RCA

# Instructions

RADIO CORPORATION OF AMERICA,
Broadcast and Communications Products

# BW-74 STEREO MONITOR

MI 560317



IB-31520-P



Tmk(s) ®

## EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or if evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Report all shortages and damages to RCA, Broadcast and Television Department, Camden 2, N. J.

Radio Corporation of America will file all claims for loss and damage on this equipment so long as the inspection report is obtained. Disposition of the damaged item will be furnished by RCA.

## REPLACEMENT PARTS AND ENGINEERING SERVICE

RCA field engineering service is available at current rates. Requests for field engineering service may be addressed to your RCA Broadcast Field Representative or the RCA Service Company, Inc., Broadcast Service Division, Camden, N. J. Telephone: WOodlawn 3-8000.

When ordering replacement parts, please give symbol, description, and stock number of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part. However, it will be a satisfactory replacement differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment. Parts with no stock numbers are standard components. They are not stocked by RCA and should be obtained from your local electronic parts distributor.

The following tabulations list service parts and electron tube ordering instructions according to your geographical location.

### SERVICE PARTS

| LOCATION | ORDER SERVICE PARTS FROM: |
|---|---|
| Continental United States, including Alaska and Hawaii | RCA Parts and Accessories Department, P.O. Box 654, Camden, New Jersey or through your nearest RCA Regional Office. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg. 60, Camden, N. J. (Telephone: WO 3-8000). |
| Dominion of Canada | RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office. |
| Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada | RCA International Division, Clark, N. J., U.S.A. or through your local Sales Representative. |

### ELECTRON TUBES

| LOCATION | ORDER ELECTRON TUBES FROM: |
|---|---|
| Continental United States, including Alaska and Hawaii | Local RCA Tube Distributor. |
| Dominion of Canada | RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office. |
| Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada | Local RCA Tube Distributor or from:<br>Tube Department<br>RCA International Division<br>30 Rockefeller Plaza<br>New York 20, New York, U.S.A. |

## RETURN OF ELECTRON TUBES

If for any reason, it is desired to return tubes, please return them through your local RCA tube distributor, RCA Victor Co. Ltd., or RCA International Div., depending on your location.

*Please do not return tubes directly to RCA without authorization and shipping instructions.*

It is important that complete information regarding each tube (including type, serial number, hours of service and reason for its return) be given. When tubes are returned, they should be shipped to the address specified on the Return Authorization form. A copy of the Return Authorization and also a Service Report for each tube should be packed with the tubes.

## LIST OF RCA SALES OFFICES

*Atlanta 3, Georgia*
1121 Rhodes-Haverty Bldg.
134 Peachtree St. N.W.
524-7703

*Dedham, Mass.*
Dedham Office Park
866 Washington St.
DAvis 6-8850

*Camden 2, N. J.*
Building 15
WOodlawn 3-8000

*Charlotte 4, N. C.*
504 Charlottetown Mall
333-3996

*Chicago 54, Ill.*
Merchandise Mart Plaza
Room 2000 — 467-5900

*Cleveland 15, Ohio*
1600 Keith Bldg.
CHerry 1-3450

*Dallas, Texas*
7901 Carpenter Freeway
MElrose 1-3050

*Detroit 39, Mich.*
12605 Arnold St.
KEnwood 4-5100

*Burbank, Calif.*
2700 Olive Street
849-6741

*Indianapolis, Ind.*
501 N. LaSalle St.
MElrose 6-5321

*Kansas City 14, Missouri*
7711 State Line Road
EMerson 1-6770

*Memphis, Tenn.*
3189 Summer Ave.
FAirfax 4-4434

*New York 20, New York*
36 W. 49th St.
MU 9-7200

*Portland 12, Oregon*
1841 N.E. Couch St.
232-5343

*San Francisco 2, Calif.*
420 Taylor St.
ORdway 3-8027

*Seattle 4, Washington*
2250 First Ave., S.
MAin 2-8350

*Washington 6, D. C.*
1725 K St., N.W.
FEderal 7-8500

*West Palm Beach, Fla.*
645 S. Military Trail
683-2219

# INSTRUCTIONS

# BW-74 STEREO MONITOR

## MI 560317

RADIO CORPORATION OF AMERICA
BROADCAST AND COMMUNICATIONS PRODUCTS, CAMDEN, N. J.

