POWER REQUIREMENTS
117 Volts 2.0 Watts
60 cycles AC or DC

ANTENNA INPUT IMPEDANCE
Balanced—30 ohms

SPEAKER
PM Dynacomp
Model AV12
V.C. Impedance
AV12
AV1C
AV1C
AV1C
AV1C

FINE TUNING CONTROL
Screw adjustment is provided for each individual channel which sets the position of all tuning locks simultaneously for the desired channel. This adjustment is accessible through a hole in the front panel when the channel selector knob is removed. To remove knob, merely pull it away from pin and rotate it in a counterclockwise direction.

L.F. FREQUENCY
Sound output—12.50 Mc.; Picture carriers—26.75 Mc.

FOCUS
Magnetic

REFLECTION

PICTURE SIZE (Direct View)
Area — 16 sq. inches
Height — Width — Width — Width — Width

DIMENSIONS
Model AV12—176" x 20" x 21"
Model AV1C — 16" x 13" x 17.5"

WEIGHTS (per set)
Model AV12—140 lbs.
Model AV1C — 15 lbs.
Model AV1F — 10 lbs.
Model AV1C — 120 lbs.

CAUTION
This chassis has its B system connected directly to one side of the AC power line. Therefore, the following precautions must be observed before making connections to test instruments during service operations. Failure to do so may result in severe shock if contact is made between test equipment and “earth” ground or a short circuit might occur if ground terminal of test equipment is connected to “earth” ground.

1. Connect an AC voltmeter between B of receiver chassis and an “earth” ground terminal of test equipment.
2. Connect an AC voltmeter between ground terminal of test equipment and “earth” ground terminal of test equipment.
3. Ground terminal of test equipment may now be connected to “earth” system of receiver.

The forementioned precautions could be avoided if an isolation transformer is connected between receiver power cord and power supply outlet.

INSTALLATION OF ANTENNA SYSTEM
To properly install an antenna system it is necessary to have some method of communication from the antenna site to the receiver. This communication should be established before the final antenna site has been chosen. A pair of interconnected telephones may be used to conversely accomplish this purpose. Do not use the transmission line on the means of interconnecting these telephones.

TYPE OF ANTENNA—Unlike the ordinary broadside receiver, the proper selection and installation of the antenna system is one of the most important factors influencing picture quality. It is necessary to have an antenna system with a broad frequency response characteristics whose impedance closely matches the input impedance of the receiver. Stewart-Warner Folded Dipole Antenna Systems 50570 and 50530 have been especially designed to match Stewart-Warner Television receivers and to obtain high operating efficiency in the present television transmission frequency range of 14 to 88 Mc. and 174 to 216 Mc. In general, the folded dipole will give excellent results without the addition of a reflector element. However, in cases where reflected signals cause “ghosts” or where the received signal is weak, the addition of a reflector element (95535) will improve performance by increasing the antenna directivity and overall gain.

In areas where both high and low band Television Stations are in operation and where antennas not suitably directed in those directions which will permit optimum orientation of a single dipole antenna, use of the Stewart-Warner Combination High-Low Band Antenna System is advisable (see Figure 1). The Stewart single dipole antenna system 50530 can be readily converted to a combination High-Low Band system by the addition of Stewart-Warner High Band Adapter Kit 506866.

ANTENNA ASSEMBLY—Complete assembly instructions accompany each antenna kit and these instructions should be followed very carefully.

LOCATING THE ANTENNA—Before attempting to install the antenna it is essential to carefully select the location which will provide the best performance conditions. A few conditions to be fulfilled:

1. Adequacy of earth conductors are the proposed antenna site and the transmitting antenna such as buildings, trees, power lines, other nearby antenna systems, etc.

2. Maximum distance between proposed antenna site and sources of electronic noise such as high voltage lines or overhead power lines, or other buildings, trees, power lines, etc.

3. Greatest possible height above ground level. In general, this will allow the antenna to overcome obstacles on the line of sight.

After choosing the antenna site in accordance with the above conditions, mark the actual test with the receiver to be sure that a satisfactory picture can be obtained from all transmitting stations and that the selected test site will maintain clear visibility. It is also advisable to mark the test with the receiver to be sure that a satisfactory picture can be obtained from all transmitting stations and that the selected test site will maintain clear visibility.

