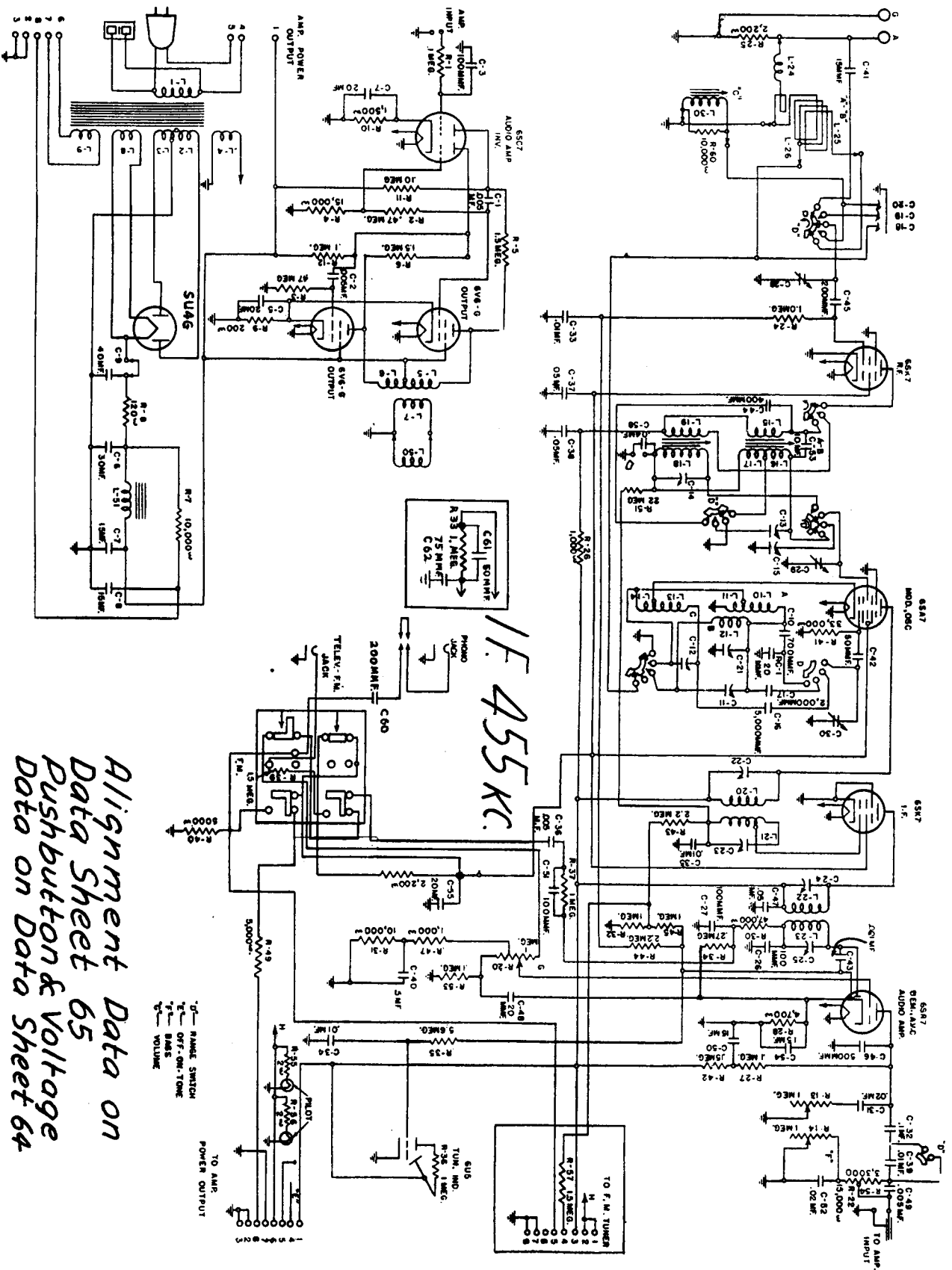
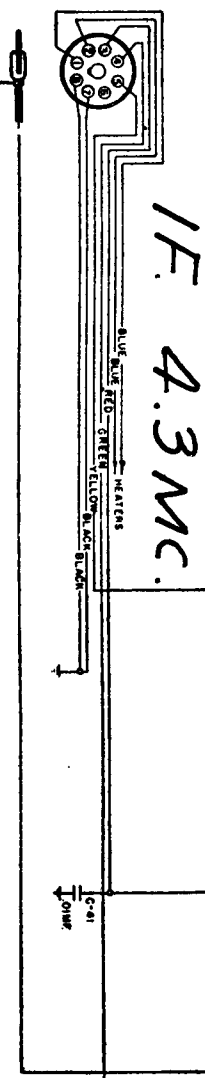