PRINTED IN USA
MT-634

IB-31520-P


Figure 1. Front View of BW-74 Stereo Monitor

# TECHNICAL DATA

## Composite Input

Impedance: 2 megohm
Sensitivity: 1 to 2.5 volts p-p

## Outputs - Left and Right

Audio
- Monitoring Circuit:
  - Source Impedance: 600 ohms bal.
  - Level: 1 volt
- Distortion Meter Circuit:
  - Source Impedance: 20,000 ohms
  - Level: (at 100% modulation) 4 v
  - Frequency Response (30-15,000 cps): ±0.5 db max.[1]
  - Distortion (30-15,000 cps): 1.0% max.
  - Noise Level: -65 db max.[2]

Composite Output:
- Source Impedance: 500 ohms
- Level: 0.75 to 2 volts
- Frequency Response (20-100,000 cps): 0.2 db
- Distortion: 0.25% max.

Stereo Phones Output:
- Source Impedance: 20,000 ohms
- Level: 2.0 volts

## Modulation Indication - Left or Right

Accuracy: 5%
Frequency Response (30 to 15,000 cps): ±0.5 db

## Pilot Injection:

Accuracy: ±1%
Range: 6 to 10%

## Separation

Left to Right: 40 db 30-15,000 cps
Right to Left: 40 db 30-15,000 cps

67 kc (SCA) into Left Channel: 65 db
67 kc (SCA) into Right Channel: 65 db

## Power Requirements

105-125 volts AC, 50/60 cps, single phase, 85 watts

## Fuse

1 amp, Slo-Blo

## Ambient Temperature Range

0 to 45° C.

## Over-all Dimensions

Height: 8-3/4"
Width: 19"
Depth: 11"

## Mounting

Standard 19-inch rack

## Weight

40 Pounds

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[1] Audio frequency response referred to 75 microsecond de-emphasis curve.

[2] Referred to 90% modulation, at 400 cps.

## TUBE AND DIODE COMPLEMENT

| Symbol | Type | Function |
|---|---|---|
| V1 | 12AT7 Tube | Composite Amplifier |
| V2 | 6C4 Tube | Phase Splitter |
| V3 | 6C4 Tube | L-R Amplifier |
| V4 | 6C4 Tube | Phase Inverter |
| V5 | 12AU7 Tube | Right Audio Amplifier |
| V6 | 12AX7 Tube | Right Audio Amplifier |
| V7 | 6SN7 Tube | Right Monitor and Meter Amplifier |
| V8 | 6AG5 Tube | Pilot Amplifier |
| V9 | 5BQ7 Tube | 38 kc Push-Pull Oscillator |
| V10 | 5BQ7 Tube | Relay Control and Pilot Meter Amplifier |
| V11 | 12AX7 Tube | Left Audio Amplifier |
| V12 | 6SN7 Tube | Left Monitor and Meter Amplifier |
| V13 | OA2 Tube | Voltage Regulator |
| V14 | OA2 Tube | Voltage Regulator |
| V15 | OB2 Tube | Voltage Regulator |
| D1 | 1N87 Diode | Meter Rectifier |
| D2 | 1N3604 Diode | Meter Rectifier |
| D3 | 1N3604 Diode | 19 kc Rectifier |
| D4 | 1N3604 Diode | 19 kc Rectifier |
| D5 | 1N3604 Diode | Modulation Diode |
| D6 | 1N3604 Diode | Modulation Diode |
| D7 | 1N3604 Diode | Modulation Diode |
| D8 | 1N3604 Diode | Modulation Diode |
| D9 | 1N87 Diode | Meter Rectifier |
| D10 | 1N3604 Diode | Meter Rectifier |
| D11 | 1N3604 Diode | 19 kc Pilot Meter Rectifier |
| D12 | 1N3604 Diode | 19 kc Pilot Meter Rectifier |
| SR1 | 1N2095 Diode | Silicon Power Rectifier |
| SR2 | 1N2095 Diode | Silicon Power Rectifier |
| SR3 | 1N2095 Diode | Silicon Power Rectifier |
| SR4 | 1N2095 Diode | Silicon Power Rectifier |

