



Owner's Manual



Model R-5

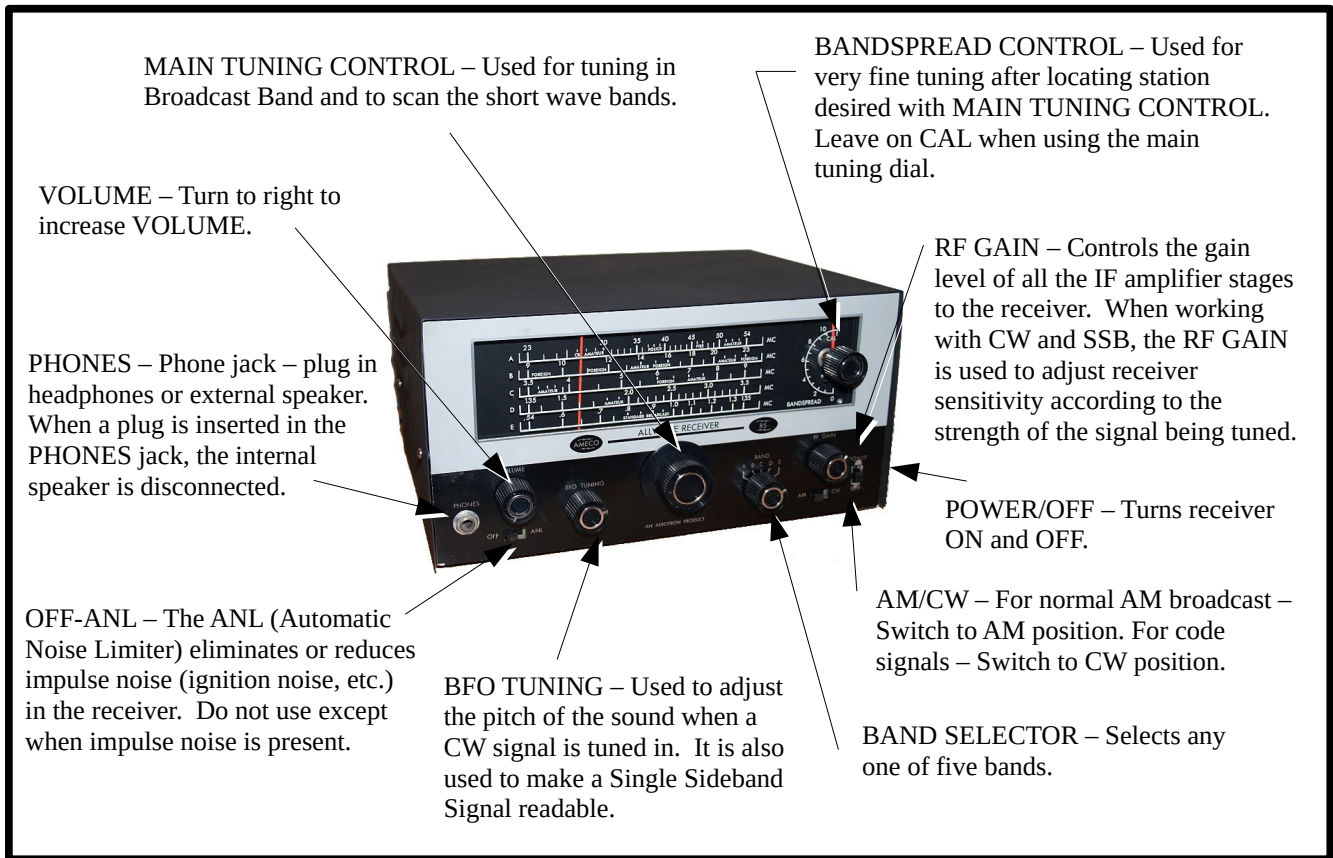
ALLWAVE RECEIVER



DIVISION OF

AEROTRON, INC. · RALEIGH, NORTH CAROLINA

(Digital version: Mike Markowski AB3AP, Mar 2020)



OPERATION

STANDARD AM BROADCAST BAND

Set the controls as follows:

<u>CONTROL</u>	<u>SETTING</u>
POWER-OFF	* POWER
AM-CW	AM
OFF-ANL	OFF
BAND	BAND D or E
VOLUME	9 o'clock position
RF GAIN	Maximum clockwise position
BANDSPREAD	10

*(The dial lights should go on)

Using the main tuning knob, tune to the frequency of the station desired, on the main dial.

Adjust the VOLUME control as desired.

When tuning signals where the stations are very close together, the main tuning dial can be left at a slightly higher frequency and the fine tuning can be done with the BANDSPREAD control.

SHORT WAVE TUNING

Short wave Broadcast Stations:

Set the controls for AM Broadcast.

Select the short wave band desired with the BAND switch.

On the short wave bands, all stations are close together, therefore the main dial is used for coarse tuning, to a point slightly higher than the frequency desired. Then use the BANDSPREAD control for fine tuning. Always return the BANDSPREAD control to CAL when using the main tuning dial.

When there is noise on the signal, shift the OFF-ANL switch to ANL. Many kinds of noise will be reduced considerably when the Automatic Noise Limiter is used.

