

GOLDEN EAGLE MARK III SERVICE MANUAL

SERVICING INSTRUCTIONS

FIELD ALIGNMENT (TYPE ACCEPTED MODEL)

CAUTION:

Do not attempt to make any of these adjustments without the following Test Equipment.

TEST EQUIPMENT REQUIRED

RF Watt Meter (at least 10 watts but not over 25 watts) with Dummy load.

VTVM

5 MHz Scope - Vertical sensitivity .05V/CM minimum

Audio Oscillator - Range 1000 - 3000 Hz

Plastic Tuning Tool to adjust cans.

Small screwdriver

Frequency Counter - Readout Frequency, of 27 MHz

Monitor Scope

PRE-SET FRONT PANEL CONTROLS

Channel Selector - Channel 12

VFO - Pointer 12 o'clock, capacitor 1/3 mesh

Meter - MA

Mode - LSB

REFER TO DIAGRAM FOR TYPICAL HOOKUP

Connect RF Wattmeter to Transmitter

Connect Monitor Scope to Wattmeter

Connect Wattmeter to Dummy Load

Connect Frequency Counter to pickup output on Dummy Load

Connect Audio Oscillator to microphone input -

Set Frequency of Audio Oscillator to 1000 Hz.

IDLE CURRENT CHECK

Turn power On - 1 Minute warmup

Key Transmitter - Close Test Switch 1

Short out audio Osc. - Close Test Switch 2

Turn R69 CCW (Not labeled screwdriver control on top of chassis near T4 can.)

Adjust R55 - Rear of chassis for center of Bias Box on meter.

ADJUST OSCILLATOR

VTVM Pin 9 to ground on 6GH8 V6B

Tune L5 for -8 volt Broad side of Osc. slope

PEAK FOR MAX RF POWER

Open Test Switch 2

Increase output of Audio OSC. - Approx. 3 Watts output on output meter

Peak T1, Peak T2, and Peak T6, (T2 and T6 have 1 slug but there are 2 possible peaks. T2 should be adj. to peak near bottom of can, T6 to peak near top of can) - MAX. RF POWER.

SSB/AM GOLDEN EAGLE MARK III FIELD ALIGNMENT

(TYPE ACCEPTED MODEL)

CAUTION

Do not make any of these adjustments unless an accurate Frequency Counter is hooked up.

Set Carrier Oscillators on either side of Crystal Filter

Increase audio OSC. output to give 5 Watts Output

Change Frequency of OSC. to 2900 Hz.

Power level at this frequency should be .05 watts

If not Tune C2

Decrease Audio Frequency down to 2700 Hz

Power should increase rapidly if C2 is properly adjusted

Retune Audio Frequency to 2900 Hz

Switch to Upper Sideband

Power level should be the same as in lower sideband position .05 Watts

If not, Tune C1.

Decrease Audio Freq. down to 2700 Hz - Power should increase rapidly if C1 is adjusted properly.

Carrier Balance

Mode - LSB

Reduce audio OSC output to Zero

Close Test Switch 2

Close Test Switch 1

Remove V7 Tube

Transmitter Still Keyed.

Connect Scope from Input of FL1 to Ground.

Adjust vertical gain of scope to maximum sensitivity .05 volts/centimeter or better.

Carefully tune R4 and C8 for minimum Trace on LSB and USB

Repeat several times because of interaction.

Frequency Adjustment

These adjustments cannot be made without a Frequency Counter hooked up to the output.

VFO - Set at 12 o'clock, capacitor 1/3 mesh

MODE - LSB

OPEN - Test Switch 2

CLOSE - Test Switch 1

Audio OSC - 1000 Hz exactly (adjust level for approx. 4 watts of power)

Channel Selector - Any Channel (Example Ch. 10)

Channel 10 should read 1000 Hz lower than the assigned frequency when on LSB.

Channel 10 should read 1000 Hz higher than the assigned frequency when on USB.

Example: Channel 10 assigned frequency 27.075000 MHz

Channel 10 LSB 27.074000 MHz

Channel 10 USB 27.076000 MHz

SSB/AM GOLDEN EAGLE MARK III FIELD ALIGNMENT

(TYPE ACCEPTED MODEL)

The above frequencies will vary with the tolerance of the crystals. Be sure they are within .005% FCC Limit.