ORIENTATION—Since the response of a dipole antenna is a directional characteristic, it is necessary to orient the antenna for the best results from the receiver. All such antennas should be directed toward the distant transmitter.

In areas where the signal strength is in doubt, it may be possible to install the antenna on the roof provided the roof is not made of metal or insulated with material. Should there be any indication that the signal strength is inadequate, the antenna should be elevated. If this is not possible, the antenna should be fixed with a dipole antenna is definitely recommended. The transmitting station is a distant one, and it is not possible to ensure that the dipole antenna will provide satisfactory results.

Refinements in view of the orientation of the antenna become of equal importance with the matter of selecting the correct location.

2. Maximum distance between proposed antenna site and sources of electronic noise such as high voltage lines or overhead power lines, or other buildings, trees, power lines, etc.

3. Greatest possible height above ground level. In general, this will allow the antenna to overcome obstacles on the line of sight.

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After choosing the antenna site in accordance with the above conditions, mark the actual test with the receiver to be sure that a satisfactory picture can be obtained from all transmitting stations and that the selected test site will maintain clear visibility. It is also advisable to mark the test with the receiver to be sure that a satisfactory picture can be obtained from all transmitting stations and that the selected test site will maintain clear visibility.
In areas where a number of television stations exist, the problem of
interference becomes more complicated and requires very careful con-
consideration. The broadcast stations are all transmitted on a basis to
obtain maximum satisfactory reception from all stations. Relative
strength of different stations may require that considerable
antenna misalignment be tolerated with regard to a high power trans-
mitter in order to favor reception from a low power transmitter.

Should the situation be encountered where it is necessary to orient
the antenna for optimum operation in both the low and high band,
the Stewart-Warner Combination Antenna System 1085/800 can be
used advantageously. It will be found that the low band dipole can
be rotated independently of the high band so as to facilitate solution
of these problems.

Final position of the antenna can be determined only by observing
the reception of the picture on the receiver screen.

MOUNTING—Various methods for mounting the antenna mast may
be used. Several preferred methods are illustrated in the figures in-
cluded in installation instructions for Stewart-Warner Television
Antenna Systems.

When using brackets to attach the mast to a wall, be sure that the
wall surface of the building is in good enough condition to withstand
the thrust of the mast against the antenna. Spacing between such
brackets should be sufficient to hold the mast rigid and should be
in proportion to mast height. It is of utmost importance that the mast
brackets grip the mast securely in all positions to prevent rotation of the
mast due to severe wind storms.

When a fasten type roof fastening is used, be sure that the mounting
plate is of sufficient size to prevent shattering of the lower end of the
mast. Make sure that the guy wire anchor points are secure and
spaced apart so that the guy wire will not stretch to loosen. The guy wire
should point radially outward to the anchor points to prevent a twisting
torque. This will also prevent any wind and rain from building up
between the mast and the house which might be used to avoid a
short circuit in the transmission line.

SafETY AND LUMINATED PROTECTION—The antenna system
should be installed in conformance with local building and fire regula-
tions. Every precaution should be taken to adequately secure the mast
in the building to avoid danger of antenna falling from the roof—use
of guy wires is recommended whenever deemed necessary on an
additional safety measure.

A degree of lightning protection may be obtained by connecting a
heavy copper conductor between the aluminum mast of the antenna
and a good ground. When using shunt fusef, do not con-
nect cable shield to any part of the antenna system—see Figure 1
for cable shield connection to receiver. Under no circumstances should
the cable system be grounded at any point. Connecting
Routing and Security—It is well to carefully consider the best route
for the cable system to provide for the longest and electrical dist-
ance shielded. A compromise must usually be made on the length
so as to be able to take advantage of the shielding effect of the
two sides of the antenna system. Whenever possible, the line should
be run in a vertical direction so that rain, sleet, and snow will have
less tendency to drip down the cable. A horizontal run is necessary, it should
be made under an overpass or other protection. Never run the line
inside of metal pipes.