CW TUNING

To tune to a CW signal use the following procedure:

1. With the AM-CW switch in AM position, tune the main tuning control until a steady signal is found.
2. Turn the RF GAIN control to the lowest possible point while still retaining an audible signal. The VOLUME control should be at midpoint of its range.
3. Tune in the signal with the BANDSPREAD control.
4. Put the AM-CW switch in CW position and adjust the BFO TUNING for zero beat.
5. Retune the signal with either the main tuning control or the BANDSPREAD control, and adjust the RF GAIN control for the volume you want.
6. When you want to tune in another CW signal use the main or BANDSPREAD tuning and RF GAIN controls.

SINGLE SIDEBAND TUNING

Use the procedure given above.

Tune the BANDSPREAD dial very slowly until the voice being received sounds most natural.

Keep the RF GAIN control as low as possible.

FM TUNING

Use the procedure given for AM tuning.

When the signal is tuned in exactly on frequency, it will probably not be as clear as you desire.

Tune the radio slightly to one side of the exact frequency, and the voice will become clear and easily understood.

As a general rule, one side will be clearest, so tune both sides of the frequency to achieve the best response.

LISTENING ON SHORT WAVE

As you become more experienced in using your R5 receiver, you will notice that many foreign stations announce in meters, rather than megahertz. Much of the amateur literature will speak of the 80 meter band, or the 40 meter band, or any of the other widely used frequencies, in meters rather than megahertz.

The formula given below may be used in converting meters to megahertz or megahertz to meters.

For Example: $300/\text{Megahertz} = \text{Meters}$

$300/12 \text{ MHz} = 25$
 $12 \text{ MHz} = 25 \text{ meters}$

or

From meter to megahertz: $300/\text{meters} = \text{megahertz}$

For example: 25 meters
 $300/25 = 12 \text{ MHz}$

Some interesting possibilities for your short wave listening are listed below:

Amateur Radio – Assigned bands between 1.800 MHz to 54 MHz.

Short Wave Broadcasting – Check with a good reference book regarding frequencies used by various countries.

Citizens Band – Frequencies assigned to private citizens in the United States and several other countries – 26.965 to 27.255 MHz.

Military Communications – Heard over the entire short wave frequency range.

Police, Fire and Commercial – Between 30 and 50 MHz.

LISTENING TO THE FM BAND

Certain bands of the frequencies in the 30 – 50 MHz range are allocated by the U.S. Government to what is known as the Public Service Channels. This includes police, fire departments, forestry and conservation, and special emergency service. Frequency modulation is used by these services because of its ability to overcome much of the effect of ignition noises.

In order to enter this exciting world of emergency communications, it will be necessary to use more rigorous standards in the selection of an antenna. It is recommended that the beginner refer to some standard book on the subject, such as the ARRL Antenna Handbook by the AMERICAN RADIO RELAY LEAGUE.

