The problem of aligning the several circuits in a television receiver is much more involved and requires more specialized equipment than the alignment of conventional radio receivers. Fortunately, the use of stable components in carefully engineered circuits of wide-band characteristics reduces to a minimum the necessity for alignment under normal operating conditions. Should alignment become necessary the following equipment will be needed:

(A) For Video I.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.

(B) Sound I.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping from 7.5 to 8.75 MC.

(C) R.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping the following bands.
   - (a) 50 to 60 MC
   - (b) 60 to 60 MC
   - (c) 66 to 72 MC

### VIDEO I.F. ALIGNMENT

<table>
<thead>
<tr>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Adjustments</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 7.5-15 MC Sweep</td>
<td>Control grid of 6A57 (2nd video I.F.)</td>
<td>Connect low output tap of video I.F. sweep oscillator to control grid of 6A57 (2nd video I.F.). Connect ground lead to chassis. Turn contrast control (R-67) to about half of maximum or to a point which gives satisfactory vertical deflection without overloading. Set horizontal centering and gain controls on oscilloscope to give suitable horizontal deflection. Adjust sweep phase to give curve similar to Fig. 8, curve 2.</td>
<td></td>
</tr>
</tbody>
</table>

### GENERAL ELECTRIC CO.

IMPORTANT NOTE

COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B
CONSISTS OF THE TELEVISION RECEIVER MODEL HM-226B REVISED FOR NEW STANDARDS AND RADIO RECEIVER MODEL HM226-7A.

ALIGNMENT REVISED FOR NEW STANDARDS:

TELEVISION ALIGNMENT procedure

(A) For Video I.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.

(B) Sound I.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping from 7.5 to 8.75 MC.

(C) R.F. Alignment
1. Cathode ray oscilloscope
2. Wide-band sweep oscillator capable of sweeping the following bands.
   - (a) 50 to 60 MC
   - (b) 60 to 60 MC
   - (c) 66 to 72 MC

### VIDEO I.F. ALIGNMENT

<table>
<thead>
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<th>Input Freq.</th>
<th>Point of Input</th>
<th>Adjustments</th>
<th>Comments</th>
</tr>
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<td></td>
</tr>
</tbody>
</table>

NOTE: If sweep oscillator has marker points internally supplied, steps 3 and 4 may be omitted.

3. Same as in No. 2 plus 12.75 MC

4. Same as in No. 2 plus 9.75 MC

5. 7.5-15 MC Sweep
   - Control grid of 6A57 (2nd video I.F.)
   - Iron cores of transformer T-9
   - Connect high tap of video I.F. sweep oscillator to control grid of 6A57 (2nd video I.F.). Adjust iron cores for maximum gain, flatness and proper centering between markers as described in step No. 5 and illustrated in Fig. 8, curve 1.

6. 7.5-15 MC Sweep
   - Control grid of 6A57 (3rd video I.F.)
   - Iron cores of transformer T-8
   - Connect low tap of video I.F. sweep oscillator to control grid of 6A57 (3rd video I.F.). Adjust iron cores for maximum gain, flatness and proper centering between markers as described in step No. 5 and illustrated in Fig. 8, curve 1.

7. 7.5-15 MC Sweep
   - Control grid of 6A57 (2nd video I.F.)
   - Iron cores of 3rd video transformer T-7
   - Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off at 9.75 MC side of curve. See Fig. 8, curve 3.

8. 7.5-15 MC Sweep
   - Control grid of 6A57 (1st video I.F.)
   - Iron cores of 2nd video transformer T-6
   - Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off on 12.75 MC side of curve. See Fig. 8, curve 3.

9. 7.5-15 MC Sweep
   - Converter Grid, 6P8G
   - Iron cores of 1st video transformer T-11
   - Connect low tap to grid. Adjust iron cores for maximum gain flatness and proper centering. 12.75 MC response must be equal to or slightly greater than 50% of the maximum response as indicated in Fig. 8, curve 4.

10. 14.25 MC
    - Converter Grid, 6P8G
    - Series iron core of 2nd video transformer T-6
    - To check alignment of 14.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.

