna. The antenna input impedance is normally 300 ohms and will be subject to some variation with frequency, performing satisfactorily with antennas in the impedance range of 50 to 600 ohms.




TRIMMER & COIL ADJUSTMENT LOCATIONS

| BAND | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| ANTENNA INDUCTOR | 6 | 4 | 5 | 3 | 1 | 2 |
| MIXER INDUCTOR | 12 | 9 | 11 | 8 | 10 | 7 |
| MIXER CAPACITOR | 23 | 22 | 21 | 21 | 21 | 20 |
| OSCILLATOR INDUCTOR | 18 | 15 | 14 | 17 | 16 | 13 |
| OSCILLATOR CAPACITOR | 29 | 28 | 27 | 26 | 25 | 24 |

BFO FREQ. ADJ.-19

**Fig. 1— Top Chassis Layout**

# SPECIFICATIONS

| | |
|---|---|
| Sensitivity: | 2 microvolts 30% modulation for 100 mw output |
| Signal-to-Noise Ratio: | 10 db at 2 microvolts input (30% modulation) |
| Audio Output: | 1.5 watts |
| Calibration: | .02% |
| Frequency Drift: | .01% |
| Selectivity: (without crystal filter) | |
| Band Width: | 2.8 kc 14 kc |
| Attenuation: | 0 db 60 db |
| Notch Rejection: (with crystal filter) | 35 db |
| S-Meter Calibration: | S1 to S9 (6 db steps) plus 10 db units over S9 |
| Image Ratio: | |
| Band 1 thru 4: | 40 db min. |
| Band 5 and 6: | 25 db min. |
| Frequency Range: | |
| Range 1: | 1.8 — 2 mc |
| Range 2: | 3.5 — 4 mc |
| Range 3: | 7 — 7.3 mc |
| Range 4: | 14 — 14.35 mc |
| Range 5: | 21 — 21.5 mc |
| Range 6: | 27 — 29.7 mc |
| Tuning Control Ratio: | 75:1 and 1:1 |
| Input Requirement: | 117 V—50/60 cycle AC |
| Power Input: | 65 watts |

Tubes: Total of 8 as follows:

| | |
|---|---|
| 6CB6 | RF amplifier |
| 6U8 | Det—Osc |
| 6CB6 | 1st IF amplifier |
| 6U8 | 2nd IF amplifier—BFO |
| 6T8 | 2nd Det—ANL—1st AF |
| 6AQ5 | AF output |
| 5Y3 | Rectifier |
| OA2 | Voltage regulator |

Controls:

a. Tuning, dual speed
b. AF gain level
c. BFO pitch
d. BFO injection
e. Antenna trimmer
f. Calibration adjust
g. Band selector switch
h. RF gain control—line switch
i. Function switch
 MGC-BFO
 AGC-AM phone
 AGC-SSB
 MGC-SSB
j. Stand-by—receive—transmit
k. Crystal filter selectivity selector
l. Crystal filter phasing—rejector
m. ANL—On-Off switch (See Fig. 2)

External Connections: (Rear chassis)

a. Antenna input—doublet and Marconi
b. External control terminals
c. Relay control terminals
d. Single sideband selector jacks
e. Speaker terminals—for 4-ohm voice coil speaker

Dimensions: 16½ in. wide x 10 in. deep x 10 in. high

Weight: 28 lb net, 32 lb shipping

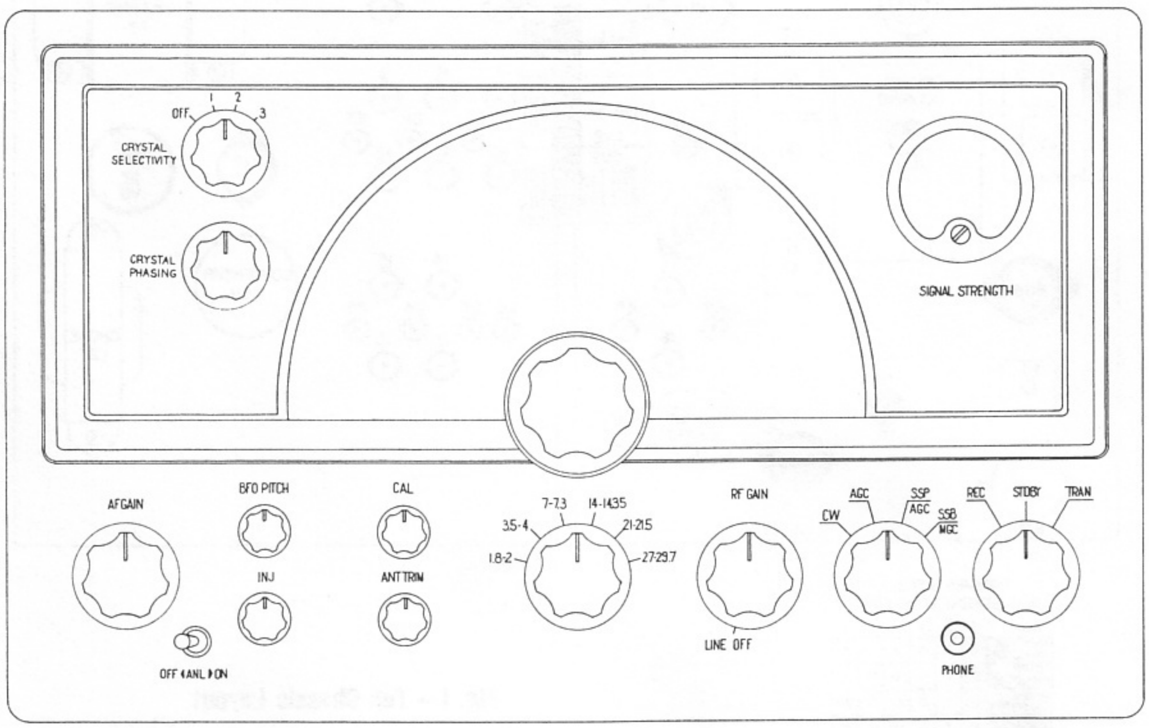



Fig. 2 — Front Panel Layout

# INSTRUCTIONS FOR SET-UP AND OPERATION

Immediately upon unpacking the amplifier carefully inspect it for physical damage. Im damage is evidenced, notify the dealer from whom the unit was purchased, or the transportation company if the unit was shipped to you. Responsibility for shipping damage lies with the carrier and claim should be made for recovery.