The transmission line must not be allowed to make excessive contact
with any surface (especially metal) and for this purpose, special
stand-off insulators are supplied with the Stewart-Warner Television
Antenna Kit. These insulators provide a means of supporting the line
as well as maintaining proper spacing from surrounding surfaces.

They may be screwed directly into wood without the aid of any other
mounting device. If the line is to be run through a brick, it may be
necessary to use some type of expansion plug. If the weight sup-
ported by these stand-offs is small, the plug hole may be drilled in
the internal portion of the insulator to suit the weight. It is preferable
to drill the plug holes in the brick or stone proper, making sure that
these holes are deep enough to accommodate the full length of the
plug. After inserting the line into the hole of the stand-off insulator,
the stand-off around the insulator should be bored in order that the
insulator be supported in the brick or stone and the outside lead
from the line to support the insulator. The inside lead should be
used in both the vertical and horizontal direction. The line should be pulled tight
so that a heavy wind will not cause it to swing against any objects.

Occasionally it will be physically impossible to install a stand-off
insulator on the edge of a protruding projection. Under such condi-
tions it will be necessary to place some sort of additional insulator
around the transmission line, holding it in place with tape. In loc-
ations where electrical noises create an interference problem, the
noise pick-up may be eliminated by twisting the line about one turn
per foot between the supporting stand-off insulators.

Various methods of bringing the transmission line into the house will
occur to the installation man. The choice of which specific
methods to use will be given. Irrespective of the method selected, basic practice
requires that precautions be taken to minimize contact of transmission
line with surrounding surfaces and to properly seal the point of entry
with a suitable moisture tight seal. Do not attempt to use any special lead
in devices or conductors in windows.

After the line has entered the house it should be routed by the shortest
possible path to the receiver, taking special precautions to avoid con-
act with pipes, valves, or other metal objects. The line should be
preferably supported by indoor type stand-off insulators as it is
routed around the floor molding of the room. However, it may be
tricked to the molding if run short and relatively few lacks are
required. Allow the line to drop away from the molding between
supporting latches for best efficiency.

Connecting Line to Receiver—A terminal strip such as shown at the
bottom of Fig. 2 will be found on the rear of the chassis on Receiver
Model AV71 (see Figure 4), and at the bottom edge of the cabinet
on Models AVCI and AVCI (see Figure 11). Connect the transmission
line to these terminals. Under certain conditions improved reception
results from reversing the connection of the line to these terminals,
so it is suggested that picture quality be observed for both conditions
before making a permanent connection of the transmission line.

When using RG-22/3 shielded cable, connect the shield to the chassis
through a 470 Micro. condenser (see Figure 3). Do not connect
directly to chassis metal through terminals or other metal objects.

MATCHING SHELLED CABLE TO RECEIVER—Where it is necessary
to use RG-22/3 shielded cable to minimize pickup of external elec-
trical interference, this cable should be matched to the receiver by a
special impedance matching network consisting of three carbon res-
nitors as illustrated in Figure 2. Do not use shielded resistor.

In general, the high line shunts which give the shield in the receiver
are connected to the shield in the line which minimizes the amount
of noise which may make the receiver inadvisable to the network
and effect direct connection of the cable to the receiver antenna
terminals, thereby eliminating the effects of the interference.

Although the preset controls have been factory adjusted for optimum
performance, it is generally necessary to make some line adjustments
of these controls at the time of installation.

1. Gain of the various antenna insulators (ind. type used on Table Model only), it will be necessary to remove the over- cover of the cable to read the gain of the insulators.

2. Note that the focus coil is held in place during shipment by a special locking device that must be removed before attempting to reposition the focus coil. The focus coil lock having a standard lock, which is

3. Set CHANNEL SELECTOR to desired CHANNEL—Channel

4. The receiver is now ready for an operational check; proceed as follows:

1. SETTING BRIGHTNESS AND CONTRAST CONTROLS—Turn both

2. TURN SET ON—Rotate "On-Off" switch clockwise. Allow

3. Set channel selector to desired channel—channel number on the knob should be opposite the Position indicator as shown in Figure 4. The following table lists all United

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The following adjustments should be made while the station is transmitting its circular test pattern.