AVERAGE GAIN MEASUREMENTS AT 455 kHz

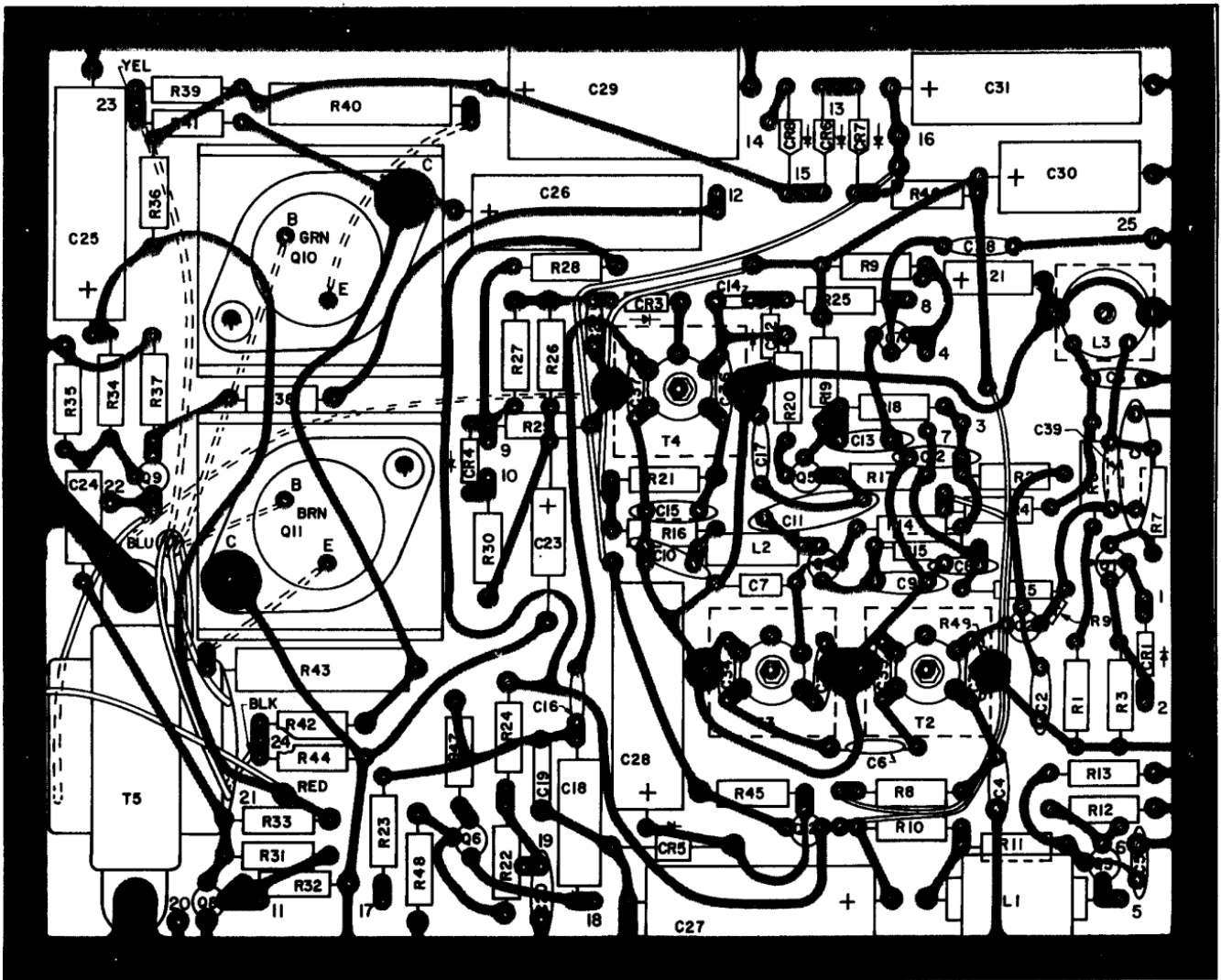


Figure 1: Printed Circuit Board Outline

AC line voltage – 117 volts.

Signal generator with 50 ohm output impedance.

Modulated 30% at 400 Hz.

0.1 uF in series with signal generator for DC isolation.

Output measured across 3.2 ohm resistor connected to PHONES jack with AC voltmeter.

1.0 volt RMS reference output.

AGC disabled by shorting terminals 2 and 3 on S 102A.

Oscillator disabled by shorting front section of main tuning capacitor, C 102B.

VOLUME at maximum

ANL switch OFF

BAND on E

RF GAIN at maximum

AM-CW switch on AM.

<u>APPROXIMATE μV INPUT:</u>	<u>INPUT TO:</u>	<u>NOTES:</u>
10	Q 1 Base	With C 113 disconnected from bandswitch.
400	Q 1 Collector	”
22	Q 2 Emitter	”
1,000	Q 2 Collector	”
55	Q 4 Base	Short T3, terminals 4 & 5
600	Q 4 Collector	Short T3, terminals 4 & 5
400	Q 5 Emitter	Short T3, terminals 4 & 5
0.9 V	Q 5 Collector	RF GAIN at Minimum
32,000	CR 3 Cathode	RF GAIN at Minimum

GLOSSARY OF TERMS

AM – Amplitude Modulation

ANL – Automatic Noise Limiter

ANT – Antenna

AVC – Automatic Volume Control. Also, called AGC – Automatic Gain Control

BFO – Beat Frequency Oscillator

CQ – A general call used to establish contact between amateurs

CW – Continuous wave. Unmodulated signal with the message transmitted by interruptions which produce dots and dashes.

FM – Frequency modulation

QRM – Interference from other signals

QRX – Standby

QRN – Interference from static

QSO – Contact between two stations.

QSY – Change operating frequency

RF GAIN – Controls the sensitivity of the RF and/or IF amplifier stages.

RST – Readability, Signal Strength, Tone

SWL – Short wave listener

STATIONS FOR INTERNATIONAL LISTENING

There are many radio stations throughout the world which broadcast in English on the short wave frequencies. Some of these stations can be found by “scanning” the appropriate bands on your R5 receiver. For a comprehensive listing, refer to WORLD RADIO-TV HANDBOOK, or any one of the directories available. The list below will serve as a starting point in your enjoyment of this fascinating hobby.

<u>COUNTRY</u>	<u>CITY</u>	<u>FREQUENCY IN MHz</u>
Albania	Tirana	7.265
Argentina	Buenos Aires	9.690
Australia	Melbourne	15.220 – 17.840
Bulgaria	Sofia	6.070
China	Peking	1.506 – 17.680
Cuba	Havana	6.170 – 11.760
Czechoslovakia	Prague	5.930 – 7.115 – 6.345
Denmark	Copenhagen	9.520
Ecuador	Quito	9.745 – 11.915 – 15.115
England	London	6.195 – 7.130 – 9.510 – 11.780
Germany	Berlin	5.960 – 6.160 – 9.730
Ghana	Accra	6.110

<u>COUNTRY</u>	<u>CITY</u>	<u>FREQUENCY IN MHz</u>
Holland	Hilversum	11.730
Hungary	Budapest	6.235 – 9.833
Italy	Rome	6.010 – 9.630
Japan	Tokyo	11.780 – 15.135
Lebanon	Beirut	9.710
Netherlands	Bonaire	9.605
Portugal	Lisbon	6.025 – 6.185
Romania	Bucharest	5.990 – 9.570
South Africa	Johannesburg	9.675 – 11.880
Spain	Madrid	6.130 – 9.760
Sweden	Stockholm	5.990
Switzerland	Berne	5.965 – 6.120 – 9.535
U.A.R.	Cairo	9.475
U.S.S.R.	Kiev	7.120 – 7.310 – 9.665
U.S.S.R	Moscow	7.150 – 7.205 – 7.310 – 9.665
Vatican	Vatican City	5.985 – 7.250

FOR MORE INFORMATION --

There are many sources you can go to for more extensive information concerning short wave radio. Some standard references which offer a wealth of information are listed below:

AMERICAN RADIO RELAY LEAGUE, INC.
Newington, Conn. 06111

The largest organization of radio amateurs.

