

MODELS

VF103

VF103M

CHASSIS

TS-8

# Motorola<sup>®</sup> Television

## SERVICE MANUAL



### GENERAL INFORMATION

The Motorola Model VF103 console combination consists of an AM-FM-TV receiver and two-speed phonograph in one cabinet. The television receiver and AM-FM tuner, PT-21, are all contained on the TS-8 chassis. The record changer is a combination 33 RPM and 78 RPM changer and is known as Motorola Model W4RC. Chassis TS-8 has 24 tubes, plus a 10" picture tube.

For service information on the record changer, refer to Motorola Service Manual Part No. 54P790283.

### ANTENNA CONNECTIONS

A two-terminal antenna strip is provided on the rear of the cabinet for connecting a 300 ohm transmission line to the set.

### OPERATING CONTROLS

#### FRONT PANEL CONTROLS

There are 10 controls on the front panel of your receiver. See Figure 1. Note that some controls are dual, consisting of a small knob and a large knob. The function of each control is indicated by markings on the front panel; the "circle" indicates the large knob, while the "dot" indicates the small knob. See Figure 1 for front panel control functions.

4545 AUGUSTA BOULEVARD

*Motorola Inc.*

CHICAGO 51, ILLINOIS

PART NO. 54P790211-A

Price 25 Cents

PRINTED IN U. S. A.

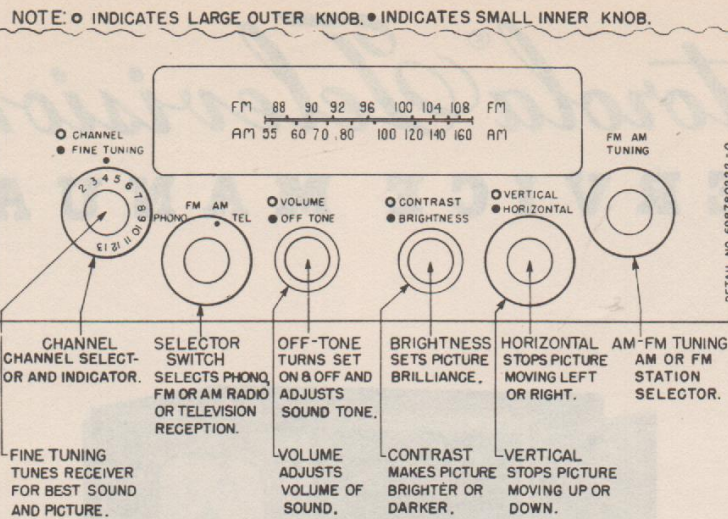


FIGURE 1. OPERATING CONTROLS

### SERVICE ADJUSTMENT CONTROLS

The receiver is completely adjusted at the factory, so normally none other than the front panel control operating instructions need be followed in putting the receiver in operation. However, to provide for any misadjustment of the service controls, due to handling, the following instructions are in order. See Figure 2 for location of service adjustment controls.

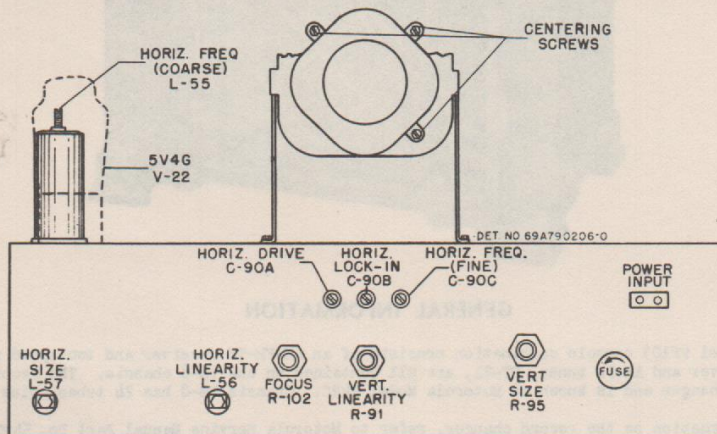


FIGURE 2. SERVICE ADJUSTMENT CONTROLS

#### FOCUS CONTROL

The FOCUS control should be adjusted until the fine horizontal line structure of the raster is clearly visible over the picture area. The control should be turned through the correct point several times so that optimum focus is obtained.

#### CENTERING

The picture is centered by positioning the focus coil. By means of three screws, the focus coil can be shifted to center the picture in its mask. These centering screws can be reached by removing the safety screen from back of receiver. A separate line cord, such as Motorola Part Number 30B470756, will be required to supply power to receiver when screen is removed. In general, the focus coil should be held as close to its mounting bracket as possible, to provide good mechanical stability and good focusing over the entire screen.

#### VERTICAL SIZE AND LINEARITY ADJUSTMENT

Adjust the VERTICAL SIZE control R-95 until picture fills the mask vertically (6-3/8" minimum). Adjust VERTICAL LINEARITY control R-91 for best overall vertical linearity. Adjustment of the VERTICAL SIZE control will require a readjust-

ment of the VERTICAL LINEARITY control and vice-versa. Center picture with centering screws on focus coil.

#### HORIZONTAL SIZE, DRIVE AND LINEARITY ADJUSTMENT

Turn HORIZONTAL SIZE control L-57 fully clockwise. Vary HORIZONTAL DRIVE trimmer C-90A for best compromise between brightness and horizontal linearity. Adjust the HORIZONTAL SIZE control L-57 until picture fills the mask horizontally (8-1/2" minimum). Clockwise rotation increases width. ADJUST HORIZONTAL LINEARITY control L-56 for best horizontal linearity on right half of picture. Adjustment of the HORIZONTAL SIZE control will require a readjustment of the HORIZONTAL LINEARITY control and vice-versa. Center picture with centering screws on focus coil.

#### HORIZONTAL OSCILLATOR CHECK

Obtain a picture on the set with approximately normal contrast. Vary the HORIZONTAL HOLD control R-89B from one extreme to the other. The picture should remain in horizontal sync in all positions of the control except the extreme counterclockwise, and there the picture should show a marked tendency to slip to the right. This slippage serves as a reference point to insure the proper range of the hold control to give synchronization under all conditions. If picture fails to show this tendency to slip,

1. Leave the HORIZONTAL HOLD control in the extreme counterclockwise position.
2. Adjust the HORIZONTAL FREQUENCY trimmer C-90C until the picture tends to slip to the right.
3. Rotate the HORIZONTAL HOLD control clockwise until the picture falls into sync, then rotate an additional 10-15 degrees clockwise and leave in that position.

When the receiver has been adjusted in this manner, it should be possible to switch off and on the station or to another station and have the picture in synchronism at all times. If this is possible, the horizontal oscillator is properly aligned.

#### COMPLETE ALIGNMENT OF HORIZONTAL OSCILLATOR

If, in the above check, the receiver failed to hold sync over the proper range of the HORIZONTAL HOLD control, the horizontal oscillator should be aligned as follows:

1. Turn CONTRAST CONTROL for about normal picture contrast.
  2. Turn HORIZONTAL FREQUENCY trimmer C-90C tight.
  3. Adjust HORIZONTAL LOCK-IN trimmer C-90B to about 2 turns from tight.
  4. Adjust the horizontal oscillator coil L-55 so that the picture will lock-in over the whole range of the HORIZONTAL HOLD control.
  5. If it is not possible to obtain proper syncing in step 4, back off on HORIZONTAL LOCK-IN trimmer an additional turn, or until it is possible to adjust L-55 to make the picture sync over the whole range of the HORIZONTAL HOLD control.
  6. Turn the HORIZONTAL HOLD control to its extreme counterclockwise position.
  7. Adjust the HORIZONTAL FREQUENCY trimmer until the picture tends to slip to the right.
  8. Rotate the HORIZONTAL HOLD control clockwise 10-15 degrees past the point at which the picture falls into sync, and leave it in that position.
- It should now be possible to change stations without losing synchronism.

#### ADJUSTMENT OF ION TRAP AND DEFLECTION YOKE

Under conditions of rough shipment, it is possible for these parts to become misaligned. The following instructions will enable the service man to bring the parts to their normal setting.

See Figure 3 for adjustment locations. A mirror placed in front of the receiver will help in making these adjustments.

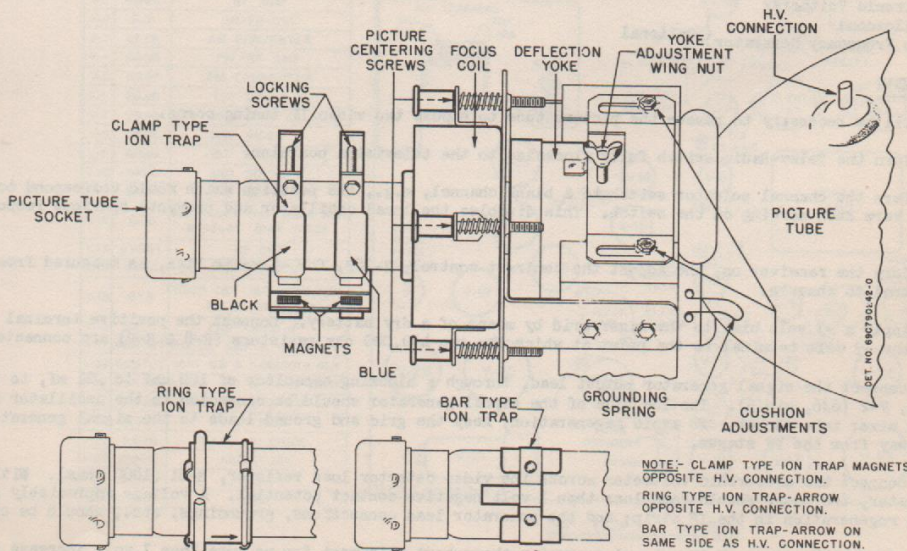


FIGURE 3. PICTURE TUBE ADJUSTMENT LOCATIONS

## ION TRAP

Three types of permanent magnet ion traps are used on the TS-8 series chassis. One is held in place with two clamps, colored black and blue; another slips over the neck of the tube and consists of a large and a small circular magnet; and a third type also slips over the neck of the tube, but it contains two square bar magnets on each side.

Shifting of the ion trap will result in poor brilliancy, or shadowing of the corners. The ion trap should be mounted on the neck of the picture tube so that the black end, the large ring magnet, or the direction in which the bar magnets point, depending upon the type of ion trap used, is toward the rear of the picture tube and approximately over the "flags" on the tube's gun structure. The two traps which slip over the tube neck also have arrows on them which should point to the front of the tube. While observing the raster on the screen, move the ion trap slightly, backward or forward, simultaneously turning it slightly to and fro until the brightest raster is obtained, and one in which none of the four corners are cut off or shadowed. These adjustments should be made with the brightest picture obtainable, consistent with good line focus and a full, square raster. When adjustment is completed, tighten screws to hold ion trap in position.

## DEFLECTION YOKE

If the deflection yoke shifts, the picture will be tilted. To correct, loosen the wing nut on top of the deflection yoke and rotate yoke till picture is straight. Before tightening wing nut, make certain that the deflection yoke is as far forward as possible.

## ALIGNMENT

### GENERAL

The chassis should be mounted on angle iron brackets (Motorola Part Number 7B484018) so that all connections and adjustments may be easily made. In all phases of the alignment procedure, be sure that the chassis and all instruments have a good common ground, either by placing all the units on a metal surface or by using bonding straps between the instruments. This will reduce spurious response trouble to a minimum. Dress the high voltage cap to the picture tube so that it cannot short to chassis. In making adjustments, keep your hands clear of the high voltage system and avoid the electrolytic condenser cans which are not at chassis potential. A long, thin screwdriver with a sleeve around the tip will be found convenient when making video IF adjustments, while for the sound IF, a small plastic or fibre screwdriver is necessary.

### EQUIPMENT NECESSARY FOR ALIGNMENT AND TESTING

AM Signal Generator: Frequency Range 4.5 to 216 mc  
Output 0-100,000 microvolts

AM Signal Generator: Frequency Range 455-1620 kc

Electronic Voltmeter  
Oscilloscope )  
Sweep Frequency Generator ) Optional

### VIDEO IF ALIGNMENT

It will be necessary to remove the picture tube to expose two video IF tuning cores.