13. CENTERING — Before attempting to center the test pattern on the screen, be sure that the focus coil locking device has been removed. This device is used only for clamping during shipment; see Figures 4 and 11. The pattern can then be readily centered by properly positioning the focus coil. This is done by turning the end of the desired direction by hand.

14. STRAIGHTENING THE YOKE RASTER — If the pattern should appear on the screen in a tilted position as shown in Figure 13, loosen the deflection yoke locking screw (see Figures 4 and 11), rotate the yoke sufficiently to correct this condition, and then tighten the screw securely.

15. WIDTH — Control of picture size in the horizontal direction is accomplished by means of the "Width" control located behind the same plate as shown. It almost invariably low line voltage makes it difficult to obtain sufficient picture width, when using the "Width" control, then change the position of the deflection yoke, with the picture tube may be helpful. Release yoke locking screw (see Figures 4 and 11) and slide the yoke about 1/4 inch toward the socket end of the tube.

16. HEIGHT — Control of picture size in the vertical direction is accomplished by means of the "Height" control located behind the same plate. This control is shown and width and height adjustments should be checked for all transmitting stations to be sure that picture properly fills the viewing area.

17. VERTICAL LINEARITY — Improper vertical linearity causes the circular test pattern to appear condensed on the upper edge of the screen and extended on the lower edge or vise versa. This effect is illustrated in Figures 4 and 11. Adjust for proper linearity by using "Vertical linearity" control located on rear of chassis (see Figure 4). It may be necessary to realign the "Height" control if an appreciable change is made in the linearity control setting.

18. WEAK SIGNAL — The characteristic of high frequency television signals which permits them to be reflected from walls of nearby buildings or other objects may, under certain conditions, cause "multiple transmission path." This would permit the reflected signal to arrive at the antenna a short interval of time later than the signal traveling in a direct path from the transmitter and the effect produced on the picture of the television receiver is illustrated in Figure 19. These multiple images, known as "ghosts" or "phantoms," may generally be prevented by careful alignment and orientation of the antenna.

19. AIRCRAFT INTERFERENCE — Aircraft in the vicinity may also produce a temporary "multiple transmission path" on the surfaces of a plane or capable of reflecting television signals. Although the source of interference is usually rare, its effect would be recognized by a temporary fluctuation in picture brightness and sound volume as well as by the presence of a "ghost" image. In areas of relatively low signal strength, aircraft interference may cause the pictures to momentarily lose synchronization or "break out." Static variation, in addition, may be observed by the picture quality improves when the next clear picture pattern exists.

20. AUTO IGNITION INTERFERENCE — Should you find that poor quality is caused when observing a "television" at a location where this may or due to the quality of the line — wait until the next clear picture pattern is established and observe whether picture quality improves when the next clear picture pattern exists.

FIG. 17 CORRECTLY ADJUSTED PICTURE

FIG. 18 VERTICAL DISTORTION
ADJUST VERTICAL LINEARITY CONTROL

FIG. 19 MULTIPLE IMAGES

FIG. 20 DISSIPATION INTERFERENCE

FIG. 21 DISSIPATION INTERFERENCE

FIG. 15 TOO SHORT
ADJUST HEIGHT CONTROL

FIG. 16 TOO RABBIT
ADJUST WIDTH CONTROL

FIG. 14 TOO CENTER
ADJUST FOCUS COIL POSITION

FIG. 13 TILTED PICTURE
ADJUST YOKE POSITION

FIG. 12—BEAM VIEW OF CONSOLE MODEL

FIG. 11—REAR VIEW OF CONSOLE MODEL
ALIGNMENT PROCEDURE
FOR
STEWART-WARNER TELEVISION RECEIVERS
MODELS AVT1, AVC1, AVC2 & AVC3

Allignment of all RF and IF tuned circuits in this receiver may be
accomplished by utilizing the procedures described in the follow-
ing chapters.

SEQUENCE OF ALIGNMENT. These procedures should preferably
be applied in the order in which they are presented, however,
alignment of the Sound Channel or IF Channel may be accom-
plished individually if desired.