Lower Sideband - Adjust C34

Upper Sideband - Adjust C33

CAUTION: Be careful not to accidentally adjust C1 and C2.

If the lower sideband frequency, tuned by C34, reads 27.074121 MHz the upper sideband frequency should read exactly 2000 Hz higher or 27.076121 MHz.

Check all frequencies to see that the average tolerance is above and below center frequency. If not, increase or decrease the center frequency with C34 on lower sideband, and adjust C33, on upper sideband, 2000 Hz above the frequency that C34 read.

C23 is a neutralization capacitor and is factory adjusted for maximum stability of the 7558 tube.

RF POWER BALANCE

CAUTION: This procedure is extremely difficult and should not be attempted unless the RF Power output is substantially different from one end of the band to the other. Be sure Bottom is on with 4 screws.

Mode Switch - LSB
Audio OSC - 1000 Hz
Channel Selector - Channel 12
Adjust level of audio OSC to approx. 3 watts
Check power level - Channel 1
Check power level - Channel 23

If power level varies more than 3/4 watt from Channel 1 - 23 proceed as follows:

Select the end of the band with the lowest output -

Carefully Tune L7, T3, T4 and T5 to equal the power level of the other end of the band.

Each of the 3 cans has a top and bottom slug. Possibly only one slug will need to be tuned to accomplish Equal power.

Switch back and forth between Channel 1 and 23 until Equal power is obtained on both Ends.

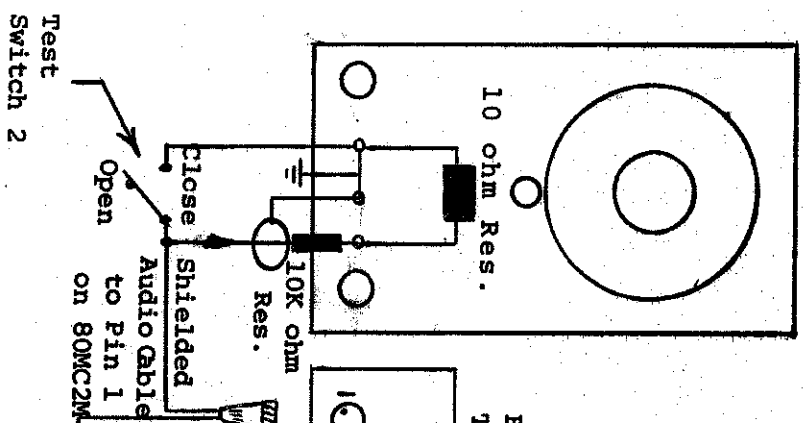
Check Channel 12. It may be higher or lower in output. Adjust T3 top or bottom slug to match the power of Channel 1 & 23. Repeat all of above steps until equal power is obtained.

A variation of 1/2 to 3/4 watt throughout the Band is acceptable.

Set Audio Oscillator on 1000 Hz - Turn up level for MAX Power (Over 10 Adj. R69 for 10 W (Equivalent to 12W - PEP on two tone test).