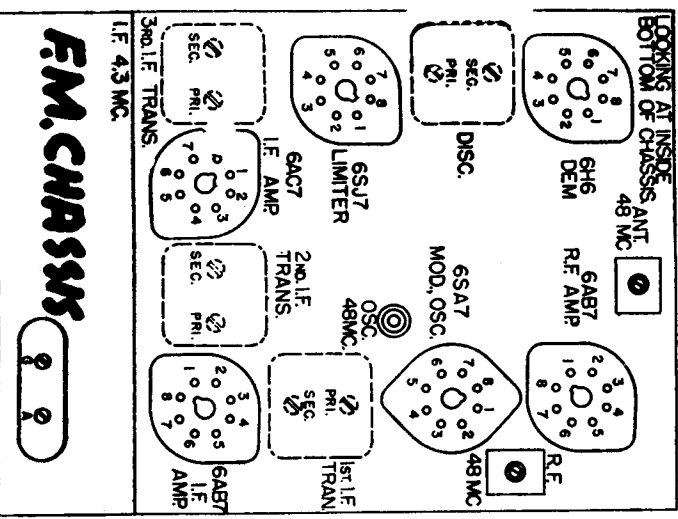
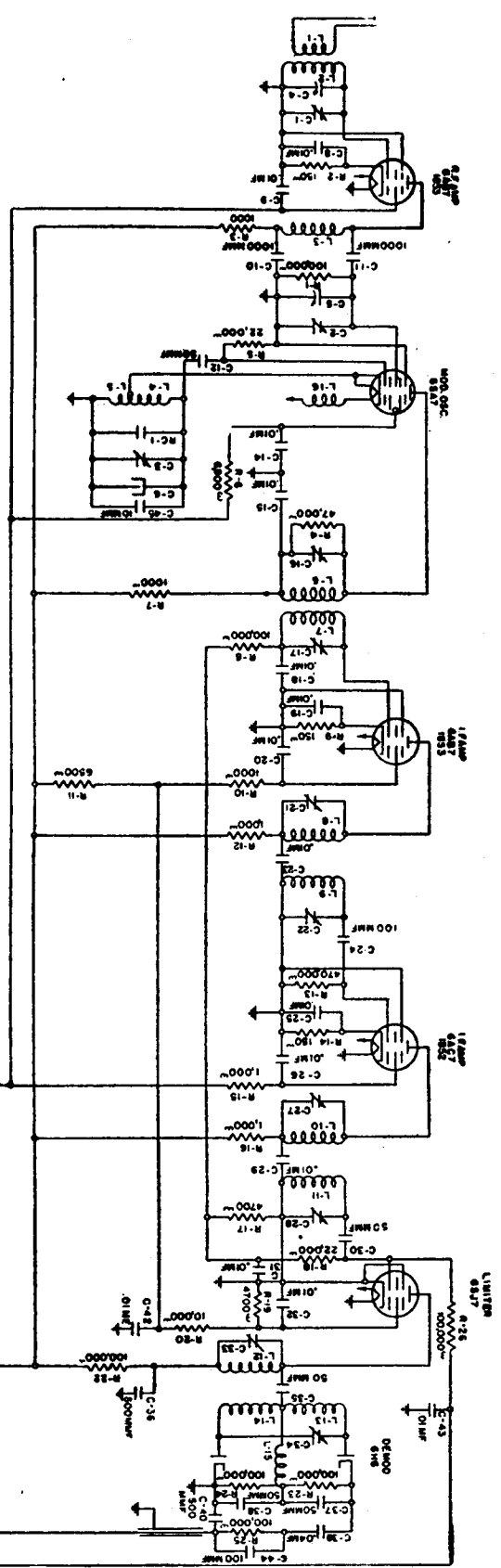