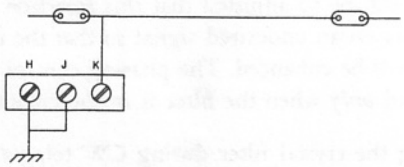
## REAR CHASSIS CONNECTIONS—

| | |
|---|---|
| A, B | Speaker |
| C | Electrical S-meter zero set |
| D, E | Transmit-standby relay circuit |
| F, G | Receive-standby |
| H | Antenna ground |
| J, K | Antenna |
| Red jack | Single sideband adapter |
| White jack | Single sideband adapter, IF |

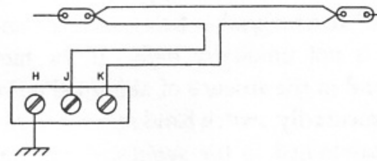
The lower left connector strip is normally connected with F-G jumper (See Fig. 3) when it leaves the factory. The receiver will not operate without this circuit being closed either with the jumper as shown or with another closed circuit, such as a pair of closed switch or relay contacts. The receiver is muted by opening this circuit.

The terminals D-E are connected to a switching circuit, closed when the stand-by switch is in position, marked "trans." (See Fig. 2). The circuit will switch a 117 V, 0.5-amp relay circuit or a 117 V, 1.0 amp noninductive circuit for transmitter control. No power is supplied in this circuit. It is merely a make-break circuit.

The receiver leaves the factory test department with jumper between H-J. If single-wire antenna is used, the connection should be as below:




Suggested all-purpose antenna; length is 75 feet including lead-in. The major portion should be 30 to 40 feet above ground.




A doublet antenna can be used and connections are made as shown above. The entire antenna and lead-in is made from 300-ohm television transmission line. The horizontal portion of the dipole should be ½ wavelength long for center of the band to be used. The transmission line can be any convenient length.

Two jacks are provided on the right-hand side of the rear chassis (See Fig. 3) for quick and complete interconnection of the RME 4300 receiver and the RME 4301 single sideband selector. The jacks are color coded as are the plugs on the side-band selector and should be mated for color when interconnecting. The "red" jack is an audio input circuit connection and the "white" jack is the IF input circuit connection to the selector from the receiver. The schematic diagram shows the exact circuitry.

**OPERATION PROCEDURE**—After unpacking the receiver and determining that all packing materials have been removed from the cabinet interior, and that all tubes are properly seated, place the instrument in its operating position and set the following controls as indicated:

| | |
|---|---|
| AF Gain Control | 50% rotation |
| ANL Switch | OFF |
| Ant. Trim | Pointer straight up |
| Cal Adj. | Should arrive from factory in "straight-up position" |
| Band Selector | Position 1 (1.8—2 mc) |
| RF Gain-Line | OFF |
| Function Switch | AGC |
| Stand-By Switch | Std-By |
| Crystal Selectivity | OFF |

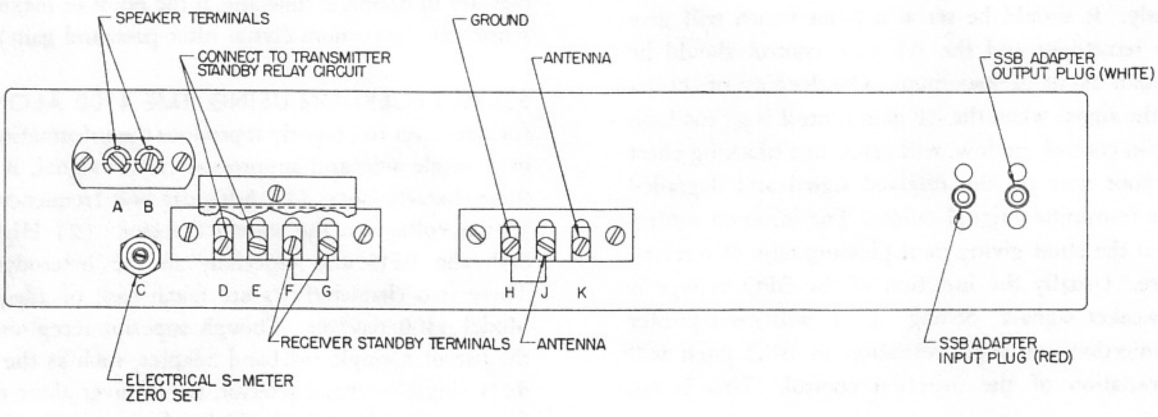



**Fig. 3 — Rear Chassis Connections**

Next connect the RME 4202 speaker or a suitable substitute with 4-ohm voice coil to the speaker terminals (See Fig. 3). The power supply plug may now be plugged into the source (117 V–50/60 cycle AC). Now connect a suitable antenna, (See preceding page) and rotate RF-gain control to full clockwise position. After a minute or so, set stand-by switch to "Rec" and the receiver will come to life as evidenced by atmospheric background noise and/or signal. The S-meter should read around "O" if no signal is being received and if ambient electrical noise is not unusually high. If the meter reads up without signal and in the absence of abnormal noise, disconnect the antenna momentarily, switch band selector to 28 mc band and with controls maintained in the suggested position (especially max. clockwise for RF gain), set the S-meter to "O" by means of the meter balance control (C) on the rear apron of the chassis (See Fig. 3). When this has been done, the antenna may be reconnected and the band selector switch restored to a desired frequency band.

