

**IT PAYS TO  
KNOW YOUR  
EQUIPMENT**

*OPERATING  
AND SERVICE  
INSTRUCTIONS*

**BROWNING  
GOLDEN EAGLE MARK II  
SINGLE SIDEBAND  
BASE STATION  
SSB-15**

**browning**  
LABORATORIES, INC.

1269 Union Avenue, Laconia, New Hampshire 03246

OPERATING AND SERVICE INSTRUCTIONS  
BROWNING GOLDEN EAGLE MARK II SINGLE SIDEBAND  
SSB-15 BASE STATION

Price \$2.00

IT PAYS TO KNOW YOUR EQUIPMENT

READ CAREFULLY

BE SURE TO READ PAGE 17

TABLE OF CONTENTS

|           |                                    | <u>Page</u> |
|-----------|------------------------------------|-------------|
| SECTION 1 | General Description                | 2           |
| SECTION 2 | Antenna Requirements               | 3           |
| SECTION 3 | Installation                       | 4           |
| SECTION 4 | Simplified Instructions            | 6           |
| SECTION 5 | Function of Receiver Controls      | 7           |
| SECTION 5 | Receiver Operation Single Sideband | 9           |
| SECTION 6 | Function of Transmitter Controls   | 10          |
| SECTION 7 | Circuit Description of Receiver    | 12          |
| SECTION 8 | Circuit Description of Transmitter | 14          |
|           | Warranty                           | 16          |
|           | Service Instructions               | 17          |

BROWNING LABORATORIES, INC.

1269 UNION AVENUE

LACONIA, N. H. 03246

## SECTION 1

### THE BROWNING GOLDEN EAGLE SSB-15 BASE STATION

Congratulations, you now own a transmitter capable of the most efficient form of voice communication. True Single Sideband is used by the Government, Army, Navy and N.A.S.A. This type of transmission is 8 times more effective than a conventional A.M. signal of the same power.

Proper operation of this system must be understood to achieve maximum performance. Tuning in sideband signals are explained in Section 5 of this manual. You must also study the Tune procedure in Section 3. This is a sophisticated piece of communications equipment and your operating technique is extremely important. When you have mastered this technique you will realize the difference between A.M. and true single sideband. Do not expect an S.S.B. signal to have Hi Fi characteristics! It is not meant to. Its main advantages are its ability to penetrate and to be understood through heavy interference.

#### GOLDEN EAGLE MARK II RECEIVER

This is truly the most versatile receiver made for use on the 11 Meter Band. With it you can now receive Citizen Band and many Business Band frequencies - whether operating on conventional A.M. or Sideband, stations operating on upper or lower single sideband, or double sideband suppressed carrier. Also featured are the following:

- Double conversion
- R.F. and I.F. Gain Control
- A.G.C. On-Off Switch
- On-Air indicator
- Beat Frequency Oscillator for Sideband Reception
- Cascode nuvistor R.F. Amplifier
- Ultimate selectivity with Collins Mechanical Filter
- Speaker Control Switch
- Fine tune for A.M. and Sideband
- Large jeweled movement "S" Meter
- Effective Noise Limiter with lock out switch
- Exclusive Channel-look fixed tuning
- Illuminated dials - meters and On Air indicator
- Frequencies as well as Channels on tuning dial

#### GOLDEN EAGLE SSB-15 TRANSMITTER

Transmitter SSB-15 Features are -

- Large RF and Plate Current Meter
- Rear illuminated selector dial with large channel numbers and frequencies
- Precision aircraft plug-in type miniature crystal switch ass
- 27 crystals  $\pm .002\%$  tolerance or better
- Special A.L.C. Circuit (Automatic Level Control)
- Front Panel V.F.O. Control
- True Single Sideband Transmission for maximum talk power
- 8 Pole crystal lattice filter
- Front panel function switch: spot, transmit, and tune
- Visual on air indicator

## SECTION 2

### ANTENNA REQUIREMENTS

For ease and simplicity of adjustment, your SSB-15 transmitter is designed to operate into a load of 50 ohms. An antenna fed with 50 ohm coaxial line will satisfy this requirement if the S.W.R. (standing-wave ratio) on the line is low. Practically all good CB antenna systems use 50 ohm coaxial line and are designed to give a low S.W.R.

Mount your antenna in the clear, away from surrounding objects (especially metallic ones) and as high as allowed by law. If the feed line must be longer than about 50 feet, use RG-8/U rather than the RG-58/U, to minimize feed-line losses. (Reducing losses helps on transmitting and receiving.)

An RG-58/U or RG-8/U line feeding an antenna, and showing an S.W.R. of 1.0 or close to it, will present a load of 50 ohms to the transmitter regardless of the line length. This ideal situation is seldom found in practice. Even if the S.W.R. proves to be 1.3 the line length will not be important and the SSB-15 will work at optimum performance.

If the SSB-15 works into an improper load, the maximum-available power of the SSB-15 will not be obtained. In extreme cases, distortion will accompany the reduction in output. Obviously, to get the maximum performance from your transmitter, you should present the transmitter with a load close to 50 ohms. A factory calibrated dummy load is included with the SSB-15, so that you can check and see how close your antenna system is to 50 ohms. (See Section 3.)