When undertaking alignment of the RF tuner circuits it is vitally
important to test check the RF Channel alignment and obtain the
proper IF band pass characteristics as results of RF circuit tuning
are observed by means of an oscilloscope connected to the output
of the IF stages.

REMOVAL OF CHASSIS. The receiver chassis must be removed
from the cabinet in order to accomplish alignment of all tuned
circuits as there are eight adjustment points located on the under-
side of the unit.

On table models the chassis should be removed from the cabinet
without disturbing the picture tube or speaker. Interconnection of
focus coil, yoke, picture tube, speaker and chassis may be
conveniently achieved by using special extension cables which
are available for service purposes. These cables can be ob-
tained through the nearest Stewart-Warner distributor by ordering
as follows:

Model 27443 High Voltage Ext. Cable & Plugs,
Model 27444 Deflection Yoke Ext. Cable & Plugs,
Model 27445 Picture Tube Ext. Cable & Plugs,
Model 27446 Focus Choke Ext. Cable & Plugs,
Model 27447 Speaker Ext. Cable & Plugs.

On console models the picture tube must be removed from the
Techcel before the chassis can be taken out. The picture tube,
focus coil and support frame can be removed as a com-
plete assembly by rolling the wing nuts which hold the frame to
top plate of cabinet. Allow speaker to remain in the cabinet.
After picture tube and chassis have been removed it will be
convenient to interconnect all units by means of special
extension cables listed above.

CAUTION
The picture tube is extremely valuable and if
broken glass fragments will be violently ex-
pelled. Handle with care, using safety gog-
gles and gloves. Avoid contact with high
tension terminals at side of tube even if it
has been disconnected from the receiver—
this precaution is necessary as inner and
outer coatings on the tube form a condenser
which may carry a high voltage charge for
an extended period of time after disconnec-
tion from the receiver.

The metal shield which covers the bottom side of the RF tuner
assembly must be left in position throughout the alignment pro-
cedure. Glitches of signal at generator sides for RF Channel alignment
is accomplished through opening in cabinet of this shield
(see Fig. 3).

INSTRUMENTS. The following instruments will be required for
signal source and output indicators during the alignment process:
Sine wave generator, signal generator, oscilloscope, and
oscilloscope test equipment.

1. STANDARD SIGNAL GENERATOR. To provide unmodulated
generator signals at the following frequencies: Minimum ven-
tage output should be at least 1 volt with provision for
attenuation as desired. This instrument must have good fre-
quency stability and be accurately calibrated. Generator
which incorporates a separate crystal controlled oscillator and
heterodyne circuit is well calibrating and therefore capable of
providing the accuracy of frequency calibration required for
tuning circuit alignment.

a. RF Frequency: 4.5 Mc, 25.5 Mc, 22.5 Mc, 14 Mc, 12 Mc, 9 Mc,
7 Mc, 5 Mc, 4 Mc, 3 Mc, 2 Mc, 1 Mc, 750 Kc, 500 Kc, 300 Kc, 100 Kc.
b. RF Channel: Picture, Sound, Carrier, eIF, Mid, 2 IF, and 3 IF stages.

2. RF SWEEP GENERATOR. To provide frequency modulated sig-
nals at the following frequencies:
4.5 Mc, 9 Mc, or 25 Mc, 6.5 Mc, 25 Mc, 15 Mc, 20 Mc, 10 Mc, 20 Mc, 5 Mc, 20 Mc,
10 Mc, 10 Mc, 10 Mc, 10 Mc, 5 Mc, 5 Mc, 1 Mc, 500 Kc, 300 Kc, 100 Kc.

Output adjustable with at least 5 volt minimum.
Output should be "flat" the amplitude variation for all set-
tings of the sweep width control.
Provisions for connection of generator sweep modulating vol-
s to horizontal deflection system of an oscilloscope.
Provisions for blanking the output signal on each return
sweep so that oscillations will not show repeats.

3. CATHODE RAY OSCILLOSCOPE preferably a unit with vari-
able amplifier having wide range frequency response and low
capacity pick-up probe.

4. VACUUM TUBE VOMETER. The lowest voltage range of this
instrument should preferably permit a 1 volt reading to be
indicated at not less than one third of full scale deflection.