If, without signal, the meter reads up a slight amount on any other band, it is of no consequence since it is measuring received noise and should not be zeroed again. The meter reading will be accurate only when the RF-gain control is in maximum position. S9 is the meter reading obtained when approximately 100 microvolts of signal is introduced across the antenna terminals. This value is subject to 50% change due to variation in circuit components. For each band selected the "Ant. Trim" control should be adjusted to maximum meter reading or maximum receiver output. As there may be slight variations between bands, especially with different types of antennas, the control should always be peaked for the signal being received.

The tuning control has two ratios, 1:1 and 75:1. Quick change of tuning to any region of any band can be achieved on the direct-coupled control (rear knob) and then a vernier type of tuning is possible by adjusting the front knob. The high ratio can be used as desired since it is effective over the entire tuning excursion of the pointer. The tuning is smooth, uniform and easily accomplished.

**CW TELEGRAPH RECEPTION**—Tuning for CW follows the same procedure as above except the function switch is set to CW and INJ control set at 50% rotation. "BFO Pitch" should be set with white dot straight up. Since AGC is switched out, the receiver may easily overload unless the RF gain control is used judiciously. It should be set at a point which will give just adequate sensitivity and the AF gain control should be carried at a point about ¾ maximum. Overloading of the receiver due to the signal when the RF gain control is set too high and the AF gain control too low, will result in a blocking effect producing a poor note on the received signal and degraded spacing of the transmitted signal pulses. The injection control should be set at the point giving most pleasing ratio of received signal to noise. Usually the injection of the BFO voltage is reduced for weaker signals. Strong signals will need greater amounts of injection. A slight variation in BFO pitch will result with variation of the injection control. This is not bothersome.

**AUTOMATIC NOISE LIMITER (ANL)**—The automatic noise limiter is usually effective only on signals received under AGC conditions and with the AF gain control set to some position less than maximum for most noticeable effects. Ignition pulses and similar "popping" types of interference are effectively reduced when using the ANL circuit. It can be switched on and off at will by means of the panel switch provided. Experience will dictate its best employment.

**CALIBRATE CONTROL**—The calibrate control CAL is used to set the receiver on an exact frequency. More than ± 10 kc adjustment (min) can be effected by adjusting this control, but all bands will be varied by its adjustment. If deviation of calibration occurs on only one band, the proper procedure would be to make a service type adjustment to only the band which has changed.

**HEADPHONE OPERATION**—A jack is provided on the panel for the insertion of a standard headphone plug. The headphone impedance should be greater than 1000 ohms, but the circuit will provide only slightly reduced performance with headsets as low as 200 ohms. The speaker is muted whenever a plug is inserted in the headphone jack marked PHONE.

**USE OF CRYSTAL FILTER**—The electro-mechanical filter employing a quartz element built into the Model 4300 receiver is used for single-signal reception. The filter has 3 degrees of selectivity increasing with clockwise rotation of the selectivity selector switch (position 4); maximum counter-clockwise rotation or position 1 switches the filter out of the receiver circuit. When the filter is used, more care in tuning will be required for best reception since receiver tuning adjustment becomes more critical as the high selectivity of the filter comes into use. It will be found that when the filter is being used, the rotation of the phasing control will vary the rejection signals with passband and it can be so adjusted that this rejection characteristic is made to act on an undesired signal so that the desired signal readability will be enhanced. The phasing control of the crystal filter is useful *only* when the filter is in the circuit.

When using the crystal filter during CW telegraph reception, a faint ringing or pinging sound will be heard, even in the absence of a signal. This ringing sound will vary as the BFO pitch control is varied. The exact pitch of the ringing sound will be the pitch that all CW telegraph signals will have when they are in optimum tune and at the point of maximum receiver sensitivity (maximum crystal filter passband gain).

**SSBSC RECEPTION USING RME 4300 ALONE**—In order for a receiver to properly reproduce the information transmitted by a single sideband suppressed carrier signal, it must possess these characteristics: (1) Adequate beat-frequency oscillator injection voltage to the second detector. (2) High stability in both the BFO and especially in the heterodyne oscillator. These two characteristics are taken care of adequately in the Model 4300 receiver. Though superior reception results with the use of a single sideband adapter, such as the RME Model 4301 single sideband selector, the receiver alone can be a satisfactory device for a single sideband suppressed carrier reception.

This type of reception demands that a carrier whose frequency is close ($\pm 20$ cycles) to that of the original carrier of the transmitted signal—which carrier has been suppressed—must be inserted at the second detector for demodulation purposes. By setting the receiver function switch to CW, adjusting the level of the RF gain and tuning of the receiver, single sideband suppressed carrier signals, usually referred to as SSBSC signals, can be adjusted to perfect reception conditions. If lower sideband signals are being transmitted, the BFO of the receiver can be adjusted so that its frequency is near one edge of the passband of the receiver (the upper edge) and the full passband can be used for the reception of the signal in a manner which will exclude all signals at frequencies in the vicinity of the upper sideband. The reverse can be accomplished if the BFO is shifted to the other edge (the lower edge) of the receiver passband. The transmission is made to contain only the upper sidebands.

During the reception of SSBSC signals, the same precautions relative to RF gain control level must be observed that were recommended for CW reception. That is, the level must always be carried below any possible RF or IF amplifier overload point otherwise the intelligibility of the signal will be greatly degraded.