When a too-high S.W.R. is encountered, better loading of the transmitter can sometimes be obtained by adding 3 or 4 feet of coaxial line to the existing feed line. This will not change the S.W.R. but it will change the load presented to the SSB-15. Changing the line length is not a sure-fire cure. The best cure is to use a proper "matching network" between the transmitter and the feed line. These networks are described in several popular antenna texts.

### ANTENNA GAIN

We recommend using the best antenna obtainable. For coverage in all directions without using a rotating mechanism, a "ground-plane" antenna is satisfactory. A "collinear" type antenna, will increase your signal at the receiving end by about 3½ db. (equal to just a little more than doubling your input power.) For better results, a rotatable directional antenna should be used. A "3-element beam" will have a gain of approximately 7 db., equivalent to multiplying your input power by 5. A "6-element beam" has approximately 10 db. gain; it effectively multiplies the power by 10.

Since your input power is limited, it is obvious that much can be gained with a good antenna system.

## SECTION 3

### INSTALLATION

#### INTERCONNECTING THE GOLDEN EAGLE SSB-15 TRANSMITTER AND RECEIVER.

Unpack your base station carefully.

Arrange your station so the units are side by side.

Connect the "Control Cable" of the transmitter to the receiver.

The Key on the octal plug must mate with the Keyway in the large center hole of the socket. Do not force; be sure the Key and Keyway are mated before pushing in all the way.

Permanently connected to the transmitter is the antenna cable for the receiver. Connect the PL-259 plug on this cable to the socket on the receiver marked ANT.

Connect your dummy load (packed with the microphone) to the socket on the transmitter marked ANT.

Never attempt to operate the transmitter without connection to a proper antenna or dummy load. (See Section 2.) Serious damage can result and such damage will not be covered by warranty.

Place the microphone in its stand in front of the equipment. Unwrap the microphone cable and insert the connector into the microphone socket on the left of the front panel.

Make certain that SSB-15 Power Switch is turned to OFF.

After checking the above connections for correctness and tightness, insert the power cord of the transmitter into the utility socket on the rear of the receiver. This can be done neatly without uncoiling the power cord of the Transmitter. Insert the receiver power cord into a wall outlet.

Your Golden Eagle SSB-15 Base Station is now ready to be placed in service after the following tests and tuning adjustments have been made:

Meter Switch -- Plate MA.  
Power Switch -- On  
Function Switch -- Transmit  
Sideband -- Lower  
Channel Selector -- 12

After a warm-up period of at least 2 minutes, press the microphone button and observe the meter indication. (Be sure not to talk into the microphone, and also make sure there is no background noise.) Carefully adjust the rear panel control marked BIAS (R52) so the pointer on the meter is centered in the brown section between 15 and 20 (lower scale). This completes the adjustment of the idling plate current. Variations in line voltage will affect this reading, but operation will be completely satisfactory if the idling plate current remains within the brown section. Release microphone button.

### SECTION 3 (cont'd)

#### INSTALLATION (cont'd)

WARNING: Failure to adjust this control properly will result in poor performance of the equipment. If the idling plate current is too low, distortion will result. If the idling plate current is too high, life of the output tube will be greatly shortened. Over an extended period of time, it may become impossible to set the BIAS control and bring the idling plate current within the brown section on the meter. If this occurs, replace the 7558 amplifier tube and immediately adjust the BIAS control using the above procedure (starting with the BIAS control set near the center of its range.)

#### ANTENNA CHECK:

With the dummy load still connected, set the controls as follows:

Meter Switch -- Power RF  
Power Switch -- On  
Channel Selector -- 12  
Sideband -- Lower  
Function Switch -- Tune

Press the microphone button. The meter reading should go from 0 to some value on the scale. Switch the SIDEBAND switch to "UPPER" and compare the meter reading you now get with the one obtained when the SIDEBAND switch was set on "LOWER". Use whichever setting of the switch gives a meter indication closer to mid scale (10 on the upper scale). Make a note of the SIDEBAND (upper or lower) for future reference. With a small screwdriver, check the adjustment of the PLATE TUNING (rear panel) for maximum meter indication. Make a note of this reading; it is the correct POWER RF indication during TUNE when using a 50 ohm Dummy load. Release the microphone button. Turn POWER switch to "OFF".

#### OUTPUT TUNING CHECK:

Remove the dummy load from the SSB-15 ANT socket and connect your antenna system. (Be sure to read Section 2 before you connect your antenna.)

Turn the POWER switch "ON" and let the transmitter warm up for at least 2 minutes. Set the controls as for ANTENNA CHECK, with the SIDEBAND switch set to the sideband previously noted. Press the microphone button and, with a screwdriver, adjust PLATE TUNING control (rear panel) for maximum meter indication. (Little or no readjustment may be required, but this check must be made.) The meter reading may not be exactly the same as obtained with the dummy load, but this merely means the antenna load is not exactly 50 ohms. The reading may be higher or lower than that obtained with the dummy load, one is no better or worse than the other.