WORLD RADIO TV HANDBOOK

List of all radio and television stations throughout the world. Can be ordered from:

Gilfer Associates
P. O. Box 238
Park Ridge, New Jersey, 07656

WHITE'S RADIO LOG

Published in the magazine RADIO-TV EXPERIMENTER. Any three consecutive issues contain a complete issue of the log.

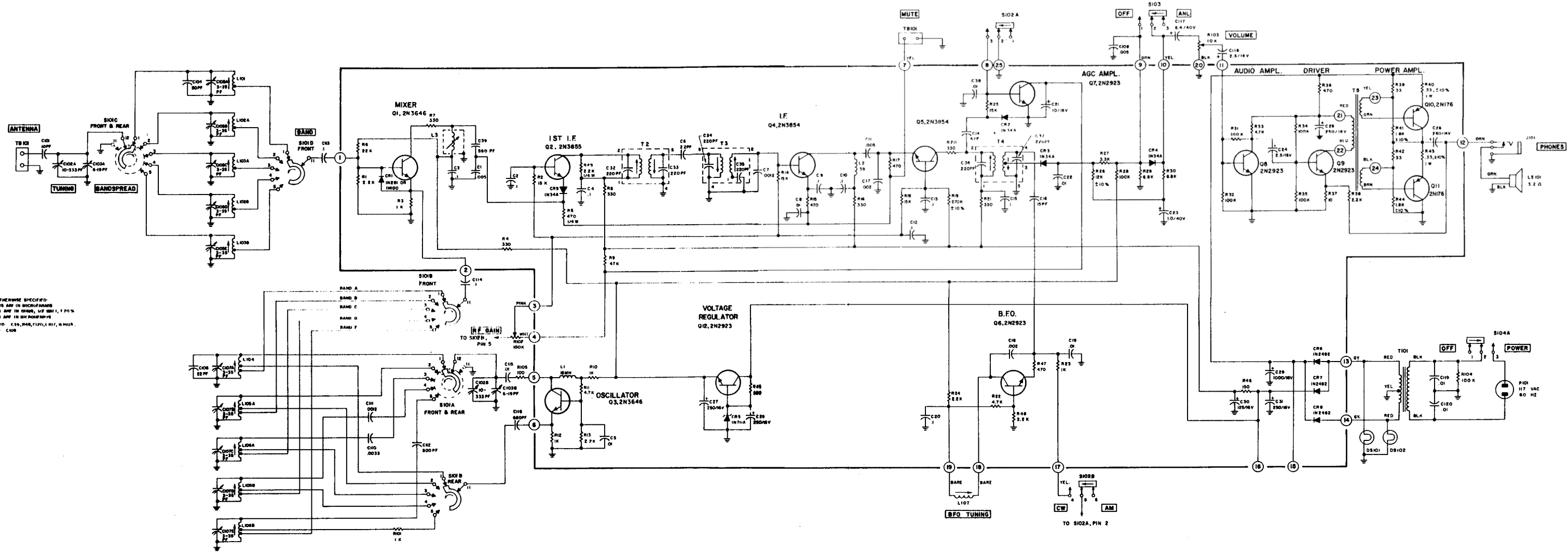
ALIGNMENT PROCEDURE

1. Use an amplitude modulated generator covering 455 kHz to 54 MHz.
2. Connect the output meter across the speaker voice coil.
3. Use non-metallic alignment tools. GC #8606L or similar.
4. Use a standard EIA dummy antenna as shown.
5. VOLUME control near maximum clockwise.
BANDSPREAD control at 10.
AM-CW switch at AM
OFF-ANL switch in OFF position.
RF GAIN at maximum unless noise exceeds 50 mW with no signal or an unmodulated signal.
6. Refer to Outline Diagram for location of adjustments.
7. Bottom must be on chassis.

STEP	SIGNAL GENERATOR CONNECTIONS	GENERATOR FREQUENCY	BAND SELECTOR SETTING	RECEIVER DIAL SETTING	ADJUSTMENT
1.	High side through a 0.01 uF capacitor to stator plate of rear section of TUNING capacitor.	455 kHz (30% mod.)	E	0.54 MHz	L3, top and bottom of T2, T3, T4 for maximum output. Keep reducing the generator output to keep output meter below 50 mW.
2.	High side through a 0.01 uF capacitor to stator plate of rear section of TUNING capacitor. Modulation OFF.	455 kHz	E	0.54 MHz	Tune BFO to zero beat. Adjust knob so pointer aims straight up and tighten set screw.
3.	High side through EIA antenna to ANT terminal on rear of chassis. Low side to chassis.	1.3 MHz (30% mod.)	E	1.3 MHz	C107E and C105E for maximum output as in Step 1.

