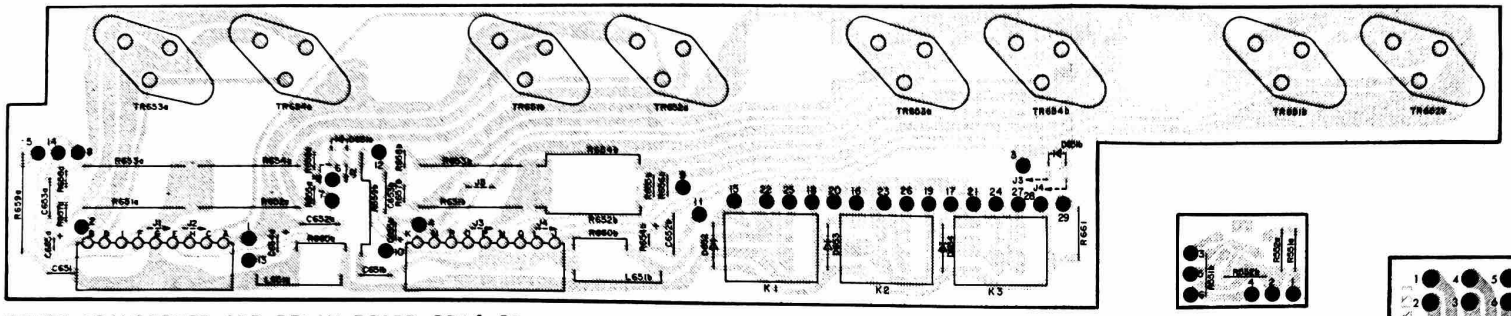
# S-75CP PRINTED CIRCUIT BOARD ASSEMBLIES

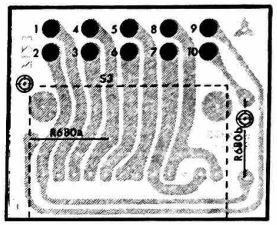
CIRCUIT BOARDS ARE SHOWN FROM THE COMPONENT SIDE; FOR A VIEW FROM THE COPPER SIDE, TURN THIS SHEET OVER AND HOLD UP TO A LIGHT.



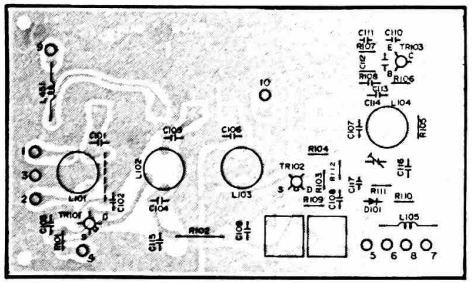
POWER TRANSISTOR AND RELAY BOARD 0046-2C



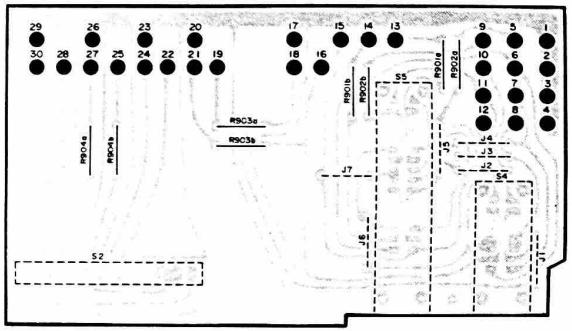
DIN JACK
BOARD
0046-2D



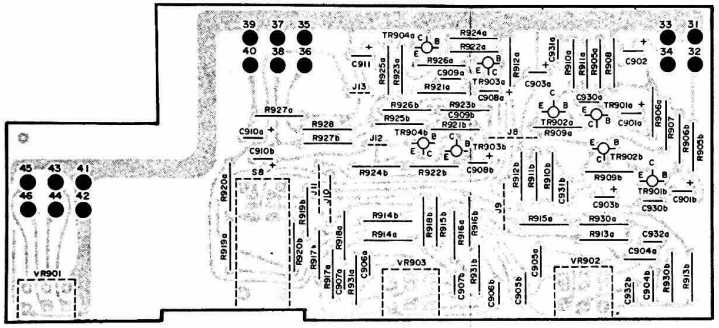
SPEAKER SELECTOR
BOARD 7123



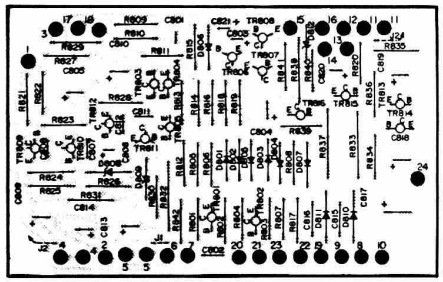
FM FRONT END 1019-1



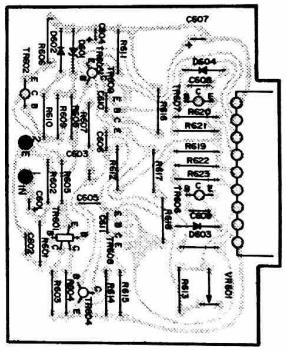
TAPE/MODE BOARD 9032-AB



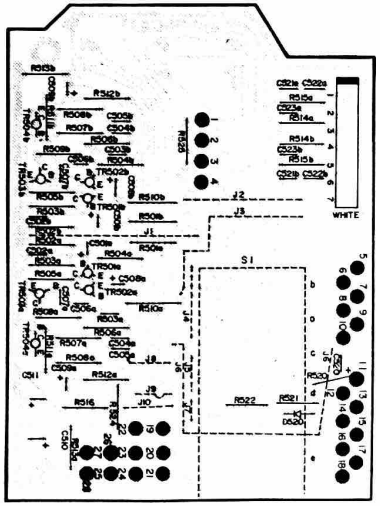
TONE CONTROL BOARD 9032-B



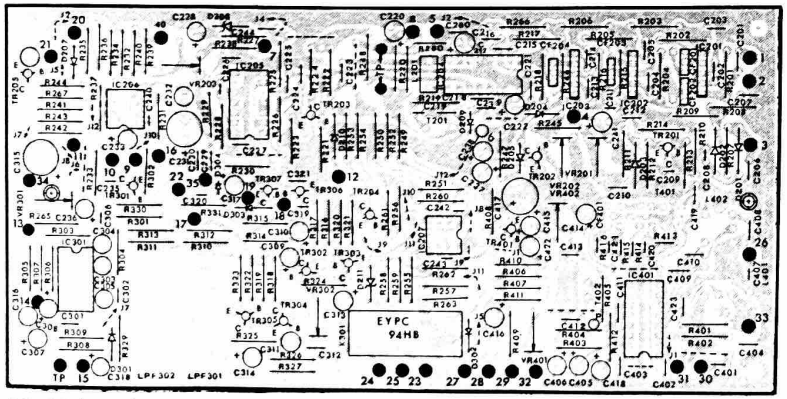
POWER SUPPLY AND AMP
PROTECTION BOARD 0046-2F



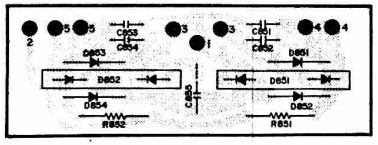
POWER AMP DRIVER BOARD
0046-2B
(TWO REQUIRED.)



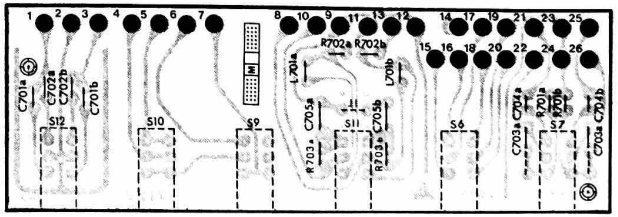
PHONO PREAMP
SELECTOR BOARD 0046-2G



FM IF/MPX/AM BOARD 0035-3



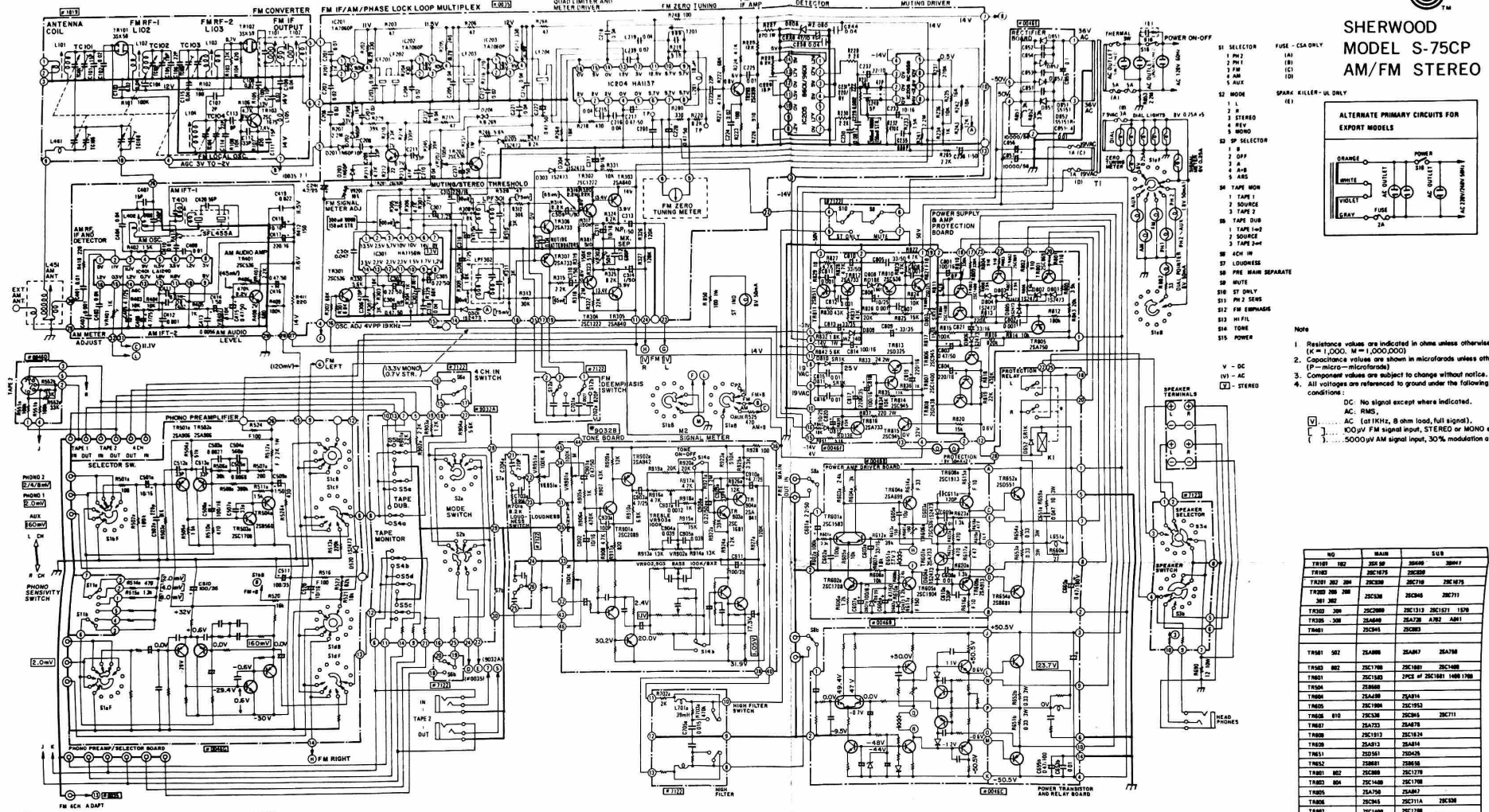
RECTIFIER BOARD 0046-2E

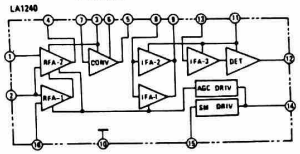


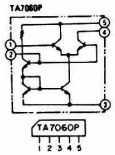
PUSH SWITCH BOARD 7122-2

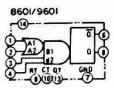
# SCHEMATIC DIAGRAM

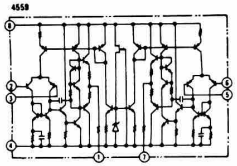
SHERWOOD
MODEL S-75CP
AM/FM STEREO RECEIVER

