RHMI-185

OPERATING INSTRUCTIONS

FOR

TELEVISION RECEIVER

MODEL HM-185

GENERAL ELECTRIC COMPANY
APPLIANCE & MERCHANDISE DEPT.
BRIDGEPORT, CONN.

CAUTION—HIGH VOLTAGE

Extremely high voltages are used in the operation of this receiver.

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

Make sure that the receiver chassis is properly grounded at all times.

NOTICE TO SERVICE ENGINEERS

For your safety, do not apply power to this receiver unless the cabinet back cover is in place or the brown and yellow lead (measuring 1250 ohms to chassis) connected to the 879 tube socket terminal is unsoldered and the exposed end thoroughly insulated. Before making any adjustments on chassis read cautionary instructions appearing on rear of power-supply unit, and in the Service Manual.

FOREWORD

Great care has been taken to design this combined sight and sound receiver so that it is capable of receiving television programs characterized by high definition pictures and tonal reproduction of remarkable realism. It now rests with you to obtain this performance from this instrument. To aid you, the following booklet has been compiled. Please read it carefully before attempting to operate.

NOTICE

This instrument will operate only from a power supply of 110–125 volts, 60 cycles. If in doubt as to the voltage and frequency supplied your home, telephone your local power company.

I. INTRODUCTION

Television in its fundamental state is closely associated with sound broadcasting. Except for the senses to which the respective services make their appeal and the transmitting and receiving treatments necessary to make this possible, they are very similar.

In order to more clearly understand the divergence in problems encountered with television and sound broadcasting, it might be well to review the characteristics of the hearing and vision senses, and how the services register upon them.

The ear has the collective property of conveying a number of sounds as a whole or complex frequency to the eardrum. The eardrum being connected to the brain conveys these sounds to it as a complex unit of sound; as for example: a piano and violin duet is conveyed simultaneously to the brain as a combined musical expression and not as separate instruments. In sound broadcasting, this characteristic is made use of in the following manner. A number of simultaneous sounds may be picked up in the studio by a microphone and converted by this device into a complex electric wave. This complex electric wave is amplified and transmitted from the station antenna. The receiver picks up this electric impulse, amplifies it and changes it back into its original form of a complex sound wave by means of the loud-speaker. Due to this fact, that it is possible to transmit an instantaneous electric voltage consisting of a multiple of frequencies or mixture of sounds and reproduce it faithfully at the receiving end, we are able to reproduce simultaneously, all instruments in an orchestra or similar pick-up. In simple terms, sound broadcasting is merely the conveying of sound energy from microphone to loud-speaker by means of an electric voltage.

Television, however, is somewhat more complex; both the transmitting and receiving problems require more complicated treatment. In order to more fully understand this, we must consider how the sense of sight varies from the sense of hearing. The eye is a very complex organ and consists essentially of a lens which focuses the scene being observed onto the retina. The retina consists of millions of small photosensitive elements which are connected individually to the brain by the optic nerve. Each detail of the picture being viewed by the eye is, therefore, separately conveyed to the brain and is not mixed as a single impulse such as sound waves are when conveyed to the brain. If all the picture details were mixed and then conveyed to the brain in the same manner as sound waves, it would result in an unintelligible blur.

In much the same manner as the eye is unable to transmit the picture to the brain as a single complex impulse, so it is impossible at present to convert a picture at the transmitter into a complex electric wave, as in sound broadcasting, and unscramble it into a complete picture at the receiver. To transmit an intelligible picture, it is necessary to resort to an expedient process called "scanning." Here, the picture or scene being televised at the transmitter is broken up into thousands of small picture elements and the brightness of each picture element in turn is transformed into a corresponding instantaneous electric voltage. Each element of the picture is thus transmitted as an electric voltage

and when received at the television receiver, these electric voltages are converted back to light and reassembled so rapidly on the picture tube that the eye is deceived by seeing it as a complete picture. At the same time, it is absolutely essential to insure that the received picture has all its elements in their proper place. This is achieved by special signals which are received from the transmitter and these signals insure that each picture element is exactly relocated to form the identical picture as transmitted.