11. 8.25 MC
    - Converter Grid, 6P8G
    - Series iron core of 3rd video transformer T-7
    - To check alignment of 8.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.
GENERAL ELECTRIC CO

ALIGNMENT REVISED FOR NEW STANDARDS

R. F. ALIGNMENT

MODELS HM-225B, HM-226B

Signal Input | Point of Input | Adjustments | Comments
--- | --- | --- | ---
1. | | Band width adjustment coupling condenser | Turn (C-2) in until tight, then open approximately 1/4 turn. Connect oscilloscope to junction of R-20 and C-32. Open-circuit B+ cad of R-3 and short-circuit R-2.

2. 50 to 56 MC sweep | Antenna terminals | (L-10), (C-3), (C-8) | Depress band No. 1 push button. Set tuning control to mid-rotation. Adjust L-10 until curve is centered between maximum horizontal sweep points. Adjust C-3 and C-8 for maximum amplitude. See Fig. 6, curve 4.

3. 60 to 66 MC sweep | Antenna terminals | (L-11), (C-4), (C-9) | Depress band No. 2 push button. Adjust L-11 for centering; C-4 and C-9 for maximum amplitude. See Fig. 6, curve 4.

4. 66 to 72 MC sweep | Antenna terminals | (L-12), (C-5), (C-10) | Depress band No. 3 push button. Adjust L-12 for centering; C-5 and C-10 for maximum amplitude. See Fig. 6, curve 4.

5. 78 to 84 MC sweep | Antenna terminals | (L-13), (C-83), (C-19) | Depress band No. 4 push button. Adjust L-13 for centering; C-83 and C-19 for maximum amplitude. See Fig. 6, curve 4.

6. 84 to 90 MC sweep | Antenna terminals | (L-14), (C-84), (C-20) | Depress band No. 5 push button. Adjust L-14 for centering; C-84 and C-20 for maximum amplitude. See Fig. 6, curve 4.

WAVE TRAP ALIGNMENT

1. 11.75 MC With modulation | Antenna terminals | Wave trap trimmer, C-88 | Adjust for maximum dip in oscilloscope curve, with oscilloscope connected to diode load resistor R-43.

AUDIO I.F. ALIGNMENT

1. Connect vertical input cable of cathode ray oscilloscope between junction of R-4 and C-29 chassis.

2. 8.25 MC with 30% tone modulation | Grid of 6P8G converter | Iron cores of all audio transformers | Align for maximum amplitude

3. 7.75 to 8.75 MC Sweep | Control grid of 6B8 | | Superimpose an accurately calibrated 8.15 MC signal in parallel with sweep signal and mark center of beat "wiggie" on oscilloscope screen as in step 3 of Video IF alignment. Also obtain an 8.35 MC beat signal mark on the oscilloscope screen. The steep straight portion of the over-all audio IF response curve must extend between these limits.

4. 7.75 to 8.75 MC Sweep | Control grid of converter 6P8G | Iron cores of audio IF transformers T2, T3 and T4. | Adjust iron cores until curve has been shaped as shown by curve 5, Fig. 7. It is important that the steep side be straight between 8.15 and 8.35 MC. The more gradual slope on the other side should extend from 8.35 MC to approximately 8.7 MC. Very few turns of the cores should be required to obtain the desired result. No more than 30% loss in peak over-all response should result from this process.

Fig. 8. Television Alignment Curves

IMPORTANT NOTES

OTHER SERVICE DATA NOT LISTED IS THE SAME AS FOR THE ORIGINAL TELEVISION RECEIVER.

FOR SERVICE DATA ON THE REGULAR RADIO CHASSIS OF THE COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B, SEE MODEL HM226-7A.

CHANGE IN CIRCUIT OPERATION

The horizontal oscillator is a multi-vibrator with speed controlled by varying the small positive grid voltage through R-69. The horizontal pulses are passed through proper wave shaping and amplifier circuits to the horizontal deflection coils of the picture tube. Horizontal linearity is adjustable by varying R-91. Horizontal sweep size is controlled by R-90 in the plate circuit of the 6P8G. The series circuits across the primary and secondary of the 6AL5G output transformer damp the output transient. Damping is adjustable through R-100.
GENERAL ELECTRIC CO.
MODELS HM-225, HM-226-7A

Parts list continued.