INSTRUMENT CONNECTIONS: This chassis has its B+ system con-
sisted directly to one side of the AC power line. Therefore the
following precautions must be observed before making connec-
tions to test instruments during service operations. Failure to do so
may result in severe shock if contact is made between test equip-
ment and “earth” ground or short circuit may occur if ground termi-
nal of test equipment is connected to “earth” ground.

1. Connect an AC voltmeter between B- and "ground" chassis and
on "earth" ground (water pipe, etc.). If meter reading is not zero, reverse receiver power cord plug at wall outlet. If meter reads 60 volts or less, do not attach instrument power cord plug.

2. Ground terminal of test instrument may now be connected to
"earth" system of receiver.

These instrument connection precautions can be avoided if an insu-
lator transformer is connected between receiver power cord and
power supply outlet.

The circuit arrangement, including details of matching and coupling
networks, for instruments used in this alignment procedure is
given in Figs. 1 to 4 inclusive. Specific instructions for each instru-
ment application will be found in various sections of the alignment
charts.

GENERAL INSTRUCTIONS. When aligning IF and RF circuits it
is necessary to apply a fixed bias voltage to the D.C. system of
the receiver. This fixed bias is obtained by using a 1.5 volt battery and
connecting it as shown in Fig. 5.

IMPORTANT
When observing the receiver band pass char-
acteristic on an oscilloscope, it is exceedingly
important to avoid distortion of that char-
acteristic which would occur when using a
large input signal from the sweep generator or
standard generator (marker signal). Al-
ways set attenuator on sweep generator so that
the reading on a vacuum tube voltmeter,
connected across 8200 ohm diode load re-
sistor (symbol 242 on schematic) does not
exceed one volt. Standard generator output
should also be attenuated so that marker sig-
nal does not pull or tear the band pass
characteristics as shown on the scope.

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### Sound Channel Alignment Procedure

1. Turn receiver Channel Selector to television channel A13 and short antenna terminals together with antenna wire.
2. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
3. Note location of Troop Coll 2018 by referring to Fig. 4. Before selecting the point of connection, connect the TV channel A13 to the TV channel A13 and connect the TV channel A13 to the TV channel A13.
4. Note location of the TV channel A13 at points 5, 6, 7, 8, 9 in Fig. 5. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
5. Adjust for maximum sensitivity on TV channel A13.

<table>
<thead>
<tr>
<th>STANDARD SIGNAL GENERATOR</th>
<th>SWEEP GENERATOR</th>
<th>TVFM CONNECTIONS</th>
<th>OSCILLOSCOPE CONNECTIONS</th>
<th>MISCELLANEOUS INSTRUCTIONS</th>
<th>TRIMMER OR SLUG</th>
<th>TYPE OF ADJUSTMENT AND OUTPUT INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 MC</td>
<td>CONNECTIONS</td>
<td>FREQUENCY</td>
<td>CONNECTIONS</td>
<td>FREQUENCY</td>
<td>#1</td>
<td>Approximate frequency output on TV</td>
</tr>
<tr>
<td>CONNECTED</td>
<td>Connect as shown in Fig. 1.</td>
<td>Connect as shown in Fig. 2.</td>
<td>Not used</td>
<td>#1 Connected</td>
<td>22.5 MC</td>
<td>Adjust for maximum sensitivity on TV</td>
</tr>
<tr>
<td>#1 Secondary</td>
<td>Secondary level is controlled by variable coupling.</td>
<td>Not used</td>
<td>#2 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TV</td>
<td>#3 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TV</td>
</tr>
<tr>
<td>#2 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
<td>Not used</td>
<td>#3 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
<td>#4 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Remove the two 60-00 ohm resistors which were used in the preceding step connected between pin 3 of the TV channel A13 and #1-2 for special connection of the TV channel A13.

### IF Channel Alignment Procedure

1. Turn receiver Channel Selector to television channel A13 and short antenna terminals together with antenna wire.
2. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
3. Note location of the TV channel A13 at points 5, 6, 7, 8, 9 in Fig. 5. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
4. When selecting the point of connection, connect the TV channel A13 to the TV channel A13 and connect the TV channel A13 to the TV channel A13.
5. Adjust for maximum sensitivity on TV channel A13.