Because of the fact that on band 6 (10 meters) the heterodyne oscillator is operating at a frequency lower than the signal, the frequency of the BFO will have to be adjusted in opposite manner to that described in the foregoing paragraph relative to upper and lower sideband reception.

Using the receiver alone, only manual gain control is provided for SSBSC reception. It will be entirely adequate and capable of high performance under these conditions.

**SSBSC RECEPTION USING THE RME MODEL 4301 SELECTOR**—The combination of the Model 4301 with the Model 4300 receiver provides exceptional performance in SSBSC reception. Upper, lower or double sideband reception is provided at the turn of a switch. This switch also can restore the combination to normal operation. The connection between the units is made by means of cables, plugs and jacks provided with the unit. The receiver is switched to the combination condition by means of the panel function switch and either the MGC-SSB or the AGC-SSB position may be used. When tuning, the double sideband position of the selector switch on the 4301 should be used. When a signal is found, the selector switch may be placed in either sideband 1 or sideband 2 position as may be required on the transmitted signal. When either of these two positions are used, the apparent selectivity is doubled because all the signal material on the unused sideband is reduced in response 40 db below the desired sideband portion of the spectrum.

A trimmer condenser adjustment for the BFO in the SSB selector is located on the panel and runs normally in a "straight-up" position. Slight variations (up to 30% rotation in either direction) from this position may be made for vernier adjustment of the frequency of the inserted carrier. Maximum unwanted sideband rejection will be obtained when it is "straight up."

## ALIGNMENT

Intermediate frequency—455 KC

Alignment of IF amplifier is easily achieved using the crystal filter and the receiver S-meter. Proceed as follows:

1. Set function switch to AGC.
2. Set band switch to band 1 (1.8 to 2.0 mc).
3. Connect signal generator output to center stator of tuning capacitor.
4. Set crystal filter selectivity switch to position 2 or 3.
5. With relatively high signal input from signal generator, sweep signal generator frequency around 455 kc till a sharp upward kick of the S-meter is noted. Carefully adjust signal generator frequency control until the meter reading is maximized. Cut back on signal generator output to keep receiver S-meter reading about mid-scale for all measurements.
6. With signal generator frequency set at the value giving maximum S-meter reading, the crystal filter selectivity switch may be switched off, and each IF transformer unit adjusted for maximum S-meter reading. With this done, the amplifier is aligned and adjusted to the proper frequency, that of the quartz plate in the filter.

The BFO frequency may be set now by allowing the signal generator to remain at the setting determined just previously, and then setting the function switch to "CW". Set the BFO pitch control knob so that the dot is in the center on top. If the BFO tone is not approximately zero frequency with controls set as suggested, adjust the BFO coil tuner slug 19 (See Fig. 1) for approximately zero frequency beat note, using the unmodulated signal generator or other signal source whose frequency has been set to the center of the IF pass as described above. Note: Make certain that the dot on BFO knob is positioned so that the BFO trimmer condenser is at 50% mesh when the dot is straight up.

**ALIGNMENT OF RF CIRCUITS**—The RF circuits and the oscillator circuits are adjusted by means of both iron-core screw adjustments and screw type adjusted capacitors. Usually, no adjustment will be required because of the inherent stability of the components. Generally, the iron-core coil adjustment is the one to use, although adjustment of the capacitors will also tune the circuits. Their use is reserved for coverage control of the tuning range. Less band coverage will result with increased trimmer capacity of the tuned circuits (this increase results when the adjustment screws are screwed in toward the chassis or as the screw length projecting from the chassis is shortened). Increased band coverage results when these trimmers are reduced in capacity or screwed outward. Very little adjustment is necessary as all circuits are designed with close tolerance fixed trimmers. The amount of variation during the life of the receiver is small and only minor touch up is possible. The oscillator circuits are adjustable in similar fashion and, because the oscillator circuit controls the receiver calibration, only slight adjustment of the oscillator should be made. For complete receiver calibration, the tuning condenser should be fully meshed when the red pointer is at the lower edge of the scale in the counter-clockwise position.

**CRYSTAL PHASING ADJUSTMENT** – Underneath the chassis between the first and second IF stages is a compression trimmer for centering the phasing control of the crystal filter located on the panel. The shaft of the phasing control, as it comes out of the front of the filter unit, is scored with a line and when positioned straight up, indicates 50% mesh of the phasing condenser. This is the proper position of the shaft when the control knob indicator is straight up. This position should be used for maximum side-frequency rejection when adjusting the under-chassis trimmer in the phasing bridge. Adjust with no signal other than noise with the filter selectivity switch set to position 2 or 3 and the panel phasing control set straight up center. Leave the trimmer adjusted at the position which gives minimum background noise response.

**S-METER** – Voltage to ground from each terminal of the S-meter when the meter is balanced will be equal and the value will be approximately 1 V dc.

**WARRANTY**—The RME Model 4300 receiver is guaranteed against defects in workmanship and materials.

## MODEL 4300 RECEIVER
### VOLTAGE CHART

| PIN No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 6CB6 R.F. AMP. | 0 | 1.1 V DC | 3 V AC | 3 V AC | 170 V DC | 95 V DC | 0 | — | — |
| 6U8 DET. OSC. | 100 V DC | 0 | 110 V DC | 3 V AC | 3 V AC | 185 V DC | 1.5 V DC | 0 | -10 TO -20 V DC x |
| 6CB6 1st. IF | 0 | .75 V DC | 3 V AC | 3 V AC | 180 V DC | 95 V DC | 0 | — | — |
| 6U8 2nd. IF BFO | 1.5 V TO 30 V DC xx | 0 | 90 V DC | 3 V AC | 3 V AC | 185 V DC | 1 V DC | 0 | –.7 V TO –2.1 V DC xx |
| 6T8 2nd. DET. AVC ANL 1st. AUD. | 0 | 0 | 0 | 3 V AC | 3 V AC | 0 | 0 | 0 | 35 V DC |
| 6AQ5 A.F. OUTPUT | 0 | 11.5 V DC | 3 V AC | 3 V AC | 180 V DC | 195 V DC | 0 | — | — |
| 5Y3G RECT. | 0 | 240 V DC | 0 | 220 V AC | 0 | 220 V AC | 0 | 240 V DC | — |
| OA2 V.R. | 140 V DC | 0 | 0 | 0 | 140 V DC | 0 | 0 | — | — |