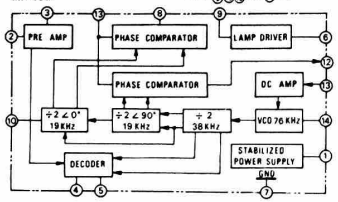


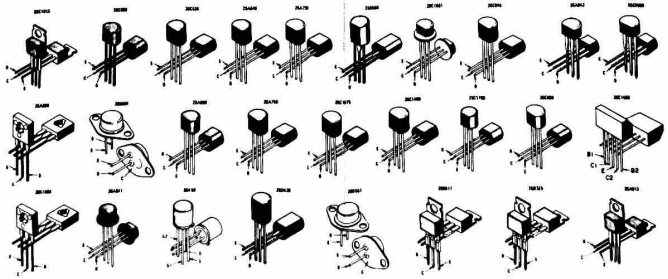



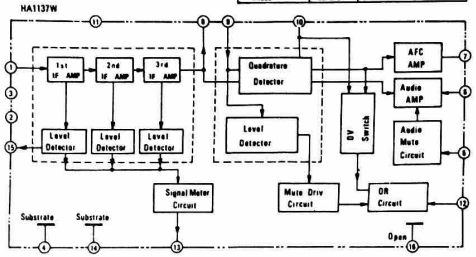






| NO | MAIN | SUB |
|---|---|---|
| TR101 102 | 2SK 58 | 2SK40 2SK47 |
| TR103 | 2SC1675 | 2SC828 |
| TR201 202 204 | 2SC536 | 2SC710 2SC1675 |
| TR203 205 206 301 302 | 2SC536 | 2SC945 2SC711 |
| TR303 304 | 2SC2688 | 2SC1313 2SC1571 1570 |
| TR305 308 | 2SA640 | 2SA728 A782 A841 |
| TR401 | 2SC945 | 2SC883 |
| TR501 502 | 2SA808 | 2SA847 2SA750 |
| TR503 802 | 2SC1708 | 2SC1681 2SC1408 |
| TR601 | 2SC1583 | 2PCS of 2SC1681 1408 1708 |
| TR504 | 2SB560 | |
| TR604 | 2SA698 | 2SA814 |
| TR605 | 2SC1904 | 2SC1953 |
| TR606 810 | 2SC536 | 2SC945 2SC711 |
| TR607 | 2SA733 | 2SA878 |
| TR608 | 2SC1913 | 2SC1624 |
| TR609 | 2SA913 | 2SA814 |
| TR651 | 2SD561 | 2SD425 |
| TR652 | 2SB681 | 2SB658 |
| TR801 802 | 2SC808 | 2SC1278 |
| TR803 804 | 2SC1408 | 2SC1708 |
| TR805 | 2SA750 | 2SA847 |
| TR806 | 2SC945 | 2SC711A 2SC536 |
| TR807 | 2SC1408 | 2SC1708 |
| TR808 | 2SD438 | 2SC1568 |
| TR809 | 2SD325 | |
| TR811 | 2SB611 | |
| TR812 816 | 2SA733 | 2SA878 |
| TR813 | 2SD325 | |
| TR815 814 | 2SC945 | 2SC1175 |
| TR903 | 2SC1681 | 2SC1313 C1708 C1222 |
| TR904 | 2SA841 | 2SA728 A840 A847 |
| TR901 | 2SC2688 | |
| TR902 | 2SA842 | |

S1 SELECTOR
1 PH 2
2 PH 1
3 FM
4 AM
5 AUX

S2 MODE
1 L
2 R
3 STEREO
4 REV
5 MONO

S3 SP SELECTOR
1 B
2 OFF
3 A
4 A+B
5 ARS

S6 TAPE MON
1 TAPE 1
2 SOURCE
3 TAPE 2

S5 TAPE DUB
1 TAPE 1→2
2 SOURCE
3 TAPE 2→1

S8 4CH IN
S7 LOUDNESS
S8 PRE MAIN SEPARATE
S9 MUTE
S10 ST ONLY
S11 PH 2 SENS
S12 FM EMPHASIS
S13 HI FIL
S14 TONE
S15 POWER

FUSE - CSA ONLY
(A)
(B)
(C)
(D)

SPARK KILLER - UL ONLY
(E)

ALTERNATE PRIMARY CIRCUITS FOR EXPORT MODELS




V - DC
(V) - AC
[V] - STEREO

Note
1. Resistance values are indicated in ohms unless otherwise specified (K = 1,000, M = 1,000,000)
2. Capacitance values are shown in microfarads unless otherwise noted (P = micro - microfarads)
3. Component values are subject to change without notice.
4. All voltages are referenced to ground under the following conditions:
   DC: No signal except where indicated.
   AC: RMS,
   [V]..... AC (at 1KHz, 8 ohm load, full signal).
   [ ]..... 100μV FM signal input, STEREO or MONO except where indicated.
   ( )..... 5000μV AM signal input, 30% modulation at 400Hz.