1. Turn the Telev-Radio switch fully clockwise to the television position.
2. Turn the channel selector switch to a blank channel, e.g., the position which would correspond to channel 14 or 15 if there were such marking on the switch. This disables the local oscillator and prevents spurious responses in the IF amplifier.
3. Turn the receiver on, and adjust the contrast control, R-78B, for -5 volts bias, as measured from the center tap of the control to chassis.
4. Apply a -3 volt bias to the mixer grid by means of a dry battery. Connect the positive terminal of the battery to ground and the -3 volt terminal to the point at which the two 470,000 ohm resistors (R-8 & R-9) are connected.
5. Connect the signal generator output lead, through a blocking capacitor of 100 mmf to .01 mf, to the grid of the mixer tube, V-2 (6J6, pin 5). The low side of the signal generator should be connected to the oscillator coil mounting plate near the mixer tube socket. To avoid regeneration, keep the grid and ground leads to the signal generator as short as possible and away from the IF stages.
6. Connect the electronic voltmeter across the video detector load resistor, R-61 (1800 ohms). With zero output from the generator, the meter should read less than 1 volt negative contact potential. A voltage appreciably greater than this indicates regeneration in the IF strip; and the generator lead connections, groundings, etc., should be checked.
7. Adjust the output of the signal generator throughout alignment for no more than 1 volt increase across the detector load resistor to prevent over-driving the IF amplifier.

8. Refer to Figure 4 for the locations of the alignment adjustments and to the following chart for procedure.

Step	Signal Generator Frequency	Adjust	Remarks
1	23.6 mc	L-41	Adjust for maximum
2	26.4 mc	T-7	Adjust for maximum
3	22.9 mc	T-8	Adjust for maximum
4	25.7 mc	T-9	Adjust for maximum. This adjustment will normally tune very broadly since the core is practically out of the coil.
5	21.7 mc	L-38	This is the sound trap adjustment; increase generator output about 10 times and adjust for minimum.
6	25.7 mc	T-9	Readjust for maximum
7	24.7 mc	T-10	Adjust for maximum

The normal video IF sensitivity is less than 400 microvolts at 24.5 mc for an increase of 1 volt over the contact potential across the detector load, R-61, with -3 volts mixer bias and zero contrast bias.

The video IF amplifier response curve is shown in Figure 5. The bandwidth at the 3 db points should be approximately 3.5 mc. To check this with the AM generator, note the signal strength in microvolts necessary to produce an increase of 1 volt above contact potential at 24.5 mc. Increase this input by 1.4 times and shift the generator frequency both sides of 24.5 mc until the original detector voltage is again obtained. These two new frequencies thus obtained are the 3 db skirt frequencies and should be approximately 22.9 and 26.2 mc. This measurement should be made with the -3 volt mixer bias and a -5 volt contrast bias.

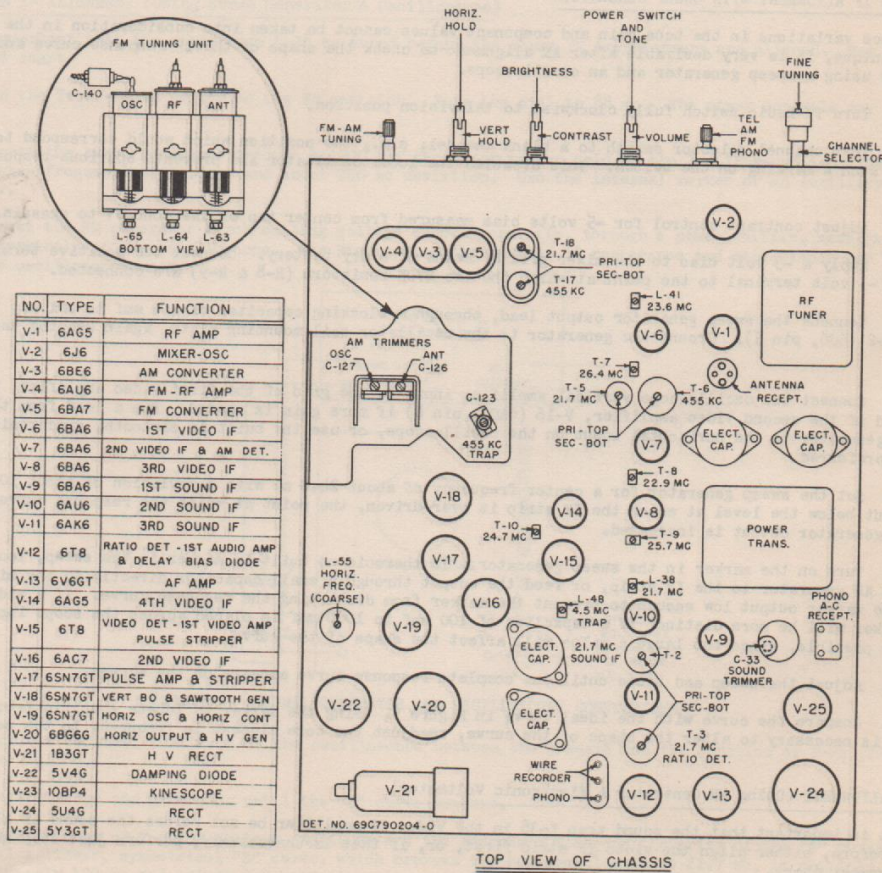


FIGURE 4. I.F. ADJUSTMENTS AND TUBE LOCATIONS

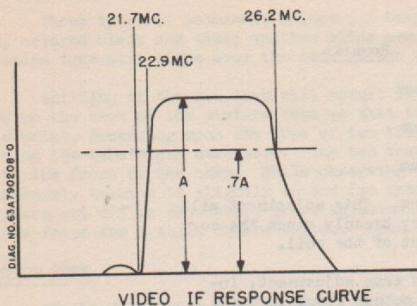


FIGURE 5. VIDEO I.F. RESPONSE WAVEFORM

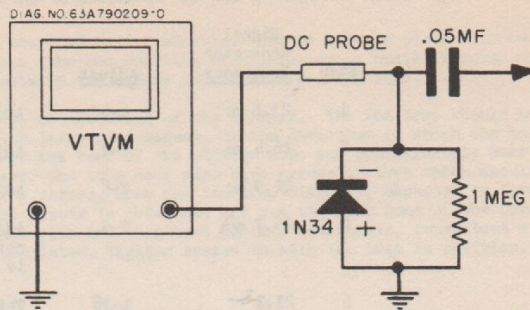


FIGURE 6. ELECTRONIC VOLTMETER CONNECTIONS

#### 4.5 MC TRAP ALIGNMENT

1. Connect the signal generator to the plate of the video detector, V-15 (6T8, pin 2).
2. Connect the electronic voltmeter and germanium crystal rectifier, as shown in Figure 6, to the plate of the second video amplifier, V-16 (6AC7, pin 8). Use the lowest voltage scale on the meter.
3. With the signal generator set at 4.5 mc and maximum output, adjust trap L-48 for minimum reading on the meter.

An alternate method is to tune in a normal picture and readjust L-48 so that the stippled or half-tone effect in the picture is minimized or eliminated. Make sure the fine tuning control is set on center audio peak while this adjustment is being made. The RF portion of the receiver must, of course, be aligned first before this method of adjusting the sound trap is attempted.

#### CHECK OF VIDEO IF ALIGNMENT WITH SWEEP GENERATOR

Since variations in the tube gain and component values cannot be taken into consideration in the single frequency alignment technique, it is very desirable after AM alignment to check the shape of the IF response curve and to touch up the adjustments by using a sweep generator and an oscilloscope.

1. Turn TV-Radio switch fully clockwise to television position.
2. Turn channel selector switch to a blank channel, e.g., the position which would correspond to channel 14 or 15 if there were such a marking on the switch. This disables the local oscillator and prevents spurious responses in the IF amplifier.
3. Adjust contrast control for -5 volts bias measured from center tap of the control to chassis.
4. Apply a -3 volt bias to the mixer grid by means of a dry battery. Connect the positive terminal of the battery to ground and -3 volt terminal to the point at which the two 470K resistors (R-8 & R-9) are connected.
5. Connect the sweep generator output lead, through a blocking capacitor of 100 mmf to .01 mf, to the grid of the mixer tube, V-2 (6J6, pin 5). Ground the generator to the oscillator coil mounting plate, again keeping the leads as short as possible.
6. Connect the oscilloscope vertical amplifier input to the grid of the first video amplifier, V-15 (6T8, pin 8) or to the grid of the second video amplifier, V-16 (6AC7, pin 4) if more gain is needed. Run a lead from the scope terminal on the sweep generator to the horizontal input on the oscilloscope, or use the built-in sawtooth, synchronized internally, whichever is preferred.
7. Set the sweep generator for a center frequency of about 24.0 mc with a deviation of about 10 mc. At all times keep the output below the level at which the IF strip is over-driven, the point at which the response curve begins to change shape as the generator output is increased.
8. Turn on the marker in the sweep generator. If there is no built-in marker in the sweep, loosely couple the output of the AM generator to the IF strip, or feed the output through a small capacitor directly to the mixer grid. At all times keep the marker output low enough to prevent the marker from distorting the response curve. If a wide band scope is used, the marker will be more distinct if a capacitor of 100 mmf to 1000 mmf is placed across the scope input. Use the smallest size possible, since too large a value will affect the shape of the curve.
9. Adjust the sweep and scope until one complete response curve appears on the screen.
10. Compare the curve with the ideal curve in Figure 5, using the marker to locate specific frequencies on the wave. If it is necessary to alter the shape of the curve, readjust the core closest in frequency to the point requiring correction.

#### FM SOUND IF ALIGNMENT (Using AM Generator & Electronic Voltmeter)

It is important that the sound trap L-38 in the video IF amplifier be set before the sound IF alignment is performed. Therefore, either align the video IF strip first, or, if that is unnecessary, perform just step number 5 in the video IF alignment chart.

1. Turn the Telev-Radio switch to the FM position. Tune the dial to 88 mc. The other controls may be in any position.

2. Connect the AM signal generator, set at 21.7 mc, to the grid of the 3rd sound IF amplifier, V-11 (6AK6, pin 1) through a 1000 mmf capacitor.
  3. Connect the electronic voltmeter between pin 2 of V-12 (6T8) and chassis. The meter will now read the AVC voltage developed in the ratio detector. With no signal, the voltage will normally be -2 to -3 volts.
  4. Increase the generator output until the meter reading increases by approximately 2 volts.
  5. Adjust the primary of T-3 for the maximum AVC voltage.
  6. Move the DC probe of the meter to the junction of R-24 (22K) and the black shielded audio lead, and connect the ground lead to the junction of R-26 (10K) and R-27 (10K).
  7. Adjust the secondary of T-3 for zero reading on the meter as the voltage swings from one polarity to another. A meter with zero center scale is convenient for this adjustment, although it is not necessary. The symmetry of the "S" curve just adjusted can be checked by noting that equal voltages, but of opposite polarities, are obtained for equal deviations of frequency above and below 21.7 mc. Since the ground lead of the meter is not connected to ground for this one adjustment, make sure that the meter case and the chassis are insulated from each other.
  8. Reconnect the meter to read the AVC voltage (step 3).
  9. Connect the generator through a 1000 mmf capacitor to the grid of the converter tube, V-5 (6BA7, pin 7). Adjust the generator output at 21.7 mc, for about a 2 volt increase in AVC voltage.
  10. Adjust the primary and secondary of T-2, C-33, and the primaries and secondaries of T-5 and T-18, all for maximum voltage on the meter. Repeat the adjustments if any one of them was far off resonance. A plastic screwdriver is necessary for adjusting the transformers, while C-33 is best tuned by hand or by the rubber eraser on a pencil.
  11. The normal FM sound IF sensitivity is less than 100 microvolts at 21.7 mc for an increase of 4 volts in AVC voltage. (This figure is not the true IF sensitivity but represents the shunting effect of the converter RF input circuit upon the generator output at IF frequencies).
- Normal TV sound IF sensitivity (with zero contrast and -3V mixer bias) is such that 75 microvolts at the 6J6 mixer grid results in an increase of 4 volts AVC voltage.

#### ALTERNATE FM SOUND IF ALIGNMENT (Using Sweep Generator & Oscilloscope)

It is important that the sound trap L-38 be tuned before the sound IF transformers are aligned. See step 5 in the video IF alignment chart.