### SECTION 3. (cont'd)

#### OUTPUT TUNING CHECK: (cont'd)

Your Golden Eagle SSB-15 Base Station is now ready to be placed in service. Please note that the internal Audio Level control R35 is factory-set to normal voice peaks. Never Shout into the microphone. To do so will result in much less than peak performance. Voice peaks should be regarded like those on a tape recorder's VU meter. With the meter in the "POWER RF" position, voice peaks should not swing past 15 on the upper scale of the meter. If these peaks are exceeded the A.L.C. (Automatic Level Control) will take over and reduce the effective power level and clarity of transmission.

The meters and channel indicators will light up when the power is on. Allow at least two minutes warm up before transmitting. Now press the push-to-talk switch on the microphone and you are on the air. The On-Air indicator will light up.

Be sure to announce your station call sign any time you turn on your transmitter. Release the Microphone Button to turn off the transmitter.

### SECTION 4

#### OPERATING THE GOLDEN EAGLE SSB-15 BASE STATION

##### NORMAL OPERATION OF RECEIVER ON SIDEBAND (Simplified Instructions)

1. Mode switch - USB or LSB
2. Volume/On-Off - Turn on and set at approximately 9 o'clock
3. Squelch - Pushed in and counter clockwise
4. Tuning - MAN.
5. RF Gain and AGC (Important) Approx. 3 o'clock depending on signal strength - AGC Pulled Out and Off.
6. Speaker - INT.
7. Fine Tuning - Indicator dot at 12 o'clock
8. Main Tuning Receiver - Desired Channel

For tuning Sideband Stations see Section 5, Page 9

NOTE: The power to the utility outlet on the rear of the receiver is controlled by the receiver Volume/ON-OFF switch. When the transmitter power cord is plugged into the utility outlet, the power switch on the transmitter may be left on at all times and the power to the complete base station can be switched on and off with the Receiver Power Switch.

##### NORMAL OPERATION SSB-15 TRANSMITTER (Simplified Instructions)

1. Antenna - connected securely
2. Microphone - connected securely
3. Meter - Power RF
4. Power - On
5. Function - Transmit
6. Sideband - Upper or Lower (same as Receiver)
7. Channel Selector (Transmitter)- Desired Channel (Same as Receiver)
8. VFO - 0 (12 o'clock)

## SECTION 5

### OPERATING THE GOLDEN EAGLE MARK II RECEIVER

#### FUNCTION OF OPERATING CONTROLS

##### Mode Switch

The position of this switch determines what type of signal is received.

1. A.M. Position -

With the Mode Switch in the A.M. position, Normal Amplitude Modulated signals may be received.

2. U.S.B. Position -

With the Mode Switch in the USB position, only Upper Sideband signals may be received.

3. L.S.B. Position -

With the Mode Switch in the LSB position, only Lower Sideband signals may be received.

##### Volume/On-Off Control

The On-Off Switch at the extreme counter clockwise rotation of the volume control, controls the power to the receiver as well as the utility outlet on the rear of the receiver. The Transmitter can be plugged into this outlet and the power to the complete Base Station can be controlled by the Receiver Volume On-Off control.

##### Squelch Control

When rotated clockwise, the squelch control can be set so that the speaker will be silent until a signal comes on. Further clockwise adjustment will keep the speaker silent on weaker signals and turn on the audio only on strong local signals. When set at the maximum counter-clockwise position, the audio will be on all the time.

##### Tuning Control

This Switch controls the Tuning Mode.

1. MAN.

In the manual position the main tuning knob varies the frequency of the second oscillator. The received channel number can be read in the Tuning window.

2. FIX

In the Fixed position the frequency of the received signal is controlled by the Channel-lok located on the right hand side of the receiver. The dial light is switched off to remind the operator that the main tuning control will not operate when the switch is in the Fixed position.



## SECTION 5 (cont'd)

### Tuning Control (cont'd)

#### 3. B.B.

In the Business Band position the first conversion oscillator is changed and on the lower part of the tuning dial a direct reading in frequency will show the bands covered for Business Band also some frequencies used by Industrial and Government services. Business Band frequencies covered are from 27.390 to 27.530 MHz.

### RF Gain Control and AGC

The RF Gain Control not only varies the gain of the Cascode RF Stage but also the first two IF stages. Maximum Gain is obtained with the control set maximum clockwise. As the control is rotated counter clockwise, the bias of the first RF and first two IF tubes increases with a resultant decrease in Gain. This control is used for decreasing the sensitivity to prevent overload from strong signals.

The AGC Switch can be disabled by pulling out on the RF Gain Control Knob. When operating in the AM position, the AGC Switch should be on to prevent blasting when tuning from weak to strong signals. It can be helpful, however, when tuning for very weak stations to disable the AGC for maximum sensitivity.

### Noise Limiter Switch

This switch is controlled by a push-pull action of the squelch control knob. When pushed IN this places the automatic series gated noise limiter circuit in operation to reduce pulse type noises such as ignition noise and other electrical interference. The limiter is turned OFF by pulling the squelch knob out.