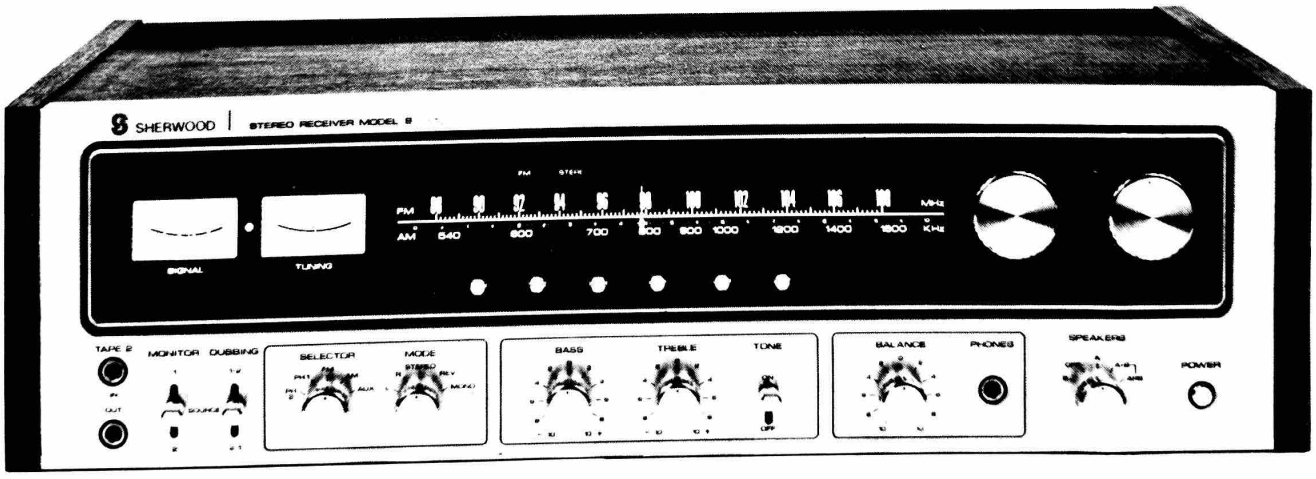
$3.00

# SHERWOOD

TM

D4207

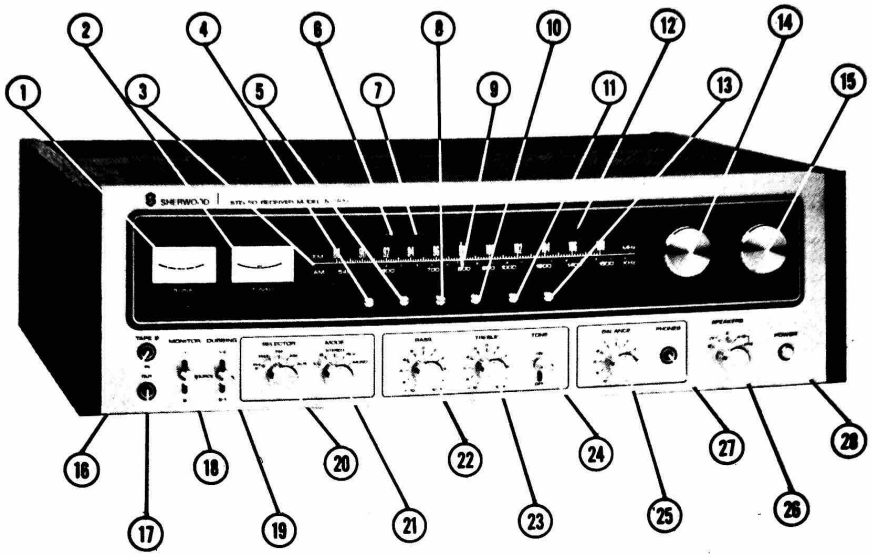
# S 75CP




# SERVICE MANUAL

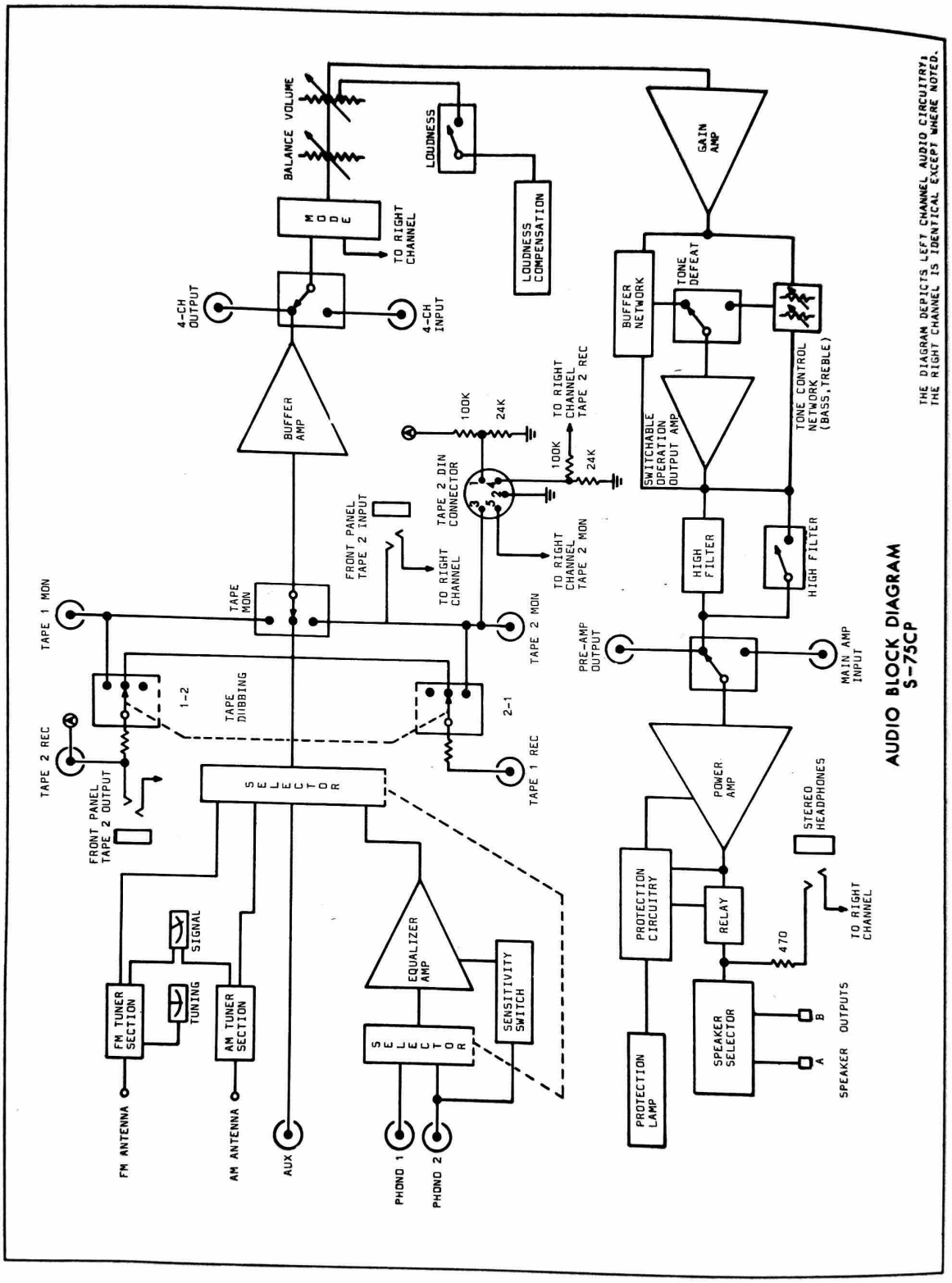
# CONTENTS

# FRONT PANEL FEATURES




1. **Signal Strength Meter:** Indicates the relative strength of the FM (or AM) channel selected.
2. **FM Zero Center Tuning Meter:** Indicates accurate FM center-channle tuning.
3. **Illuminated Tuning Scales.**
4. **FM Deemphasis Switch:** Selects proper deemphasis for either normal FM transmission or 25 $\mu$ sec. specially encoded broadcasts.
5. **FM Stereo Only Switch:** Mutes mono transmission; permits listening of stereo stations only.
6. **Source Indicator Lights:** Visually indicates the selected input source.
7. **Stereo FM indicator Light.**
8. **FM Muting Switch:** Removes FM interstation noise.
9. **Dial Pointer:** Illuminates in FM (and AM) mode.
10. **High Filter Switch:** Cuts out 'scratch' from records or background 'hiss' from noisy FM stations.
11. **4-Channel Adapter Switch:** Activates external 4-channel decoder or other external processing unit; also serves as an additional Tape Monitor.
12. **Protection Light:** Illuminates when automatic protection circuit is engaged.
13. **Loudness Switch:** Activates loudness control compensation circuit.
14. **Tuning Control:** Counterbalanced for easy tuning of FM (and AM) stations.
15. **Loudness Control:** Volume control that automatically adds bass and treble compensation at low levels when the Loudness Switch is depressed.
16. **Tape-2 In Jack:** Convenience front panel Tape-2 Input.
17. **Tape-2 Out Jack:** Convenience front panel Tape-2 Record Output.
18. **Tape Monitor Switch:** Selects either Tape-1 or Tape-2 as the listening source.
19. **Tape Dubbing Switch:** Permits duplication from Tape-1 to Tape-2, or 2-1.
20. **Selector Switch:** Selects your listening source: Phono 2, Phono 1, FM, AM, or Aux.
21. **Mode Switch:** Provides for selection of Left or Right Channel only, Stereo, Stereo Reverse, or Mono.
22. **Bass Control:** Varies low frequency levels as much as ± 14 dB.
23. **Treble Control:** Varies high frequency levels as much as ± 12 dB.
24. **Tone Defeat Switch:** Disables tone controls and establishes a flat frequency response regardless of the tone control settings.
25. **Balance Control:** Balances the relative volume levels of the left and right speakers.
26. **Speaker Selector Switch:** Selects desired combination of speakers or switches speakers off (for headphone listening.)
27. **Stereo Headphone Jack.**
28. **Main Power Switch.**

# BLOCK DIAGRAM



# SERVICE AND ADJUSTMENT PROCEDURE

## AMPLIFIER SERVICE AND ADJUSTMENT

NOTES:

1. For simplicity only the left channel and its related circuitry are described. The right chanrel is identical except for reference symbol numbers (see Schematic Diagram).
2. As a convenience for fast component location, this manual contains detailed pictorials of all the printed circuit boards (shown 3/4 size). Reference to these pictorials should aid considerably in the quick, accurate fault analysis of an existing malfunction.
3. As an additional service aid, the power amplifier driver boards are of a plug-in design. To remove these and other boards and components, black plastic retaining 'pins' must first be lifted. This is easily accomplished by gripping the head of the retaining pin with a long nose pliers and lifting the pin away from the component to be removed. Care should be taken so the black plastic 'sleeve' remaining after pin removal is not lost.

### USE OF A VARIAC:

It is imperative that a variable voltage line source (Variac) equipped with a line wattmeter to identify abmormal power consumption be used when servicing power amplifiers and associated power supply citcuitry. With the Volume (Loudness) control set at minimum, the power consumption should not exceed 40 watts as the voltage is increased by the Variac to the rated 120VAC. If the power consumption begins to exceed 40 watts, do NOT increase the line voltage any further. Determine if the malfunction is in the power amplifier, power supply, preamplifier, or tuner section of the receiver.

### LINE FUSE AND INITIAL CIRCUIT CHECKS:

Verify that the line fuse is unopened and check idling power consumption. The main cause for abnormal power consumption, in order of decreasing occurance, are:

1. Open or shorted amplifier output, driver or pre-driver transistors.
2. Open or shorted power supply diodes.
3. Shorted power transformer.

### AMPLIFIER FAULT ANALYSIS:

If an amplifier channel is in question, check related circuit boards for burned parts and replace. Check all the transistors with an ohmmeter* for opens or shorts and replace if defective.

* WARNING: Some ohmmeters may damage sensitive solid-state devices. Whenever possible, use a high resistance range (at least RX10).

IMPORTANT: For the following tests, an 8 ohm load resistor must be connected to each of the two power amplifier (speaker) output terminals.

Use the centerpoint voltage (measured from the + speaker terminal to ground) as a guide. The centerpoint voltage should always be Zero ±50mV. Any deviation suggests shorted or open devices.

If channel operation is still faulty, verify that there are no shorted capacitors, open resistors, etc., on the board.

Inspect the underside of the board for shorted pads, broken connections, etc.

When the board is restored, readjust Output Bias (see next page).

DISTORTION IN AMPLIFIER OUTPUT:

Distortion which exceeds the amplifier ratings (see Specification Section) may be due to the following:

1. Mismatched output transistors.
2. Defective (low-beta) driver transistors.
3. Incorrectly adjusted output transistor bias.

OUTPUT TRANSISTOR BIAS ADJUSTMENT:

Proper output transistor operation and output bias adjustment are most important to assure cool, low-distortion operation of the amplifier. Bias adjustment is necessary if the output transistors are replaced* or any of the transistors in the driver circuitry of the amplifier exhibits one or more of the following symptoms:

1. Overheating of the output transistors under normal operating conditions. [Normal output transistor case temperatures are 30-35°C (86-95°F), quiescent operation at 25°C (77°F) ambient.]
2. Excessive low level Intermodulation Distortion (IMD) or Total Harmonic Distortion (THD) - more than 0.08% at 3.0 volts across 8 ohms.

* It is extremely important that the insulating washers used to separate the output transistors from their heat sink be unbroken and installed with heat transfer compound liberally applied to all surfaces in contact with each other. Make certain that the emitter and base pins of the output transistors do not touch any part of the heat sink assembly.

NOTE: For the following tests, an 8 ohm load resistor must be connected to each of the two power amplifier (speaker) output terminals.

The following are four methods for adjusting output transistor bias:

BIAS ADJUSTMENT USING AN INTERMODULATION DISTORTION (IMD) ANALYZER:

1. Connect the receiver's amplifier for testing.
2. Connect an Intermodulation Distortion Analyzer with a ratio of 4:1 using 60Hz and 7000Hz to the receiver's Left AUX 1 input and set the SELECTOR switch to AUX 1.
3. Set the VOLUME (LOUDNESS) control to maximum and adjust the generator for an amplifier output of 3.0 volts across the 8 ohm load of the amplifier channel under test.
4. While observing the resultant distortion waveform, adjust the left channel bias pot VR601 so that the crossover distortion is at the point of being eliminated (class "AB"). NOTE: Class "A" operation (continued CW rotation) causes the output transistors to draw excessive current and consequently overheat. Refer to Figure 1 below.
5. Repeat Steps 3 and 4 for the Right channel.

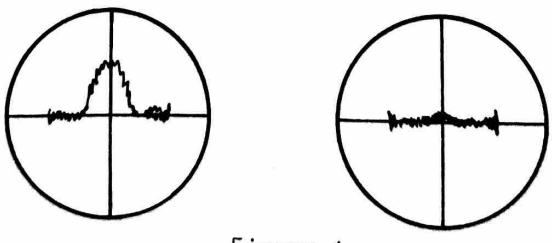



Figure 1

The following performance indicates a properly operating amplifier with both channels driven into 8 ohm loads:

1. Less than 0.08% Intermodulation Distortion (IMD) at 3.0V (typically 0.05%).
2. 70 watts of power per channel at no greater than 0.08% IMD.