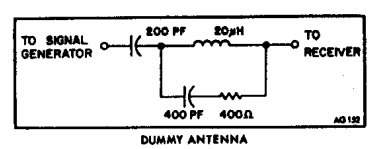
STEP	SIGNAL GENERATOR CONNECTIONS	GENERATOR FREQUENCY	BAND SELECTOR SETTING	RECEIVER DIAL SETTING	ADJUSTMENT
4.	Same as Step 3	0.6 MHz (30% mod.)	E	0.6 MHz	L106B and L103B for maximum output as in Step 1.
5.	Same as Step 3	---	E	---	Repeat steps 3 and 4 until no further increase in output can be obtained on either adjustment.
6.	Same as Step 3	3.2 MHz (30% mod.)	D	3.2 MHz	C107D and C105D for maximum output as in Step 1.
7.	Same as Step 3	1.5 MHz (30% mod.)	D	1.5 MHz	L105B and L102B for maximum output as in Step 1.
8.	Same as Step 3	---	D	---	Repeat steps 6 and 7 until no further increase in output can be obtained.
9.	Same as Step 3	8.0 MHz (30% mod.)	C	8.0 MHz	C107C and C105C for maximum output as in Step 1.
10.	Same as Step 3	3.8 MHz (30% mod.)	C	3.8 MHz	L103A and L106A for maximum output as in Step 1.
11.	Same as Step 3	---	C	---	Repeat steps 9 and 10 until no further increase in output can be obtained.
12.	Same as Step 3	21 MHz (30% mod.)	B	21 MHz	C107B and C105B for maximum output as in Step 1.
13.	Same as Step 3	10 MHz (30% mod.)	B	10 MHz	L102A and L105A for maximum output as in Step 1.
14.	Same as Step 3	---	A	---	Repeat steps 12 and 13 until no further increase in output can be obtained.

STEP	SIGNAL GENERATOR CONNECTIONS	GENERATOR FREQUENCY	BAND SELECTOR SETTING	RECEIVER DIAL SETTING	ADJUSTMENT
15.	Same as Step 3	50 MHz (30% mod.)	A	50 MHz	C107A and C105A for maximum output as in Step 1.
16.	Same as Step 3	25 MHz (30% mod.)	A	25 MHz	L101 and L104 for maximum output as in Step 1.
17.	Same as Step 1	---	A	---	Repeat steps 15 and 16 until no further increase in output can be obtained.



D 161001 Rev. A

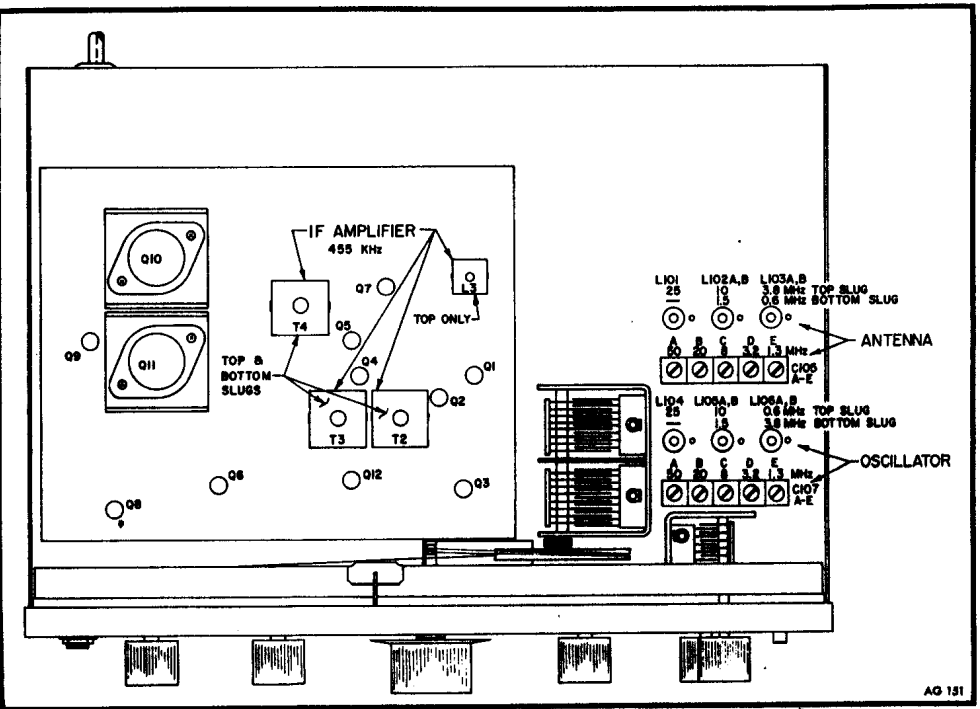
ALIGNMENT PROCEDURE



- ALIGNMENT PROCEDURE**
1. Use an amplitude modulated generator covering 455 KHz to 54 MHz.
 2. Connect the output meter across the speaker voice coil.
 3. Use non-metallic alignment tools. GC #B606L or similar.
 4. Use a standard EIA dummy antenna as shown.
 5. VOLUME control near maximum clockwise. BANDSPREAD control at 10. AM-CW switch at AM. OFF-ANL switch in OFF position. RF-GAIN at maximum unless noise exceeds 50 milliwatts with no signal or an unmodulated signal.
 6. Refer to Outline Diagram for location of adjustments.
 7. Bottom must be on chassis.