1. Turn the Telev-Radio switch to the FM position. Tune the dial to 88 mc. The other controls may be in any position.
2. Connect the sweep generator through a 1000 mmf capacitor to the grid of the 3rd IF sound amplifier, V-11 (6AK6, pin 1), with a center frequency of 21.7 mc and about 250 kc deviation. Use the internal marker or an auxiliary AM generator to supply a marker.
3. Connect the FM generator synchronizing voltage output terminals, through a phase shifting network to the horizontal amplifier terminals of the oscilloscope. See Figure 7. Other values of resistance and capacitance may be required, depending upon the oscilloscope used.

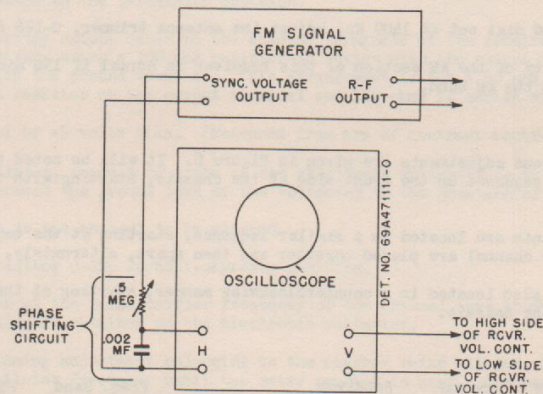


FIGURE 7. SIGNAL GENERATOR AND OSCILLOSCOPE CONNECTIONS

4. Connect the vertical terminals of the oscilloscope between the chassis and the junction of R-24 (22K) and the black shielded audio lead.
5. Adjust the scope and generator until the "S" curve appears.
6. Tune the primary of T-3 for maximum amplitude and the secondary for good linearity of the "S" curve. Repeat each adjustment until a linear, symmetrical "S" curve, which crosses the horizontal axis at 21.7 mc, is obtained. Reduce the deviation to approximately 100 kc and adjust for best linearity over this range.
7. Move the sweep generator to the grid of the FM converter, V-5 (6BA7, pin 7).

8. Adjust C-33 and the primaries and secondaries of T-2, T-5, and T-18, for the "S" curve with the most amplitude and the best symmetry around the 21.7 mc cross-over point.

#### FM TUNER ALIGNMENT

1. Turn the Telev-Radio switch to the FM position.
2. Check the setting of the dial pointer before starting alignment. With the gang fully closed, the pointer should be in line with the last mark on the extreme left-hand side of the dial scale. Should it be necessary, the dial scale may be moved by loosening the screw above each pilot light and sliding the entire dial scale assembly until pointer is in proper position. If this cannot be accomplished, the pointer must be reset on the dial cord. Do not attempt to calibrate the dial by above procedure, which is solely for mechanical alignment of pointer travel to scale.
3. Connect the AM signal generator through a 270 ohm resistor to the antenna terminals of the receiver, making sure the signal is fed to the ungrounded conductor of the 300 ohm transmission line.
4. Connect the electronic voltmeter between pin 2 of V-12 (6T8) and chassis.
5. With the signal generator and the dial both set at 90 mc, increase the generator output until an AVC voltage increase of about 2 volts is obtained. Adjust C-140 and the antenna trimmers across L-64 and L-63, respectively, for maximum voltage, using an insulated alignment wrench (Motorola Part Number 66A471864) for these adjustments.
6. With the signal generator and the dial set at 105 mc, adjust the oscillator, L-65; RF, L-64; and antenna, L-63, cores for maximum.
7. Repeat steps 5 and 6 several times until the oscillator tracks with the dial calibration and until no further increase in output is obtained.
8. The overall sensitivity of the FM section of this receiver is normal if a signal of 15 microvolts or less will give an AVC voltage increase of 3 volts, across the FM band.

#### AM ALIGNMENT

1. Turn the Telev-Radio switch to the AM position.
2. Check the setting of the dial pointer, as in step 2 of the FM Tuner Alignment.
3. Connect the low frequency signal generator, with 30% modulation at 400 cycles, to the grid of the AM converter, V-3 (6BE6, pin 7) through a .1 mfd capacitor.
4. For an indicator, use a standard output meter across the voice coil, or connect the electronic voltmeter to the junction of R-41, and R-51, both 2.2 megohms, where the AM AVC voltage is developed.
5. With the generator set at 455 Kc, adjust the primary and secondary of T-6 and T-17 for maximum.
6. Connect the signal generator to the antenna terminal strip through a 200 mmf capacitor.
7. With the generator set at 455 Kc, and the receiver tuned to 600 Kc, adjust trap C-123 for minimum.
8. With the generator and dial set at 1450 Kc, adjust the oscillator trimmer, C-127, for maximum.
9. With the generator and dial set at 1400 Kc, adjust the antenna trimmer, C-126 for maximum.
10. The overall sensitivity of the AM section of this receiver is normal if 150 microvolts or less produces 1.2 volts across the voice coil, across the AM band.

#### TELEVISION RF ALIGNMENT PROCEDURE

The locations of the various adjustments are given in Figure 8. It will be noted that the oscillator adjustments are arranged in a counterclockwise sequence on the front side of the chassis, starting with the #2 channel as the first adjustment at the top.

The RF amplifier adjustments are located in a similar sequence, starting at the top of the chassis and going around to the bottom. Both coils for each channel are placed together and then apart, alternately, in the channel sequence.

The antenna trimmers are also located in a counterclockwise manner, starting at the top of the chassis with #2 channel and going around to below the chassis.

#### Television Frequency Channels

Channel	Freq. Band Mc	Picture Carrier	Sound Carrier	Receiver Oscillator	Channel	Freq. Band Mc	Picture Carrier	Sound Carrier	Receiver Oscillator
2	54-60	55.25	59.75	81.45	8	180-186	181.25	185.75	207.45
3	60-66	61.25	65.75	87.45	9	186-192	187.25	191.75	213.45
4	66-72	67.25	71.75	93.45	10	192-198	193.25	197.75	219.45
5	76-82	77.25	81.75	103.45	11	198-204	199.25	203.75	225.45
6	82-88	83.25	87.75	109.45	12	204-210	205.25	209.75	231.45
7	174-180	175.25	179.75	201.45	13	210-216	211.25	215.75	237.45



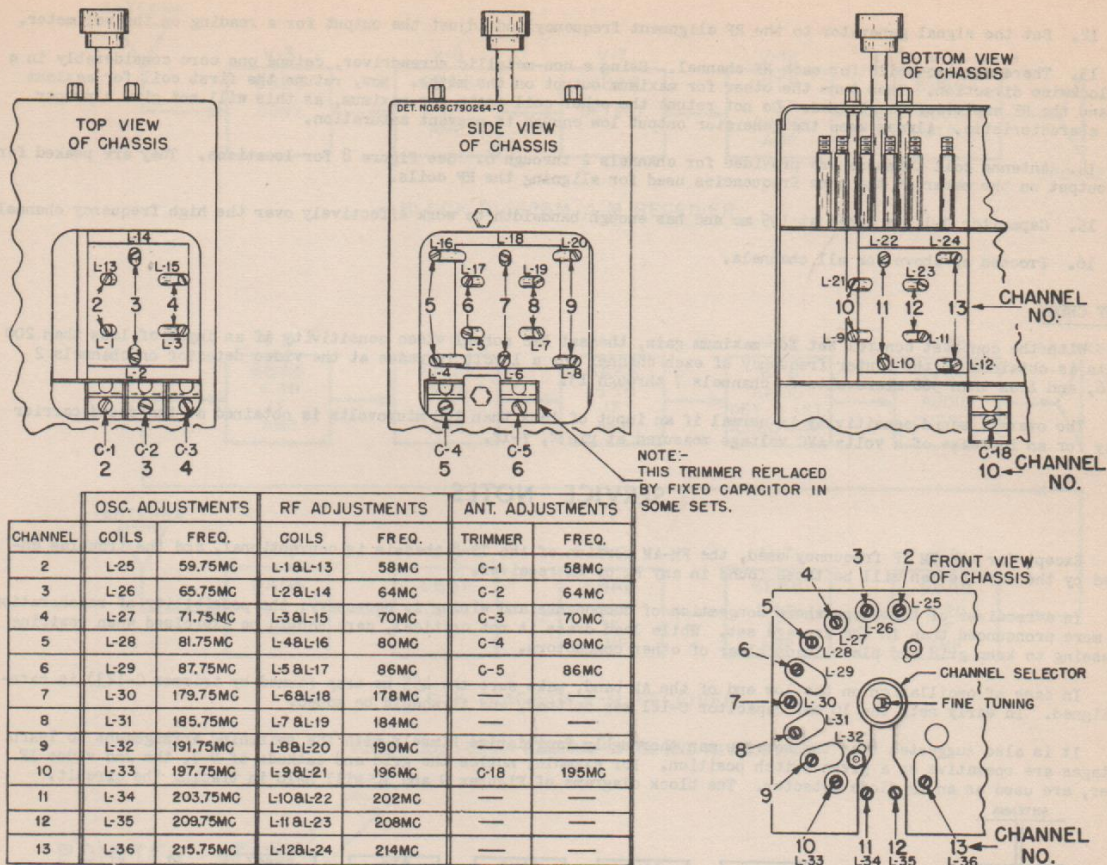


FIGURE 8. OSCILLATOR, R.F., AND ANTENNA ADJUSTMENT LOCATIONS

Procedure:

1. Turn the Telev-Radio switch to the Television position.
2. Connect the signal generator output cable to the antenna terminals of the receiver. Match the generator to the 300 ohm input impedance of the receiver, using a 100 ohm resistor in series with the output terminal of the generator cable and a 150 ohm resistor in series with the ground terminal. This arrangement is for a 50 ohm generator. If the generator impedance is 30 ohms, use a 120 ohm resistor on the output terminal and 150 ohms in series with the ground terminal.
3. Set the contrast control to -5 volts bias. (Measured from arm of contrast control to chassis).
4. When aligning the oscillator, connect DC probe of the electronic voltmeter to the junction of R-24 (22K) and the black shielded audio lead, and connect the ground lead of the voltmeter to the junction of R-26 (10K) and R-27 (10K).
5. Turn the channel switch to the channel to be aligned.
6. Set the fine tuning capacitor C-10, to half-capacity position.
7. Set the signal generator at the sound carrier frequency of the channel (see above chart) and adjust the signal generator output until a voltage reading is obtained on the electronic voltmeter.
8. Locate the oscillator tuning adjustment belonging to the channel being aligned. See Figure 8. With a non-metallic screwdriver, adjust the oscillator frequency until the meter reading is zero. The meter reading will change rapidly from one polarity, through zero, to the opposite polarity as the oscillator frequency is adjusted to produce the correct sound IF of 21.7 mc.
9. Proceed as above for each channel; and, if the fine frequency trimmer is left in the same position for each channel when the oscillator adjustments are made, very little retuning of the fine tuning control will be required in changing from one television station to the next.
10. With the oscillator correctly set, the next step is the alignment of the RF amplifier. The RF coils for all channels and the antenna trimmers for the first five channels are aligned at a frequency 1 mc higher than the center frequency of the channel under test; that is, 4 mc above the lower channel limit, or 2 mc below the upper limit. See chart above for channels and Figure 8 for alignment locations and frequencies.
11. Connect electronic voltmeter across the video detector load resistor R-61.

12. Set the signal generator to the RF alignment frequency and adjust the output for a reading on the voltmeter.
13. There are two coils for each RF channel. Using a non-metallic screwdriver, detune one core considerably in a counterclockwise direction. Then tune the other for maximum output on the meter. Now, retune the first coil for maximum output, and the RF amplifier is aligned. Do not retune the other coil again for maximum, as this will not give a proper bandpass characteristic. Always keep the generator output low enough to prevent saturation.
14. Antenna coil trimmers are provided for channels 2 through 6. See Figure 8 for locations. They are peaked for maximum output on the meter at the same frequencies used for aligning the RF coils.
15. Capacitor C-11 is tuned at 195 mc and has enough bandwidth to work effectively over the high frequency channels.
16. Proceed as above for all channels.