## DESCRIPTION

General:

The RCA Type BW-74 FM Stereo Monitor has been developed for FM broadcast stations which feature stereo programming. The BW-74 is to be used in conjunction with the RCA BW-73A, McMartin TBM-3500 and TBM-4000 main channel monitors, or the equivalent for complete stereo monitoring.

The left and right modulation meters will separately indicate total left and right modulation. The left meter will also indicate pilot injection with the function switch in the pilot position. The BW-74 in conjunction with a distortion and noise meter may also be used for distortion and noise measurements and for separation between left and right channels.

In addition to the modulation meters, the stereo monitor incorporates a pilot indicator light which will indicate when the pilot modulation is on. The indicator light threshold is adjustable.

Terminal strips, mounted on the rear of the chassis, provide connections for the following:

1. Aural monitoring of either left or right channel.
2. External distortion meter.
3. External (remote) right channel metering.
4. External (remote) left channel metering.

Complete stereo composite information is present at the BNC connector located on the front panel. An oscilloscope may be connected for direct viewing. This will be a true display of the input signal to the BW-74.

Controls:

For simple operation there are only two controls located on the front panel — a function switch for pilot injection reading or left modulation; and the phase control (screwdriver adjustable) for internal phase calibration.

Circuit Description:

The stereo signal is fed to the input of the first half of V1A, a 12AT7 tube which is used as a cathode follower with a very high input Z so as not to load the detector circuits in the main channel receiver or monitor. The output of this cathode follower is low and is fed through a 40 ufd capacitor (C2) to the level control and to the composite output jack located on the front panel. R-4 level control is adjusted to feed the correct level of signal for calibration. The signal is fed to the grid of the second half of V1. The input Z of this section is also high. Regardless of the settling of R4, the frequency response is not altered in any way. The gain of this stage is approximately 10 db. The 19 kc pilot information is fed through a high-pass filter consisting of R8 and C23, which offers high Z to the lower audio frequencies, keeping them out of the 19 kc circuits. This 19 kc is taken from the arm of the level control R4. Being taken from this low Z source, the loading is negligible.

The composite output from the plate of V1B is fed to a phase splitter V2, again with a high input Z. Two signals — 180° out of phase — appear at the plate and cathode of this tube. The amplitude of these two signals must be exactly the same. R14 is an adjustable control for making this adjustment. The outputs from the plate and cathode are fed through coupling capacitors C6 and C7 to four equal value resistors R15, R16, R17, and R18. The electrical center of R16 and R17 are connected to test point A.