### "S" Meter

The "S" Meter provides a visual indication of the relative signal strength of an incoming signal. The "S" Meter is calibrated in "S" units from 1 to 9 and in decibels above S-9 to plus 40 db. The "S" Meter will not operate with AGC Pulled out.

The S Meter reading will not be accurate except at full clock-wise setting. Adjustment of the "S" meter Zero should be made only when the R-F Gain Control is set for maximum clockwise rotation and pushed in. Disconnect the antenna connection to the receiver and adjust the S Meter Zero Adj. control at the rear of the chassis. Watch the S Meter while turning the control and set the needle at "0", the lowest line on the meter. This adjustment may vary slightly with changes in line voltage. Now reconnect the Antenna cable.

## SECTION 5 (cont'd)

### Speaker Switch

The slide designated EXT for external, INT for internal, and ALL controls the speaker system of the receiver by the use of an external speaker obtainable separately from your Browning Franchised Dealer. An external speaker may be installed at the remote position from the base station in the work shop, in the basement, in the garage, and by proper setting of this selector switch, in the external position, the receiver will be heard only at this remote location, in the internal position the built in speaker in the receiver only will be heard. In the ALL position the internal and any remote speakers will be heard simultaneously. This remote speaker will also be used on the paging system as explained under the transmitter section.

#### CAUTION:

When operating headphones in the external speaker function, be sure not to operate the paging from the transmitter.

Note: Use a #40 Switchcraft plug or equivalent with remote speaker or headphones. The wires can be connected to either terminal on the Browning remote speaker.

### Fine Tuning

The fine tuning front panel control varies the frequency, in all tuning functions, approximately 1/2 of a channel.

This feature gives added ease of differentiating between two or more stations close together and is especially useful for tuning in Sideband stations.

### Channel-Lok

The FIXED channel is set for any one C.B. channel by adjusting the capacitor through the small channel-lok hole on right side of case, using a small screwdriver. Use the spot switch on the transmitter to provide a signal for tuning the channel-lok. Adjust the channel-lok for maximum "S" Meter reading when pushing the spot switch with the transmitter set to the desired channel. This feature allows "fixed controlled" receiving without changing the main tuning knob. The channel indicator light will go out in the Fix Tune Mode.

Note: In Channel-lok position the fine tune is still operable.

### Tuning Sideband Stations

Tuning in a Sideband Station (single or double sideband) is easy when one becomes experienced after considerable practice.

When receiving sideband stations the carrier is inserted by the Receiver's beat frequency oscillator.

## SECTION 5 (cont'd)

### Tuning Sideband Stations (cont'd)

When a sideband signal is heard switch to L.S.B. and remove the noise limiter and A.G.C. by pulling these two switches out. Reduce the R.F. gain control to about 12 o'clock and advance the volume control if necessary. Now very carefully use the fine tune control to bring the local carrier into line with the received signal. The resultant signal may sound very squeaky and high pitched or very guttural and low pitched but careful tuning will change it to a good readable signal.

Another point to remember is that two stations may already be in contact on a very slightly different frequency. You will only be able to tune one clearly but may be able to listen to both by tuning one on the high side and the other on the low side. In other words between them. This however cannot always be done due to the variations in their crystals. No fault of your receiver. Unlike regular A.M. listening to more than one station at a time on Sideband is very hard to do unless they are on exactly the same frequency. Most C. B. stations are using Double Sideband suppressed carrier transmission. However, when the signal cannot be cleared up as above you may be hearing single sideband which can be either upper or lower sideband. It will then be necessary to find out by trial if the upper or lower sideband is being used by switching to upper sideband and tuning as above. At this time of writing most single sideband stations are using lower sideband.

Sometimes when listening to double sideband signals one sideband, either the upper or the lower, may have less interference from A.M. stations. Only trial will tell.

Sideband reception depends very strongly on the skill of the operator and only practice will produce that skill.

## SECTION 6

### OPERATING THE GOLDEN EAGLE SSB-15 TRANSMITTER

#### FUNCTION OF OPERATING CONTROLS

##### Channel Selector

The SSB-15 Transmitter has a built in crystal switch assembly with all 23 crystals factory installed. These plug-in miniature type fundamental crystals are made especially for the Browning SSB-15 and afford even a tighter frequency tolerance than previous types.

CAUTION: Use only direct factory replacement crystals.

## SECTION 6 (cont'd)

### Meter Switch

In the Power/RF function, RF Peak Envelope Power is indicated on the top scale of the meter. When the switch is turned to the Plate MA position, final plate current is read using the Bottom meter scale. This switch position is the most important position in the entire unit. It is extremely important to adjust the idling current. BE SURE TO REFER TO SECTION 3. Page 4.

### Function Switch

Center position - transmit (Normal Position)  
Left position - spot  
Right position - tune

The function switch must be in the transmit position when communicating.