#### ALIGNMENT CHECK

With the contrast control set for maximum gain, the set has normal video sensitivity if an input of less than 200 microvolts is obtained at the center frequency of each channel for a 1 volt increase at the video detector on channels 2 through 6, and less than 300 microvolts on channels 7 through 13.

The overall sound sensitivity is normal if an input of less than 100 microvolts is obtained at the sound carrier frequency for an increase of 4 volts AVC voltage measured at pin 2, V-12.

### SERVICE NOTES

Except for the FM IF frequency used, the FM-AM portion of the TS-8 chassis is conventional, and the troubles encountered by the service man will be those found in any FM or AM receiver.

In a receiver of this type where congestion of components and wiring is necessary, the possibility of regeneration is much more pronounced than in the average set. While lead dress is not critical, care should be exercised when rewiring or redressing to keep grid and plate leads clear of other conductors.

In case of oscillation on the low end of the AM band, make sure the 455 kc trap (tuned by trimmer C-123) is carefully aligned. In early sets the 10 mmf capacitor C-121 was omitted, and it should be added.

It is also suggested that the service man thoroughly familiarize himself with the switching arrangement to learn which stages are operative on a given switch position. For example, notice the grid and cathode of V-7, the 2nd video IF amplifier, are used as an AM diode detector. The block diagrams of Figures 9 and 10 will help in tracing the circuit.

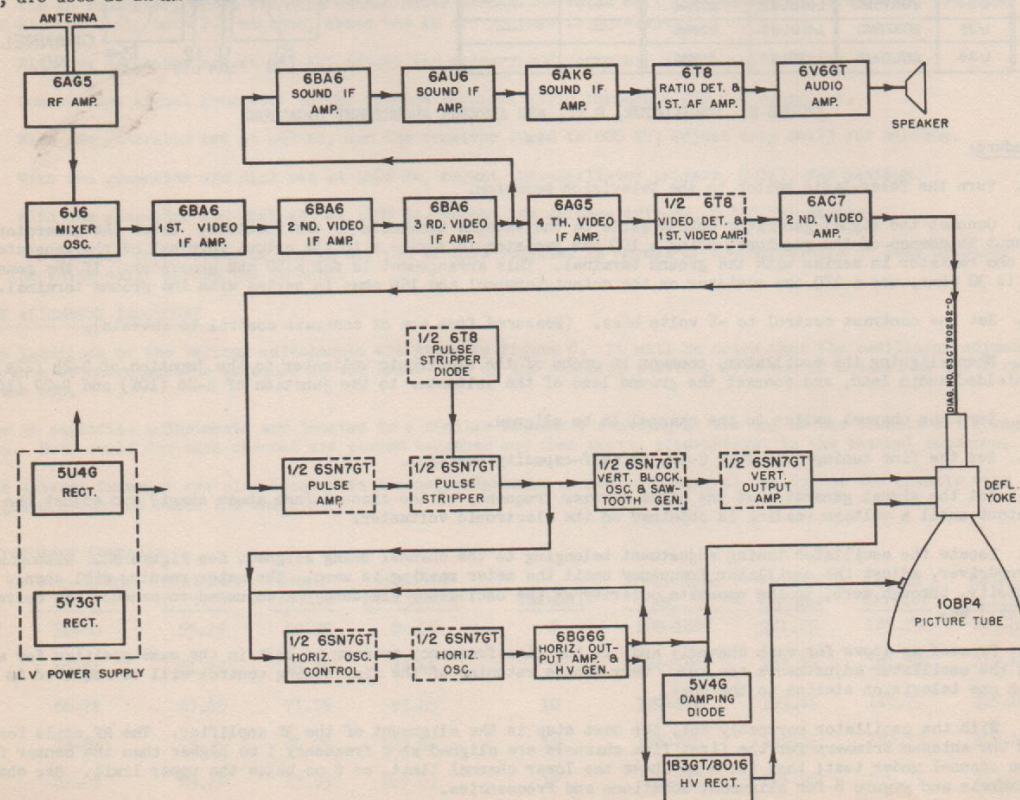
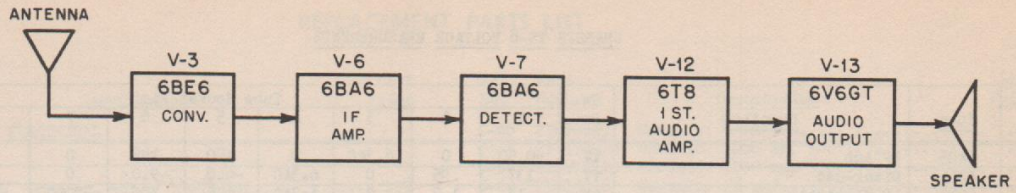
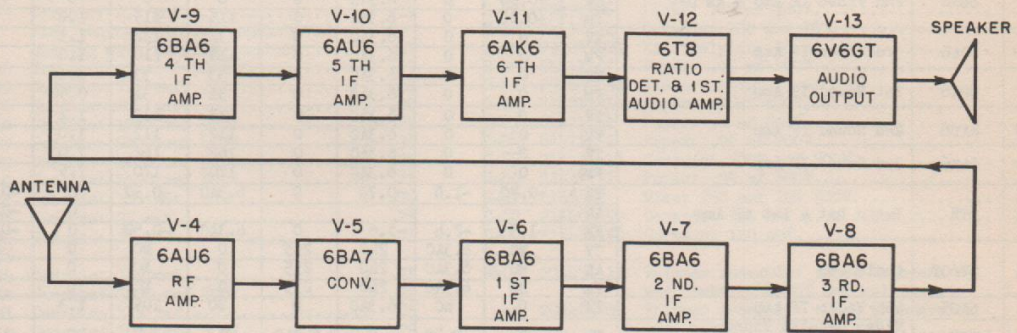


FIGURE 9. BLOCK DIAGRAM OF TELEVISION RECEIVER



BLOCK DIAGRAM A-M RECEIVER



BLOCK DIAGRAM F-M RECEIVER

FIGURE 10. BLOCK DIAGRAMS OF AM AND FM RECEIVERS

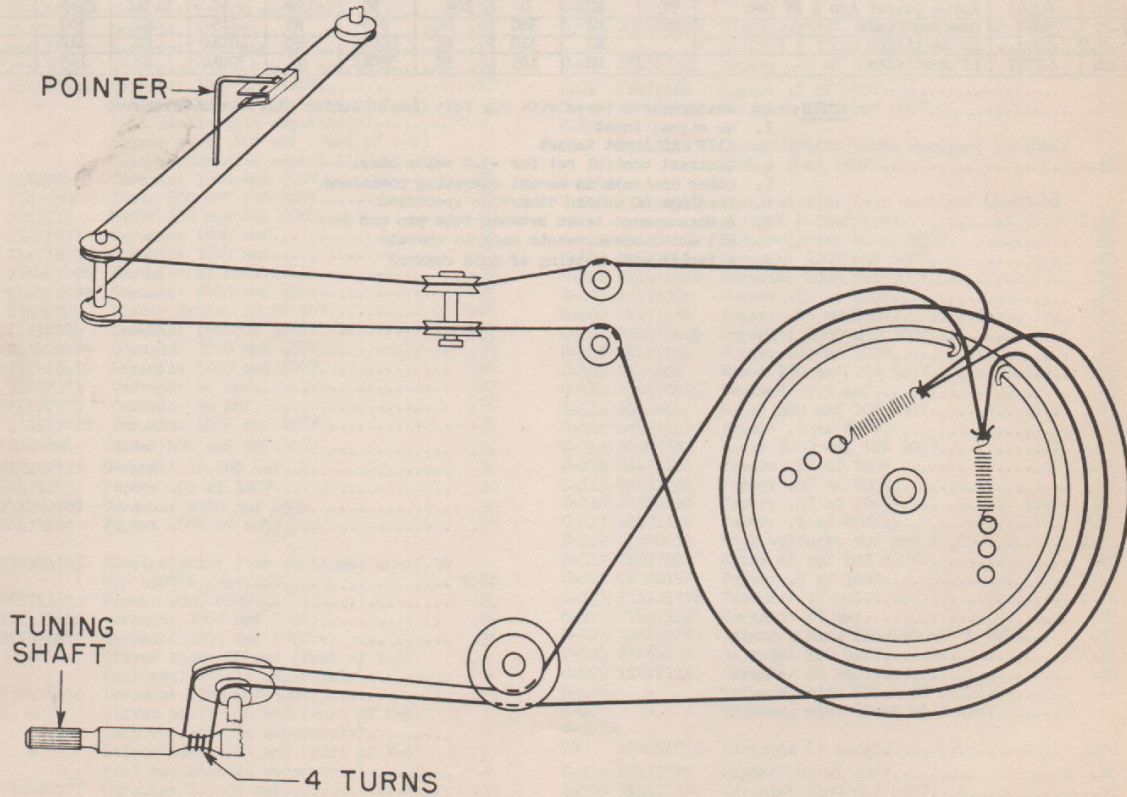


FIGURE 11. TUNER DRIVE AND POINTER RESTRINGING DIAGRAM

CHASSIS TS-8 VOLTAGE MEASUREMENTS

Ref. No.	Tube	Function	Sw. Pos.	Tube Socket Pin									
				1	2	3	4	5	6	7	8	9	
V-1	6AG5	RF Amp	TV	-0.50	0	6.3AC	0	150	105	0			
V-2	6J6	Mixer-Osc	TV	137	95	0	6.3AC	-6.0	-9.0	0			
V-3	6BE6	AM Converter	AM	-12	1.3	0	6.3AC	125	105	-0.50			
V-4	6AU6	FM RF Amp	FM	0	0	0	6.3AC	113	107	1			
V-5	6BA7	FM Converter	FM	105	-5.0	0	6.3AC	0	0	0	0	110	
V-6	69A6	1st Video IF Amp	TV	-3.0	0	6.3AC	0	133	133	0.80			
			AM	-4.0	0	6.3AC	0	110	130	1.0			
			FM	-1.0	0	6.3AC	0	95	110	0.80			
V-7	6BA6	2nd Video IF Amp & AM Det	TV	-3.0	0	6.3AC	0	130	130	0.90			
			AM	-0.80	0	6.3AC	0	0	0	0			
			FM	-0.80	0	6.3AC	0	115	115	1.0			
V-8	6BA6	3rd Video IF Amp	TV	0	0	6.3AC	0	132	132	1.3			
			FM	0	0	6.3AC	0	110	110	1.0			
V-9	6BA6	1st Sound IF Amp	TV	0	0	6.3AC	0	33	33	0.60			
			FM	0	0	6.3AC	0	31	31	0.50			
V-10	6AU6	2nd Sound IF Amp	TV	0	0	6.3AC	0	133	133	1.2			
			FM	0	0	6.3AC	0	112	112	1.0			
V-11	6AK6	3rd Sound IF Amp	TV	0	0	6.3AC	0	162	162	7.0			
			FM	0	0	6.3AC	0	170	170	7.5			
V-12	6T8	Ratio Det & 1st AF Amp	TV	-0.70	-1.0	-0.70	0	6.3AC	-0.50	0	-0.50	59	
			AM						0	0	-0.50	59	
			FM	-1.5	-2.4	-1.6	0	6.3AC	-0.50	0	-0.50	59	
V-13	6V6GT	Audio Amp	TV	NC	6.3AC	240	255	0	NC	0	12		
			AM	NC	6.3AC	240	255	0	NC	0	12		
			FM	NC	6.3AC	240	255	0	NC	0	12		
V-14	6AG5	4th Video IF Amp	TV	0	NC	6.3AC	0	80	105	1.3			
V-15	6T8	Video Det-1st Video Amp & Pulse Stripper	TV	0	-0.50	0	6.3AC	0	-3.0	0	-1.0	130	
V-16	6AC7	2nd Video Amp	TV	0	0	0	-1.0	0.70	150	6.3AC	243		
V-17	6SN7GT	Pulse Amp & Stripper	TV	-0.60#	66#	0#	-3.0	180	5.0	0	6.3AC		
V-18	6SN7GT	Vert Blkg Osc	TV	1.0##	325##	13##	-42##	130##	0#	0	6.3AC		
V-19	6SN7GT	Horiz Osc & Horiz Osc Control	TV	-7.5##	90##	4.0##	-67#	167#	0#	0	6.3AC		
V-20	6BG6G	Horiz Output Amp & HV Gen	TV	NC	0	10#	NC	-10#	NC	6.3AC	255#		
V-22	5V4G	Damping Diode	TV	NC	360	NC	265	NC	265	NC	360		
V-24	5U4G	LV Rectifier		NC	310	NC	400AC	NC	400AC	NC	310		
V-25	5Y3GT	LV Rectifier		NC	165	NC	300AC	NC	300AC	NC	165		