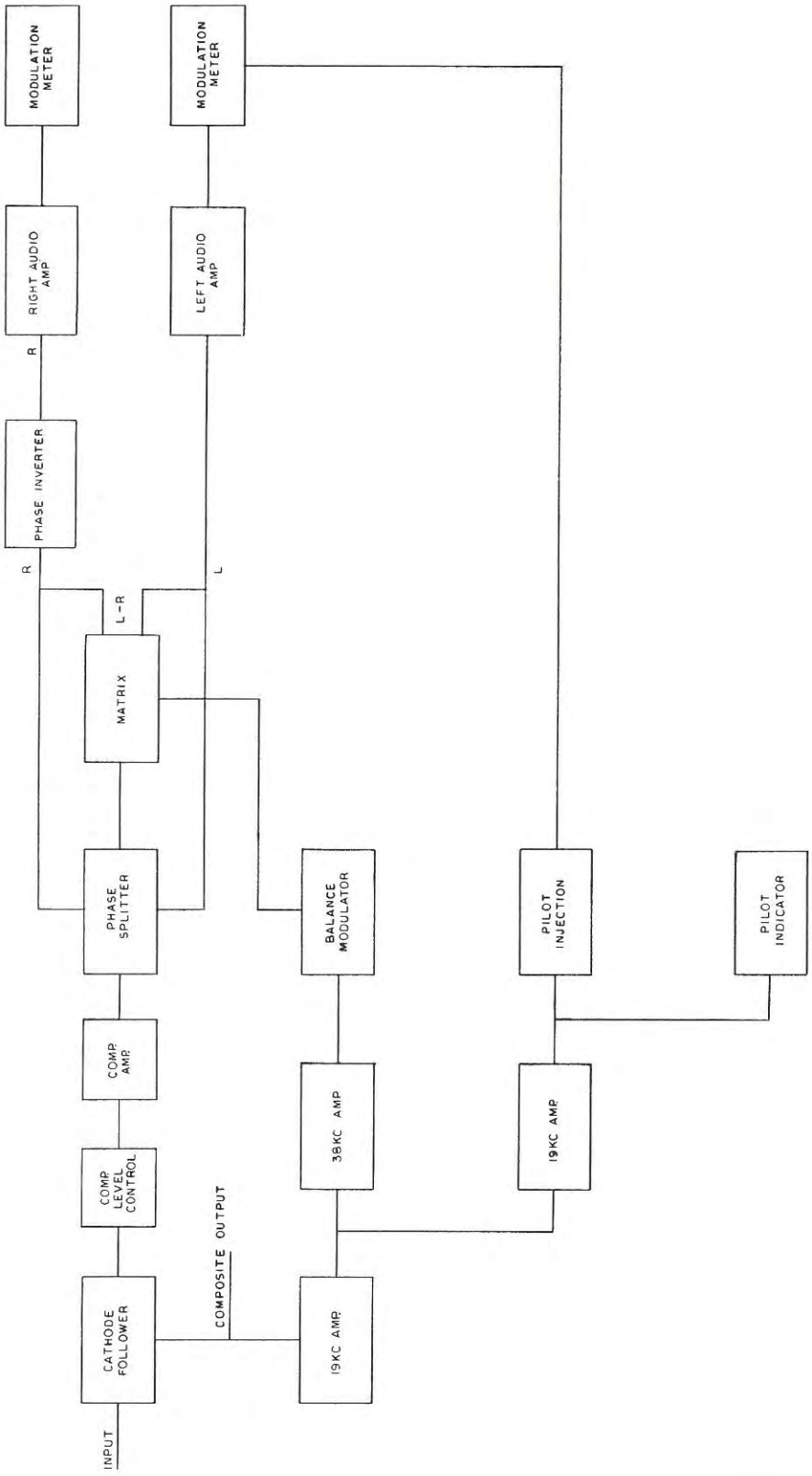



Figure 3. Block Diagram

Now let us go back to the 19 kc signal fed to V-8 (6AG5). A 19 kc peaking coil (L1) with high Q is in the grid circuit of this tube. Another 19 kc peaking coil (L2) in the plate circuit of this tube has eliminated all frequencies except the 19 kc signal. L2 is center tapped. The signals, 180° out of phase are fed through coupling capacitors C28 and C29 to a full wave rectifier which doubles the frequency to 38 kc. These strong 38 kc pulses synchronize the push-pull 38 kc oscillator.

The output of the 38 kc oscillator is transformer coupled to a balanced ring modulator. This modulator is basically a double-pole double-throw switch. Depending on the polarity of the biasing voltage, the switch is thrown from one position to another. These electronic switches are connected to the junctions of R17 and R18 and R15 and R16, alternately shorting these junctions to ground at 38 kc per second.