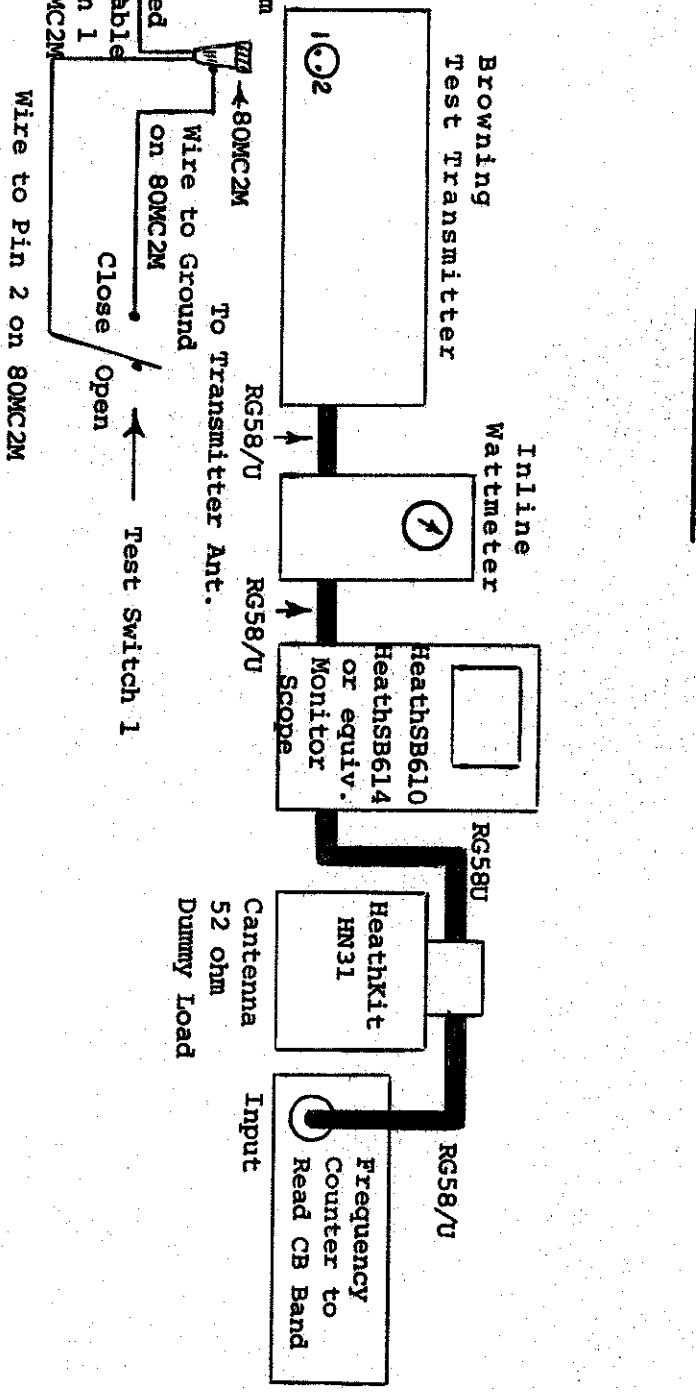
Switch to AM connect mike to transmitter. Adj. R38 for 100% modulation on monitor scope at normal voice level.

HP 200 CD
Audio Osc.



SSB/AM TRANSMITTER

TEST SET-UP



If other than an HP200CD
Audio Osc. is used it may not be
necessary to attenuate the signal
with a 10 ohm & 10K resistor.

SSB/AM GOLDEN EAGLE MARK III SERVICE MANUAL

GOLDEN EAGLE MARK III RECEIVER

The Browning Golden Eagle Mark III Receiver is a precision communications receiver utilizing high quality components throughout and should provide dependable service for years. Although the tubes and nuvistors will normally have a long life they should be checked first, if trouble develops. The tube tester does not always show up a bad tube, therefore, substitution of a known good tube is the best method for locating a bad tube. The dust cover can be removed from the Golden Eagle Mark III Receiver by removing four screws, two at each end.

1. Check to see that the tubes and pilot lights light, - if not, check the fuse.
2. Check tubes as above by replacing suspected defective ones with known good ones.
3. Be sure both control cables are plugged into the receiver, or a jumper plug may be used in the receiver control socket. A jumper plug can be made by jumping pins 4 to 5 and 7 to 8 of an octal plug.
4. With the volume control at full and the squelch maximum counter clockwise, there should be some noise from the speaker. If noise is heard but no signals are heard, disconnect the antenna lead and with a pointed instrument or screw driver touch the antenna socket inner terminal. If there is a good increase in noise and if some local stations can be heard, look for trouble in the antenna or its cable connections.

Having checked the above thoroughly without locating the trouble, the following simplified method of isolating the defective stage may be used.

1. With squelch and volume set as above, remove V9 (12AX7), and listen for a loud click from the speaker. If there is a click, the output stage, 6AQ5, is working properly, if no click is heard, it is defective. Check screen and plate voltages.
2. Proceed with each previous stage, replacing the tube each time until a tube is pulled which causes no click in the speaker. Check the stage after this one for correct voltages and continuity.

This simple method of isolation will usually help to locate the trouble quickly. Do not tune transformers or coils, as the repair can usually be made without disturbing any of the alignment. Refer to the schematic for voltages.

If a tube must be replaced use the exact replacement - not a so called substitute (6CW5 Does Not replace 6DS4 and 6AU6 Does Not replace 6BA6.)