MEASUREMENT CONDITIONS
(Values indicated may vary ±15%)

1. Voltages indicated are measured between point indicated and ground
2. Voltmeter resistance: DC—20,000 ohms/volt; AC—1,000 ohms/volt
3. Antenna disconnected — no signal condition
4. R.F. gain control set at maximum
5. Function switch set for AGC
6. Voltage to ground from each terminal of S-meter when meter is balanced will be equal and approximately 1V DC

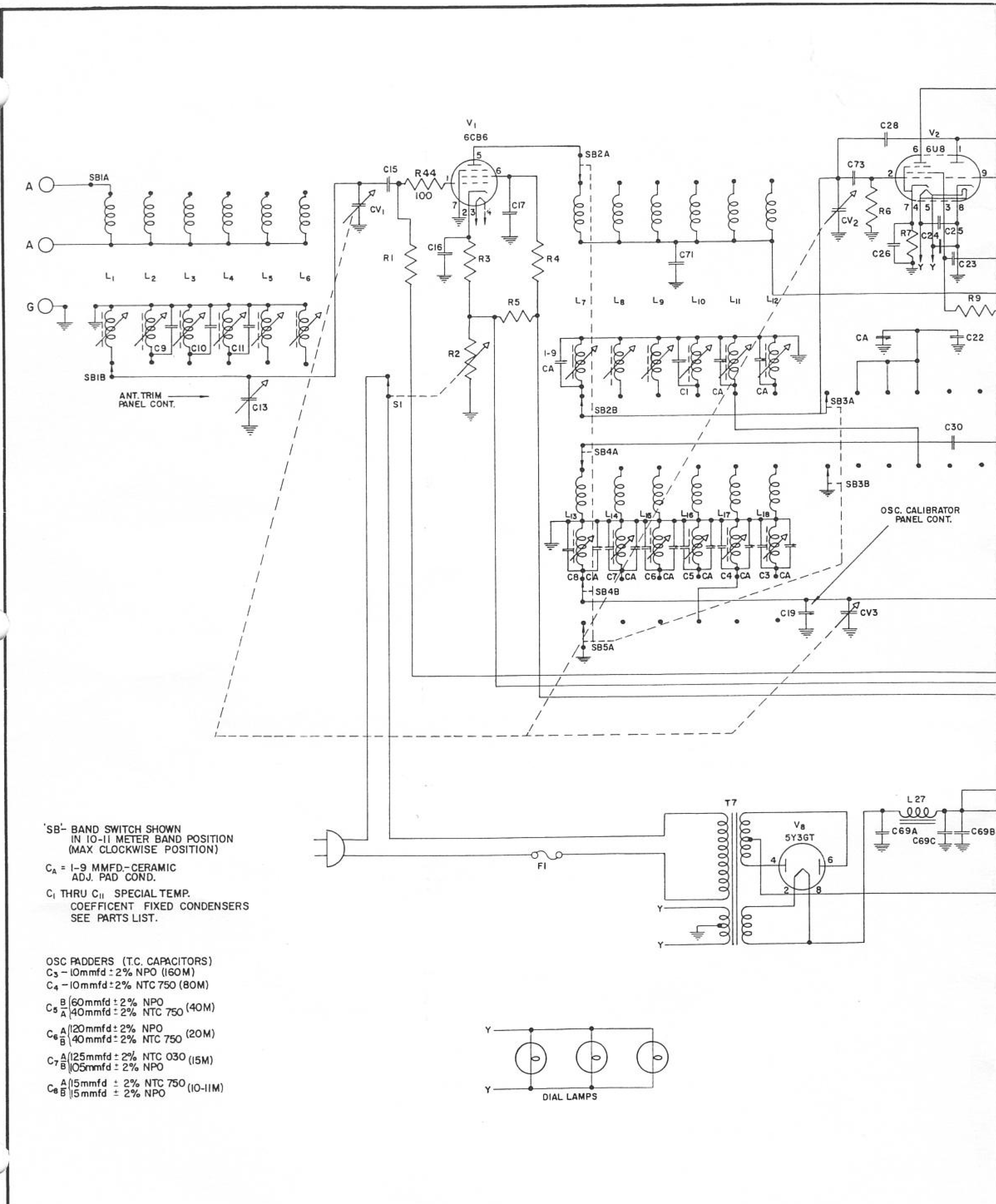
*OSC. grid voltage varies with frequency range — measured with 2 mh choke in series with V.M. lead