1940-41 MODEL 154

Schematic Circuit Chassis and Power Ampl.

Alignment Data on
Data Sheet 65
Pushbutton & Voltage
Data on Data Sheet 64
F.M. CIRCUIT & LAYOUT
on Data Sheet 63





**Alignment
Data on Data
Sheet 65
1940.41**

FREQUENCY MODULATION CHASSIS, MODEL 154

* Read on 1000 volt scale of voltmeter.
Between terminals 2 and 8 of rectifier socket—5 volts A. C.

Component	6AB7	6SA7	6AB7	6AC7	6SJ7	6H6
R. F. Amplifier	0	0	0	0	0	0
Modulator and Oscillator	0	0	+265	+100	0	0
I. F. Amplifier	0	0	0	0	+2.2	+150
I. F. Amplifier	0	0	0	0	+2.2	+150
Limiter	0	0	0	0	0	+42
Demodulator	0	0	0	0	0	6.3

FM. CHASSIS

MODEL 51 VOLTAGES & LAYOUT

NORMAL VOLTAGE READINGS

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt. Take all D. C. voltage readings on the 500 volt scale except where an asterisk appears. Take all readings with chassis operating and tuned to 1000 Kc.—no signal. Use a line voltage of 120 volts or make allowance for the variation. Read from indicated socket terminals to chassis base. See Location Chart for position of terminals. A. C. Voltages are indicated by italics.

Tube	Circuit	Terminals of Sockets								Heater Voltages Between Heater Terminals	
		1	2	3	4	5	6	7	8	Socket Terminal Numbers	Voltage A. C.
6SA7	Mod.—Osc.	0	0	+205	+70	-125	-	<i>6.3</i>	-	2-7	<i>6.3</i>
6SK7	I. F. Amp.	0	0	-	-	+11*	+5	<i>6.3</i>	+205	2-7	<i>6.3</i>
6SQ7	Dem.—A. V. C.	0	0	0	0	0	+100	<i>6.3</i>	0	7-8	<i>6.3</i>
6SF6	Output	0	0	+200	+205	0	-	<i>6.3</i>	+11*	2-7	<i>6.3</i>
6Y4G	Rectifier	0	0	<i>265</i>	-	<i>265</i>	-	+265	+265	7-8	5

Total Rectified D. C. current is 51 milliamperes. Drop across Field Coil is 65 volts.

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned normally to 1000 Kc. or 47 megacycles—no signal. Use a line voltage of 120 volts or make allowance for the variation. Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

AMPLITUDE MODULATION AND POWER AMPLIFIER CHASSIS, 154 RECEIVER

Tube	Circuit	Terminals of Sockets							
		1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	0	0	0	0	0	+100	<i>6.3</i>	0
6SA7	Modulator and Oscillator	0	0	+260	+100	-20*	0	<i>6.3</i>	0
6SK7	I. F. Amplifier	0	0	0	0	0	+100	<i>6.3</i>	0
6SR7	Demod. A. V. C., Audio Amp.	0	0	+3	0	0	+84	<i>6.3</i>	0
6AC7	Audio Inverter	0	+165	0	0	+165	+2	0	<i>6.3</i>
6Y4G	Output	0	0	+260	+263	0	-	<i>6.3</i>	+14
6Y4G	Rectifier	0	+360	0	0	-	-	<i>335</i>	+370
6Y4G	Speaker Socket	0	+263	0	0	0	0	+265	+200