### Spot Position

This is a good time to impress upon you the fact that each C.B. Channel is 10,000 Hz wide. A Single Sideband station must be tuned to within 100 Hz to be intelligible. Therefore only by careful tuning and completely understanding your equipment will you derive the excellence of operation of which it is capable. First you must determine whether the station you want to call is on upper or lower sideband. This is done with your receiver. Generally an upper sideband station will be copied most clearly slightly above center channel, a lower sideband slightly below center channel. Set your transmitter on the same sideband and channel as the receiver. Now switch to "Spot" position and by means of your "VFO" control on the transmitter you should be able to zero beat your receiver. This condition occurs when no tone is heard between two rising tones. (Sometimes referred to as a "Null").

### Tune Position

This position is used to tune the plate circuit of the transmitter for maximum R.F. power output as shown on the R.F. power meter. REFER TO SECTION 3. Page 5.

### Sideband Switch

This switch selects lower sideband (to the left) and upper sideband (to the right). Be sure that both transmitter and receiver are set to the same sideband.

### V.F.O.

The letters V.F.O. stand for Variable Frequency Oscillator. This function enables the operator to synchronize his transmitter frequency with another station's transmitter frequency. (See "Spot" listed under function switch.) As indicated on the front panel, the V.F.O. can be varied approximately 700 Hz. This is still within the channel limitation established by the FCC because of the tight tolerances of the crystals used in this transmitter.

## SECTION 7

### GOLDEN EAGLE MARK II RECEIVER CIRCUIT DESCRIPTION

The Golden Eagle Mark II Receiver is a deluxe communications type receiver capable of receiving conventional AM citizens band and business band signals plus upper or lower sideband citizen band signals. This receiver covers the CB radio frequency spectrum between 26.965 megahertz and 27.255 megahertz and the Business Band radio frequency spectrums between 27.235 to 27.275 megahertz and 27.390 to 27.490 megahertz. This receiver utilizes a dual nuvistor cascode front end, dual conversion mixing to minimize spurious interference, a mechanical filter to enhance the selectivity, and a high gain IF strip for that extra measure of sensitivity often needed on weak stations.

For conventional AM reception circuit operation is as follows:

The signal from the antenna is coupled into a broadband tuned circuit followed by two nuvistors (V1 and V2) which form a cascode RF amplifier. A cascode amplifier is used because it offers better signal-to-noise performance than does the conventional grounded cathode or grounded grid RF amplifiers. The output of V2 is coupled into the grid of V3B ( $\frac{1}{2}$  12AT7) which serves as the 1st mixer. The other  $\frac{1}{2}$  12AT7 (V3A) operates as a tuned plate crystal controlled oscillator. In the manual and fixed positions of the front panel tuning switch the oscillator frequency is 31.400 MHz and in the BB position it is 31.795 MHz. The 1st mixer output, therefore, contains a frequency product between 4.125 and 4.435 MHz the actual value depending upon the incoming signal frequency. The output of the 1st mixer (V3B) is coupled into the grid of V4B ( $\frac{1}{2}$  6GH8) which operates as the 2nd mixer. The other half of this 6GH8 (V4A) is a Series Tuned Colpitts Oscillator serving as a variable frequency oscillator. This oscillator operated at a frequency between 4.580 and 4.890 MHz, the actual frequency being determined by the rotation of the main tuning capacitor (C44). A small variable tuning capacitor (the series combination of C46 and C47) allows fine tune variation of the oscillator frequency. The output of the second mixer (V4B) is a 455 kHz signal which is fed into a mechanical filter (FL1) to electrically shape the signal and provide greatly increased selectivity over that which can be obtained with a doubletuned IF transformer which is customarily used. The mechanical filter output is fed into a three stage 455 kHz IF strip comprised of V5, T3, V6, T4, V7 and T5. The amplitude modulated 455 kHz output of the IF strip is converted into audio by use of crystal diode detector circuit incorporating CR3, the secondary of T5 and C40. Delayed AGC is obtained from V8A ( $\frac{1}{2}$  6AL5) allowing full audio output from the weakest input signals yet preventing overload with strong input signals. AGC is applied to the cascode RF stage and to all three IF amplifiers. A front panel push-pull switch provides grounding of the AGC buss thereby allowing the receiver to operate at full gain but subject to overload with strong input signals. An RF gain control is provided on the front panel which allows manual adjustment of the gain of the cascode RF amplifier and the first two IF amplifier tubes. V8B ( $\frac{1}{2}$  6AL5) is a series gated noise limiter which can be by passed with the ANL ON-OFF push-pull switch on the front panel. The audio output of the detector and noise limiter is fed to the top of the volume control through the Mode Switch (SW6B). A portion of this audio signal, the amount being dependent on the position of its wiper arm, is fed into the audio amplifiers V9B and V10 ( $\frac{1}{2}$  12AX7 and 6AQ5 respectively).