BIAS ADJUSTMENT USING A HARMONIC DISTORTION ANALYZER:

1. Connect the receiver's amplifier for testing.
2. Connect an oscillator with less than 0.01% distortion at 1KHz to the receiver's Left AUX 1 input and set the SELECTOR switch to AUX 1.
3. Set the VOLUME (LOUDNESS) control to maximum and adjust the oscillator for an amplifier output of 3.0 volts across the 8 ohm load of the amplifier channel under test.
4. Using the Harmonic Distortion Analyzer, looking at the distortion of the amplifier properly nulled, make the adjustment as follows: Adjust bias for class "AB" operation by turning the bias potentiometer VR601 so that the crossover is at the point of being eliminated. NOTE: Class "A" operation (continued CW rotation) causes the output transistors to draw excessive current and overheat. Refer to Figure 2 below.
5. Repeat Steps 3 and 4 for the Right channel.

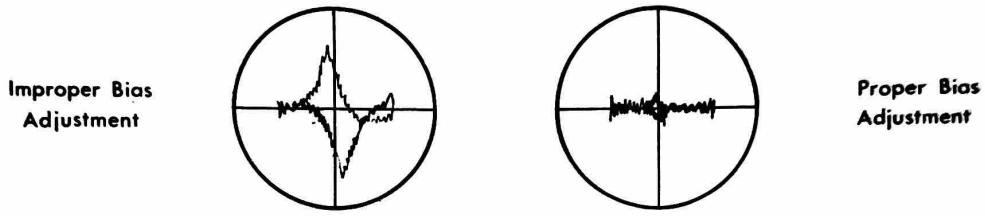



Figure 2

The following performance indicates a properly operating amplifier with both channels driven into 8 ohm loads:

1. Less than 0.08% THD at 3.0 volts (typically 0.05%).
2. 75 watts per channel at no more than 0.08% THD (1KHz).
3. 70 watts per channel at no greater than 0.08% THD (20-20,000Hz).

BIAS ADJUSTMENT USING A MILLIVOLTMETER:

If an accurate digital or analog voltmeter is available, the bias pots (VR601A Left and VR601B Right channel) can be adjusted to indicate 4.0 mV DC across an output transistor's emitter resistor. Proceed as follows:

1. Remove all amplifier input signals.
2. Rotate the LOUDNESS LEVEL control to minimum.
3. Connect the voltmeter across either R653 or 654 emitter resistors of the left channel power output transistors TR652 and 654.
4. Adjust bias potentiometer VR601, located on the driver board, for 4.0 mV DC.
5. Repeat Steps 3 and 4 for the Right channel.

BIAS ADJUSTMENT USING A LINE WATTMETER:

When test equipment required for previous bias adjustments is not readily available and adjustment is absolutely necessary, the following procedure may be used which requires only an accurate line wattmeter:

1. Turn the VOLUME (LOUDNESS) control to minimum.
2. Adjust the bias pots (VR601 Left and Right channel) one at a time to the point at which the amplifier begins to cause a very slight increase in line wattage consumption. Typical proper operation would develop a line wattage consumption of 36 watts.

## POWER SUPPLY SERVICING AND FAULT ANALYSIS:

Power supply malfunctions are usually due to shorted or open power diodes (located on the Rectifier PC Board 0046E), shorted or open zener diodes or transistors found on the Power Supply and Amplifier Protection PC Board 0046F, or a defective power transformer.

The devices may be easily checked using an ohmmeter. The transformer's operation may be checked by measuring secondary voltages with the associated circuit legs disconnected. Shorted windings can cause abnormal power consumption in a unit that otherwise functions well.

## AMPLIFIER ELECTRONIC RELAY PROTECTION AND SPEAKER SYSTEM CHECKS:

It is necessary in the design of a high powered receiver to provide protection for both the amplifier AND the speaker load. The primary purpose of the S75CP's relay protection circuit is to disconnect the speakers if a potentially damaging situation should occur.

If there is no output to the speaker, first check the speaker connections for shorted wires or a shorted speaker (speaker load resistance should not indicate less than 4 ohms resistance on an ohmmeter). If the relay protection circuit is suspect, the following explanation of its normal operational characteristics may be helpful.

The complementary output transistors are load line limited, with the maximum current limited to 6.5A peak (equivalent to 85 watts @ 4 ohms). Signal voltages developed across the output transistor's emitter resistors R652a and R654a forward-bias transistors TR606a and TR607a shunting the output transistor's base drive signal.

The amplifier protection circuit (PC Board 0046F) in normal operation is set so that transistor TR806 is reverse biased and non-conducting. This allows base current drive to the darlington relay transistors TR807 and TR808 through resistor R818 from the 50 volt supply. The relay is thereby activated and connects the speaker loads to the amplifier. Also, because of the turn-on 'delay' caused by the RC time constant of resistor R818 and capacitor C804 at the base of the relay driver, the AC Power turn-on pulse (speaker pops) are eliminated.

Transistors TR801 and TR802 constantly monitor the negative and positive current swings of the respective left and right channel complementary output transistors. As the load impedance is reduced with a signal applied, a point is reached where, for example, if the left channel's output exceeds its rated power level, transistor TR801 becomes forward biased. Its collector current passes through diode D805, switching transistor TR805 and consequently transistor TR806 into conduction. TR806's resultant low collector voltage (Vce saturation) clamps the darlington relay driver off, deactivating the relay and disconnecting the potentially dangerous load condition. Also, this simultaneously activates the front panel protection warning light.

The protection circuit constantly resets itself (disconnecting the speakers) as it continually samples the existing load condition and amplifier power requirements; therefore, the protection light will continue to flash on and off until the abnormal load condition is corrected.

The protection warning light system is automatically tested for operation each time the receiver's AC Power switch is turned on. This happens because the driver transistor TR815 is momentarily forward biased until the relay driver saturates (as determined by the previously mentioned RC time constant which establishes the relay turn-on delay). Until said saturation occurs, the protection warning light illuminates (for approximately 4 seconds) each time the AC Power switch is activated.

Loudspeaker protection is also provided in the event that either a positive or a negative DC voltage becomes present at the amplifier speaker terminals.

Positive Voltage Protection: An amplifier malfunction resulting in a positive DC voltage at the speaker terminals causes transistor TR803 to conduct. Base current now activates TR805 which in turn drives the base of transistor TR806 whose collector now switches low, clamping off the relay driver transistor thereby disconnecting the speaker load.

Negative Voltage Protection: If a negative voltage were to appear at the speaker terminals (such as would occur when a negative side driver or output transistor fails in a short mode) transistor TR804 will conduct. As was the case with the positive voltage protection, base current is now fed to transistor TR806, causing its collector to switch low, clamping off the relay driver transistor and disconnecting the speaker.

FM TUNER AND IF ALIGNMENT (Refer to PART LOCATION PICTORIALS, Pages 9 and 10):

1. Set the SELECTOR switch to FM and turn the FM MUTING switch off. Connect an FM Generator to the 300 ohm antenna terminals using a matching transformer with a 1:1 voltage ratio or, if necessary, use a 2:1 ratio resistive network as shown below in Figure 3.

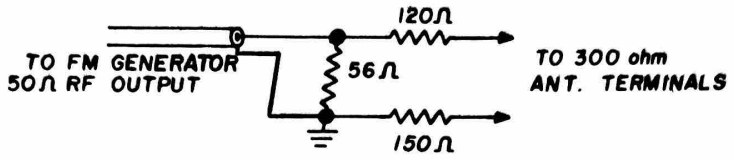



Figure 3

2. Tune the receiver to a point of no signal or interference near 90MHz.
3. Tune the FM Generator, modulated ±300KHz @ approximately 20uV output level, to the receiver frequency. Connect an RF Detector Probe to Pin 1 of IC204 (HA1137) and center the FM IF response on the oscilloscope. The FM IF bandpass characteristics are now being displayed. Adjust the cores of the converter FM IF transformers T101 and 102 for maximum gain and symmetry (Figure 4).

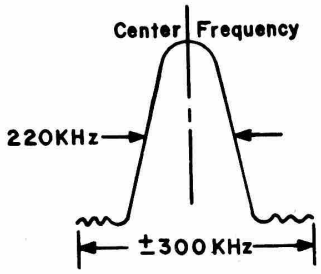



Figure 4

4. The FM front end alignment can also be determined while observing the oscilloscope display of Step 3. Tune the receiver and generator to a point of no interfering signal near 90MHz. Check that the receiver dial pointer indicates within ±100KHz from the FM generator frequency. (If the generator output is not accurately calibrated, a FM station can be used as a calibration reference.) If the dial deviation exceeds 100KHz, adjust the local oscillator coil L104 slightly, until optimum dial calibration is obtained. Next, adjust the antenna and RF amplifier coils L101, L102 and L103 for maximum gain. Tune the receiver and the generator to a point of no interference near 106MHz. Check the dial calibration. If required, adjust the local oscillator trimmer TC104 until optimum dial calibration is obtained. Now, adjust the antenna and RF amplifier trimmer capacitors TC101, TC102 and TC103 for maximum gain. Repeat alignment at 90MHz and 106MHz until no further improvement is obtained.
5. ZERO CENTER TUNING METER ADJUSTMENT: To adjust for the correct zero indication, leave the FM Generator connected as in step 1 and tune the receiver to a point of no signal or interference.
   A. Connect a DVM or VOM across series resistors R220 and R280 on the Tuner PC Board 0035. These two test points are also identified as "TP" on the tuner board and the schematic.
   B. Tune the core of transformer T201 (Quadra tune coil) for a zero DC voltage indication on the voltmeter.
   C. Actually the zero center meter can be monitored to adjust transformer T201.
6. SIGNAL STRENGTH TUNING METER ADJUSTMENT: Decrease the FM signal generator output to zero. The meter pointer should indicate near zero. Now, increase the generator output to 100mV and if necessary adjust potentiometer VR201 for a meter indication of 4½. The signal meter adjustment is now complete.

7. FM DIGITAL DETECTOR: Basically, the digital detector converts the Frequency Modulation of the received station into audio. In this system there are no coils or tuned circuits that require exacting frequency and distortion alignment, such as are necessary in the conventional discriminator, ratio detector or quadrature detector circuits.

   The monostable multivibrator IC205 is locked into operation by the modulation of the transmitted signal itself - tuned circuits are unnecessary. Since the received signal controls the detection process the recovered audio is essentially as distortion free as the signal itself.