Of course, the above reconstruction of a picture on the picture tube is useless unless the whole operation is performed so rapidly that the eye is unable to follow the process. The remarkable characteristic of the eye which aids this process is called "persistence of vision" and is strikingly exemplified in the movies where a succession of still pictures is projected on the screen at the rate of 24 pictures a second and because the eye is unable to follow this rapid change, the effect of continuous motion and vision is given. On this same principle, a moving dot of light paints a picture every 1/30 of a second on the picture tube. If this process could be slowed down, approximately 441 distinct lines of picture elements would be observed, each picture element having a varying shade of black and white. This succession of small picture elements of varying shades, creates a picture much the same as a newspaper picture which, upon close examination, will be found to consist of thousands of small dots or picture elements. Motion is imparted to the television picture by presenting thirty of these reconstructed and complete pictures every second to the eye so that the illusion of motion and vision is imparted. Thus, television is merely the subdividing and conversion of a picture into electrical voltages whence it is conveyed to a receiver and reassembled in proper order and position to form a complete picture again.

Unlike the regular broadcast service, however, it is essential that television programs be transmitted on what is called the ultrahigh-frequency band. This is necessary because of the fact that the transmission of the picture elements covers far more space in the "ether" than sound broadcasting, for example, if a television program were to be transmitted on the regular broadcast band, all broadcast stations would suffer interference. This necessary high transmitting frequency, however, limits the service area considerably more than the usual broadcast service. Under very favorable receiving conditions, the range of good television reception is within a forty-mile radius.

II. RECEIVER DESCRIPTION

The complete receiver consists of the following:

1. Sound channel
2. Vision channel

} Synchronized for television program reception

Sound Channel

The sound channel reproduces the sound accompanying the television program and is similar to the usual broadcast receiver except that all tuning is accomplished by means of push buttons and a vernier tuning control. High-fidelity reproduction is obtained by special circuit treatments and an efficient eight-inch speaker.

Vision Receiver

The vision receiver operates in much the same manner as a broadcast receiver; that is, it picks the signal from the antenna and amplifies it many times but instead of conveying the signal to a loud-speaker, the signal is reproduced electrically as vision on the picture tube. The television sound and vision channels are interlocked by the tuning system so that it is merely necessary to tune for the best reproduction of the sound channel and this will automatically assure maximum picture detail.

III. INSTALLATION

This receiver should be installed and tested for maximum performance by a television service engineer. The following precautions should be followed:

1. Do not place the receiver in such a position that the light from a window falls directly on the picture tube. For night use, it is unnecessary to turn out all lights when viewing; however, experimenting with shaded lamps to give the best effect without eyestrain will be necessary.

2. Make sure the receiver has at least a five-inch air space in back so that adequate ventilation will be assured. This also improves the sound reproducing possibilities.

3. A proper installation of the antenna is a major contribution to receiving good pictures. Should you move the receiver from its original location, call a television service engineer to make the necessary change in the antenna lead-in.

IV. OPERATION

Immediately beneath the picture tube are the only operating controls necessary to adjust the sound and vision receiver for optimum results. These consist of six knobs and three television channel keys. The location and name of the controls are shown in Fig. 1.

It is suggested that when a picture is being received, the new operator turn the various controls one at a time to familiarize himself with their effects.

Power Control

The power is turned on by turning the brightness control in the clockwise direction. To turn power off, merely turn this control to the extreme counterclockwise position.

Program Keys

Each of the three station keys tunes to a separate television program channel. Satisfactory reception on each key is dependent upon the distance of the receiver from the transmitter, upon receiving conditions, and whether there is a

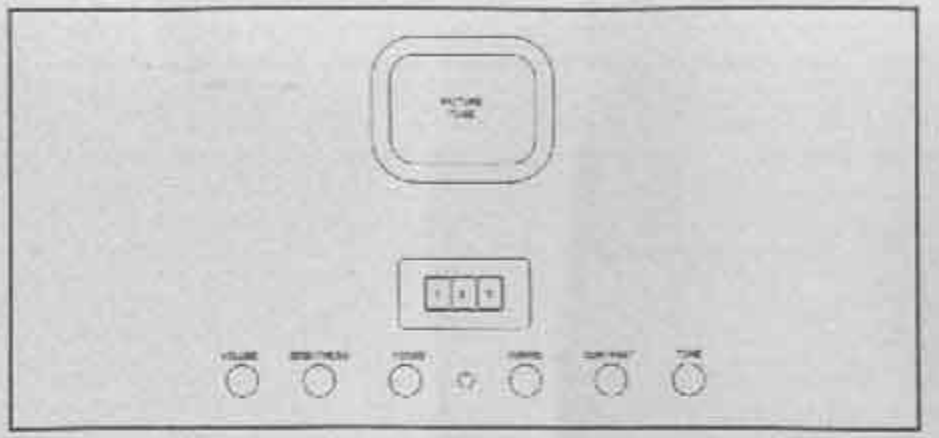

Fig. 1. Control Location

station operating at the time upon this assigned television channel. The keys are numbered in Fig. 1 and the assigned channel frequency is given below:

Key Number	Frequency Band
1	44–50 M.C.
2	50–56 M.C.
3	66–72 M.C.