SSB/AM GOLDEN EAGLE MARK III SERVICE MANUAL

GOLDEN EAGLE MARK III RECEIVER GAIN MEASUREMENTS

Test Equipment required

1. A Signal Generator calibrated in frequency, DB and microvolts output to cover the frequency range from 26.965 - 27.490 MHz and 4.0 - 4.5 MHz and 455 KHz.
2. A D.C. Vacuum tube volt meter.

Procedure

PRESET FRONT PANEL CONTROLS

Main Tuning - The middle of the band (Ch. 12)
Band Spread - Pointer 12 o'clock (1/2 rotation of Pot.)
Mode - AM
Power - On
Volume - Any position
Squelch - Max. CCW
ANL - Push ON
Tuning - Man.
R. F. Gain - Max. CW
AGC - Push ON
Speaker Switch Internal
S Meter (rear adjustment) Set at Zero with antenna disconnected.

Connect a VTVM between ground and T5, Junction of R38, R39, R46 and C40.

Use a .01 MFD 500V capacitor in series with the generator.

Connect the generator to each of the points listed in the following table. Adjust the generator for a -5 volt reference on the VTVM. compare the output of the generator with the values in the table. Plus 3 db from these values is normal due to tolerances. If less than indicated signal level is required the unit exceeds published specifications.

Signal level for -5 volts at detector

<u>Signal applied to</u>	<u>Frequency</u>	<u>Microvolts</u>	<u>or</u>	<u>DB above 1 μv</u>
Pin 1 of V7	455 KHz	32,000		90 DB
Pin 1 of V6	455 KHz	4,000		72 DB
Pin 1 of V5	455 KHz	250		48 DB
Pin 7 of V4B	455 KHz	28		29 DB
Pin 7 of V3B	4.3 MHz	13		22 DB
Pin 8 of V2	27 MHz	5.6		15 DB
Pin 4 of V1	27 MHz	4		12 DB
Antenna Input	27 MHz	.32		-10 DB

SSB/AM GOLDEN EAGLE MARK III SERVICE MANUAL

GOLDEN EAGLE MARK III RECEIVER ALIGNMENT PROCEDURE AM

Alignment of the Mark III Receiver should not be attempted unless suitable equipment is available.

Test Equipment required:

1. A 455 KHz Test Oscillator with variable output
2. A Signal Generator calibrated in frequency and microvolts output.
3. A vacuum tube volt meter

Front panel control settings

Main Tuning - Channel 12
Mode - AM
Power - On
Volume - Any position
Squelch - Max CCW
ANL - Push On
Tuning - Man.
RF Gain - Max. CW
AGC - Push On
Speaker - Internal
Band Spread - Pointer at 12 o'clock with 1/2 rotation of Pot.

1. Connect the VTVM across the detector or between ground and T5, Junction of R38, R39, R46 and C40.
2. Apply an accurate 455 KC signal to Pin 7 of V4B and adjust the generator level for approximately -5 volts on the VTVM.

CAUTION: It is very important to have an accurate 455 kc signal, so the 4 MHz crystals will convert accurately.

3. Tune T3, T4, T5, T8 and T9 both top and bottom for maximum reading on the VTVM. Reduce 455 KHz generator output level to maintain approx. -5 volts while tuning the IF transformers to avoid overload and insure proper tuning. It is possible to find 2 peaks in the C584 IF cans used in the Mark III and late Mark II Series "B" Receiver. One peak is with both slugs to the inside or middle of the can. The other with both slugs tuned out towards each end of the cans. This outside peak is the correct adjustment. The inside peak gives poor adjunct channel rejection. Use a plastic tuning tool. (T8 Top Slug may be adjusted to Inner Peak if necessary to obtain enough sensitivity.)
4. Apply a 27.105 MHz signal (Channel 12) to the antenna input. Tune Receiver to Channel 12. Adjust Generator output for a -5 volt reading on the VTVM. Tune T1 and T2 top and bottom for maximum reading on VTVM. Tune L1 for maximum reading on the VTVM.

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GOLDEN EAGLE MARK III RECEIVER ALIGNMENT PROCEDURE AM (cont'd)

Change generator frequency to 27.255 MHz (Channel 23) and tune Receiver to Channel 23. Peak the bottom slug of T2 for maximum reading on the VTVM. DO NOT readjust T1 or L1 at this time. Change generator frequency to 26.965 (Channel 1) and tune Receiver to Channel 1, Peak top slug of T2.

Note the detector reading on the VTVM.