- NOTES:
1. Measurements taken with RCA Volt Ohmyst Junior Electronic Voltmeter
  2. No signal input
  3. 117V AC input to set
  4. Contrast control set for -3.0 volts bias
  5. Other controls in normal operating positions
  6. Readings DC unless otherwise specified
  7. # Measurement taken between tube pin and B-
  8. All other measurements made to chassis
  9. \* Varies with setting of hold control

## REPLACEMENT PARTS LIST

Ref. No.	Part Number	Description	List Price	Ref. No.	Part Number	Description	List Price
<b>CHASSIS PARTS - ELECTRICAL</b>							
<b>Capacitors</b>							
C-1	20K470384	Trimmer, mica: 35-55 mmf.....	.25	C-66	21K86819	Ceramic: 5 mmf.....	.30
C-2	20A470148	Trimmer, mica: 6-30 mmf.....	.25	C-67	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-3	20A470148	Trimmer, mica: 6-30 mmf.....	.25	C-68	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-4	20A18355	Trimmer, mica: 1.25-15 mmf.....	.25	C-69	21K28816	Ceramic: 25 mmf.....	.20
C-5	21A489052	Ceramic: 3.3 mmf.....	.15	C-70	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-6	21R2736	Mica: 15 mmf 10% 500V.....	.20	C-71	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-7	21R2736	Mica: 15 mmf 10% 500V.....	.20	C-72	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-8	21K489053	Ceramic: 2.2 mmf.....	.15	C-73	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-9	21K489053	Ceramic: 2.2 mmf.....	.15	C-74	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-10	1K485422	Fine tuning trimmer: consists of bushing with bakelite washer.....	.45	C-75	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-11	20A470148	Trimmer, mica: 6-30 mmf.....	.25	C-76	21A101778	Ceramic: 10 mmf.....	.25
C-12	21C470735	Ceramic: 7.5 mmf.....	.25	C-77	8K471166	Paper: .05 mf 100V.....	.20
C-13	21K470736	Ceramic: 100 mmf.....	.20	C-78	21K38224	Ceramic: 100 mmf 10%.....	.25
C-14	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-79	23K489031	Electrolytic: 10 mf 450V.....	.75
C-15	21A470789	Ceramic: 5000 mmf 450V.....	.30	C-80	8K471167	Paper: .05 mf 400V.....	.20
C-16	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-81	23K489031	Electrolytic: 10 mf 450V.....	.75
C-17	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-82	8A471151	Paper: .05mf 600V.....	.25
C-18	21K470736	Ceramic: 100 mmf.....	.20	C-83	8A471149	Paper: .1 mf 600V.....	.35
C-19	21A470738	Ceramic: 25 mmf.....	.25	C-84	8A471356	Paper: .25 mf 200V.....	.35
C-20	21A470738	Ceramic: 25 mmf.....	.25	C-85	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-21	21K482296	Ceramic: 1.5 mmf.....	.25	C-86	8A471151	Paper: .05 mf 600V.....	.25
or	21K489054	Ceramic: 1000 mmf 500V.....	.25	C-87	21R6662	Mica: 250 mmf 10% 500V.....	.25
C-22	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-88	21K484150	Ceramic: 120 mmf.....	.20
C-23	21A780121	Ceramic: 1.5 mmf.....	.35	C-89	21K484150	Ceramic: 120 mmf.....	.20
C-24	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-90A,			
C-25	21A470738	Ceramic: 25 mmf.....	.25	B&C	20A484112	Trimmer assembly: three trimmers on mtg. brkt. (40-245 mmf ea).....	1.00
C-26	21A470738	Ceramic: 25 mmf.....	.25	or	20K484805	Trimmer assembly: three trimmers on mtg. brkt.....	1.00
C-27	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-91	21R6664	Mica: 400 mmf 10% 500V.....	.25
C-28	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-92	8K780005	Paper: .002 mf 400V.....	.20
C-29	21K470323	Molded: 15 mmf.....	.25	C-93	8K780006	Paper: .005 mf 200V.....	.20
C-30	21K482726	Ceramic: 10,000 mmf 450V.....	.30	C-94	8K780006	Paper: .005 mf 200V.....	.20
C-31	21K77373	Ceramic: 50 mmf.....	.20	C-95	21R6567	Mica: 5000 mmf 10% 500V.....	.65
C-32	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-96A,			
C-33	19A470426	Variable, air: 2.5-30 mmf.....	.50	B, C&D	23A484196	Electrolytic: four section; 40-10-10 mf/450V & 250mf/25V.....	2.30
C-34	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-97	8K484148	Paper: .25 mf 400V.....	.45
C-35	-	Silver mica: 50 mmf (Part of T-2) (not replaceable separately).....	-	C-98	8K471169	Paper: .1 mf 400V.....	.25
C-36	-	Silver mica: 100 mmf (Part of T-2) (not replaceable separately).....	-	C-99	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-37	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-100A,			
C-38	21R6590	Mica: 500 mmf 20% 500V.....	.25	B&C	23A484197	Electrolytic: three section; 40-40mf/ 450V & 40mf/150V.....	2.25
C-39	21R2717	Mica: 150 mmf 10% 500V.....	.25	C-101A,			
C-40	21A77633	Ceramic: 1500 mmf.....	.25	B, C&D	23A484194	Electrolytic: four section; 40-40-40 mf/300V & 20mf/150V.....	2.30
C-41	21A77633	Ceramic: 1500 mmf.....	.25	C-102	23A485454	Electrolytic: 40 mf 150V.....	.85
C-42	21K489096	Ceramic: 47 mmf.....	.30	C-103	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-43	21A470789	Ceramic: 5000 mmf 450V.....	.30	C-104	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-44	23A90205	Electrolytic: 10 mf 50V.....	.45	C-105	8A471356	Paper: .25 mf 200V.....	.35
C-45	21K38224	Ceramic: 100 mmf 10%.....	.25	C-106	8K471166	Paper: .05 mf 100V.....	.20
C-46	21A470789	Ceramic: 5000 mmf 450V.....	.30	C-107	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-47	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-108	8K471164	Paper: .02 mf 100V.....	.20
C-48	21K77373	Ceramic: 50 mmf.....	.20	C-109	21R6662	Mica: 250 mmf 10% 500V.....	.25
C-49	21K77373	Ceramic: 50 mmf.....	.20	C-110	21C470735	Ceramic: 7.5 mmf.....	.25
C-50	21A470789	Ceramic: 5000 mmf 450V.....	.30	C-111	21R6664	Mica: 400 mmf 10% 500V.....	.25
C-51	21R6664	Mica: 400 mmf 10% 500V.....	.25	C-112	8A471149	Paper: .1 mf 600V.....	.35
C-52	21K482726	Ceramic: 10,000 mmf.....	.30	C-113	21R6568	Mica: 2000 mmf 10% 500V.....	.45
C-53	8K471163	Paper: .01 mf 100V.....	.20	C-114	8A471356	Paper: .25 mf 200V.....	.35
C-54	21A470789	Ceramic: 5000 mmf 450V.....	.30	C-115	8A471151	Paper: .05 mf 600V.....	.25
C-55	8K471162	Paper: .005 mf 600V.....	.20	C-116	8K780430	Paper: .03 mf 1000V.....	.25
C-56A,				C-117	8A471149	Paper: .1 mf 600V.....	.35
B, C&D	23A484195	Electrolytic: four sections; 40-15-10 mf/450V & 25mf/25V.....	1.85	C-118	21A90013	High voltage: 500 mmf 10,000V.....	1.55
C-57	8K471162	Paper: .005 600V.....	.20	C-119	21R2740	Mica: 68 mmf 10% 800V.....	.25
C-58	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-120	8K780158	Paper: .5 mf 100V.....	.45
C-59	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-121	21A101778	Ceramic: 10 mmf.....	.25
C-60	-	Silver mica: 50 mmf (Part of T-5) (not replaceable separately).....	-	C-122	21K471128	Ceramic: 68 mmf.....	.25
C-61	21K478410	Ceramic: 1000 mmf 500V.....	.25	C-123	20A482283	Trimmer, mica (16-160mmf) & brkt.....	.35
C-62	-	Silver mica: 100 mmf (Part of T-5) (not replaceable separately).....	-	C-124	21K554876	Ceramic: 150 mmf.....	.20
C-63	-	Silver mica: 250 mmf (Part of T-6) (not replaceable separately).....	-	C-125	21K77115	Ceramic: 10 mmf.....	.20
C-64	21K482726	Ceramic: 10,000 mmf.....	.30	C-126	-	Trimmer, mica (Part of C-128).....	-
C-65	-	Silver mica: 250 mmf (Part of T-6) (not replaceable separately).....	-	C-127	-	Trimmer, mica (Part of C-128).....	-
				C-128A			
				&B	19B481816	Variable (2 gang).....	3.20
				C-129	8K471165	Paper: .03 mf 400V.....	.20
				C-130	21A470789	Ceramic: 5000 mmf 450V.....	.30
				C-131	-	Silver mica: 100 mmf (Part of T-17) (not replaceable separately).....	-

Ref. No.	Part Number	Description	List Price
C-132	21A470789	Ceramic: 5000 mmf 450V.....	.30
C-133	-	Silver mica: 100 mmf (Part of T-17) (not replaceable separately).....	-
C-134	8K471165	Paper: .03 mf 400V.....	.20
C-135	21K77268	Molded: 3.3 mmf.....	.10
C-136	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-137	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-138	21A470789	Ceramic: 5000 mmf 450V.....	.30
C-139	21K28816	Ceramic: 25 mmf.....	.20
C-140	19A470426	Variable, air: 2.5-30mmf.....	.50
C-141	21C470735	Ceramic: 7.5 mmf $\pm$ 10% negative temp. comp.....	.25
C-142	21K55003	Ceramic: 50 mmf.....	.25
C-143	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-144	-	Silver mica: 38 mmf (Part of T-18) (not replaceable separately).....	-
C-145	21A470789	Ceramic: 5000 mmf 450V.....	.30
C-146	21K478410	Ceramic: 1000 mmf 500V.....	.25
C-147	-	Silver mica: 88 mmf (Part of T-18) (not replaceable separately).....	-
C-148	21A101774	Ceramic: 10 mmf.....	.25
CR-1	21A473040	Capacitor-Resistor (3 leads); 47,000 ohms 100 mmf 100 mmf.....	.40
<b>Rectifier</b>			
E-1	48A90173	Crystal, 1N34 Germanium.....	1.75
<b>Ion Trap</b>			
	24A489077 or 24A780604	Ion Trap.....	2.35 1.75
<b>Fuse</b>			
F-1	65K474899	Fuse: 1/8 amp; 250V; type 3AG; tubular glass.....	.15
<b>Dial Lights</b>			
I-1,2 & 3	65X4151	Bulb: 6-8V; .15 amp; round; bayonet; clear; #47 (dial lights).....	.15
<b>Coils</b>			
L-1 to 36	INCL.	Part of tuner assembly TT-4. In case of trouble, return complete tuner to factory for exchange	
L-37	24A90064	Coil, filament choke.....	.15
L-38	24K780152	Coil, sound trap tuning: with core and clip.....	.60
L-39	24B780349	Coil, IF sound (wound on 1 meg resistor).....	.35
L-40	24A780127	Coil, RF choke: 1 ph.....	.20
L-41	24B780394	Coil, Video (Mixer IF) with core and clip.....	.80
L-42	24A90064	Coil, filament choke.....	.15
L-43	24A780127	Coil, RF choke: 1 ph.....	.20
L-44	24A90064	Coil, filament choke.....	.15
L-45	24A780127	Coil, RF choke: 1 ph.....	.20
L-46	24A780127	Coil, RF choke: 1 ph.....	.20
L-47	24K780386	Coil, compensating: blue dot (with 1 meg resistor).....	.50
L-48	24K780402	Coil, trap: 4.5 mc: with clip & core.....	.60
L-49	24K780385	Coil, compensating: green dot (with 1 meg resistor).....	.50
L-50	24K780387	Coil, compensating: yellow dot (with 1 meg resistor).....	.50
L-51	24K780389	Coil, compensating: white dot (with 12K resistor).....	.50
L-52	24K780388	Coil, compensating: orange dot (with 1 meg resistor).....	.50
L-53A, B, & C	D 24K485475 or 24K485474 or 24K485476	Coil, deflection yoke: complete.....	9.00
L-54	24B485467	Coil, focus.....	9.00
L-55	24B780356	Coil, horizontal oscillator: complete with iron core; less shield can.....	2.00
L-56	24B470796	Coil, horizontal linearity: complete with iron core & clip.....	.95

Ref. No.	Part Number	Description	List Price
L-57	24B96119	Coil, horizontal size: complete with iron core & clip.....	.95
L-58	24A489036	Coil, wave trap.....	.65
L-59	24A484025	Coil, RF choke.....	.20
L-60	24A484025	Coil, RF choke.....	.20
L-61	24A74989	Coil, filament choke.....	.10
L-62	24A74989	Coil, filament choke.....	.10
L-63	24C484564	Inductor, VHF & capacitor (includes trimmer).....	2.00
L-64	24K780024	Inductor, VHF & capacitor (includes trimmer).....	2.00
L-65	24K489048	Inductor, VHF & capacitor.....	2.00
L-66	24A780127	Coil, RF choke: 1 mh.....	.20

**Speaker**

LS-1	50C780041 or 50C489187	Speaker: 10" electrodynamic; 3.2 ohm VC; 100 ohm (hot) field.....	7.90 Exch 5.90
------	---------------------------	---	-------------------

**Resistors**

NOTE: All resistors are insulated carbon type unless otherwise specified.