INSTRUCTIONS FOR SETTING UP PUSH BUTTONS

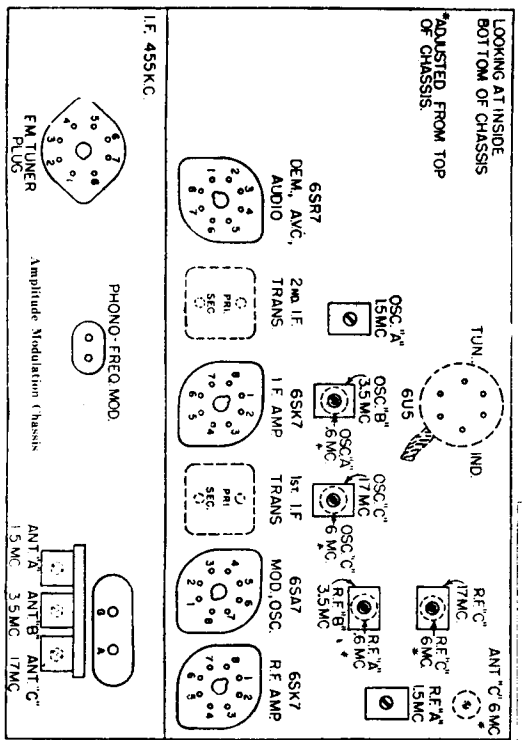
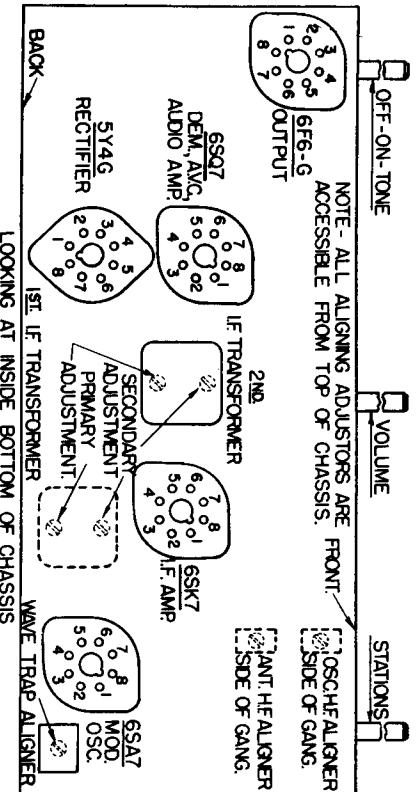
1. Turn the receiver "On".
 2. On the No. 154 Receivers, be sure the "Phono" and "M" buttons are in the proper position to receive the desired stations.
 3. Set the range switch to the "BC" position.
 4. Turn volume control about three-quarters of the way on (in a clockwise direction).
 5. Pull the six station push buttons off their levers.
 6. Remove the call letters of the six selected stations from the call letter sheets, which are in an envelope stapled to the cabinet. Insert the station call letters part way in the slots at the
7. Loosen the set screws of the lever to be set up.
 8. Push in the lever and manually tune in the desired station, observing the tuning indicator in order to obtain exact resonance.

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MODEL 154

Voltages, Layouts & Pushbutton Adj.

Alignment on Sheet 65 F. M. on Sheet 63



ALIGNMENT DATA

MODEL 154

Circuit on Data Sheet 62
F.M. Circuit on Sheet 63

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NEVER REALIGN UNLESS ABSOLUTELY NECESSARY.

GENERAL. All aligning adjustments are carefully made at the factory with special equipment which is designed for aligning Frequency Modulation receivers. The limitations of commercial oscillographs and ordinary test equipment are such that alignment should not be attempted in the field unless absolutely necessary. If alignment is attempted, it will not be successful unless the instructions which follow are adhered to exactly.