## SECTION 7 (cont'd)

The audio amplifier circuitry provides four watts of audio to drive the built-in speaker, an optional external speaker system or both. Speaker switching is controlled by a three position slide switch located on the front panel. V9A ( $\frac{1}{2}$  12AX7) is the squelch amplifier tube. The plate of V9A is DC connected to the grid of V9B, the audio amplifier, and controls its conduction. When the receiver is squelched V9A conducts heavily, lowering its plate voltage which in turn cuts off V9B and does not allow audio to be amplified by V9B. In the presence of an input signal a negative voltage is developed in the detector circuit at the junction of C40, R38, R39 and R46. If this voltage is sufficiently large it increases the bias applied to the grid of V9A, decreasing its plate current flow and increasing its plate voltage thereby allowing V9B to conduct and amplify audio normally. The squelch threshold is adjusted by varying the cathode voltage of V9A by means of the squelch potentiometer (R45) located on the front panel.

The Power supply consists of a voltage doubler circuit with capacitor input filtering and two RC filter networks. A voltage regulator tube V11 (OB2) is used to regulate the supply voltage for the variable frequency oscillator to insure frequency stability and compensate for line voltage variations and fluctuations.

The "S" Meter is in the cathode circuit of the last IF amplifier stage (V7) and incorporates diode protection against meter damage in case of tube removal or failure.

The rear illuminated dial is calibrated with both channel numbers and citizen band channel frequencies thereby enabling quick identification of the channel being received. The dial light is interlocked with the tuning switch so that the dial is illuminated in the CB and BB positions but not in the SET-LOCK position. The meter light is on whenever the unit is turned on and indicates the presence of power applied to the unit. An "On the Air" light activated by the transmitter relay is also mounted in the receiver.

For Upper or Lower Sideband reception circuit operation is as follows:

Operation is identical to that described above for AM reception up to and including the three stage 455 kHz IF strip. For Sideband reception the carrier must be reinserted prior to detection. The output of the last 455 kHz IF amplifier stage (V7) is coupled to the third grid of a pentagrid converter tube V12 (6BE6). A pentagrid converter tube is used to simultaneously perform both oscillator and mixing functions. The first grid, screen and cathode elements of the tube are connected as a Series Tuned Colpitts Beat Frequency Oscillator tuned to approximately 455 kHz. The actual frequency is dependent on which of the two sidebands is being recovered and is switched by the Front Panel Mode Switch (SW6C). The remaining elements of the pentagrid converter perform the mixing action and audio output is obtained from the plate of V12 and after some processing is fed to the top of the volume control through the Mode Switch (SW6B). The mode switch also removes B+ from this tube when the receiver is operating in the AM Mode to prevent the beat frequency oscillator from oscillating. The operation of the audio section, power supply, etc., are also identical to that described above for AM reception.

## SECTION 8

### GOLDEN EAGLE SSB-15 TRANSMITTER CIRCUIT DESCRIPTION

The Golden Eagle SSB-15 is a 23 channel crystal controlled 15 watt PEP input Single Sideband citizens band transmitter for operation in the 26.965 MHz to 27.255 MHz frequency spectrum.

By the use of a front panel control, 23 channels may be obtained on Lower Sideband and 23 channels on Upper Sideband giving twice the capabilities of the conventional AM transmitter.

The signal transmitted by your SSB-15 is a result of mixing three (3) separate crystal controlled oscillators and the audio signals from the microphone. There are 27 crystals in the SSB-15 transmitter.

The Single Sideband signal begins at V1A a crystal controlled oscillator which operates at 5.645 MHz for upper sideband and 5.648 MHz for lower sideband. The output of V1A is coupled through C5 to the arm of the carrier balance pot. R4. The ends of R4 feed into the Balanced Modulator. R4 and C6 are factory adjusted to null out the signal coming from V1A. When a signal is applied to the microphone an unbalance will occur in T1 (the Balanced modulator) which will give an RF signal output through a tuned circuit and on to the grid (Pin 1 of V2). The double sideband suppressed carrier signal is then amplified through V2 and coupled to the 8 pole crystal lattice filter through tuned transformer T2.

The unwanted sideband is removed by the crystal filter depending on which oscillator crystal is selected, CR1 or CR2. The center frequency of the filter is half-way between the frequencies of the upper and lower sideband crystals.

T3 is used to transformer couple and impedance match the sideband signal from the crystal filter to the grid of V3.

V1B, a separate oscillator, has a direct frequency relationship to the V1A oscillator and is necessary so that the suppressed carrier from V1A is electrically in the center of each citizen band channel.

The low impedance output of V1B is transformer coupled through T6 and then on to the mixer.

V7B, the third crystal oscillator, uses any 1 of 23 crystals in the 16 MHz range by means of the front panel crystal switch. A variable frequency capacitor (C48) in the grid circuit of this oscillator enables the operator to move each transmitter crystal up to  $\pm 650$  to 700 Hz. This front panel control is named V.F.O. (Variable Frequency Oscillator.)

V7A is a 21 MHz Mixer which receives two signals at its grid. One, 16 MHz signal from the output of V7B, and the second, 5 MHz signal from the output of V1B via T6. These two signals are added together in the Mixer V7A and the output (21 MHz) is fed into T3 a selective transformer that accepts only the wanted conversion signals.