<table>
<thead>
<tr>
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<th>SWEEP GENERATOR</th>
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<th>OSCILLOSCOPE CONNECTIONS</th>
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<th>TRIMMER OR SLUG</th>
<th>TYPE OF ADJUSTMENT AND OUTPUT INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.5 MC</td>
<td>CONNECTIONS</td>
<td>FREQUENCY</td>
<td>CONNECTIONS</td>
<td>FREQUENCY</td>
<td>#1</td>
<td>Approximate frequency output on TV</td>
</tr>
<tr>
<td>CONNECTED</td>
<td>Connect as shown in Fig. 3.</td>
<td>Connect as shown in Fig. 4.</td>
<td>Not used</td>
<td>#1 Connected</td>
<td>22.5 MC</td>
<td>Adjust for maximum sensitivity on TV</td>
</tr>
<tr>
<td>#1 Secondary</td>
<td>Secondary level is controlled by variable coupling.</td>
<td>Not used</td>
<td>#2 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TV</td>
<td>#3 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TV</td>
</tr>
<tr>
<td>#2 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
<td>Not used</td>
<td>#3 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
<td>#4 Connectors Troop Coll 2018</td>
<td>Adjust for maximum sensitivity on TVFM.</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Remove the two 60-00 ohm resistors which were used in the preceding step connected between pin 3 of the TV channel A13 and #1-2 for special connection of the TV channel A13.

### IF Channel Alignment Procedure

1. Turn receiver Channel Selector to television channel A13 and short antenna terminals together with antenna wire.
2. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
3. Note location of the TV channel A13 at points 5, 6, 7, 8, 9 in Fig. 5. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
4. When selecting the point of connection, connect the TV channel A13 to the TV channel A13 and connect the TV channel A13 to the TV channel A13.
5. Adjust for maximum sensitivity on TV channel A13.

**IMPORTANT:** Remove the two 60-00 ohm resistors which were used in the preceding step connected between pin 3 of the TV channel A13 and #1-2 for special connection of the TV channel A13.

### Troubleshooting

- **If channel is badly missaligned and two or more immediately adjacent IF stages are tuned to the same frequency, oscillation may occur.** Each oscillator shows up as a voltage across the 5000 ohm shunt load resistor and is indicated by the TV channel A13 that is connected to this point during alignment. It should be noted that if voltage is due to IF oscillation is unacceptably strong, a slight adjustment may be made.

**Options:**
- **Add a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
- **Select location of the TV channel A13 at points 5, 6, 7, 8, 9 in Fig. 5. Connect a 1% volt battery to the receiver AGC system at both terminals of the TV channel A13 and connect a 1V volt battery to the receiver AGC system at both terminals of the TV channel A13.
- **Adjust for maximum sensitivity on TV channel A13.**
RF CHANNEL ALIGNMENT PROCEDURE

1. Connect a 1 kΩ voltage battery to the receiver AGC system so that negative terminal of battery connects to the AGC line and positive terminal of battery contacts to G (see Fig. 1 for convenient point of connection).

2. Do not allow the shield on the underside of the RF tuner unit to come in contact with the chassis as this could lead to low current from the AGC line. This shield must remain in position during alignment.

3. Before undertaking alignment of the RF tuner it is necessary to set the tuning slug to its correct mechanical position as shown in Fig. 7 (see slug numbers 11, 12, 13, 14, 15, 16, and 17). That is accomplished by first turning the receiver Channel Selector knob to channel #12 and then using three special tools which are supplied by Stewart-Warner. These three tools are small drivers that are used to turn the slugs in the tuner. The slugs are identified by corresponding codes so that they differ in length. Using the correct color-coded tool for a particular slug, insert the tool into the slot opening in the bottom of the slug until it stops. Then turn the slug clockwise several times so as to lessen the tool. This will properly engage the slug.

4. The tuning slugs in the tuner mechanism (see Fig. 5) should now be pressed back against its mechanical stop so that the slugs are withdrawn from the control fan as far as possible.