   The 10.7MHz ±75KHz IF signal (approximately 1.5V p-p) drives pin 1 of the integrated circuit IC205. Its complementary pulsed output (4V p-p) appears out of phase at pins 2 and 8. It is frequency divided (F/2) to 5.35MHz ±75KHz and is pulse position modulated as established by the incoming signal. The pulse duration is fixed by the IC and the external timing components R228 (6.2K) and C226 (15pF). The charge and discharge of the integrating capacitors, C229 and C230, now occurs at the modulating audio rate.

   The recovered out-of-phase audio signal is applied to the differential inputs of IC206, resulting in a 0.8V p-p (0.3V RMS) audio signal at its pin 1 output.

8. MUTING STEREO THRESHOLD ADJUSTMENT: This receiver is equipped with a muting circuit which automatically removes or reduces the noise (rushing sound) normally heard between broadcast channels on a highly sensitive receiver. The noise threshold level can be adjusted with the Muting Threshold Control VR202 located on the tuner board 0035. The normal threshold level is 3 microvolts.

   To adjust the muting sensitivity, connect the FM Generator and oscilloscope as in Step 1 and move the oscilloscope lead to the REC Output jack on the back panel. With the MUTING switch in, slowly increase the generator output from zero to the automatic muting threshold level. Audio can now be observed on the oscilloscope. The desired threshold level can be set by adjusting VR202 and repeating the above.

PHASE LOCK LOOP MULTIPLEX ADJUSTMENT:

NOTE: This receiver utilizes an integrated circuit phase lock loop (PLL) stereo modulator. The phase lock loop is essentially a free-running 76KHz oscillator (subsequently divided down to 38KHz and 19KHz) which locks onto the stereo pilot tone of the transmitted signal, enabling accurate signal decoding. Proper adjustment of the free-running oscillator control VR301 is essential for stable and proper channel separation. Two methods of making this adjustment are described below:

1. PLL ADJUSTMENT USING A DIGITAL FREQUENCY COUNTER AND AN FM STEREO GENERATOR: Tune the receiver to a point of no signal or interference. Tune the generator to the receiver frequency and adjust it for an unmodulated signal at 100 microvolt output. With the digital frequency counter probe attached to Pin 10 (test pin provided) of IC301, adjust VR301 (FM MPX VCO) for 19KHz ±10Hz. Using a stereo test signal, adjust VR302 for best total separation and minimum difference in the right-to-left and left-to-right separation. The separation should be 40dB minimum in reference to a 100% modulated audio at 1KHz.

   If 40dB is not obtainable, apply the pilot signal only and check the left and right multiplex outputs for 19KHz/38KHz residual. It should be a minimum of -60dB below audio reference.

2. PLL ADJUSTMENT USING AN FM STEREO GENERATOR: With the receiver tuned to a stereo signal, adjust VR301 to determine the endpoints for stereo lock-in and set VR301 halfway between these end-points. Using a stereo test signal, adjust VR302 for best separation.

AM TUNER AND IF ALIGNMENT:

1. Set the receiver SELECTOR switch to AM. Tune the receiver to a point of no signal or interference near 600KHz. Connect the scope/VTVM to the REC output jack. Connect the AM Generator output to the receiver AM Antenna terminal through a 200pF capacitor.
2. Adjust the AM Generator for 455KHz RF output, modulated @ 400Hz, 50%. Tune the AM Converter (AM IFT-1, T401) and the 2nd AM IF (AM IFT-2, T402) cores for maximum audio output.
3. Adjust the AM Generator for 600KHz. If required, adjust the AM Oscillator L402 so that the generator signal is received by the receiver at 600KHz, as indicated on the dial scale. Adjust the Rod Antenna core L451 located at the end of the antenna rod assembly for maximum output as indicated on the scope/VTVM.

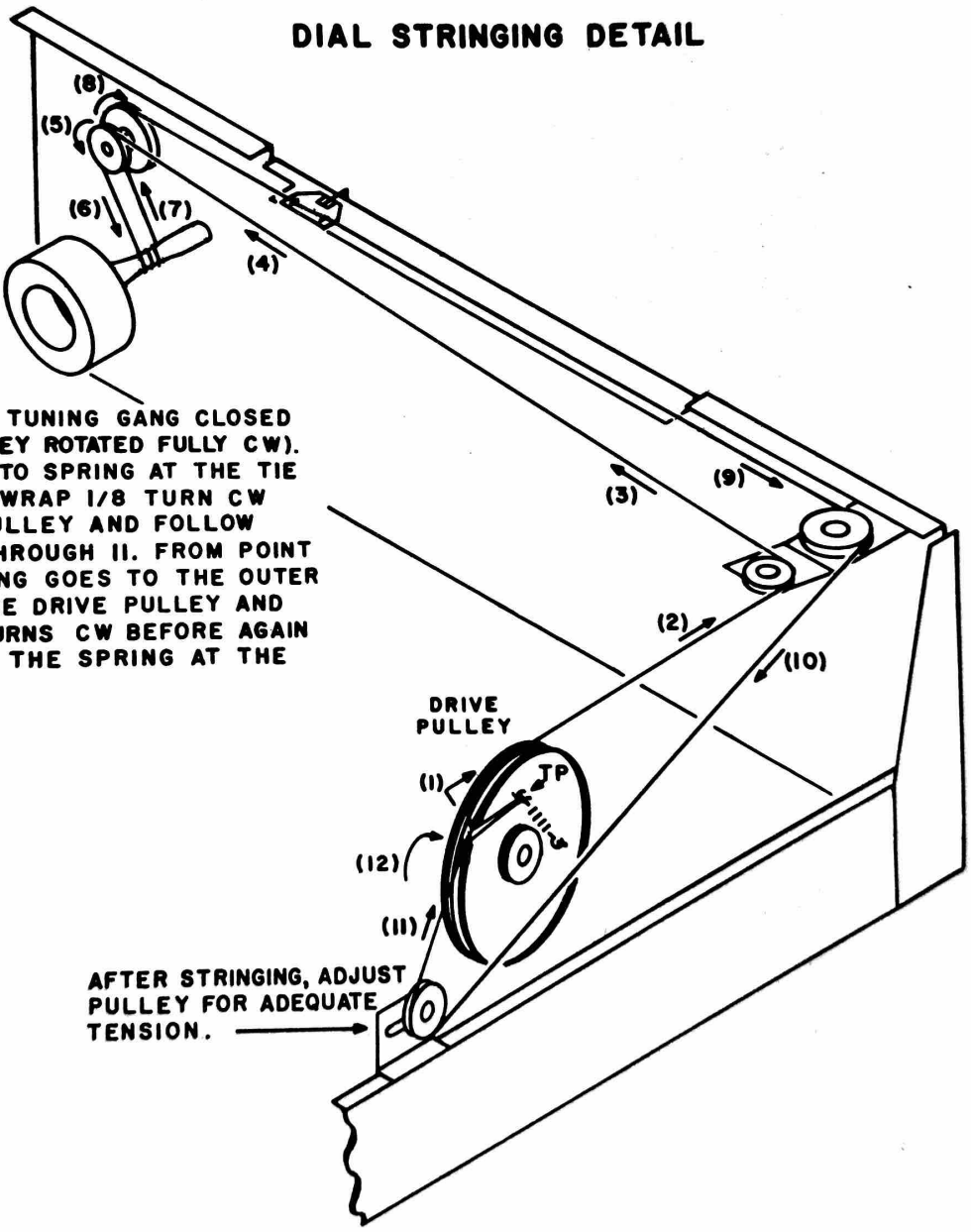
4. Tune the receiver and generator to a point of no interfering signal near 1400MHz. Check the dial calibration and if necessary adjust the AM Oscillator Trimmer TC106 for optimum dial calibration. Adjust the Antenna Trimmer TC105 for maximum output.

5. Repeat Steps 3 and 4 until no further improvement is obtained.

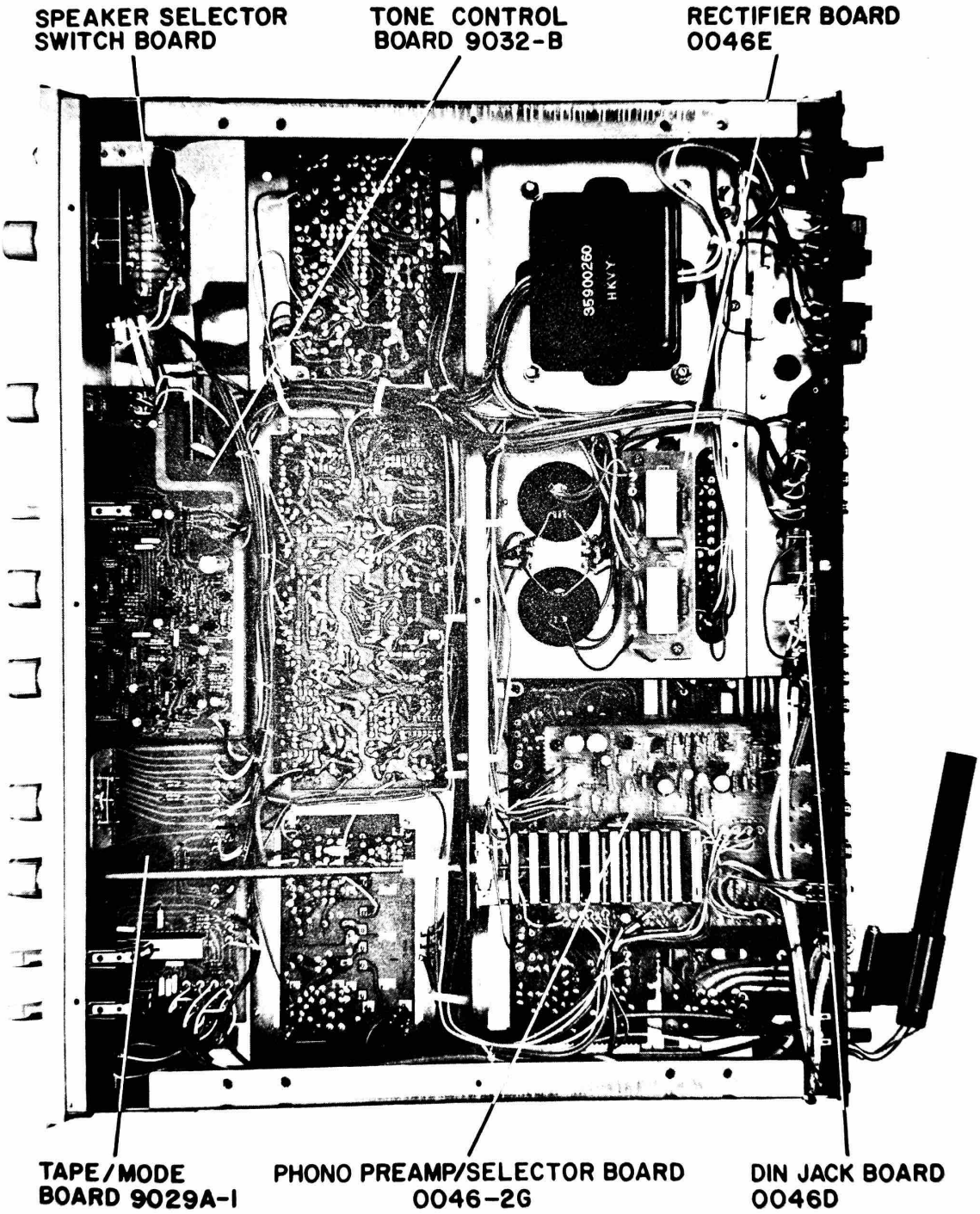
SIGNAL METER CALIBRATION: Adjust potentiometer VR401 for a 4½ division meter deflection with a 10KuV signal generator input.