STEP	SIGNAL GENERATOR CONNECTIONS	GENERATOR FREQUENCY	BAND SELECTOR SETTING	RECEIVER DIAL SETTING	ADJUSTMENT
1.	High side through a .01 mfd capacitor to stator plates of rear section of TUNING capacitor.	455 KHz (30% mod.)	E	.54 MHz	L 3, top and bottom of T 2, T 3, T 4 for maximum output. Keep reducing the generator output to keep the output meter below 50 milliwatts.
2.	High side through a .01 mfd capacitor to stator plates of rear section of tuning capacitor. Modulation OFF.	455 KHz	E	.74 MHz	Tune BFO to zero beat. Adjust knob so pointer line straight up and tighten set screws.
3.	High side through EIA antenna to ANT terminal on rear of chassis. Low side to chassis	1.3 MHz (30% mod.)	E	1.3 MHz	C 107E and C 105E for maximum output as in Step 1.

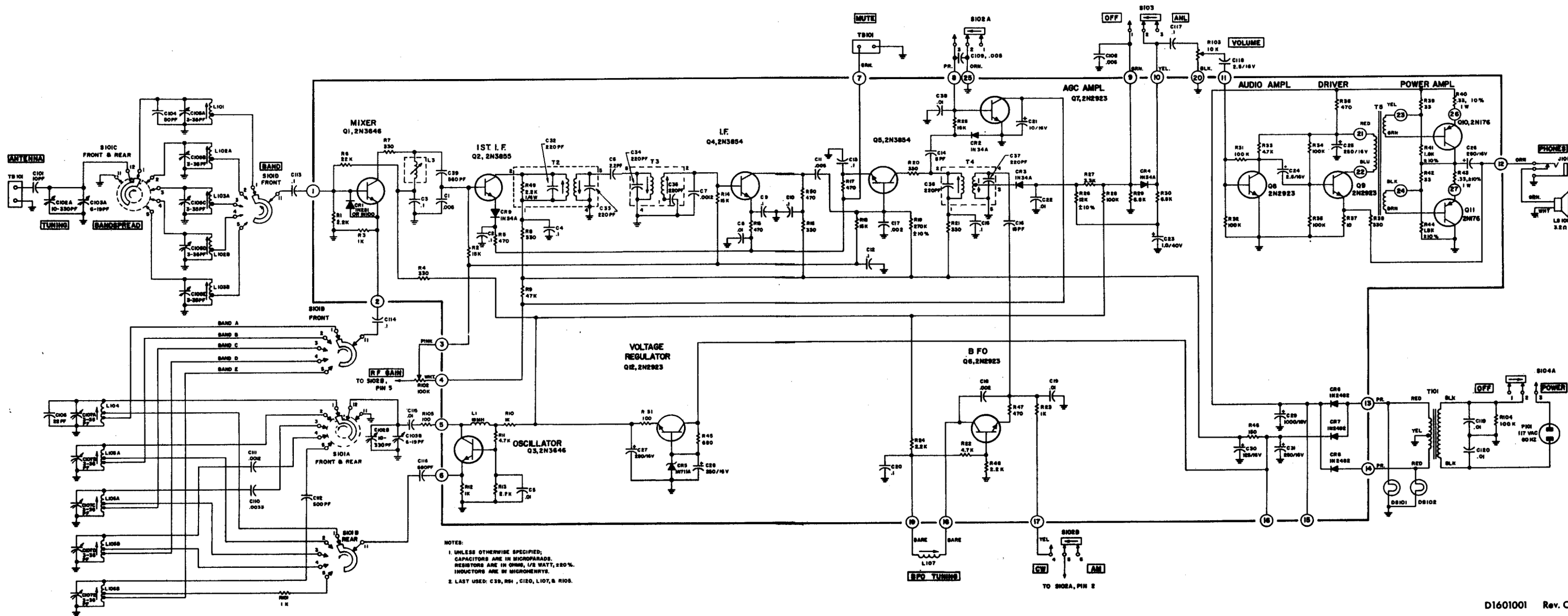
4.	Same as Step 3	0.6 MHz (30% mod.)	E	0.6 MHz	L 106B and L 103B for maximum output as in Step 1.
5.	Same as Step 3	---	E	---	Repeat steps 3 and 4 until no increase in output can be obtained on either adjustment.
6.	Same as Step 3	3.2 MHz (30% mod.)	D	3.2 MHz	C 107D and C 105D for maximum output as in Step 1.
7.	Same as Step 3	1.5 MHz (30% mod.)	D	1.5 MHz	L 105B and L 102B for maximum output as in Step 1.
8.	Same as Step 3	---	D	---	Repeat steps 6 and 7 until no increase in output can be obtained.
9.	Same as Step 3	8.0 MHz (30% mod.)	C	8.0 MHz	C 107C and C 105C for maximum output as in Step 1.
10.	Same as Step 3	3.8 MHz (30% mod.)	C	3.8 MHz	L 103A and L 106A for maximum output as in Step 1.
11.	Same as Step 3	---	C	---	Repeat steps 9 and 10 until no increase in output can be obtained.
12.	Same as Step 3	21 MHz (30% mod.)	B	21 MHz	C 107B and C 105B for maximum output as in Step 1.
13.	Same as Step 3	10 MHz (30% mod.)	B	10 MHz	L 102A and L 105A for maximum output as in Step 1.
14.	Same as Step 3	---	A	---	Repeat steps 12 and 13 until no increase in output can be obtained.
15.	Same as Step 3	50 MHz	A	50 MHz	C 107A and C 105A for maximum output as in Step 1.
16.	Same as Step 3	25 MHz	A	25 MHz	L 101 and L 104 for maximum output as in Step 1.
17.	Same as Step 1	---	A	---	Repeat Steps 15 and 16 until no increase in output can be obtained.