RTT-3001 Transformer—1st video I.F. transformer (T-10)
RTT-3501 Transformer—2nd video I.F. transformer (T-6)
RTT-4001 Transformer—3rd video I.F. transformer (T-8)
RTT-4501 Transformer—4th video I.F. transformer (T-6)
RTT-5001 Transformer—5th video I.F. transformer (T-8)
RTT-6500 Transformer—Horizontal output transformer (T-3)
RTT-7501 Transformer—Vertical output transformer (T-3)
RTT-7701 Transformer—1st audio I.F. transformer (T-2)
RTT-7801 Transformer—2nd audio I.F. transformer (T-6)
RTT-8001 Transformer—3rd audio I.F. transformer (T-9)
RTT-9000 Transformer—Vertical oscillator transformer (T-10)
RTT-9500 Transformer—Audio output transformer (T-5)
RTW-501 Window—Station letter window (Pkg. 5)
RTW-501 Window—Safety glass window for Model HM-225
RTX-101 Assembly—Wave trap assembly (L-1, 2, 3, 4, 5, 6)
RTX-1001 Assembly—Wave trap assembly (L-15, C-88)
RTX-2000 Assembly—Chassis mounting assembly

* Used on previous radio receivers.

CAUTIONARY INSTRUCTIONS

All adjustments not accessible with the back cover in place can be made without energizing the high-voltage circuits. Servicing of the high-voltage circuits can be satisfactorily performed with the power-cord plug removed from any power supply outlet. A resistance check of the circuit components will indicate any trouble existing. HIGH VOLTAGES SHOULD NEVER BE MEASURED.

The "picture tube" is highly evacuated and is consequently subject to a great air pressure. If it is broken, glass fragments will be violently expelled. Handle with care, using safety goggles and gloves.

The large end of the "picture tube"—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure. DO NOT FORCE THE SOCKET ONTO THE TUBE OR STRAIN ANY EXTERNAL CONNECTIONS. If it fails to slip into place smoothly, investigate and remove the cause of the trouble.

Extremely high voltages (4000 volts or more) are used in the operation of this receiver; therefore, every precaution must be exercised to insure safety to the service engineer and to the customer.

The back cover, while in place, protects the user and should never be removed except by a qualified television service engineer.

The power-cord plug should not be inserted in a power supply outlet until a good, solid ground connection has been properly made to the receiver chassis.

For safety, the following operations must be performed with power plug disconnected before working on the receiver with the back cover removed:
1. Remove 879/2X2 tube from socket.
2. Detach top cap lead of 879/2X2 tube and insulate the contact end of this cap lead.
3. Ground the receiver chassis.

TELEVISION RECEIVER CIRCUITS

The television receiver circuits are divided into the following sections:
1. R.F. Unit
2. Converter-Oscillator and Amplifier
3. Audio Unit
4. Video Unit
5. Sync Pulse Clipper—Amplifier
6. Horizontal Oscillator—Output
7. Vertical Oscillator—Output
8. Low Voltage Rectifier
9. High Voltage Rectifier

R.F. Unit
This unit, comprising all circuits between the antenna terminal posts and the converter grid, consists of a high pass filter input, a series tuned antenna coil primary, a shunt capacitively coupled secondary (C-2) and a video I.F. wave trap (C-88, L-15). The wave trap is broadbanded at 11.75 M.C. to prevent I.F. interference. Any one of the five tuned circuits for each of the five television transmission bands can be connected into the secondary circuit by pressing the appropriate button. The secondary circuit trimmers when properly tuned give a broad, flast response curve.

Converter-Oscillator and Amplifier
A plate-tuned oscillator is used with vernier tuning permitted from the front control panel through trimmer C-17. The resultant video I.F. signal of 12.75 M.C. and the audio I.F. signal of 8.25 M.C. developed in the converter-oscillator tube circuit is coupled through transformer T-11 to the 1862 amplifier tube.

Audio Unit
The audio unit is a conventional-type superheterodyne sound receiver with the I.F. stages tuned to 8.25 M.C. The audio I.F. signal is taken off through the suppressor of the 1st video I.F. tube.