AM OUTPUT LEVEL: When all AM adjustments are completed, adjust VR402 for an output of 120mV (30% modulation) at any REC Output jack.

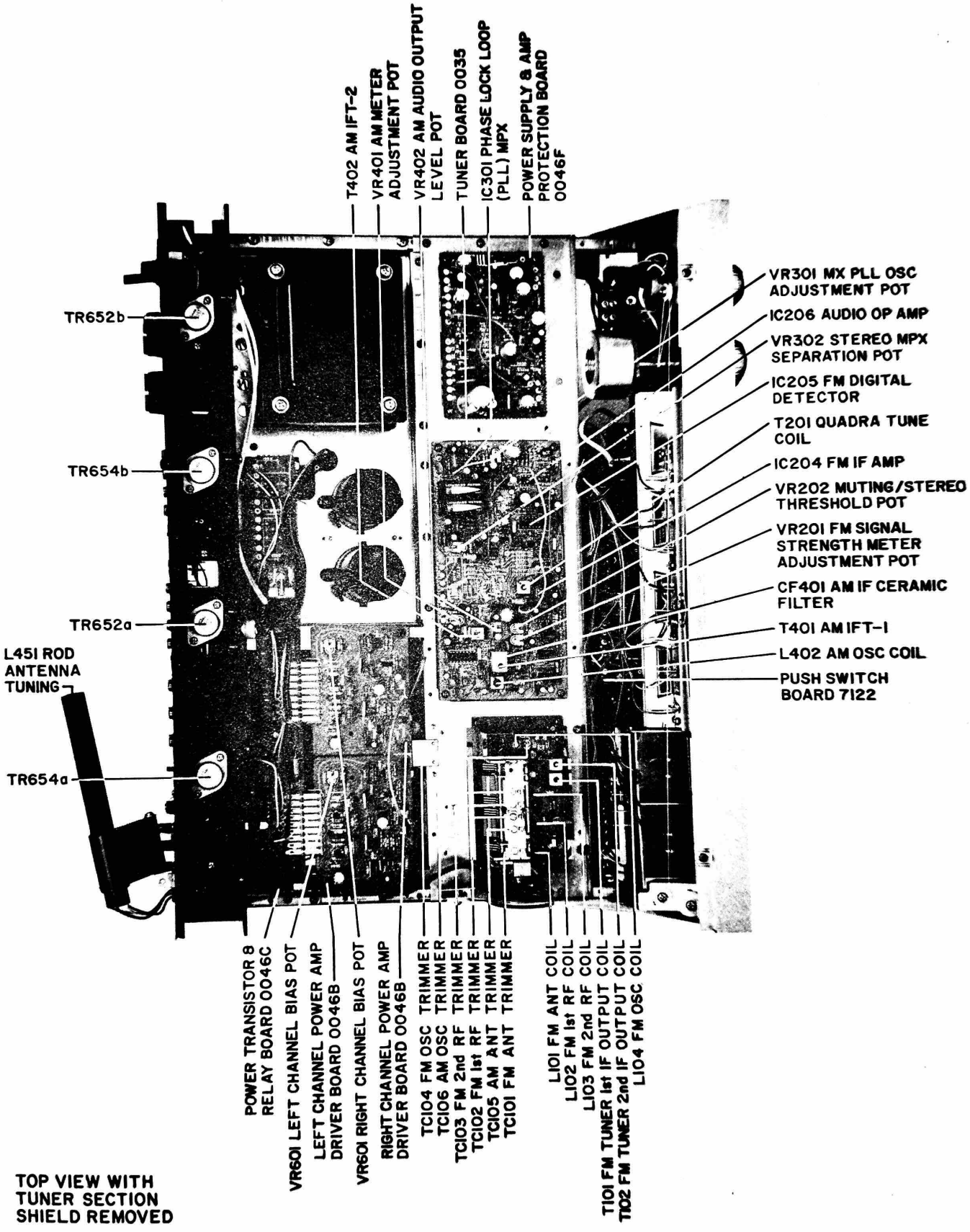
## DIAL STRINGING DETAIL



# PART LOCATION PICTORIALS




**BOTTOM VIEW**




TOP VIEW WITH TUNER SECTION SHIELD REMOVED

# SPECIFICATIONS *

## PREAMPLIFIER

OUTPUT LEVEL (to drive main amp.): 1.0V
OUTPUT CAPABILITY FROM 20-20,000 Hz WITH LESS THAN 0.08% TOTAL HARMONIC DISTORTION: 3V
OUTPUT CAPABILITY WITH LESS THAN 0.08% INTERMODULATION DISTORTION (60/7000Hz, 4:1): 3V
INPUT SENSITIVITY (and Impedance) FOR RATED OUTPUT @ 1KHz:
- Phono 1: 2.0mV (47K Ohm/220pf)
- Phono 2: 2.0mV, 4.0mV, 8.0mV selectable (47K Ohm/220pf)
- Aux: 160mV (50K Ohm)
- Tape Monitor 1 & 2: 160mV (50K Ohm)
- 4-CH Adapter: 160mV (50K Ohm)

PHONO INPUT CAPABILITY° FOR 0.08% THD @ 16V,

| RECORD OUTPUT: | (1000Hz) | (10,000Hz) |
|---|---|---|
| Phono 1: | 200mV | 975mV |
| Phono 2 (with Input Sensitivity Selector Switch): Hi: | 200mV | 975mV |
| Med: | 400mV | 1950mV |
| Lo: | 750mV | 3650mV |

INPUT CAPABILITY FOR 0.08% THD, 1000Hz:
- Aux: Greater than 10V
- Tape Monitor 1 & 2: Greater than 10V
- 4-CH Adapter: Greater than 10V

HUM AND NOISE: (Signal to Noise)(IHF "A" Wtg.)

| | | |
|---|---|---|
| Phono 1: | -68dB | -80dB |
| Phono 2: | -68,-73,-78dB | -80,-85,-90dB |
| Aux: | -85dB | -90dB |
| Volume Minimum: | -90dB | -95dB |
| Referenced to 10mV Input: Phono 1&2: | -82dB | -94dB |

PHONO EQUIVALENT INPUT NOISE:
- Unweighted: -122dBV, 0.79uV
- IHF "A" Weighted: -134dBV, 0.20uV

PHONO GAIN (SENSITIVITY): 38dB(2.0mV), 32dB (4.0mV), 26dB(8.0mV)
AUX GAIN: 16.3dB
RECORD OUTPUT IMPEDANCE: 2K Ohm
DIN RECORD OUTPUT IMPEDANCE: 18K Ohm
FREQUENCY RESPONSE:
- Phono 1&2: ±0.5dB RIAA Standard
- Aux, Tape Monitor 1&2, and 4-CH Adapter: 20-20,000Hz ±0.5dB
- Bass Control: ±14dB @ 50Hz (Detented)
- Treble Control: ±12dB @ 15,000Hz (Detented)
- High Filter: -3dB @ 7000Hz, -20dB @ 20KHz, 12dB/Octave
- Loudness Compensation @ -30dB Setting: +8dB @ 100Hz, +4dB @ 10,000Hz

CROSSTALK: Better than 40dB from 20Hz to 20,000Hz

*All specifications with 120VAC; specifications and design subject to possible change without notice.

°Since the RIAA Standard has a boost of 4.87 @ 10KHz, there is as much freedom from overload at 10KHz as at 1KHz.

## POWER AMPLIFIER

POWER OUTPUT: 70 watts per channel (18.45 dBW), minimum RMS, at 8 Ohms from 20Hz - 20KHz with no more than 0.08% Total Harmonic Distortion
INTERMODULATION DISTORTION:
- Less than 0.08% @ 8 Ohm rated output
- Less than 0.03% @ 20 Watts

INPUT SENSITIVITY (and Impedance) FOR RATED OUTPUT @ 1000Hz: 1.0V (100K Ohm)
FREQUENCY RESPONSE: 5-110,000Hz ±1dB
HUM AND NOISE:
- Signal to Noise: -100dB
- IHF "A" Weighting: -110dB

CROSSTALK: Better than -50dB from 20Hz to 20,000Hz; -65dB @ 1000Hz
DAMPING FACTOR: 50:1 @ 8 Ohm
HEADPHONE OUTPUT: 4 Ohm or greater

## FM TUNER

IHF SENSITIVITY: 9.84dBf (1.7uV)
- Mono Sensitivity for 50dB S/N: 13.86dBf (2.7uV)
- Stereo Sensitivity for 50dB S/N: 34.77dBf (30uV)

TOTAL HARMONIC DISTORTION (THD) @ 1000Hz:
- Mono: 0.15% @ 100% Modulation
- Stereo: 0.3 @ 100% Modulation

SIGNAL TO NOISE RATIO:
- Mono: -70dB
- Stereo: -65dB

CAPTURE RATIO: 1.0dB
ALTERNATE CHANNEL SELECTIVITY (IHF): 80dB
STEREO SEPARATION:
- Better than 45dB @ 1000Hz
- Better than 30dB @ 20-10,000Hz

SPURIOUS RESPONSE REJECTION: -95dB
IF REJECTION: -95dB
AM REJECTION: -65dB
FREQUENCY RESPONSE (Stereo and Mono):
- 20-15,000Hz ±1dB

AUTOMATIC STEREO THRESHOLD: 5uV
MUTING THRESHOLD: 5uV
OUTPUT VOLTAGE @ 100% MODULATION (Stereo and Mono): 1V

## AM TUNER

IHF SENSITIVITY : 28.75dBf (15uV)
TUNING RANGE: 525-1610KHz
SELECTIVITY: 35dB ±10,000Hz
FREQUENCY RESPONSE: -6dB @ 4000Hz
IMAGE REJECTION: -40dB @ 1MHz
IF REJECTION: -40dB @ 1MHz
SPURIOUS RESPONSE REJECTION: -40dB
OUTPUT VOLTAGE @ 30% MODULATION: 120mV