## SECTION 8 (cont'd)

The output signal from V3 is transformer coupled into the driver V4 where the sideband signal is amplified and then transformer coupled into the grid of the final V5 which is a Class AB<sub>1</sub> linear amplifier. C22 tunes the plate of the final linear amplifier. L2 and C26 make up the balance of the Pi network and C27 couples the signal to the antenna through the relay contacts.

The front panel meter is used as both an RF Power Meter and also a Plate Current Meter to accurately adjust the Idling plate current of the final amplifier. When SW2 is in the RF position a very small amount of RF Power is coupled through C29 where it is rectified into DC and fed to the meter. When SW2 is in the Plate MA position the front panel meter reads actual plate current of the final by use of two precision resistors R23 and R24.

The SSB-15 uses two power supplies, a high voltage supply which delivers DC to all the tubes and a low voltage supply which delivers Bias voltage through R52 to the grid of the final amplifier. Be sure to refer to the operating section of the manual before attempting to adjust R52 the potentiometer at the rear of the chassis.

In order to minimize flat topping to the final stage an A.L.C. (Automatic Level Control) is incorporated. At the first trace of overdrive grid current will be drawn at the final which will result in a negative voltage applied back to the grid of V2 through R48. This negative voltage will reduce the driving level by reducing the gain of V2.

The function switch on the front panel has three (3) positions. The normal center position is called transmit. In this position all circuits are connected so that the transmitter may be operated normally. Switching to the left (Spot) position automatically disconnects the mic input and also puts a small amount of screen voltage on the final stage to enable the sideband signal to show on the receiver S meter for spotting. (See Section 6 Spot Position). Switching to the far right (Tune) position automatically disconnects the microphone audio circuits and connects an internal tone oscillator. This audio tone provides an output signal to the RF Meter and antenna at a reduced level providing the Push to Talk mic switch is depressed. This enables the operator to tune C25 the plate tuning capacitor, for maximum RF output as indicated by the meter when in R.F. Position.



## W A R R A N T Y

Browning Laboratories, Inc. warrants each new inter-communicating device manufactured by it to be free from defective material and workmanship and agrees to remedy such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service, discloses such defect - provided the unit is delivered by the owner to us or to our authorized distributor or dealer from whom purchased within one (1) year from the date of sale to original purchaser, and provided that such examination discloses in our judgment that it is thus defective. Tubes and labor are warranted for ninety (90) days.

This warranty does not extend to any of our products which have been subjected to misuse, neglect, accident, incorrect application, improper installation, or use in violation of instructions furnished by us.

This is not an all-encompassing or performance guarantee (see instructions) and this Warranty is in lieu of all other Warranties expressed or implied; and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

Browning Laboratories, Inc. reserves the right to make any change in design, or to make additions and improvements in its products without imposing any obligation on itself to install them in its products previously manufactured.

Your warranty is not valid unless warranty card is on file at Browning Laboratories. Mail it now.

BROWNING LABORATORIES, INC.

1269 UNION AVENUE

LACONIA, N. H. 03246

## WARNING

The extreme selectivity and sensitivity of the Golden Eagle Mark II Receiver can only be attained through the use of precise test equipment.

NO ONE should attempt to make adjustments to the receiver without the proper equipment. Browning will not be responsible whether under warranty or not for work needed to be performed when examination indicates that internal adjustments of any kind have been made by unauthorized persons.

A standard service charge shall be made for realignment of the receiver.

There are four ceramic padder capacitors on the chassis of the receiver which have been sealed at the factory. Breaking these seals will absolutely void the warranty as adjustments can only be made with most precise laboratory equipment.

## SERVICE RETURN INSTRUCTIONS

If trouble develops with your unit which you cannot remedy yourself, contact our service department by telephone or mail, listing all possible symptoms that might be helpful information.

Before returning your unit be sure all parts are securely mounted and well packed. Also attach a tag to your equipment with complete name and address and return all parts pertaining to the operation of the unit; ie microphone.

Please enclose a letter with your unit indicating all of your problems. Remember even if you have called in advance about your equipment a letter enclosed with your equipment will expedite matters both in Receiving and the Repair Department.

If you plan to bring your equipment to Browning in person, please call or write in advance for an appointment.