Video Unit
This unit includes all the video I.F. amplifier stages, the video detector, two stages of video amplification and the picture tube input. Three wave traps are provided in this unit; one at T-6 for rejecting the audio I.F. of the adjacent television band, one at T-7 for rejecting the audio I.F. of the band concerned, and one in the cathode circuit of the 1st video, 6FP6, comprising L-18 and C-52, for removing the 12.75 M.C. video I.F. from the detected signal amplifier stages. A sensitivity control, known as contrast control, (R-67), is provided in the AVC circuits of the 6H6 video detector for varying the grid bias on the 2nd and 3rd video I.F. tubes.

D.C. reinserter (automatic background control) is accomplished in the 2nd video 6FP6 tube circuit by using part of the varying screen voltage developed across R-93 to control the picture tube grid voltage. A high impedance voltage divider, R-94 and R-95, is used and the coupling condenser, C-38, is made small to prevent low frequency variations in the plate supply from getting to the picture tube grid.

Sync-pulse Clipper—Amplifier
Sync-pulses are taken off the plate of the right section of the 1st video and clipper tube, 6FP6. The video signals are separated by tube cut-off since the plate voltage is only about 10 volts. The sync-pulses are then amplified in the sync amplifier tube and coupled through a high-pass filter to the grid of the horizontal oscillator.

Horizontal Oscillator—Output
The horizontal oscillator is a multi-vibrator with speed controlled by varying the small positive grid voltage through R-89. The horizontal pulses are passed through proper wave shaping and amplifier circuits to the horizontal deflection coils of the picture tube. Horizontal linearity is adjustable by varying R-91. Horizontal sweep size is controlled by R-60 in the cathode circuit of the 6AL6G. The degeneration resistor R-22 and series circuit across the secondary of the 6AL6G output transformer damp the output transient. Damping is adjustable through R-100.

Vertical Oscillator—Output
Vertical sync-pulses are separated from the horizontal pulses in the vertical clipper right section of 6FP6 and are fed to the vertical oscillator. This oscillator is of the blocking type, transformer coupled. The generated sawtooth wave across C-70 is shaped by the vertical linearity control, R-53. The speed of the oscillator is controlled by R-79 and the length of sweep (size) is adjustable through R-65. The output is amplified and coupled to the vertical deflection coils of the picture tube.

Low-voltage Rectifier
Two 5U4G rectifiers are necessary to supply plate current which is over 300 ma. A combination of choke and resistance filters is used so that the audio and oscillator plate supplies will be free from video and sweep signals.

High-voltage Rectifier
The high voltage rectifier uses a resistance filter. The bleeder is connected across the filter input to reduce ripple. R-103 is inserted in the plate lead for protection.
Radio Receiver (used in HM-226-7A only)
Band "B" 540-1600 K.C.
Band "C" 2.1-6.3 M.C.
Band "D" 6.25-22.5 M.C.

Fig. 12. Radio Schematic Diagram
(Model HM-226-7A only)

Fig. 11. Radio Chassis Trimmer Location
(Model HM-226-7A)

Fig. 13. Radio Chassis Socket Voltages

Radio (used in HM-226-7A only)
Converter-Oscillator........GE-6SA7
1.F. Amplifier.............GE-6SK7
Detector and AVC............GE-6H6
1st Audio Amplifier..........GE-6SF5
2nd Audio Amplifier.........GE-6J5G
Audio Output................GE-6Y6G
Rectifier....................GE-5Y3G
Dial Lamps...................(3)MAZDA No. 44

Loud-speaker—"Albico" Magnetic Dynamic
Type of Cone................Curvilinear
Cone Diameter................12 inches
Voice Coil Impedance (400 cycles)..........3.5 ohms
TO CENTER THE VOICE COIL, LOOSEN THE TWO SCREWS WHICH CLAMP THE SPEAKER SPIDER IN POSITION. THESE TWO SCREWS ARE AVAILABLE FROM THE REAR OF THE SPEAKER. SHIFT THE SPIDER AROUND UNTIL THE VOICE COIL IS CENTERED, THEN TIGHTEN THE SCREWS IN POSITION.

MODEL HM-226-7A RADIO RECEIVER IS EQUIPPED WITH A PHONO-TERMINAL (PIN JACK) TO ALLOW THE CONVENIENT CONNECTION OF A RECORD PLAYER. GENERAL ELECTRIC PLUG, STOCK NO. RP-145, FITS THE PIN JACK.