## GENERAL

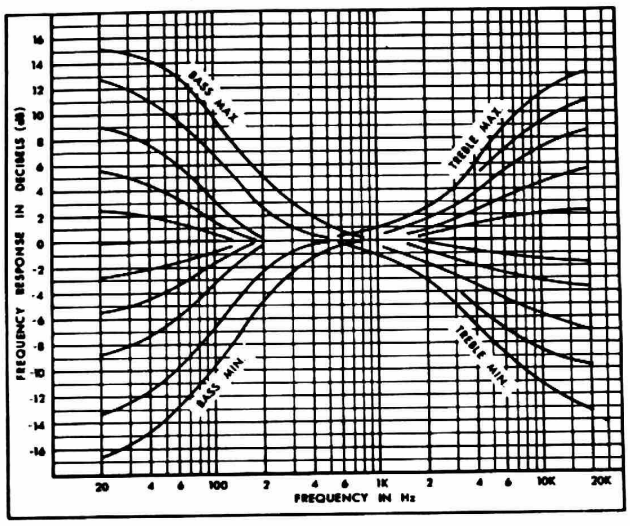
| POWER REQUIREMENTS: | FUSE: |
|---|---|
| Domestic: 115-125VAC, 50/60Hz | 6Amp, 3AG |
| Export: 230VAC, 50/60Hz | 3Amp, 3AG |

(Do not use Slo-Blo fuses)
RATED POWER CONSUMPTION: 30-250 watts

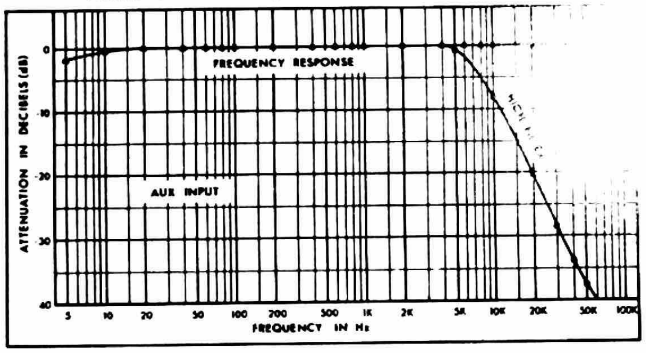
# PERFORMANCE CURVES

## PREAMPLIFIER

TONE CONTROL CHARACTERISTICS

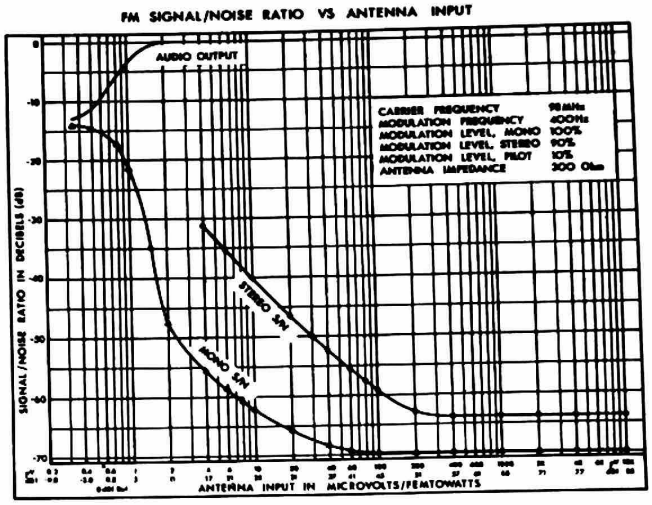



FREQUENCY RESPONSE / HIGH FILTER CHARACTERISTICS

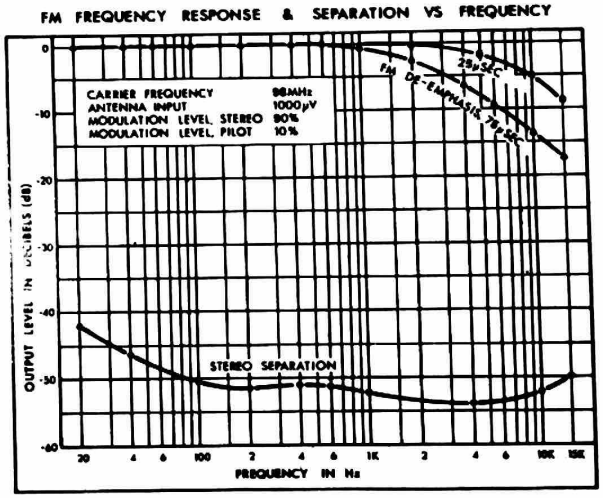



## TUNER

FM SIGNAL/NOISE RATIO VS ANTENNA INPUT

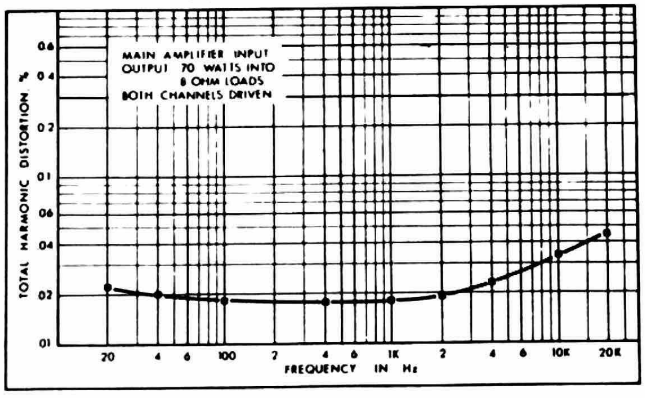



FM FREQUENCY RESPONSE & SEPARATION VS FREQUENCY

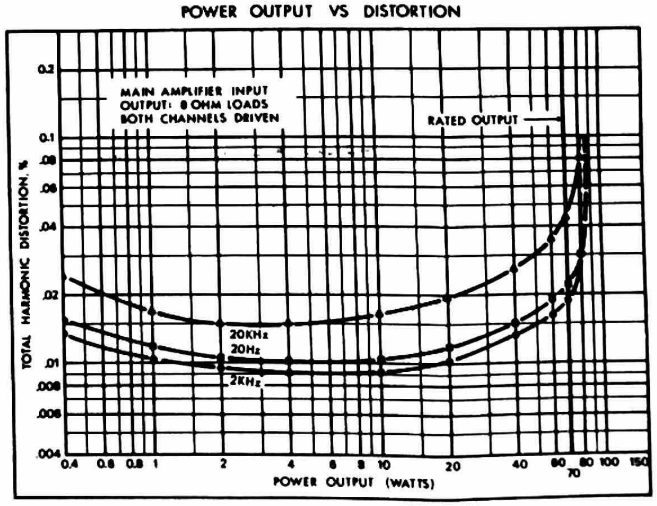



## POWER AMPLIFIER

DISTORTION VS FREQUENCY




POWER OUTPUT VS DISTORTION



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SHERWOOD ELECTRONIC LABORATORIES, INC.
4300 NORTH CALIFORNIA AVENUE, CHICAGO, ILLINOIS 60618

# SHERWOOD RECEIVER MODEL S 75CP REPLACEMENT PARTS

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

| TRANSISTORS & FETS | REFERENCE NO. | PART NUMBER | LIST PRICE |
|---|---|---|---|
| 2SA640E | TR303, 305 | 30000241 | $1.18 |
| 2SA733Q | TR306,307,607a,b; 812,816 | 30000423 | 1.07 |
| 2SA750E,F | TR805 | 30000471 | 1.28 |
| 2SA841BL | TR504a,b; 904a,b; 907 | 30000442 | 1.24 |
| 2SA899B,V | TR604a,b | 30000533 | 1.74 |
| 2SA906G,H | TR501a,b; 502a,b | 30000631 | 1.36 |
| 2SA913 | TR609a,b | 30000501 | 2.40 |
| 2SA942BL | TR902a,b | 30000623 | 1.24 |
| 2SB511E | TR811 | 30100031 | 2.34 |
| 2SB681[PNP OUTPUT] | TR654a,b | 30100111 | 9.05 |
| 2SB560E,F | TR504a,b | 30100041 | 1.58 |
| 2SC536F | TR202, 204, 301, 606a,b; 810 | 30200131 | 1.00 |
| 2SA536G | TR301, 401 | 30200132 | 1.00 |
| 2SC869C | TR801, 802 | 30201251 | 1.36 |
| 2SC930D,E | TR201, 203 | 30200271/272 | 1.07 |
| 2SC945L-P | TR401, 806 | 30201031 | 1.00 |
| 2SC945L-K | TR814, 815 | 30201032 | 1.00 |
| 2SC1222E | TR302, 304 | 30200662 | 1.13 |
| 2SC1400 | TR803, 804, 807 | 30201191 | 1.24 |
| 2SC1583F,G | TR601a,b | 30201172 | 1.61 |
| 2SC1675 | TR103 | 30201121 | 1.00 |
| 2SC1681BL | TR903a,b; | 30201132 | 1.18 |
| 2SC1708F,G | TR503a,b; 602a,b | 30201231 | 1.18 |
| 2SC1904B,V | TR605a,b | 30201241 | 1.72 |
| 2SC1913 | TR608a,b | 30201241 | 2.28 |
| 2SC2089 | TR901a,b | 30201403 | 1.18 |
| 2SD325E | TR809, 813 | 30300151 | 1.76 |
| 2SD330E | TR809 | 30300111 | 1.87 |
| 2SD551[NPN OUTPUT] | TR652a,b | 30300331 | 8.37 |
| 2SD438E,F | TR808 | 30300250 | 1.47 |
| 3SK5P[MOS-FET] | TR101 | 30400141 | 2.22 |
| 3SK45[MOS-FET] | TR102 | 30400071 | 2.75 |

| INTEGRATED CIRCUITS | | | |
|---|---|---|---|
| HA1156 [PLL MPX] | IC301 | 30900260 | 6.44 |
| HA1137 [FM IF, AGC] | IC204 | 30900450 | 6.61 |
| LA1240 [AM RF/IF] | IC401 | 30900460 | 5.79 |
| RC4558DN[Dual OP Amp] | IC207 | | 3.06 |
| RC4559D [Dual OP Amp] | IC206 | 30900520 | 4.10 |
| TA7060P [FM IC] | IC201, 202, 203 | 30900300 | 1.81 |
| MC8601/9601 [FM Det.] | IC205 | | 1.58 |

| DIODES, SIGNAL, POWER, ZENER & LED | | | |
|---|---|---|---|
| 1N60 | D201, 202, 203 | 30600010 | .73 |
| 1S2473 | D205,301,602a,b; 603a,b;604a,b;801, 802,803,804,805, 806 | 30600410 | .60 |
| KB-269 | D204 | 30600490 | 1.00 |
| RD6.3EB [6.2VZ, 400mW] | D601a,b | 30600691 | 1.13 |
| RD13EB [13VZ, 500mW] | D812 | 30600331 | 1.07 |
| RD18EB [18VZ, 500mW] | D808 | 30600630 | 1.07 |
| S5151 [5A, 200 PIV] | D851 | 30600901 | 5.38 |
| S5151R [5A, 200 PIV] | D852 | 30600902 | 5.38 |
| SR1K-2 [1.6A, 100 PIV] | D652,807,810,811 | 30600540 | .92 |
| STV-3H [1.6V Ref.] | D651a,b | 30600881 | 1.70 |
| WZ-050 [5VZ, 500mW] | D208 | 30600931 | 1.07 |
| WZ-140 [14VZ, 500mW] | D809 | 30600911 | 1.07 |