To tune for a particular program channel, merely press the desired station key until it clicks into position. (Note—Each key, when pressed, should lock in a depressed position until another key is pressed.) This tuning operation sets the tuned circuits approximately. For final adjustment, the vernier tuning adjustment, described in the following paragraph, must be properly made.

Tuning Control

The tuning control properly adjusts the receiver frequency for the television band being received. Correct adjustment is essential for good picture detail and tonal reproduction.

Turn the volume control about halfway on; then, adjust the tuning control to that point where the tonal response of the sound receiver is the clearest and free from distortion. This tuning point automatically insures a best vision adjustment of tuning. Should adjustment of the tuning control produce excessive sound volume, reduce the volume control never reduce volume by detuning.

Contrast Control

As the name suggests, this control adjusts the black and white contrast between the various picture elements. Turn this control up until the picture remains still on the screen. Too much contrast is apparent when the picture is lacking in detail in the blacks and whites; while with too little contrast, the picture appears faded, being composed entirely of grays.

CORRECT PICTURE

REDUCE CONTRAST

INCREASE BRIGHTNESS

INCREASE CONTRAST

REDUCE BRIGHTNESS

ADJUST FOCUS

EXAMPLES OF MALADJUSTMENT OF CONTROLS

Brightness Control

This control regulates the brilliancy of the received picture. A too-brilliantly lit screen will often result in a loss of detail and it is advisable to strike a proper balance between the contrast control and brightness control settings. Since the proper operation of the contrast and brightness controls cannot be adequately described in words, photographic inserts of maladjustments have been made to show their effects on the picture. Do not turn the brightness control so high that the diagonal fly-back lines become apparent.

Focus Control

As the name implies, this control focuses the received picture on the screen. It is merely necessary to set the control at the point which gives the sharpest definition in the picture.

Volume Control

When this control is in the extreme counterclockwise position, the volume of the sound receiver will be at a minimum. By clockwise rotation, volume may be increased to any degree until the full output of the sound receiver is obtained.

Tone Control

This control changes the audio response of the sound receiver and is continuously variable from bass (counterclockwise) to full range.

V. OPERATING NOTES

1. If, at any time, the picture disappears and leaves only one line or a spot, switch off your receiver immediately and call a television service engineer. Operation of your receiver under the above condition will be detrimental to the life of the tube.

2. *Do not remove the back cover of the receiver.*

3. Picture failure at the transmitter would result in the picture fading out and all that would be left would be a square faintly illuminated frame. Turn up the contrast control and if no transmission is taking place, no great change in screen illumination will take place.

4. Do not change any control setting other than those on the main panel.

5. Call in a television service engineer if the picture loses vertical or horizontal synchronism. Loss of vertical synchronism is indicated when the picture appears to be slowly slipping down the screen. Loss of horizontal synchronism is indicated when a section of the picture becomes unintelligible.

6. Ignition interference from motor cars and interference from electrical appliances are the most general sources of trouble when receiving pictures. These interferences are characterized by white specks or even white bands breaking up the picture. Some types of interference may even affect the picture but cause no crackle or harsh grating sound in the speaker.

WARRANTY

General Electric Company warrants to the purchaser of each new General Electric Television Receiver (subject to the conditions of the immediately following paragraph) that any part thereof which proves to be defective in material or workmanship within 90 days from the date of original purchase for use will be repaired or replaced. If, within nine months after the expiration of the foregoing warranty, the cathode-ray "Picture Tube" becomes inoperative, General Electric Company will make such allowance toward the purchase of a replacement tube as is provided for in its then current service policy.

The foregoing warranty shall be ineffective unless the warranty registration card accompanying the receiver is dated and signed by the purchaser at the time of installation and given to the dealer from whom the receiver was purchased.

Any defect in said receiver should be brought to the attention of the dealer from whom it was purchased, who will be authorized to furnish or arrange for repairs or replacement within the terms of this warranty.

The foregoing is in lieu of all other warranties express or implied and General Electric Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said receiver.