NOTE—A SUITABLE LOAD CONSISTING OF A 100,000 OHM RESISTOR IN SERIES WITH A .01 MFD. CAPACITOR SHOULD BE CONNECTED ACROSS THE PICK-UP LEADS WHEN USING A CRYSTAL-TYPE UNIT.
### RADIO ALIGNMENT PROCEDURE

#### I. F. ALIGNMENT WITH OSCILLOSCOPE

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band “B”</td>
<td>455 K.C.</td>
<td>.05 Mfd. or Larger</td>
<td>I.F. Grid</td>
<td>2nd I.F. Sec.</td>
<td>Gang condenser plates closed—“Manual” key depressed—connect audio input of oscilloscope to chassis and to junction of R-3 and R-15. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude.</td>
</tr>
<tr>
<td>2. Band “B”</td>
<td>455 K.C.</td>
<td>.05 Mfd. or Larger</td>
<td>Converter Grid</td>
<td>1st I.F. Sec.</td>
<td></td>
</tr>
</tbody>
</table>

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<th>Comments</th>
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<td>455 K.C.</td>
<td>.05 Mfd. or Larger</td>
<td>I.F. Grid</td>
<td>2nd I.F. Prl.</td>
<td></td>
</tr>
<tr>
<td>2. Band “B”</td>
<td>455 K.C.</td>
<td>.05 Mfd. or Larger</td>
<td>Converter Grid</td>
<td>1st I.F. Prl.</td>
<td>(T-7)</td>
</tr>
</tbody>
</table>

#### R. F. ALIGNMENT

1. Band “B”

2. Band “D” 21 M.C. with Modulation

3. Band “C” 6 M.C. with Modulation

4. Band “B” 1500 K.C. with Modulation

5. Band “B” 580 K.C. with Modulation

6. Band “B” 1500 K.C. with Modulation

### RADIO CHASSIS PARTS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-008</td>
<td>BOARD—Terminal board (2 lug)</td>
</tr>
<tr>
<td>B-009</td>
<td>BOARD—Terminal board (1 lug)</td>
</tr>
<tr>
<td>B-035</td>
<td>BOARD—Antenna terminal board</td>
</tr>
<tr>
<td>B-045</td>
<td>BOARD—Terminal box (5 lug)</td>
</tr>
<tr>
<td>B-096</td>
<td>BOARD—Terminal board (3 lug)</td>
</tr>
<tr>
<td>B-235</td>
<td>BOARD—Ant. grnd. terminal board</td>
</tr>
<tr>
<td>B-635</td>
<td>BUSHING—Tuning control shaft bushing</td>
</tr>
<tr>
<td>R-009</td>
<td>RESISTOR—100 mfd. 600 V. paper (C-35)</td>
</tr>
<tr>
<td>R-096</td>
<td>RESISTOR—0.1 mfd. 600 V. paper (C-32)</td>
</tr>
<tr>
<td>R-106</td>
<td>RESISTOR—50 mfd. 600 V. paper (C-30)</td>
</tr>
<tr>
<td>R-196</td>
<td>RESISTOR—50 mfd. 600 V. paper (C-31)</td>
</tr>
<tr>
<td>R-296</td>
<td>RESISTOR—50 mfd. 600 V. paper (C-34)</td>
</tr>
<tr>
<td>R-675</td>
<td>RESISTOR—150 mfd. 600 V. paper (C-38)</td>
</tr>
<tr>
<td>R-987</td>
<td>RESISTOR—150 mfd. 600 V. paper (C-39)</td>
</tr>
<tr>
<td>R-1989</td>
<td>RESISTOR—150 mfd. 600 V. paper (C-40)</td>
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<tr>
<td>R-2190</td>
<td>RESISTOR—150 mfd. 600 V. paper (C-41)</td>
</tr>
<tr>
<td>R-3192</td>
<td>RESISTOR—150 mfd. 600 V. paper (C-42)</td>
</tr>
</tbody>
</table>