The following equipment will be required:

1. Standard signal generator with sweep circuit.
 2. Wide band sweep signal generator.
 3. Oscillograph.
 4. Microammeter—0 to 200 microamps.
 5. Center "0" microammeter with 100 divisions either side of "0".
- See location chart for location of all aligners.

ALIGNING PROCEDURE (AMP. MOD)

I. Dial Pointer Adjustment (A. M.)

With the plates of the gang tuning capacitor fully engaged, check to be sure that the dial pointer is in a vertical position directly on the calibration marks located at the low frequency end of the dial scale. Adjust if necessary.

II. Intermediate Frequency Adjustments (A. M.)

1. Set the range switch to standard broadcast position.
2. Tune set to extreme low frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 kilocycles to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8), using a 0.1 mfd. capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. aligners for maximum output in the following order:
 - a. Secondary of second I. F. transformer.
 - b. Primary of second I. F. transformer.
 - c. Secondary of first I. F. transformer.
 - d. Primary of first I. F. transformer.

III. Radio Frequency Adjustments (A. M.)

1. Replace the 0.1 mfd. capacitor in series with the output lead of the signal generator with a 200 mfd. capacitor and connect it to the antenna terminal of the chassis.

2. Set the signal generator frequency and the receiver tuning dial to 600 kc.

3. Set the range switch to the Standard Broadcast Range (A Band).

4. Adjust the 600 kc. oscillator and R. F. aligners (from covers) for maximum signal.

5. Set the signal generator frequency and the receiver tuning dial to 1500 kc.

6. Adjust the 1500 kc. oscillator, R. F. and antenna aligning capacitors for maximum signal.

7. Repeat operations three and four.

8. Repeat operations five and six.

9. Connect the center "0" microammeter and the 5 megohm resistor in series with it across the whole discriminator board. (From ground to the junction of R-23, 1 megohm resistor and C-29, 50 mfd. capacitor.)

10. Adjust the secondary of the discriminator amplifier for centering of reading of the microammeter.

11. Vary the frequency of the standard signal generator, making sure that the voltage peaks, which should be of the same magnitude, are the same number of kilocycles off on either side of resonance. Any departure from these conditions may be corrected by a slight readjustment of the primary.

Note: Connect the wide band sweep signal generator to the grid of the 6SA7 Modulator and Oscillator tube socket and make slight readjustments of the I. F. transformers for proper curve, since there is some interaction between these stages and the discriminator.

IV. Radio Frequency Adjustments (F. M.)

1. Set the signal generator frequency and the receiver tuning dial to 485 megacycles.

2. Replace the 0.1 mfd. capacitor in series with the output lead from the signal generator with a 100 ohm resistor and connect it to one of the F. M. terminals on the back of the chassis.

3. Connect the ground lead of the signal generator to the other F. M. terminal.

4. Adjust the oscillator aligner (air trimmer) for maximum signal.

5. Adjust the R. F. and antenna aligners for maximum signal on the 0 to 200 microammeter, maintaining the center "0" microammeter at slightly back and forth.

6. Repeat operations three and four.

7. Repeat operations five and six.

8. Repeat operations three and four.

9. Connect the center "0" microammeter and the 5 megohm resistor in series with it across the whole discriminator board. (From ground to the junction of R-23, 1 megohm resistor and C-29, 50 mfd. capacitor.)

10. Adjust the secondary of the discriminator amplifier for centering of reading of the microammeter.

11. Vary the frequency of the standard signal generator, making sure that the voltage peaks, which should be of the same magnitude, are the same number of kilocycles off on either side of resonance. Any departure from these conditions may be corrected by a slight readjustment of the primary.