ALIGNMENT OUTLINE

FACTORY ASSEMBLED RF SUBASSEMBLY

<u>Item</u>	<u>Description</u>	<u>Part No.</u>
<u>Coils</u>		
L 101	Coil antenna	1801 1601 032
L 102	Coil antenna	1801 1601 033
L 103	Coil antenna	1801 1601 034
L 104	Coil, oscillator	1801 1601 032
L 105	Coil, oscillator	1801 1601 035
L 106	Coil, oscillator	1801 1601 036
<u>Capacitors</u>		
C 104	50 pF, $\pm 10\%$, NPO, Disc ceramic	1501 5002 007
C 105	5x10-35 pF, mica trimmer	1573 3502 004
C 106	22 pF, $\pm 10\%$, NPO, disc ceramic	1501 2202 007
C 107	5x10-35 pF, mica trimmer	1573 3502 004
C 110	0.0033 uF, $\pm 10\%$, mica	1512 3304 003
C 111	0.0012 uF, $\pm 5\%$, silver mica	1513 1204 008
C 112	500 pF, $\pm 5\%$, silver mica	1513 5003 008
<u>Resistor and Switch</u>		
R 101	1 k Ω , $\pm 20\%$, ½ W, comp	4701 1004 003
S 101	Bandswitch	5112 1601 037



SCHMATIC DIAGRAM: R5K RECEIVER

D1601001 Rev. C

UNIT: AMECO R5 ALLWAVE RECEIVER4210 1601 102
13 Dec 1967

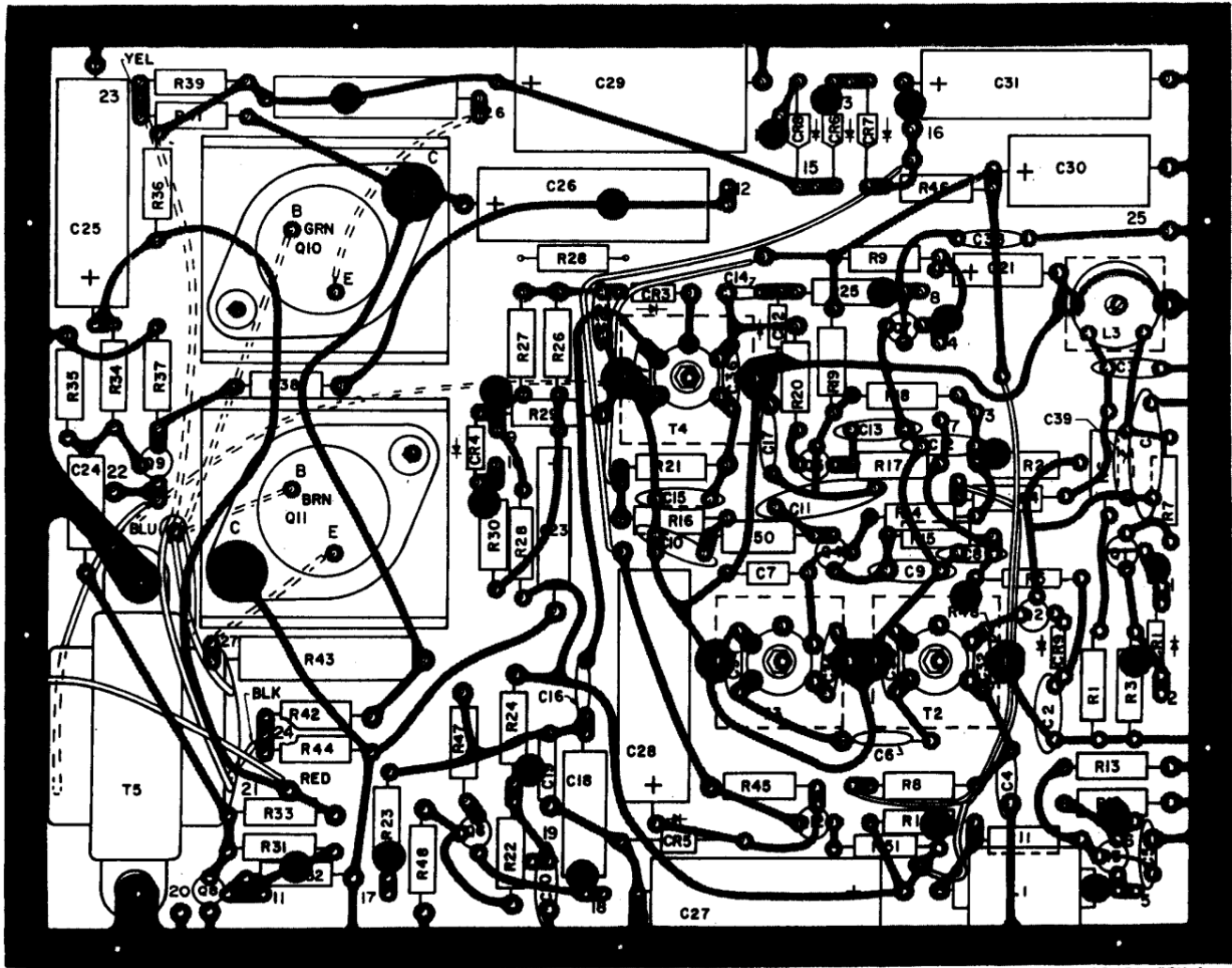
This ADDENDUM should be kept with your Owner's Manual for the Model R-5 Allwave Receiver. The schematic diagram and printed circuit board diagram shown on this ADDENDUM reflect the latest changes in the R-5 Receiver.