#### RADIO CHASSIS PARTS

<table>
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<th>Part Number</th>
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</thead>
<tbody>
<tr>
<td>R-044</td>
<td>KNOB—Radio control knob (Pkg. 2)</td>
</tr>
<tr>
<td>R-045</td>
<td>KEY—Station key</td>
</tr>
<tr>
<td>R-063</td>
<td>COIL—C and D band antenna coil (T-1)</td>
</tr>
<tr>
<td>R-096</td>
<td>COIL—B band antenna coil (L-1)</td>
</tr>
<tr>
<td>R-287</td>
<td>COIL—Oscillator coil (T-5)</td>
</tr>
<tr>
<td>R-345</td>
<td>COIL—Antenna choke (L-4)</td>
</tr>
<tr>
<td>R-606</td>
<td>COIL—Wave trap coil (L-9)</td>
</tr>
<tr>
<td>R-6510</td>
<td>COIL—Station selector coil assembly (L-5)</td>
</tr>
<tr>
<td>R-501</td>
<td>MASK—Dial scale mask (Pkg. 2)</td>
</tr>
<tr>
<td>R-127</td>
<td>POINTED—Dial pointer assembly (Pkg. 6)</td>
</tr>
<tr>
<td>R-303</td>
<td>PULLEY—Pulley and C clip (Pkg. 2)</td>
</tr>
<tr>
<td>R-942</td>
<td>RESISTOR—3,000 ohms 6 W. carbon (R-13)</td>
</tr>
<tr>
<td>R-970</td>
<td>RESISTOR—68 ohms 6 W. carbon (R-19) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1239</td>
<td>RESISTOR—105 ohms 6 W. carbon (R-10) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1251</td>
<td>RESISTOR—470 ohms 6 W. carbon (R-16) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1271</td>
<td>RESISTOR—3,300 ohms 6 W. carbon (R-10) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1273</td>
<td>RESISTOR—3,900 ohms 6 W. carbon (R-9) (Pkg. 5)</td>
</tr>
<tr>
<td>R-921</td>
<td>RESISTOR—22,000 ohms 6 W. carbon (R-12) (Pkg. 5)</td>
</tr>
<tr>
<td>R-929</td>
<td>RESISTOR—47,000 ohms 6 W. carbon (R-15) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1301</td>
<td>RESISTOR—56,000 ohms 6 W. carbon (R-15) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1307</td>
<td>RESISTOR—100,000 ohms 6 W. carbon (R-11) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1315</td>
<td>RESISTOR—220,000 ohms 6 W. carbon (R-7) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1319</td>
<td>RESISTOR—330,000 ohms 6 W. carbon (R-19) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1323</td>
<td>RESISTOR—470,000 ohms 6 W. carbon (R-4, 20) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1321</td>
<td>RESISTOR—1.0 mohm 6 W. carbon (R-8) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1339</td>
<td>RESISTOR—2.2 mohm 6 W. carbon (R-3) (Pkg. 5)</td>
</tr>
<tr>
<td>R-1365</td>
<td>RESISTOR—15 mohm 6 W. carbon (R-6) (Pkg. 5)</td>
</tr>
<tr>
<td>R-236</td>
<td>SOCKET—Radio dial light socket</td>
</tr>
<tr>
<td>R-252</td>
<td>SOCKET—Octal tube socket</td>
</tr>
<tr>
<td>R-253</td>
<td>SOCKET—Electrolytic mounting socket</td>
</tr>
<tr>
<td>R-268</td>
<td>SOCKET—Resiil pilot lamp socket</td>
</tr>
<tr>
<td>R-401</td>
<td>SPRING—Drive cord spring (Pkg. 2)</td>
</tr>
<tr>
<td>R-924</td>
<td>SHAFT—Tuning control shaft</td>
</tr>
<tr>
<td>R-862</td>
<td>TRIMMER STRIP—Station selector trimmer strip (C-7a, 7b, 7c, 7d, 7e, 7f)</td>
</tr>
<tr>
<td>R-863</td>
<td>TRIMMER STRIP—D and C antenna trimmers, D oscillator trimmer (C-2, 3, 4)</td>
</tr>
<tr>
<td>R-952</td>
<td>TERMINAL—Speaker lead terminal (Pkg. 10)</td>
</tr>
<tr>
<td>R-967</td>
<td>VOLUME CONTROL—3 mohm volume control (R-1)</td>
</tr>
<tr>
<td>R-801</td>
<td>WASHER—Knob felt washer (Pkg. 10)</td>
</tr>
<tr>
<td>R-908</td>
<td>WHEEL—Dial tuning volume wheel</td>
</tr>
</tbody>
</table>