| ELECTROLYTIC CAPACITORS [PC unless otherwise specified] | | | |
|---|---|---|---|
| 0.22 @ 50V[Low-Leakage] | C908a,b | 68145224 | .84 |
| 0.22 @ 50V [Non-Polar] | C303, 305 | 64535224 | 1.07 |
| 0.47 @ 50V | C217,220,222,316, 415,416,604a,b;803 | 64005474 | .60 |
| 0.47 @ 50V [Non-Polar] | C304 | 64535474 | 1.07 |
| 0.47 @ 50V[Low-Leakage] | C901a,b; 904a,b | 68145474 | .84 |
| 0.47 @ 100V | C655b | 67100474 | 1.00 |
| 1 @ 50V | C236,237,309,310, 313,314,414 | 64005105 | .60 |
| 1 @ 50V [Low-Leakage] | C509a,b | 68145105 | .84 |
| 2.2 @ 35V[Low-Leakage] | C709a,b | 68144225 | .84 |
| 2.2 @ 50V[Low-Leakage] | C601a,b | 68135225 | .92 |
| 4.7 @ 25V | C241,307,308,405, 406 | 64003475 | .60 |
| 4.7 @ 25V[Low-Leakage] | C903a,b;910a,b | 68133475 | .92 |
| 10 @ 16V | C233,317,318,902a, 902b | 64002106 | .60 |
| 10 @ 16V [Non-Polar] | C311 | 64532106 | 1.07 |
| 10 @ 16V [Low-Leakage] | C501a,b; 520 | 68142106 | .92 |
| 10 @ 25V | C806, 820 | 64003106 | .60 |
| 22 @ 10V | C232 | 64001226 | .60 |
| 22 @ 25V | C920 | 64003226 | .73 |
| 33 @ 16V | C821 | 64002336 | .73 |
| 33 @ 16V [Non-Polar] | C603a,b | 64532336 | 1.18 |
| 33 @ 35V | C809, 813 | 64004336 | .92 |
| 33 @ 50V | C805, 810 | 64005336 | .92 |
| 47 @ 10V | C228 | 64001476 | .73 |
| 100 @ 6.3V | C607a,b | 64000107 | .73 |
| 100 @ 16V | C814, 818, 508a,b | 64002107 | .92 |
| 100 @ 16V [Non-Polar] | C801 | 64542107 | 1.40 |
| 100 @ 35V | C510, 511, 911 | 64004107 | 1.00 |
| 220 @ 6.3V | C231 | 64000227 | .84 |

S-75CP

| ELECTROLYTICS (Cont) | REFERENCE NO. | PART NUMBER | LIST PRICE |
|---|---|---|---|
| 220 @ 16V | C315,417,804,819 | 64002227 | $1.00 |
| 2200 @ 35V | C817 | 64004228 | 2.87 |
| 10,000 @ 56V | C856, 857 | 50000222 | 16.03 |
| **COILS & TRANSFORMERS** | | | |
| AM ROD ANTENNA | L451 | 35400531 | 5.44 |
| COIL, RF CHOKE, 2.2uH | L105, 106 | 35102228 | .73 |
| COIL, FM OSC. | L104 #116L | 35501166 | 1.40 |
| COIL, FM RF | L102 #127B | 35501272 | 1.47 |
| COIL, FM RF | L103 #128B | 35501282 | 1.47 |
| COIL, FM ANT. | L101 #129A | 35501291 | 1.47 |
| COIL, RF CHOKE, 18uH | L201 | 35109180 | .84 |
| COIL, AM OSC. | L401 #416L | 35504166 | 1.32 |
| COIL, RF CHOKE, 3uH | L651a,b | 35500300 | 1.24 |
| COIL, 38mH | L701a,b | 35500190 | 1.44 |
| TRANSFORMER, FM IF | T101 #111A | 35701111 | 1.40 |
| TRANSFORMER, FM IF | T102 #112A | 35701121 | 1.40 |
| TRANSFORMER, QUADRA-TUNE | T201 #222D | 35702224 | 1.50 |
| TRANSFORMER, FM BALUN | T151 | 35500060 | 1.28 |
| TRANSFORMER & FILTER | T401 [SFL-455A] | 35300016 | 2.69 |
| TRANSFORMER, AM(IFT-2) | T402 #406B | 35704062 | 1.40 |
| TRANSFORMER, POWER | T1 [120V AC] | 35900260 | 63.89 |
| TRANSFORMER, POWER | [120/234V AC] | ** | |
| **ELECTRONIC COMPONENTS** | | | |
| CERAMIC FILTER [SFE10.7MA8] | CF201, 202, 203 204 | 35300012 | 1.61 |
| CERAMIC FILTER [SFD-455C4] | CF401 | 35300017 | 2.11 |
| FILTER, MPX LOW-PASS | LPF301, 302 | 35000070 | 3.92 |
| METER, ZERO-CENTER | M1 | 60100018 | 10.82 |
| METER, SIG. STRENGTH | M2 | 60200017 | 10.82 |
| PILOT LIGHT, 8V/0.25A | | 37008019 | .88 |
| PILOT LIGHT, 8V/0.05A | | 37008035 | .88 |
| POTENTIOMETER, 100KX2 | VR951a,b [Volume] | 28000127 | 6.32 |
| POTENTIOMETER, 100KX2 | VR901a,b [Bal.] | 28000128 | 7.66 |
| POTENTIOMETER, 100KX2 | VR902a,b; 903a,b; [Tone] | 28000129 | 3.04 |
| RELAY, DPDT [Protect] | K1 | 82000100 | 8.78 |
| SWITCH, LEVER | S4 [Tape Monitor] | 27600024 | 3.28 |
| SWITCH, LEVER | S5 [Tape Dubbing] | 27600025 | 3.57 |
| SWITCH, LEVER | S14 [Tone On-Off] | 27600029 | 2.93 |
| SWITCH, PUSH-BUTTON | S15 [Power] | 27200082 | 2.63 |
| SWITCH, 4 PUSH-BUTTON | S9, 10, 12, 13 | 27200104 | 5.97 |
| SWITCH, 2 PUSH-BUTTON | S6, 7 | 27200085 | 2.93 |
| SWITCH, ROTARY, 5 POS. | S3 [Speaker Sel.] | 27100135 | 5.50 |
| SWITCH, ROTARY, 5 POS. | S1 [Phono Board] | 27100133 | 16.38 |
| SWITCH, ROTARY, 5 POS. | S2 [Mode] | 27100132 | 5.50 |
| SWITCH, SLIDE | S8 [Pre-Amp/Main] | 27300011 | 1.66 |
| SWITCH, SLIDE | S11 [Phono Sens.] | 27300012 | 1.72 |
| SWITCH, THERMAL | TM1 [Opens 90°C] | 30700210 | 6.73 |

| ELECTRONICS (Cont) | REFERENCE NO. | PART NUMBER | LIST PRICE |
|---|---|---|---|
| TRIMMER RESISTOR, 1K | VR401 | 28100059 | $1.07 |
| TRIMMER RESISTOR, 100K | VR202 | 28100063 | 1.07 |
| TRIMMER RESISTOR, 5K | VR301 | 28100060 | 1.07 |
| TRIMMER RESISTOR, 50K | VR302 | 28100096 | 1.07 |
| TRIMMER RESISTOR, 10K | VR201, 402 | 28100061 | 1.07 |
| TRIMMER RESISTOR, 100 | VR601a,b | 28100104, | 1.07 |
| TUNER ASSEMBLY, FM | [#1019-1] | B01763A0 | 46.21 |
| **MECHANICAL COMPONENTS** | | | |
| BAR ANTENNA HOLDER | | 63030001 | .84 |
| ESCUTCHEON ASSEMBLY | | 10763A02 | 42.14 |
| DIAL DRUM | | 21008003 | 1.72 |
| DIAL POINTER ASSY., ILLUMINATED | | 25043002 | 4.68 |
| DIAL SCALE | | 20105002 | 6.79 |
| DIAL SHAFT AND FLYWHEEL | | 23046001 | 7.43 |
| FEET, PLASTIC | | 84251001 | .41 |
| FUSE HOLDER [Line Fuse] | | 34032001 | 1.74 |
| GROUND TERMINAL AND NUT | | 53012300 | 1.24 |
| JACK, PHONE [Tape IN-Out](Dual) | | 33031500 | 2.87 |
| JACK, PHONE [Stereo Headphones] | | 33031600 | 1.70 |
| KNOB, LARGE, WITH INDICATOR [Loudness] | | 29235991 | 4.33 |
| KNOB, LARGE, WITHOUT INDICATOR [Tuning] | | 29236001 | 4.39 |
| KNOB, LEVER [Lever switches] | | 29232002 | 2.28 |
| KNOB, PUSH-BUTTON [Power switch] | | 29234001 | 1.44 |
| KNOB, PUSH-BUTTON [Push-Buttons] | | 29233002 | 1.44 |
| KNOB, SMALL, WITH INDICATOR [Balance] | | 29230001 | 1.81 |
| KNOB, SMALL, WITHOUT INDICATOR [Sw., Tone] | | 29229001 | 2.11 |
| RECEPTACLE, AC | | 34049001 | 1.36 |
| RECEPTACLE BOARD, 1 PHONO JACK [4-CH] | | 33010440 | 1.13 |
| RECEPTACLE, 5 PIN DIN JACK | | 34057001 | 1.44 |
| RECEPTACLE BOARD, 8 PHONO JACKS | | 33081340 | 3.51 |
| RECEPTACLE BOARD, 6 PHONO JACKS [for Pre-Amp Board mounting] | | 33060450 | 3.39 |
| SOCKET, POWER TRANSISTOR | | 34061002 | 1.32 |
| TERMINAL BOARD, 3 KNOB POST, 1 SCREW POST [Antenna] | | 53032500 | 2.05 |
| TERMINAL BOARD, 8 SPRING POSTS [Spkr's] | | 53082430 | 9.24 |
| WOODEN CABINET | | 85070003 | 28.00 |
| CARTON, SHIPPING WITH POLYFORMS | | 88763A01 | 5.00 |
| OWNER'S MANUAL | | 94763A11 | 2.50 |

** Request quotation from Sherwood Factory Service Dept.

NOTE: For parts not listed, order parts by Schematic Reference Number, Model S-75CP and Serial Nimber.

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