12. Connect the ground terminal of the signal generator to the grid of the 6SA7 Modulator and Oscillator tube socket.

13. Adjust the first I. F. transformer in the same manner.

2. Set the range switch to the Medium Wave Range (B Band).

3. Set the signal generator frequency and the receiver tuning dial to 3.5 megacycles.

4. Adjust the oscillator, R. F. and antenna aligning capacitors for maximum signal.

5. Set the signal generator frequency and the receiver tuning dial to 17 megacycles.

6. Adjust the 17 megacycle oscillator, R. F. and antenna aligning capacitors for maximum signal.

7. Repeat operations three and four.

8. Repeat operations five and six.

9. Connect the center "0" microammeter and the 5 megohm resistor in series with it across the whole discriminator board. (From ground to the junction of R-23, 1 megohm resistor and C-29, 50 mfd. capacitor.)

10. Adjust the secondary of the discriminator amplifier for centering of reading of the microammeter.

11. Vary the frequency of the standard signal generator, making sure that the voltage peaks, which should be of the same magnitude, are the same number of kilocycles off on either side of resonance. Any departure from these conditions may be corrected by a slight readjustment of the primary.

Note: All I. F. adjustments are made using a wide band sweep signal generator with a sweep circuit of plus or minus 300 kilocycles.

1. Push in the F. M. button.

2. Tune the set to the extreme high frequency end of the dial (50 megacycles).

3. Connect the 0-200 microammeter across the R-17 4700-ohm resistor. (This resistor is mounted on the terminal strip located on the side of the base.)

4. Connect the oscillograph between ground and the junction of C-43, 0.1 mfd. capacitor and R-26 100,000-ohm resistor. (This resistor is on the terminal strip with the R-17 resistor.)

5. Connect the ground terminal of the wide band sweep signal generator to the ground terminal of the OACT second I. F. tube socket.

6. Introduce a signal of 4.3 megacycles to the grid of the 6A7 second I. F. tube socket terminal of the discriminator. (Keep the output lead of the signal generator. Keep the 0 to 200 microammeter at approximately 100 microamps.)

7. Adjust the secondary and primary of the third I. F. transformer for maximum reading on the 0 to 200 microammeter.

8. Connect the output lead of the wide band sweep signal generator and the 0.1 microfarad capacitor in series with it to the grid of the 6A7 first I. F. tube socket (terminal No. 4).

9. Connect the ground lead of the signal generator to the ground terminal of the 6A7 first I. F. tube socket.

10. Adjust the second I. F. transformer in the same manner.

11. Connect the output lead of the wide band sweep signal generator with the 0.1 microfarad capacitor in series with it to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8).

12. Connect the ground terminal of the signal generator to the ground terminal of the 6SA7 tube socket.

13. Adjust the first I. F. transformer in the same manner.

1. Connect the ground terminal of the standard unmodulated signal generator to the ground terminal of the 6A7 first I. F. tube socket.

2. Connect the output lead of the unmodulated standard signal generator to the grid of the 6A7 first I. F. tube (terminal No. 4), using a 0.1 mfd. capacitor in series with the output lead of the standard signal generator, having the wide band sweep signal generator connected to the grid of the 6SA7 Modulator and Oscillator tube socket.

3. Adjust the attenuator of the wide band sweep signal generator for a curve on the oscillograph.

4. Set the frequency of the unmodulated standard signal generator to approximately 4.3 megacycles as shown on the oscillograph. Adjust the unmodulated standard signal generator frequency until interference patterns on each trace come together. (This is done in order to assure that the frequency of the standard signal generator which is used to align the discriminator coincides with the mean frequency of the wide band sweep signal generator.)

5. Remove the wide band sweep signal generator.
6. Connect the center "0" microammeter with a 5 megohm resistor in series across one-half of the discriminator load. (From ground to the junction of the two 1 megohm resistors R-23 and R-24.)
7. Set the attenuator of the standard signal generator for maximum output.
8. Adjust the primary of the discriminator transformer for maximum reading on the center "0" microammeter.