5. Then, rotate the tuning slugs clockwise so that the jambs are in the correct position, Form a position where the slug disconnects from the tuning slugs and this automatically readjusts the correct setting.

HIGH BAND ALIGNMENT

After the tuning slugs have been positioned on channel #12, insert a step #2 in the head of the chart, leave Channel Selector set to channel #12. The fine tuning screw in the Channel Selector Mechanism (see Fig. 5) must now be correctly positioned.

LOW BAND ALIGNMENT

Turn this screw clockwise until taster output is shown as described in step #3 at the head of this chart, leave Channel Selector set to channel #8. The line tuning screw in the Channel Selector Mechanism (see Fig. 5) must now be correctly positioned.

STANDARD SIGNAL GENERATOR

CONNECTIONS FREQUENCY CONNECTIONS FREQUENCY sweep generator vvm connections oscilloscope connections oscilloscope connections CONNECTIONS FREQUENCY CIRCUIT CONNECTIONS FREQ.

(Continued from previous page)


LOW BAND ALIGNMENT

Before proceeding with the alignment of the low band, turn the receiver Channel Selector knob to channel #1 (low band). Then turn the RF sweep generator and marker generator on for each of these channels with marker set at picture carrier frequency (see note on page for picture carrier frequency of each channel).

2.55 MC. 200 kHz 300 kHz 250 kHz

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The voltages shown on the oscillograph chart were measured on "Series W" chassis and under the following conditions.

When servicing chassis other than "Series W", refer to the table of Production Changes on schematic diagram page for details of circuit differences which may affect certain operating voltages.

1. Power supply 217 volts 60 cycle AC.
2. All voltages, with exception of tube filament voltages, are measured between socket terminals and B—. Filament voltages are measured across tube terminals.

NOTE: Measurements made with voltmeter having a sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

4. No input signal — antenna terminals shorted together.
5. Channel Selector set for high band operation unless otherwise indicated by notes "F" and "K".
6. All other controls were set at their COUNTER-CLOCKWISE position unless the voltages shown on the chart is followed by a letter to indicate a special condition of measurement as outlined in Step 7.

7. Certain voltages were measured with two different settings of a specific control. It should therefore be understood that in these instances all controls, with exception of one, were set in their counter-clockwise position — a letter following the voltages shown on the chart indicates this exception and is explained below.

A Vert. Lim. control max. clockwise
B Brightness control max. clockwise
C Contrast control max. clockwise
D Horia. Hold control max. clockwise
E Width control max. clockwise
F Focus control max. clockwise
G Vert. Hold control max. clockwise
H Height control max. clockwise
I Channel Selector set to Chan., #10
J Channel Selector set to Chan., #4

NOTE L. This measurement should NOT be made with a conventional type voltmeter as circuit may break into oscillation due to coupling thru instrument leads; use a vacuum tube voltmeter with short leads.

NOTE M. Do not attempt to measure the voltages at the tube cap. There is a high R. F. potential at this point.

NOTE N. If you do not have an instrument capable of directly measuring voltages in this range, the voltage can be measured by using a voltmeter divider network consisting of twenty 25 megohm 2 watt resistors and one 1 megohm 2 watt resistor, all connected in series. Avoid using resistors of higher values as their individual voltage rating may be exceeded. It is also important to use resistors of equal wattage. Solder all connections between resistors. Accurately measure the overall resistance of the entire combination as well as the resistance of the 1 megohm section.

With the switch turned off, connect the 25 megohm end of the resistance voltmeter divider to the filament of the ESSTF80/16 tube, or B - V. terminal of the kilowatt, and connect the 1 megohm end to B-. Now, turn the set on and measure the voltage drop across the 1 megohm resistor with a vacuum tube voltmeter. The voltage at the tube terminal can then be calculated as follows:

\[
\text{Voltage at Tube Terminal} = \frac{\text{Measured Resistance of Divider}}{\text{Volts Measured Across 1 Meg. Section}} \times \text{Resistance of This 1 Meg. Section}
\]

NOTE P. Grounding of center stud on tube socket is necessary to reduce capacity coupling between other plates. Oscillation may result if this ground is omitted.