R-1	6R6270	220 10% 1/2W.....	Doz 1.00
R-2	6R5554	390 10% 1/2W.....	Doz 1.00
R-3	6R6377	470,000 10% 1/2W.....	Doz 1.00
R-4	6R6229	1000 10% 1/2W.....	Doz 1.00
R-5	6R6378	100,000 10% 1/2W.....	Doz 1.00
R-6	6R5575	82,000 10% 1W.....	ea .15 Doz 1.45
R-7	6R476014	18,000 10% 2W.....	Doz .20
R-8	6R6377	470,000 10% 1/2W.....	Doz 1.00
R-9	6R6377	470,000 10% 1/2W.....	Doz 1.00
R-10	6R6056	47,000 20% 1/2W.....	Doz 1.00
R-11	6R2119	15,000 20% 1/2W.....	Doz 1.00
R-12	6R5610	8,200 10% 1W.....	ea .15 Doz 1.45
R-13	6R6301	1000 20% 1/2W.....	Doz 1.00
R-14	6R2119	15,000 20% 1/2W.....	Doz 1.00
R-15	6R6229	1000 10% 1/2W.....	Doz 1.00
R-16	6R2004	8,200 10% 1/2W.....	Doz 1.00
R-17	6R3933	220 20% 1/2W.....	Doz 1.00
R-18	6R6056	47,000 20% 1/2W.....	Doz 1.00
R-19	6R6410	33,000 10% 1/2W.....	Doz 1.00
R-20	6R6018	100 20% 1/2W.....	Doz 1.00
R-21	6R6090	470 10% 1/2W.....	Doz 1.00
R-22	6R5671	4700 10% 2W.....	.20
R-23	6R6039	4700 20% 1/2W.....	Doz 1.00
R-24	6R6397	22,000 10% 1/2W.....	Doz 1.00
R-25	6R6056	47,000 20% 1/2W.....	Doz 1.00
R-26	6R6320	10,000 10% 1/2W.....	Doz 1.00
R-27	6R6320	10,000 10% 1/2W.....	Doz 1.00
R-28	6R6080	4700 10% 1/2W.....	Doz 1.00
R-29	6R6377	470,000 10% 1/2W.....	Doz 1.00
R-30	6R2109	10 meg 20% 1/2W.....	Doz 1.00
R-31	18K489005	Potentiometer, dual: R-31A Vol. 1 meg & R-31B Tone - 1 meg.....	2.25
R-32	6R6039	4700 20% 1/2W.....	Doz 1.00
R-33	6R6410	33,000 10% 1/2W.....	Doz 1.00
R-34	6R6004	1 meg 20% 1/2W.....	doz 1.00
R-35	6R5656	12,000 10% 1W.....	each .15 doz 1.45
R-36	6R6377	470,000 10% 1/2W.....	doz 1.00
R-37	6R476116	270 10% 2W.....	.20
R-38	6R6004	1 meg 20% 1/2W.....	doz 1.00
R-39	6R6007	68 20% 1/2W.....	doz 1.00
R-40	6R6290	2200 20% 1/2W.....	doz 1.00
R-41	6R6433	2.2 meg 10% 1/2W.....	doz 1.00
R-42	6R6031	100,000 10% 1/2W.....	doz 1.00
R-43	6R6004	1 meg 20% 1/2W.....	doz 1.00
R-44	6R6397	22,000 10% 1/2W.....	doz 1.00
R-45	6R6229	1000 10% 1/2W.....	doz 1.00
R-46	6R6007	68 20% 1/2W.....	doz 1.00
R-47	6R6397	22,000 10% 1/2W.....	doz 1.00
R-48	6R6007	68 20% 1/2W.....	doz 1.00
R-49	6R5581	3300 10% 1/2W.....	doz 1.00
R-50	6R6004	1 meg 20% 1/2W.....	doz 1.00
R-51	6R6433	2.2 meg 10% 1/2W.....	doz 1.00
R-52	6R6031	100,000 10% 1/2W.....	doz 1.00

Ref. No.	Part Number	Description	List Price
R-53	6R3933	220 20% 1/2W	doz 1.00
R-54	6R6080	4700 10% 1/2W	doz 1.00
R-55	6R6039	4700 20% 1/2W	doz 1.00
R-56	6R6320	10,000 10% 1/2W	doz 1.00
R-57	6R6377	470,000 10% 1/2W	doz 1.00
R-58	6R6320	10,000 10% 1/2W	doz 1.00
R-59	-	See L-47	-
R-60	-	See L-44	-
R-61	6R2089	1800 10% 1/2W	doz 1.00
R-62	-	See L-50	-
R-63	6R2089	1800 10% 1/2W	doz 1.00
R-64	6R5631	120,000 10% 1/2W	doz 1.00
R-65	6R6229	1000 10% 1/2W	doz 1.00
R-66	6R5697	560,000 10% 1/2W	doz 1.00
R-67	6R2085	39 10% 1/2W	doz 1.00
R-68	6R6056	47,000 20% 1/2W	doz 1.00
R-69	-	See L-51	-
R-70	6R5687	2200 10% 2W	doz .20
R-71	-	See L-52	-
R-72	6R6327	1000 10% 1W	each .15 doz 1.45
R-73	6R6039	4700 20% 1/2W	doz 1.00
R-74	6R6377	470,000 10% 1/2W	doz 1.00
R-75	6R6004	1 meg 20% 1/2W	doz 1.00
R-76	6R6031	100,000 10% 1/2W	doz 1.00
R-77	6R6398	150,000 10% 1/2W	doz 1.00
R-78	18A484072	Potentiometer, dual: R-78A Brightness-100,000 - R-78B Contrast 10,000	1.80
R-79	6R6031	100,000 10% 1/2W	doz 1.00
R-80	6R5768	33,000 10% 2W	doz .20
R-81	6R6428	6800 10% 1/2W	doz 1.00
R-82	6R2118	3.3 meg 20% 1/2W	doz 1.00
R-83	6R6397	22,000 10% 1/2W	doz 1.00
R-84	6R2004	8200 10% 1/2W	doz 1.00
R-85	6R6428	6800 10% 1/2W	doz 1.00
R-86	6R6377	470,000 10% 1/2W	doz 1.00
R-87	6R6004	1 meg 20% 1/2W	doz 1.00
R-88	6R2118	3.3 meg 20% 1/2W	doz 1.00
R-89	18A484073	Potentiometer, dual: R-89A-Vert Hold, 1 meg: R-89B Hor. Hold-30,000	1.75
R-90	6R6291	560 10% 1/2W	doz 1.00
R-91	18A484800	Potentiometer, 5000 (Vert. Linearity)	.80
R-92	6R2118	3.3 meg 20% 1/2W	doz 1.00
R-93	6R5581	3300 10% 1/2W	doz 1.00
R-94	6R6407	220,000 10% 1/2W	doz 1.00
R-95	18A484199	Potentiometer, 2 meg (Vert Size)	.80
R-96	6R3966	1.5 meg 20% 1/2W	doz 1.00
R-97	6R6327	1000 10% 1W	each .15 doz 1.45
R-98	6R488144	10 20% 2W	doz .20
R-99	6R476116	270 10% 2W	doz .20
R-100	6R476116	270 10% 2W	doz .20
R-101	6R488036	560 10% 2W	doz .20
R-102	18K780354	Potentiometer: 1000 (Focus control)	1.95
R-103	17K780343	Wire wound: 1000	.55
R-104	6R6254	330 10% 1W	each .15 doz 1.45
R-105	17A485413	Wire wound: 9500 25W; tapped	1.35
R-106	6R6290	2200 20% 1/2W	doz 1.00
R-107	6R3964	1800 10% 2W	doz .20
R-108	6R476012	3900 10% 2W	doz .20
R-109	6R476012	3900 10% 2W	doz .20
R-110	6A489166	Special: negative temp. compensating; 33,000 at 25° C	.35
R-111	6R6378	56,000 10% 1/2W	doz 1.00
R-112	6R2004	8200 10% 1/2W	doz 1.00
R-113	6R5697	560,000 10% 1/2W	doz 1.00
R-114	6R6444	180,000 10% 1/2W	doz 1.00
R-115	6R6031	100,000 10% 1/2W	doz 1.00
R-116	6R6031	100,000 10% 1/2W	doz 1.00
R-117	6R2118	3.3 meg 20% 1/2W	doz 1.00
R-118	6R6054	10,000 20% 1/2W	doz 1.00
R-119	6R6398	150,000 10% 1/2W	doz 1.00
R-120	6R5698	120,000 10% 1W	each .15 doz 1.45
R-121	6R6229	1000 10% 1/2W	doz 1.00
R-122	17K489099	Wire wound: 10,000 25W	1.35
R-123	6R6004	1 meg 20% 1/2W	doz 1.00
R-124	6R2108	47 20% 1/2W	doz 1.00

Ref. No.	Part Number	Description	List Price
R-125	6R5697	560,000 10% 1/2W	doz 1.00
R-126	6R488222	82 10% 2W	doz .20
R-127	6R5732	15,000 10% 2W	doz .20
R-128	17K485412	Wire wound: 3.3 10% 1/2W	.10
R-129	6R2053	820,000 10% 1W	each .15 doz 1.45
R-130	6R6291	560 10% 1/2W	doz 1.00
R-131	6R6291	560 10% 1/2W	doz 1.00
R-132	6R5687	2200 10% 2W	doz .20
R-133	6R6028	22,000 20% 1/2W	doz 1.00
R-134	6R5551	120 10% 1/2W	doz 1.00
R-135	6R6036	3300 20% 1/2W	doz 1.00
R-136	6R6036	3300 20% 1/2W	doz 1.00
R-137	6R6018	100 20% 1/2W	doz 1.00
R-138	6R6036	3300 20% 1/2W	doz 1.00
R-139	6R6028	22,000 20% 1/2W	doz 1.00
R-140	6R6269	820 10% 1/2W	doz 1.00
R-141	6R6301	1000 20% 1/2W	doz 1.00
R-142	6R6075	100,000 20% 1/2W	doz 1.00
R-143	6R6075	100,000 20% 1/2W	doz 1.00
R-144	6R6117	5600 10% 1/2W	doz 1.00
R-145	-	See L-39	-
R-146	6R6018	100 20% 1/2W	doz 1.00
R-147	6R488036	560 10% 2W	doz .20
R-148	6R6016	1 meg 10% 1/2W	doz 1.00
R-149	6R488036	560 10% 2W	doz .20

#### Switches

S-1,2	Channel Switch-Part of TT-4 tuner. It is recommended that entire tuner be returned for exchange if trouble develops in the channel switch.	-
S-6	40C484046 Changeover switch	4.25