**Present only when BFO is on and variation is controlled by injection control

# PARTS LIST

| | | |
|---|---|---|
| C1 | Capacitor, 10 MMF, ±5%, 500 V, Ceramic | 42029 |
| C3 | Capacitor, 10 MMF, ±2% NPO, 500 V, Ceramic | 42030 |
| C4 | Capacitor, 10 MMF, ±2% NTC 750, 500 V, Ceramic | 42031 |
| C5A | Capacitor, 40 MMF, ±2% NTC 750, 500 V, Ceramic | 42033 |
| C5B | Capacitor, 60 MMF, ±2% NPO, 500 V, Ceramic | 42032 |
| C6A | Capacitor, 120 MMF, ±2% NPO, 500 V, Ceramic | 42034 |
| C6B | Capacitor, 40 MMF, ±2% NTC 750, 500 V, Ceramic | 42035 |
| C7A | Capacitor, 125 MMF, ±2% NTC 030, 500 V, Ceramic | 42036 |
| C7B | Capacitor, 105 MMF, ±2% NPO, 500 V, Ceramic | 42049 |
| C8A | Capacitor, 15 MMF, ±2% NTC 750, 500 V, Ceramic | 42039 |
| C8B | Capacitor, 15 MMF, ±2% NPO, 500 V, Ceramic | 42038 |
| C9 | Capacitor, 20 MMF, ±10%, 500 V, Ceramic | 42026 |
| C10 | Capacitor, 20 MMF, ±10%, 500 V, Ceramic | 42026 |
| C11 | Capacitor, 50 MMF, ±2½%, 500 V, Ceramic | 42027 |
| C13 | Capacitor, Adjustable, Air trimmer | 42017 |
| C15 | Capacitor, .000047 MFD, ±10%, 500 V, Ceramic | 42022 |
| C16 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C17 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C19 | Capacitor, Adjustable, Air trimmer | 42016 |
| C22 | Capacitor, 39 MMF, ±2½%, 500 V, Ceramic | 42028 |
| C23 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C24 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C25 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C26 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C28 | Capacitor, 2 MMF, ±5% NPO, 500 V, Ceramic | 42040 |
| C29 | Capacitor, 0.000047 MFD, NTC 750, 500 V, Ceramic | 42023 |
| C30 | Capacitor, 0.00047 MFD, ±20%, 500 V, Mica | 42021 |
| C31 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C32 | Capacitor, Part of T-1 | |
| C33 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C34 | Capacitor, Adjustable, Trimmer | 42025 |
| C35 | Capacitor, 0.000047 MFD, ±10%, 500 V, Ceramic | 42022 |
| C36 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic Tubular | 42041 |
| C37 | Capacitor, 15 MMF, Air trimmer | 42042 |
| C41 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic | 4266 |
| C42 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C43 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C44 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C45 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C46 | Capacitor, 0.00047 MFD, ±20%, 500 V, Mica | 42021 |
| C47 | Capacitor, 100 MFD, ±20% NPO, 500 V, Ceramic | 42044 |
| C48 | Capacitor, 0.001 MFD, ±10%, 500 V, Mica | 4284 |
| C49 | Capacitor, Adjustable, Air trimmer | 42017 |
| C50 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C51 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C52 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic | 4266 |
| C55 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic | 4266 |
| C56 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C57 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C58 | Capacitor, Part of T-4 | |
| C59 | Capacitor, Part of T-4 | |
| C60 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C61 | Capacitor, 0.000047 MFD, ±10%, 500 V, Ceramic | 42022 |
| C62 | Capacitor, 0.000047 MFD, ±10%, 500 V, Ceramic | 42022 |
| C63 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic | 4266 |
| C64 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C65 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C66 | Capacitor, 0.1 MFD, ±20%, 150 V, Paper Tubular | 42024 |
| C67 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C68 | Capacitor, 5 MFD, 50 V, Electrolytic | 42020 |
| C69A<br>C69B<br>C69C | Capacitor, 10-15-15 MFD, 450 V, Electrolytic | 42019 |
| C71 | Capacitor, 0.01 MFD, GMV, 500 V, Ceramic | 4252 |
| C72 | Capacitor, 10 MMF, ±10%, 500 V, Ceramic Tubular | 42041 |
| C73 | Capacitor, 0.000047 MFD, ±10%, 500 V, Ceramic | 42022 |
| CA | Capacitor, 1-9 MMF, Ceramic Tubular, Adjustable (10) | 42018 |
| $CV_1$ | Capacitor, Tuning, 3 Gang, Variable | 42013 |
| $CV_2$ | Capacitor, Tuning, 3 Gang, Variable | 42013 |
| $CV_3$ | Capacitor, Tuning, 3 Gang, Variable | 42013 |
| R1 | Resistor, 270K, ±10%, ½W, Carbon | 4669 |
| R2 | Potentiometer, 15K, 2W, Special Taper, Carbon | A46037 |
| R3 | Resistor, 150 OHM, ½W, Carbon | 4641 |
| R4 | Resistor, 47K, ½W, Carbon | 4615 |
| R5 | Resistor, 39K, ±10%, 2W, Carbon | 4682 |
| R6 | Resistor, 120K, ½W, Carbon | 4632 |
| R7 | Resistor, 330 OHM, ½W, Carbon | 46040 |
| R8 | Resistor, 22K, ½W, Carbon | 46007 |
| R9 | Resistor, 15K, ±10%, ½W, Carbon | 46029 |
| R10 | Resistor, 4.7K, ½W, Carbon | 4638 |
| R11 | Resistor, 2.2K, ½W, Carbon | 46042 |
| R12 | Resistor, 10K, ½W, Carbon | 4613 |
| R13 | Resistor, 68K, ½W, Carbon | 46044 |
| R14 | Resistor, 1 MEG, ½W, Carbon | 46010 |
| R15 | Resistor, 150 OHM, ½W, Carbon | 4641 |