© John F. Rider
WARNING—4000 VOLTS

SOUND I-F: 8.25 MC
PICTURE I-F: 12.75 MC
RESISTANCE OF VIDEO AND AUDIO I. F. TRANSFORMER WINDINGS APPROXIMATELY EQUAL TO ONE OHM

For test patterns see back of Manual
ANTENNA

In general, the television antenna should be of the dipole type located as high as is practical and in an area where the horizon in the direction of the television transmitter is not obstructed by buildings or structures. A noticeable gain in signal strength will be obtained as antenna height is increased. Since television radiation reacts similarly to light waves, reflection problems arise which often modify otherwise ideal installation locations. Consideration must also be given noise sources within buildings, or ignition noises from vehicles on adjacent streets. It is usually best to locate the dipole antenna on the side of the building away from the street thus allowing the building to shield the antenna from ignition noises.

The dipole should be erected with arms parallel to the ground and at right angles to the direction of the television station. If noise or reflection interference exist it may be better to point the dipole arms in the direction of the interference.

Noise interference and poor signal strength may dictate the use of a reflector. A reflector will increase the signal strength appreciably as well as increase the horizontal directivity.

General Electric Television Receiver, Model HM-225, is a console type, 22-tube, superheterodyne receiver equipped with a full magnetic, short, 9-inch picture tube. The rectifier-power supply is on a separate chassis mounted in the lower cabinet compartment with the speaker.

General Electric Television and Radio Receiver, Model HM-226-7A, is a console type instrument using the same television receiver as the Model HM-225 with minor alterations for use in conjunction with a 7-tube radio receiver. Model HM-226-7A is equipped with a full magnetic, short, 12-inch picture tube.

Additional design features include iron-core I.F. tuning, automatic contrast control, automatic brightness control, automatic tone compensation, automatic volume control and a constant high-gain antenna coupling circuit.

SERVICE DATA

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles per Second)</th>
<th>Power Consumption (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM-225</td>
<td>115-125</td>
<td>60</td>
<td>300</td>
</tr>
<tr>
<td>HM-226-7A</td>
<td>115-125</td>
<td>60</td>
<td>300 (Television)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 (Radio)</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 2. Front Control Location**

Model HM-226-7A

**Fig. 4. Rear Control Location**

Model HM-226-7A

**Fig. 7. Television Chassis Trimmer Location**

Models HM-225 and HM-226-7A

**Tone Control**

Television Audio

Radio Audio

**Fig. 9. Television Socket**
**Tubes**

- Television Converter-Oscillator: 6F8G
- 1st Audio I.F. Amplifier: 6SK7
- 1st and 4th Video I.F. Amplifier: (2) 6B5/G6C7
- 1st and 3rd Video I.F. Amplifier: (2) 6B5/6AB7
- Video Detector and AVC: 4116
- 1st Video Amplifier and Sync. Clipper: 6F8G
- 2nd Video Amplifier: 6F6G
- Sync. Amplifier and Vertical Clipper: 6E8G
- Vertical Oscillator and Amplifier: 6F8G
- Horizontal Oscillator: 6N7G
- Vertical Output: 6V6G
- Horizontal Output: 6A6L6G
- Low Voltage Rectifier: (2) 5U4G
- High Voltage Rectifier: 879/2X2
- Picture Tube (HM-225): M/V-22-2
- Picture Tube (HM-226-7A): M/V-31-3

**Intermediate Frequencies**

- Television Video (Picture): 12.75 M.C.
- Television Audio: 8.25 M.C.
- Radio: 455 K.C.

**Maximum Electrical Output**

- Television Audio: 10 Watts
- Radio Audio: 5 Watts

---

**Fig. 1. Front Control Location**

Model: HM-225

**Picture Size**

<table>
<thead>
<tr>
<th>Model</th>
<th>Height</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM-225</td>
<td>53 3/4 inches</td>
<td>10 inches</td>
</tr>
<tr>
<td>HM-226-7A</td>
<td>73 3/4 inches</td>
<td>10 inches</td>
</tr>
</tbody>
</table>

---

**Fig. 3. Rear Control Location**

Model: HM-225

**Fig. 5. Television Chassis Parts Layout**

Models HM-225 and HM-226-7A
RECOMMENDED PROCEDURE FOR READJUSTING THE R.F. CIRCUITS TO CONFORM TO THE NEW TELEVISION FREQUENCY ALLOCATIONS ON THE LOWER CHANNELS.