Operation and Alignment Procedures have not been affected by the minor changes made to the R-5.

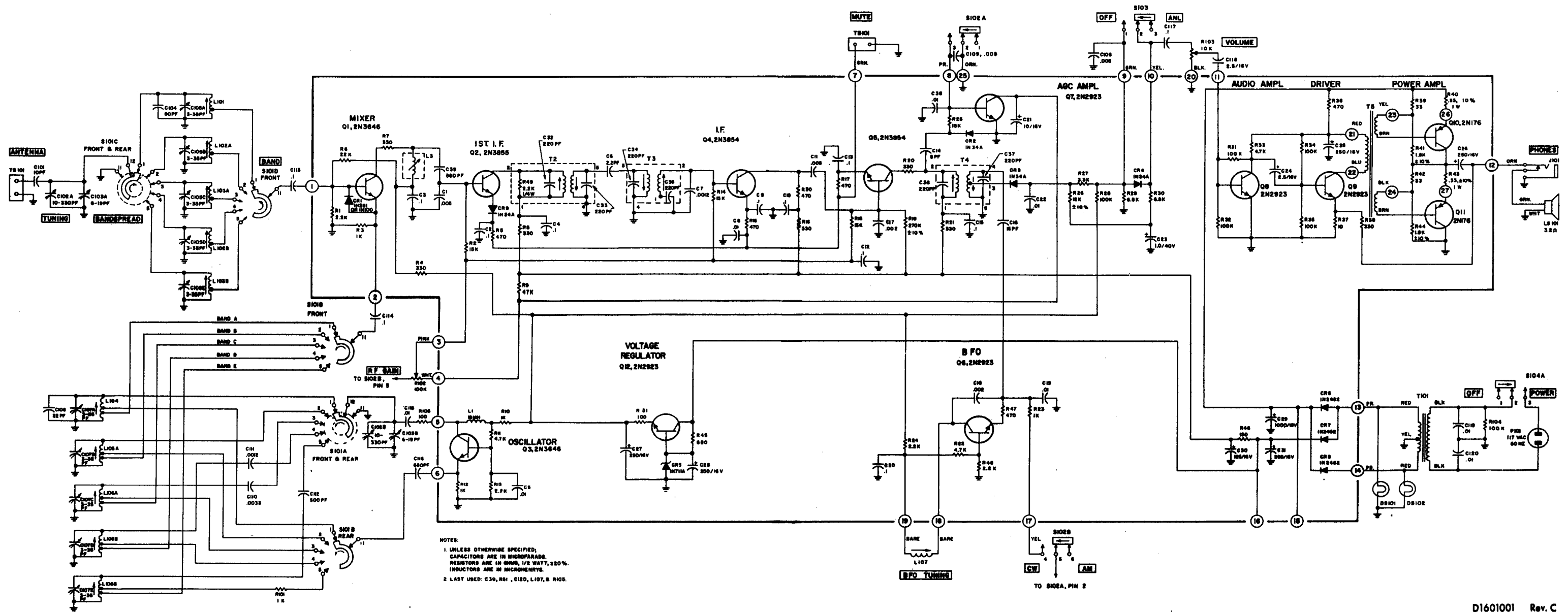
Changes are made as follows:

1. Two pads, No. 26 and No. 27, were added to the printed circuit board.
2. Wire color designations were added or changed as necessary.
3. To improve sensitivity, all three IF amplifiers now use the common emitter circuit.

PRINTED CIRCUIT BOARD OUTLINE, REV A



AG 150, REV A



SCHMATIC DIAGRAM: R5 RECEIVER