| | | |
|---|---|---|
| R16 | Resistor, 47K, ½W, Carbon | 4615 |
| R17 | Resistor, 2.2K, ½W, Carbon | 46042 |
| R18 | Resistor, 1 MEG, ½W, Carbon | 46010 |
| R19 | Resistor, 150 OHM, ½W, Carbon | 4641 |
| R20 | Resistor, 47K, ½W, Carbon | 4615 |
| R21 | Resistor, 10K, ½W, Carbon | 4613 |
| R22 | Resistor, 680K, ½W, Carbon | 46009 |
| R23 | Resistor, 47K, ½W, Carbon | 4615 |
| R24 | Resistor, 270K, ±10%, ½W, Carbon | 4669 |
| R25 | Resistor, 120K, ½W, Carbon | 4632 |
| R26 | Resistor, 47K, ½W, Carbon | 4615 |
| R27 | Resistor, 820 OHM, ½W, Carbon | 4694 |
| R28 | Potentiometer, 5 MEG, 2W, Audio Taper, Carbon | C46037 |
| R29 | Resistor, 270K, ±10%, ½W, Carbon | 4669 |
| R30 | Resistor, 120K, ½W, Carbon | 4632 |
| R31 | Resistor, 47K, ½W, Carbon | 4615 |
| R32 | Resistor, 2.2K, ½W, Carbon | 46042 |
| R33 | Resistor, 1 MEG, ½W, Carbon | 46010 |
| R34 | Resistor, 1 MEG, ½W, Carbon | 46010 |
| R35 | Resistor, 47K, ½W, Carbon | 4615 |
| R36 | Potentiometer, 100K, 2W, Linear, Carbon | B46037 |
| R37 | Resistor, 47K, ½W, Carbon | 4615 |
| R38 | Resistor, 10K, ½W, Carbon | 4613 |
| R39 | Resistor, 1 MEG, ½W, Carbon | 46010 |
| R40 | Resistor, 470 OHM, 1W, Carbon | 4643 |
| R41 | Potentiometer, 1K, 2W, Linear, Carbon | E46037 |
| R42 | Resistor, 68K, 1W, Carbon | 46039 |
| R43 | Resistor, 2.5K, ±5%, 5W, Wire-wound | 46038 |
| R44 | Resistor, 100 OHM, ½W, Carbon | 46041 |
| L1 | Coil, 28 MC | E3593 |
| L2 | Coil, 21 MC | D3593 |
| L3 | Coil, 14 MC | C3593 |
| L4 | Coil, 7 MC | B3593 |
| L5 | Coil, 3.5 MC | A3593 |
| L6 | Coil, 1.7-2 MC | 3596 |
| L7 | Coil, 28 MC | E3594 |
| L8 | Coil, 21 MC | D3594 |
| L9 | Coil, 14 MC | C3594 |
| L10 | Coil, 7MC | B3594 |
| L11 | Coil, 3.5 MC | A3594 |
| L12 | Coil, 1.8 MC | 3595 |
| L13 | Coil, 28 MC | E3592 |
| L14 | Coil, 21 MC | D3592 |
| L15 | Coil, 14 MC | C3592 |
| L16 | Coil, 7 MC | B3592 |
| L17 | Coil, 3.5 MC | A3592 |
| L18 | Coil, 1.8 MC | 3597 |
| L19 | Choke, 2.4 MH, Ferrite Core | 15018 |
| L20 | Coil, Part of T2 | |
| L21 | Coil, Part of T2 | |
| L22 | Coil, Part of T2 | |
| L23 | Choke, 2.4 MH, Ferrite Core | 15018 |
| L24 | Coil, Part of T3 | |
| L25 | Coil, Part of T3 | |
| L26 | Coil, Part of T3 | |
| L27 | Choke, 12 HY, 80 MA | 15015 |
| M1 | Meter, 2" round, 0-1 MA, 125 OHM | 3202 |
| S1 | Switch, Part of R2 | |
| S2 | Switch, 1 Pole, 4 pos. rotary | 5667 |
| S3 | Switch, 2 Pole, 3 pos. rotary | 5663 |
| SB | Switch, 10 Pole, 6 pos. rotary | 5664 |
| S4 | Switch, 4 Pole, 4 pos. rotary | 5665 |
| S5 | Switch, SPST, Toggle | 5666 |
| V1 | Tube, 6CB6, RF Amp | 4347 |
| V2 | Tube, 6U8, Det-Osc | 4331 |
| V3 | Tube, 6CB6, 1st IF | 4347 |
| V4 | Tube, 6U8, 2nd IF—BFO | 4331 |
| V5 | Tube, 6T8, 2nd Det-AVC-ANL-1st Aud. | 4332 |
| V6 | Tube, 6AQ5, AF Out | 4333 |
| V7 | Tube, OA2, Volt. Reg. | 4330 |
| V8 | Tube, 5Y3GT, Rect. | 4314 |
| J1 | Jack, SSB Adpt. Out | 1795 |
| J2 | Jack, SSB Adpt. In | 1795 |
| J3 | Jack, Phone, Closed circuit—one break | 17010 |
| T1 | Transformer, 455 KC | 15011 |
| T2 | Transformer, IF, Interstage | 8736 |
| T3 | Transformer, IF, Interstage | 8736 |
| T4 | Transformer, 45 KC | 15012 |
| T5 | Transformer, Audio, 5000 to 4 OHM, 5W | 15014 |
| T6 | Coil, BFO, 125 MH | 3598 |
| X | Crystal, 455 KC | 7139 |
| F1 | Fuse, 1½ A, 3 AG Slo-Blo | 20171 |




'SB'- BAND SWITCH SHOWN IN 10-11 METER BAND POSITION (MAX CLOCKWISE POSITION)

$C_A$ = 1-9 MMFD.-CERAMIC ADJ. PAD COND.

$C_1$ THRU $C_{11}$ SPECIAL TEMP. COEFFICENT FIXED CONDENSERS SEE PARTS LIST.