Necessary Equipment:

1. Oscilloscope - G.E. Model CRO-5-S or equivalent.

2. Wide-band sweep oscillator capable of sweeping the following bands:
   - (a) 54 to 60 MC
   - (b) 60 to 66 MC
   - (c) 66 to 72 MC
   - (d) 76 to 82 IC
   - (e) 82 to 88 MC

3. Accurately calibrated absorption wave-meter with a frequency range of at least 54 to 88 IC.

4. Accurately calibrated signal generator with a frequency range of at least 59.75 to 87.75 MC with 30% tone modulation.

5. 50,000 ohm 1/2-W resistor.

PROCEDURE FOR CIRCUITS ASSOCIATED WITH #1 PUSH BUTTON.

1. Disconnect R-2 from ground and connect a 50,000 ohm resistor in series with it to ground.

2. Remove all rectifier tubes.

3. Connect vertical input of oscilloscope across R2 and the 50,000 ohm resistor.

4. Connect wide band sweep generator to antenna terminals and adjust for a 54-60 MC sweep. Output of generator should be set near maximum.

5. Depress the #1 push-button (heaters should be on) and adjust sweep and sync controls on scope to give a curve similar to Fig. 1.

6. Turn band width adjustment coupling condenser C-2 in until tight, then open approximately 1/16 of a turn.

7. Check location of the 54 and 60 MC points on the curve with the absorption wave-meter.

8. Adjust trimmers C-3 and C-8 until the 54 and 60 MC points appear on the curve as shown in Fig. 2. It will probably be necessary to decrease the inductance of L-5 somewhat by spreading the coil, before the 54 and 60 MC points come in at the proper place.

9. Remove the 50,000 ohm resistor, connect R-2 back to ground, remove scope and replace rectifier tubes.

10. Disconnect wide band sweep generator from antenna terminals and connect in its place the modulated signal generator adjusted to exactly 59.75 MC.
11. Set tuning control C-17 to mid-rotation. Adjust brass slug of L-10 until maximum audio tone is heard, with volume control turned partially up. If slug does not have sufficient range, it will be necessary to decrease the inductance of L-10 somewhat by spreading the coil.

PROCEDURE FOR CIRCUITS ASSOCIATED WITH #2 P.B.

1. Same as for the #1 P.B.
2. ditto
3. " 
4. " - except that the oscillator is adjusted for a 60-66 MC sweep.
5. Depress the #2 push button.
6. Do not readjust C-2. Check location of the 60-66 MC points on curve with absorption wave-meter. The 60-66 MC points should appear on curve as shown in Fig. 3 without any adjustment since these circuits have already been aligned at this frequency 60-66 MC. However, if the 60-66 MC points do not appear at the proper place on curve, it will be necessary to adjust trimmers C-4 and C-9 until they do.
7. Same as in step #9 for the #1 P.B.
8. " " " " #10 " " " - except that the modulated generator is adjusted to exactly 65.75 MC.
9. Same as in step #11 for the #1 P.B. - except that the brass slug of L-12 is adjusted and it should not be necessary to adjust the coil itself.

PROCEDURE FOR CIRCUITS ASSOCIATED WITH #3 P.B.

1. Same as for the #1 P.B.
2. ditto
3. " 
4. " - except that the oscillator is adjusted for a 66-72 MC sweep.
5. Depress the #3 push button.
6. Check location of the 66-72 MC points on curve with absorption wave-meter. They should appear as shown in Fig. 4 without any adjustment since these circuits have already been aligned at this frequency 66-72 MC. If necessary, adjust trimmer C-5 and C-10 for proper location of the 66-72 MC points.
7. Same as in step #9 for the #1 P.B.
8. Same as in step #10 for the #1 P.B. - except that the modulated signal generator is adjusted to exactly 71.75 MC.
9. Same as in step #11 for the #1 P.B. - except that the brass slug of L-12 is adjusted.