Readjust the Generator output frequency and receiver to Channel 12 (27.105 MHz) repeak T1 top and bottom.

Check both ends of the band 26.965 (Channel 1) and 27.255 (Channel 23) several times peaking as above to ensure approximate equal receiver gain.

5. Check crystal oscillator stability. Connect VTVM Pin 2 to ground V3A. Looking at L3 from the bottom of the chassis, tune the slug in (CW) until there is no voltage on the meter. Slowly Tune L3 out (CCW) for maximum meter reading and then tune 1/4 turn beyond the peak for stability.

6. Dial Calibration

Band spread control should be at mid frequency (1/2 rotation of Pot.) indicating dot in knob at 12 o'clock.

Calibrate the dial by applying an accurate CB channel signal to the antenna input, set the dial to the known channel being used and carefully adjust the 3-12 ceramic trimmer (C50) for maximum reading on the VTVM. L5 can be adjusted if the linearity of the channels are off.

Tune C50 to calibrate the low frequency channels and Tune L5 for the high frequency channels. Interaction between L5 and C50 will require several adjustments of both components if the linearity should be off.

Be sure to use the correct plastic tuning tool for both L5 and C50 so as not to damage either component.

NOTE: A metal screwdriver will influence the calibration, therefore, do not use a metal screwdriver.

(CW) Clockwise

(CCW) Counter Clockwise

SSB/AM GOLDEN EAGLE MARK III SERVICE MANUAL

GOLDEN EAGLE MARK III RECEIVER ALIGNMENT PROCEDURE - SSB

1. Align the receiver completely in the AM function
2. Be sure the fine tuning pointer is set at 12 o'clock with 1/2 rotation of Pot.
3. Connect a 455 KHz variable signal generator to Pin 7 of V4B. (Use a .01 MFD capacitor between the signal generator and Pin 7 of V4B.)

Connect the VTVM across the detector between ground and T5, junction of R38, R39, R46 and C40.

4. Tune the signal generator for a peak detector voltage and adjust the signal generator output for approximately -3 volts on the VTVM.
5. Detune the generator in the higher frequency direction and increase the output 30 DB. Carefully tune the generator until the same -3V reference is obtained.
6. Set mode switch to LSB and Tune C69 to a Zero Beat.
7. Reset mode switch to AM position and repeat Step 4.
8. Detune the generator in the lower frequency direction and increase the output 30 DB. Carefully tune the generator until the same -3 volt reference is obtained.
9. Set mode switch to USB and tune C70 to a Zero Beat.

ALTERNATE METHOD - FIELD ALIGNMENT FOR GOLDEN EAGLE MARK III RECEIVER
LOWER SIDEBAND AND UPPER SIDEBAND BALANCE

Preset Front Panel Controls on Receiver.

Mode	-	A.M.
Speaker	-	Internal
Power	-	On with 1/4 volume
Band Spread	-	12 o'clock
Squelch	-	Max Counter Clockwise and in
Tuning	-	Manual
R.F. Gain	-	Max Clockwise and in
Channel Selector	-	Channel 3

Carefully remove the top cover of the receiver. Put Transmitter in AM Mode. Turn the Channel Selector on the Mark III Transmitter to Channel 3 and press the Spot Switch, and check for calibration on the Receiver. If the calibration is slightly off, carefully tune L5 coil (inside the receiver) for maximum S Meter reading. Be sure to use the proper plastic Hex drive tool so as not to crack the iron slug.

SSB/AM GOLDEN EAGLE MARK III SERVICE MANUAL

GOLDEN EAGLE MARK III RECEIVER ALIGNMENT PROCEDURE - ALTERNATE METHOD

LOWER SIDEBAND AND UPPER SIDEBAND BALANCE

Lower Sideband adjustment

Change mode switch to Lower Sideband and carefully detune the main dial of the receiver slightly greater than 1/4 Channel away from Channel 3 and towards Channel 2.

With the Spot Button depressed very carefully Tune C69 (located inside the receiver to the rear of the speaker switch,) for a zero beat.

Upper Sideband Adjustment

Change Mode Switch to Upper Sideband and carefully Tune the main dial of the receiver slightly greater than 1/4 Channel away from Channel 3 and towards the R/C Channel.

With the Spot Switch depressed very carefully Tune C70 (located beside C69) for a Zero Beat.

Carefully replace the Top Cover and return all controls to the desired operation.