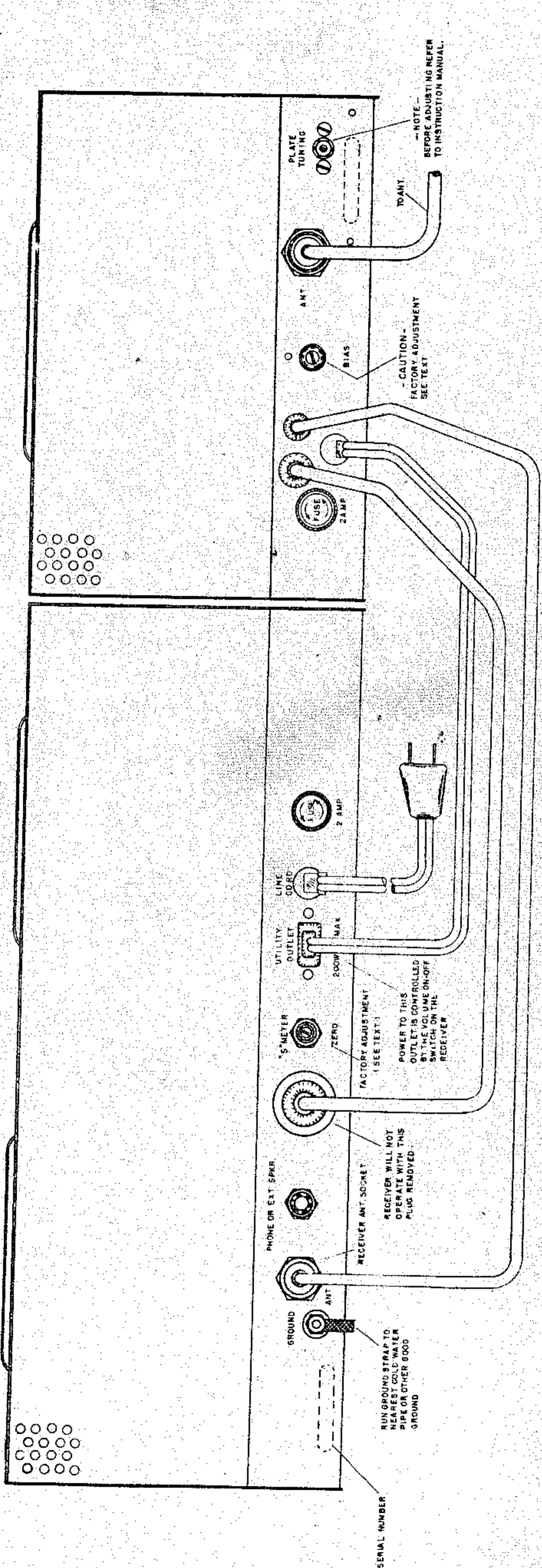
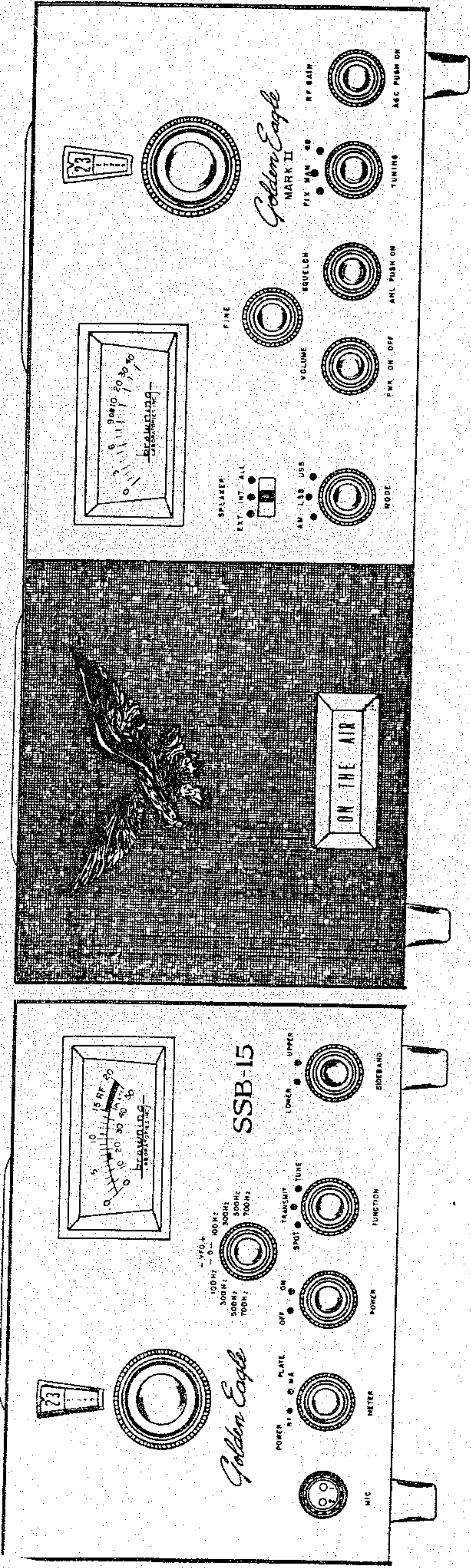
We do not recommend returning transceivers, receivers, or transmitters via Parcel Post as this equipment is too heavy and delicate. Prepay and insure all shipments.

\* \* \* \* \*

**WARNING:** The use of this equipment must comply with Part 95 of the Federal Communications Commission Rules and Regulations and failure to do so will subject the operator and all owners to severe fines and penalties.

The proper adherence to these rules and regulations by all will improve the efficiency and operating pleasure for everyone.

Any alterations of the transmitter by anyone other than the manufacturer is a violation of F.C.C. regulations and punishable accordingly and voids your warranty.



699 RECEIVER B SSBIS TRANSMITTER CONTROL CONNECTIONS