#### Transformers

T-1	1X780159	Antenna Transformer: complete with antenna receptacle, brkt & trimmer...	2.75
T-2	24B780319	IF transformer (21.7 Mc): less shield can	2.10
T-3	24B484084	Ratio Detector Transformer (21.7 Mc): less shield can	3.30
T-4	25B489030	Audio Transformer (less bracket)	1.60
T-5	24B780319	IF Transformer (21.7 Mc): less shield can	2.00
T-6	24B489033	IF Transformer (455 Kc): less shield can	1.75
T-7	24K780398	1st Video IF Transformer: with iron core & clip	.75
T-8	24K489071	2nd Video IF Transformer: with iron core & clip	.60
T-9	24B780406	3rd Video IF Transformer & Sound Take-Off: with core, nut & clip	.90
T-10	24K780390	4th Video IF Transformer: with core & clip	.60
T-11	24B485416	Vertical Blocking Oscillator Transformer	2.35
T-12	25K489134	Vertical Output Transformer	5.05
T-13	25C484095	Power Transformer	17.65
T-14	25C90052	Horizontal Output Transformer	10.30
T-15	24B489042	AM Antenna Transformer	1.60
T-16	24B489044	AM Oscillator Transformer	.95
T-17	24B481874	IF Transformer (455 Kc) (less shield can)	1.55
T-18	24B489056	IF Transformer (21.7 Mc) (less shield can)	2.10

#### Chassis Parts - Mechanical

26A780043	Base, tube shield (V-11)	.25
26A473002	Base, tube shield (V-12)	.10
7B489064	Bracket, coil mtg (horiz size & linearity coils)	.35
1X489106	Bracket & Cushions Assembly: front kine-scope support ring; with cushions, speed-nut & clamping screw	3.25
7B470376	Bracket, deflection yoke mtg	2.00
7B484163	Bracket, focus coil mtg	.75
1X470706	Bracket, hi-voltage rectifier tube mounting: complete with socket	.85

Ref. No.	Part Number	Description	List Price	Ref. No.	Part Number	Description	List Price
7B90091		Bracket, picture tube support: wht cad ...	.40	9A489098		Receptacle: 3-prong (phono) .....	.40
1X484049		Bracket & Pulleys Assembly (top chassis)..	.25	9A27674		Receptacle: 3-prong (phono AC) .....	.10
7B485423		Bracket, shipping support (between kinescope support brackets) .....	.20	9A22367		Receptacle, 5-prong (speaker) .....	.15
7A484070		Bracket, switch mtg (changeover switch)...	.10	5S7771		Rivet: .088 x 3/16 stl; pol nkl (7-prong miniature sockets) .....	per/c .50
7C489086		Bracket, tube support (picture tube) .....	.30	5S7774		Rivet: .088 x 1/4 stl; pol nkl (V-12 & V-15) .....	per/c .50
7K485411		Bracket, tuner chassis mtg: terme .....	.05	5S7707		Rivet: .122 x 5/32 stl; pol nkl (soldering lugs) .....	per/c .50
43K484140		Bushing: 15/32; brass or aluminum (FM-AM tuner mtg) .....	.10	5S7701		Rivet: .122 x 3/16 stl; pol nkl (phono receptacle, terminal strips, elect. mtg, etc.) .....	per/c .50
43A484161		Bushing, shaft: brass (switch actuating shaft) .....	.10	5S7700		Rivet: .122 x 1/4 stl; pol nkl .....	per/c .50
1X484841		Cable Assembly, speaker: includes receptacle .....	1.35	5S7704		Rivet: .122 x 11/32 stl; pol nkl (V-21 socket) .....	per/c .50
42B70721		Clip, coil (T-6, T-3) .....	.25	5S2841		Rivet: .143 x 7/16 stl; pol nkl (V-19)doz	.15
42K470074		Clip, coil retainer (horiz linearity, size, IF's) .....	.30	5K13896		Rivet, shoulder: 5/16"; wht nkl (pulley bracket) .....	.15
30A482192		Conductor, shielded: black .....	.10	34C489095		Scale, dial .....	.60
30K489040		Conductor, shielded: blue .....	.10	3S7152		Screw, machine: 6-32 x 1/4 plain hex head; cad pl (hi-volt cap mtg) .....	per/c .50
30M489041		Conductor, shielded: green .....	.10	3S7163		Screw, machine: 8-32 x 1/4 plain hex head; cad pl (horiz output transformer, focus coil mtg brkt & deflection yoke mtg bracket) .....	per/c .50
42K484844		Connector, 2nd anode .....	1.00	3S488240		Screw, machine: 8-32 x 1-1/4; slotted fillister head; cad pl (focus coil)...	doz .15
39K17396		Contact, pin terminal (speaker) .....	.50	3S7467		Screw, sheet metal: #8 x 3/8 PKZ plain hex head; cad pl (vert output transformer) .....	doz .15
11M8944		Cord, dial: 18 lb; black .....	.10	3S7454		Screw, sheet metal: #8 x 1/4 PKZ plain hex head; cad pl (shipping support brkt, picture tube support & coil mtg brkt)per/c	.50
46A780344		Core, iron-ceramic, & screw (horiz size) ..	.45	3S488242		Screw, sheet metal: #8 x 1/4 PKZ plain washer hex head; white cad (tuner tube shield) .....	doz .15
46K471143		Core, iron & screw (horiz linearity).....	.15	3S7530		Screw, sheet metal: #8 x 1-1/2" PKZ plain hex head; wht cad (kinescope support brkt) .....	doz .15
46K471337		Core, iron & screw (L-38, T-3).....	.35	3A470369		Screw, thumb: 8-32; cad pl (deflection yoke adj) .....	doz .50
46A70023		Core, iron & screw (L-41, T-7, T-8, L-48, T-9, T-10, T-6) .....	.15	3S7113		Setscrew: 8-32 x 1/4 slab head; wht cad (changeover switch) .....	doz .50
46K471143		Core, iron & screw (L-55) .....	.15	47K484105		Shaft, switch actuating .....	.15
46A484198		Core, iron: threaded (T-5) .....	.15	15A790016		Shell, connector: phono .....	doz .30
35K484817		Cushion, picture tube: felt; 32-1/2" long.	.55	26K485410		Shield, coil (T-5 T-2) .....	.20
35A90057		Cushion, picture tube retainer: felt (on top retainer brackets) .....	.25	26K485936		Shield, coil (L-55, T-3) .....	.20
3E3135		Eyelet: .324 x .593; brass (focus coil)doz	.30	1X478504		Shield, corona (V-21 base) .....	.15
5A12105		Eyelet, gang mtg (FM-AM tuner mtg).....doz	.20	1A71049		Shield & Sleeve Assembly (T-6) .....	.30
5S7845		Eyelet (V-19 socket) .....	.30	26A90301		Shield, tube (V-11) .....	.15
37K45125		Grommet, rubber (FM-AM tuner mtg) .....	.50	26B780042		Shield, tube & spring (V-12) .....	.35
37A12691		Grommet, rubber (V-19) .....	.35	26B484041		Shield, tuner .....	.20
9A31442		Insert, connector receptacle (phono).....	.15	26A780515		Shield, tuner tube (covers V-1 & V-2) ....	.15
11F87179		Insulation, coil: 2-1/8 x 3-1/8 (T-3).....doz	.25	43K489084		Sleeve, spacer: 7/16; cad pl (cord pulley) .....	doz .15
11A780088		Insulator, coil: varnish paper (T-5).....doz	.20	1X489088		Slider Mounting Bracket Assembly .....	.65
11A780371		Insulator, hi-voltage capacitor: waxed....	.20	9B90116		Socket, picture tube (12-pin) & leads ....	2.10
4S7657		Lockwasher, external: #8; cad pl (power transformer) .....	per/c .50	9A780020		Socket, pilot light & lead .....	.20
4S7666		Lockwasher, external: #6; wht cad (hi-voltage cap) .....	per/c .50	9K484167		Socket, tube: miniature; 7-prong.....	.20
4S7686		Lockwasher, external: #5; cad pl (TT-4 tuner mtg) .....	per/c .50	9A485495		Socket, tube: noval; 9-prong (V-12 & V-15) ..	.25
4S9751		Lockwasher, internal-external: #8; cad pl (deflection yoke mtg brkt, slider mtg brkt, deflection yoke adj & focus coil mtg bracket) .....	per/c .50	9K471270		Socket, tube: octal; impreg (for all octal tubes but V-19 & V-21) .....	.20
4S7655		Lockwasher, internal: 3/8; cad pl (changeover switch) .....	per/c .50	9A480274		Socket, tube: octal; molded (V-21) .....	.20
29R3013		Lug, soldering: double .....	doz .15	9A484835		Socket, tube: octal; steatite (V-19) .....	.50
29R5388		Lug, soldering: #6; hot-tinned .....	per/c .50	41A70705		Spring, coil (L-55, T-6, T-3) .....	doz .15
29R5248		Lug, soldering: #6; hot-tinned (hi-voltage cap) .....	doz .15	41A484166		Spring, compression (focus coil) .....	doz .25
2S7019		Nut, hex: 4-40 x 1/4; wht cad (horiz linearity & size) .....	per/c .50	41A21332		Spring, tension coil (dial cord) .....	doz .50
2S7005		Nut, hex: 6-32 x 1/4; wht cad; (FM-AM tuner mtg) .....	per/c .50	22S7906		Staple, flat head (dial cord) .....	per/c .50
2S7003		Nut, hex: 8-32 x 5/16; wht cad; (power transformer) .....	per/c .50	31A780091		Strip, terminal: 6 ins, #5 gnd .....	.10
2S7004		Nut, hex: 3/8-32 x 9/16; wht cad (changeover switch) .....	doz .20	31K90046		Strip, terminal: 5 ins, #1 gnd .....	.10
2A780157		Nut, mounting (TT-4 tuner mtg) .....	doz .40	31A780374		Strip, terminal: 5 ins, #4 gnd, #3 large..	.10
2A470365		Nut, speed: #8A (vertical output transformer, kinescope support brkt) .....	doz .25	31A780304		Strip, terminal: 5 ins, #2 gnd .....	.10
35A780085		Pad, felt (focus coil) .....	.10	31K471569		Strip, terminal: 4 ins, #1 gnd .....	.10
2S7051		Palnut, hex: 3/8-32 x 9/16; wht cad (for potentiometers) .....	doz .15	31K37494		Strip, terminal: 4 ins, #3 gnd; 3/8" .....	.10
2B70703		Palnut, special (L-55, T-6, T-3) .....	doz .30	31A780373		Strip, terminal: 4 ins, #3 gnd; 1/2" .....	.10
1X790017		Phono Cable & Connector Assembly .....	1.00	31K471565		Strip, terminal: 3 ins, #1 gnd .....	.05
64C489093		Plate, dial background .....	.35	31K51511		Strip, terminal: 3 ins, #3 gnd .....	.05
28A470122		Plug: 4-pin (antenna cable) .....	.10	31K26235		Strip, terminal: 3 ins, #1 gnd .....	.05
28K471323		Plug, line cord (interlock on chassis)....	.20	31K34326		Strip, terminal: 2 ins, #3 gnd .....	.05
28K22183		Plug, phono: one-pin .....	.05	31K90044		Strip, terminal: 2 ins, #2 gnd .....	.05
52A489092		Pointer, dial .....	.20	31K51251		Strip, terminal: 1 ins, #1 gnd .....	.05
49A12646		Pulley, cord: 7/32 groove .....	doz .30				
49A21741		Pulley, cord: 3/8 groove .....	doz .30				
65A780351		Receptacle, fuse (includes 2A780376 nut & 4A780375 washer) .....	.60				



Part Number	Description	List Price
46K780452	Stud, tri-mount (dial background plate mtg) .....	.15
1X484061	Switch Actuating Link Assembly: less setscrews (changeover switch) .....	.35
9K471267	Wafer, electrolytic mtg: bakelite; for 4-lug cap .....	.35
4K61642	Washer, "C" (switch actuating shaft retainer) .....	.50
4S1720	Washer: 3/8 x .156 x .030; cold rolled steel; cad pl (TT-4 tuner mtg) .....	.50
4S7614	Washer: 11/16 x 11/64 x .036; cold rolled steel; cad pl (FM-AM tuner mtg) .....	.15