OSC PADDERS (T.C. CAPACITORS)

$C_3$ – 10mmfd ± 2% NPO (160M)

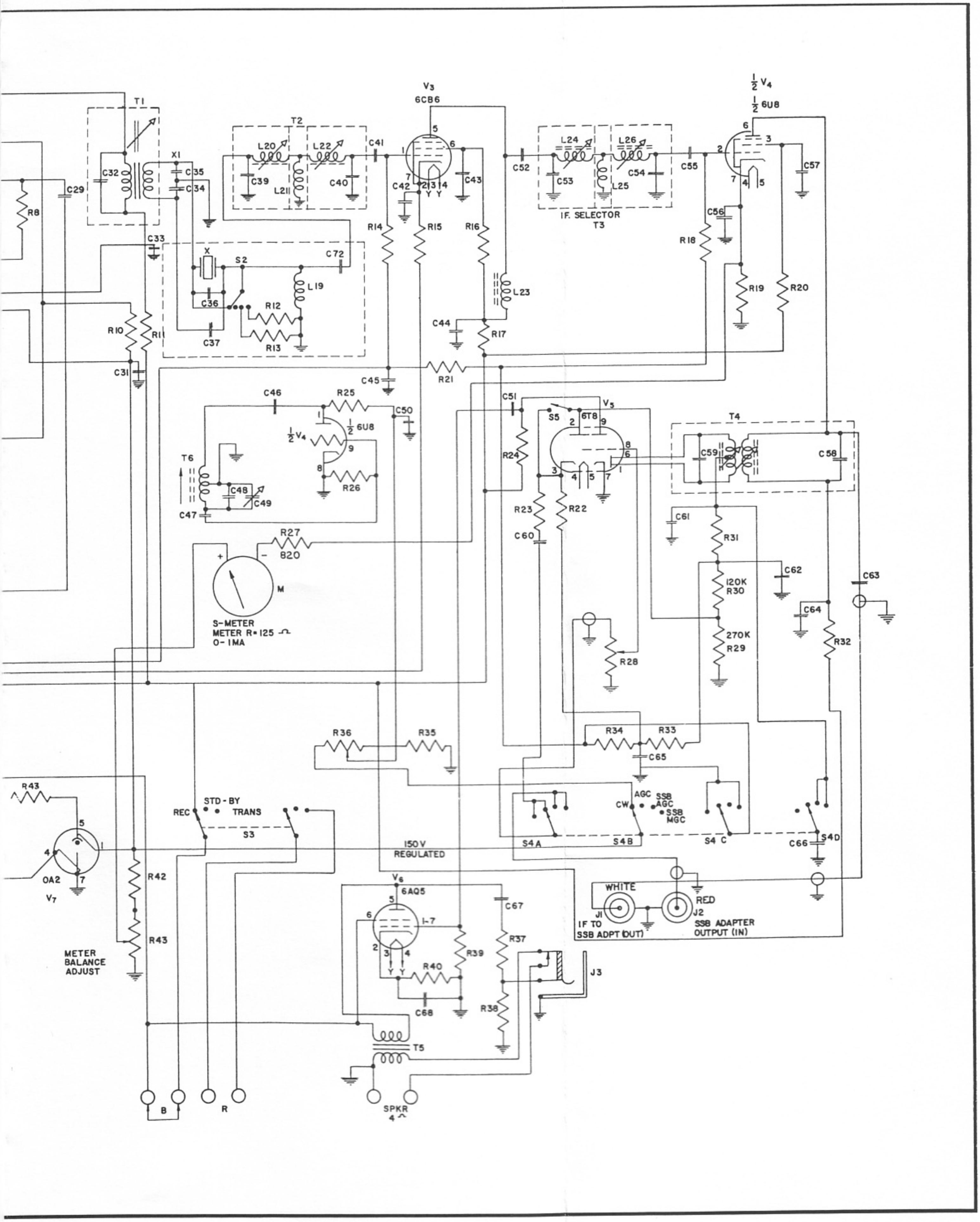
$C_4$ – 10mmfd ± 2% NTC 750 (80M)

$C_5$ B 60mmfd ± 2% NPO / A 40mmfd ± 2% NTC 750 (40M)

$C_6$ A 120mmfd ± 2% NPO / B 40mmfd ± 2% NTC 750 (20M)

$C_7$ A 125mmfd ± 2% NTC 030 / B 105mmfd ± 2% NPO (15M)

$C_8$ A 15mmfd ± 2% NTC 750 / B 15mmfd ± 2% NPO (10-11M)



T1
C32
X1
C35
C34
C29
R8
C33
T2
L20
L22
L21I
C39
C40
C41
V3
6CB6
C42
C43
R14
R15
R16
X
S2
C72
L19
C36
R12
R13
C37
L23
C44
R17
R10
R11
C31
C45
R21
C52
L24
L26
C53
L25
C54
C55
I.F. SELECTOR
T3
1/2 V4
1/2 6U8
C57
C56
R18
R19
R20
C46
R25
C50
1/2 V4
1/2 6U8
T6
C48
C49
R26
C47
C51
S5
6T8
V5
R24
T4
C59
C58
R23
R22
C60
C61
R31
C62
C63
R27
820
S-METER
METER R=125 Ω
0-1MA
M
120K
R30
C64
270K
R29
R28
R32
R36
R35
R34
R33
C65
R43
REC
STD-BY
TRANS
S3
CW
AGC
SSB AGC
SSB MGC
S4A
S4B
S4 C
S4D
C66
150V
REGULATED
0A2
V7
R42
R43
METER
BALANCE
ADJUST
WHITE
RED
J1
J2
IF TO
SSB ADPT (OUT)
SSB ADAPTER
OUTPUT (IN)
V6
6AQ5
C67
R39
R37
R40
C68
R38
J3
T5
B
R
SPKR
4 Ω

## Schematic Diagram Model 4300