Mechanical Parts - Tuner TT-4

43A4326	Ball, steel: 1/8" (Fine Tuning Shaft) .....	.15
7B482263	Bracket, tuner support .....	.25
42A470100	Clip, coil mounting .....	.25
42A790007	Clip, shaft retainer (Fine Tuning Shaft) .....	.30
42A484849	Clip, spring .....	.10
14A470146	Form, coil .....	.10
4S7655	Lockwasher, internal: 3/8; cad pl (end of shaft) .....	.50
29R5362	Lug, soldering: plain clamp .....	.30
29R5252	Lug, soldering: plain long tab .....	.15
2S7004	Nut, hex: 3/8-32 x 9/16; wht. cad. (end of shaft) .....	.20
64K485419	Plate, shaft support (front end) .....	.50
1X780199	Receptacle & Bracket Assembly, antenna ...	.30
5S8497	Rivet: .088 x 1/8 steel; nkl pl (V-1 & V-2 sockets) .....	.50
5S7707	Rivet: .122 x 5/32; nkl pl (soldering lugs) .....	.50
3A470109	Screw, coil adj: 1/2"; brass .....	.05
3S7155	Screw, machine: 6-32 x 3/16 plain hex head; cad pl (Tuner support bracket) .....	.50
3S7247	Screw, machine: 6-32 x 3/16 slotted lock hex head, cad pl (Tuner support bracket) .....	1.00
47K484851	Shaft, vernier .....	.35
26A471317	Shield, tube & sleeve (V-2) .....	.60
26K485109	Shield, tuner .....	.20
9A470781	Socket, tube: miniature 7-prong (V-1 & V-2) Shaft) .....	.25
41A482255	Spring, compression coil (Vernier shaft) .....	.05
31K90046	Strip, terminal: 5 ins. #4 gnd; 3/8" .....	.10
31A76184	Strip, terminal: 2 ins. #1 gnd; 3/8" .....	.05

PT-21 FM-AM Tuner - Mechanical Parts

1X481864	Arm & Bushing Assembly .....	.20
43K484138	Bushing, spacer: 3/16 (T-16) .....	.15
42B470431	Clamp, tube: bakelite (FM inductor clamp) .....	.30
42A72725	Clip, swivel nut (FM inductor core screw) .....	.35
11M8944	Cord, dial: 18 lb; black .....	.10
46A470885	Core, iron (threaded) (T-17) .....	.15
46A484198	Core, iron (threaded) (T-18) .....	.15
46A71749	Core, iron & screw (L-63 & L-64) (specify color coding on old part when ordering) ..	.90
46K484114	Core, iron & screw (L-65) (specify color coding on old part when ordering) .....	.90
45A481806	Link, connecting .....	.20
3S7247	Lockscrew, machine: 6-32 x 3/16 plain hex head; cad pl (gang capacitor brkt) .....	1.00
4S7650	Lockwasher, internal: #6; cad pl (FM inductor clamp) .....	.50
29R3014	Lug, soldering: #6 H.T. (FM inductor clamp) .....	.15
2S7005	Nut: 6-32 x 1/4; hex; wht cad (T-16) .....	.50
2K780129	Nut, spacer: 5/8 long (FM inductor clamp screw) .....	.30
2A72726	Nut, swivel (FM inductor core screw) .....	.05
49A21741	Pulley, cord (3/8 groove) .....	.30
49A26433	Pulley, cord (21/32 groove) .....	.10
1X482294	Pulley & Gear Assembly: less setscrews ...	.55
5S7771	Rivet: .088 x 3/16 stl; nkl pl .....	.50

Part Number	Description	List Price
5S7701	Rivet: .122 x 3/16 stl; nkl pl .....	.50
5A470101	Rivet, shoulder: 7/16 .....	.15
5K484022	Rivet, shoulder: 11/16 .....	.15
5A481813	Rivet, shoulder (on connecting arms) .....	.15
3A484005	Screw, machine: 6-32 x 3" plain hex head; cad pl (FM inductor clamp) .....	.25
3S488195	Screw, machine: 6-32 x 2 plain hex head; cad pl (FM inductor clamp) .....	.20
3S8134	Screw, sheet metal: #6 x 5/8 plain hex head; cad pl (guide brkt assembly) .....	.50
3S7113	Setscrew: 8-32 x 1/4 slab head; wht cad (connecting arm bushing & pinion gear) .....	.50
47A482280	Shaft, tuning .....	.15
26K485110	Shield, coil (T-18) .....	.20
26A482292	Shield, grid: metal plate (V-4) .....	.35
1K480037	Shield & Sleeve Assembly (T-17) .....	.20
9K484167	Socket, tube: miniature 7-prong (V-3 & V-4) .....	.20
9A485495	Socket, tube: noval 9-prong (V-5) .....	.25
43A481805	Spacer, shaft (gear, arm & shaft assem) .....	.15
41A780056	Spring, compression (tuning gear) .....	.20
41A74880	Spring, core tension (L-63, 64, 65) .....	.50
41A470123	Spring, string tension (dial cord) .....	.05
41A481790	Spring, take-up (connecting links) .....	.30
31A780093	Strip, terminal: 4 insulated, #1 ground; 1 blank .....	.10
31A780092	Strip, terminal: 4 insulated, #2 ground; 1 blank .....	.10
31K76184	Strip, terminal: 2 insulated, #1 ground ..	.05
31K51251	Strip, terminal: 1 insulated, #1 ground ..	.05
11M2505	Tubing, extruded: #3 Vinyl; black (on tuning shaft) .....	.10
4K73809	Washer, "C" (tuning shaft retainer) .....	.50
4A74936	Washer, spring (FM inductor core screw) ..	.15

Cabinet Parts - Models VF103 & VF103M

1X780032	Back & Line Cord Assembly .....	
37K471416	Band, rubber: 3/8 x 5/16 (on window re-tainer brackets) .....	.50
13K780037	Bezel, kinescope: molded plastic .....	2.60
7A76156	Bracket, pilot light .....	.05
7A471395	Bracket, window retainer .....	.35
35A780467	Bumper, rubber recess (record changer drawer) .....	.40
43A489175	Bushing, knob (channel selector shaft) ..	.10
16F484120	Cabinet, brown mahogany (VF103) .....	-
16K484121	Cabinet, red mahogany (VF103M) .....	-
1X484869	Cable assembly, antenna: 300 ohm cable (with 4-pin plug & 2 screw terminal strip) .....	.85
55K482159	Catch, bullet (for door latching) .....	.05
1X480238	Cord, Line, Plug and Receptacle Assembly (bottom rear of cabinet) .....	1.50
30K480201	Cord, line with plug & receptacle (2ft) (cabinet back cover) .....	.90
42K481492	Clamp, cable: plastic .....	.10
13K484129	Cloth, grille: .....	1.55
15D484125	Cover, chassis bottom .....	3.65
13C489135	Escutcheon, dial scale .....	1.90
32C90053	Gasket, kinescope seal: felt .....	1.75
13C484127	Grille, cabinet .....	3.10
55A480240	Hinge, door (concealed): statuary bronze finish (Radio & TV doors) .....	.25
55A72558	Hinge, door: statuary bronze (record album compartment) .....	.15
60A28520	Jewel, light: amber .....	.20
36B489176	Knob, control: mahogany plastic (VF103M Channel) (Includes two 3S3854 setscrews) .....	.60
36A485480	Knob, control: mahogany plastic (VF103M Fine Tuning) .....	.10
36K780033	Knob, control: mahogany plastic (VF103M Change-over Switch) .....	.35
36B485489	Knob, control: mahogany plastic (VF103M Contrast & Volume) .....	.15
36B489179	Knob, control: mahogany plastic (VF103M Vertical Hold) .....	.20

Part Number	Description	List Price	Part Number	Description	List Price
36A485477	Knob, control: mahogany plastic (VF103M Brightness, Horiz. Hold & Off-tone) .....	.10	3S476115	Screw, sheet metal: #6 x 1/4 PKA plain hex head; cad pl (kinescope window bracket) .....	per/c .50
36B489182	Knob, control: mahogany plastic (VF103M AM-FM Tuning) .....	.30	3S7536	Screw, sheet metal: #6 x 3/8 PKA slotted acorn head; antique copper (ant. terminal strip) .....	per/c .50
36K489177	Knob, control: walnut plastic (VF103 Channel) (Includes two 3S3854 setscrews) .....	.60	3S7455	Screw, sheet metal: #8 x 3/8 PKA slotted acorn head; antique copper (cabinet back & window bracket) .....	doz .15
36K485481	Knob, control: walnut plastic (VF103 Fine Tuning) .....	.10	3S3359	Screw, sheet metal: #8 x 1-5/8 PKA plain hex head (chassis bottom) .....	doz .15
36K780034	Knob, control: walnut plastic (VF103 Change-over Switch) .....	.35	3K653	Screw, speaker mounting .....	doz .20
36K485490	Knob, control: walnut plastic (VF103 Contrast & Volume) .....	.15	3S1328	Screw, wood: #2 x 3/8 Phillips oval head; brass (Kinescope bezel & dial escutcheon) .....	doz .20
36K489180	Knob, control: walnut plastic (VF103 Vertical Hold) .....	.20	3S488319	Screw, wood: #4 x 1/2 Phillips oval head; statuary bronze (rubber bumper) .....	doz .15
36K485478	Knob, control: walnut plastic (VF103 Brightness, Horiz. Hold & Off-Tone) .....	.10	3S1336	Screw, wood: #5 x 3/4 slotted flat head; antique copper (concealed door hinge) doz	.15
36K489183	Knob, control: walnut plastic (VF103 AM-FM Tuning) .....	.30	3S1321	Screw, wood: #6 x 3/8 slotted round head; statuary bronze (chassis bottom) .....	per/c .50
489751	Lockwasher, internal-external: #8; cad pl (speaker mounting) .....	per/c .50	3S1344	Screw, wood: #6 x 5/8 flat head; statuary bronze (album compartment hinge) .....	per/c .50
287003	Nut, hex: 8-32 x 5/16; cad pl (speaker mounting) .....	per/c .50	3S8302	Screw, wood: #6 x 5/8 slotted acorn head; antique copper (cable clamp & cabinet back) .....	doz .15
35K470657	Pad, felt: 1/2" O.D. x 1/16" thick (door stops) .....	per/c .50	3S1314	Screw, wood: #6 x 3/4 slotted round head; statuary bronze (RC support rail) .....	per/c .50
37K77329	Pad, sponge rubber: 1 x 1/2 x 3/8 thick (record drawer stop pad) .....	doz .20	3S7103	Setscrew: 8-32 x 1/8 Allen head (tuner shaft) .....	.10
22S1633	Pin, escutcheon: brass (dial escutcheon) .....	per/c .50	3S3854	Setscrew: 8-32 x 1/2 slotted headless machine screw (Channel Selector Knob) ..	
28A470122	Plug: 4-pin (antenna cable) .....	.10	41A489149	Spring, compressions (inside door pulls) .....	doz .15
55A489156	Pull, door (album) .....	.60	41A471379	Spring, tension (on kinescope support brackets) .....	.25
55A489158	Pull, door (Radio-Phono) .....	.75	55K482160	Strike, bullet: includes one 1/2" steel nail (on doors) .....	.05
55K74787	Rail, support: left hand (RC drawer) .....	1.15	31A21990	Strip, terminal: 2 screws (antenna cable) ..	.10
55C74786	Rail, support: right hand (RC drawer) .....	1.15	2A489123	Teenut: 1/4-20; 3-prong .....	doz .50
587706	Rivet: .122 x 1/8 stl; nkl pl (elect. insulators) .....	per/c .50	4K485418	Washer, felt (control knobs) .....	doz .15
586846	Rivet: .110 x 5/32 stl; nkl pl (back line cord assembly) .....	per/c .50	4S8214	Washer, flat: 7/8 x .203 x .067; cad pl (chassis mtg) .....	doz .25
5A470755	Rivet, shoulder (line cord to cabinet back) .....	.05	1X471310	Window & Gasket Assembly (kinescope) .....	4.15
3K489169	Screw, cross slot: 8-32 x 1; statuary bronze (door pulls) .....	doz .15	61C90071	Window, picture tube: glass .....	2.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