The 19 kc signal is also fed from L-2 through capacitor C39, a 15 pf capacitor which has very little loading on L2 to V10B where it is again amplified and fed to a voltage doubler and filter to give a DC voltage proportioned to the amplitude of the 19 kc pilot. This DC voltage is used to drive the pilot injection meter. This circuit is stabilized by feedback resistor R119. Also, this DC voltage is fed through R80 to an adjustable potentiometer controlling the relay control tube V10A. This relay closes the B+ circuit of the push-pull oscillator when a pilot signal is received. Voltage is also applied to the pilot indicator light. R82 is the pilot injection calibrate potentiometer. R75 is the relay sensitivity control.

The 38 kc switching pulses from the ring modulator produce an L-R signal at test point A. The L-R is amplified by V3 and is added at the junction of R19 and R24, producing 2R or Right signal. Also adding the L-R at the junction of R21 and R25 will produce 2L or Left signal.

The left and right signals are now fed to their respective left and right amplifiers. Right signal is fed to V5A and left signal to V5B, a dual triode 12AU7. This tube is merely a matching device with an output Z to match the 15 kc low-pass filters. From this point on we will follow the signal through the right amplifier only as both left and right are handled identically.

The output of the low-pass filter is fed to V6A and V6B, a dual triode 12AX7. V6A is the meter amplifier and V6B is the program or monitor amplifier. The output of V6A is fed to V7A (6SN7) which drives the meter network. The gain of this cascade amplifier is controlled by inverse feedback so that the frequency response is not effected by the gain control.

The meter amplifier has approximately 15 db feedback; thereby stabilizing the circuit so it is insensitive to tube changes, voltage, etc., without effecting the accuracy of meter readings. The output of V7A feeds a semi-peak reading voltmeter which is adequate for audio monitoring.

In order to get proper rise time, decay, and overshoot to meet FCC requirements, a circuit is used that is adjustable to accomplish this. C57 and diode D2, in conjunction with R51, is a boost circuit used to get a rapid upswing. Overshoot is controlled by R52 and has little effect on rise time. Decay is controlled by R50. This can produce two meter circuits, left and right, that are identical in characteristics. The left meter is controlled by the function switch and will read injection in the pilot injection position.

Tubes V6B and V7B provide two stages of audio amplification which include 75 μs de-emphasis in a feedback network consisting of R44 and C21. The signal is fed to terminal E of the right audio terminal board. By strapping E and D, the signal is fed to a transformer. This steps down the impedance to 600 ohms. This output appears across B & C on the terminal board. The 600-ohm output is also fed to the patch cord jack on the front panel. A stereo phone jack on the front panel is fed from both the left and right amplifier.

The power supply is conventional with regulated B+ for added stability.

## INSTALLATION

Mounting:

The BW-74 is ready to be mounted in a standard 19-inch rack. Mount the unit next to the BW-73A or equivalent monitor. Connect the AC line cord into a 117-volt power line.

Input:

Connect a short length of low capacity cable from the output of the BW-73A or equivalent to the input jack J1. Caution: The length of this cable should be as short as possible, not over 4 feet in length.

Initial Check and Adjustment:

Prior to shipment from the factory, the monitor received a thorough check-out which included all adjustment and calibration required for optimum performance of the unit. However, after the unit has been rack-mounted and before it is placed into operation, the following checks should be made:

1. Before applying power to the unit, check the mechanical zero setting of each meter. Adjust each mechanical zero setting if necessary.
2. Turn power switch on and allow sufficient time for tube warm-up and stabilization.

## OPERATION

Adjustment of Input Level:

1. Modulate the transmitter with 400 cps sine wave (monaural) 100%, as read on the main channel modulation meter.
2. Adjust the level control on the BW-74 for 100% modulation on the left and right meter. These readings should be identical.

This is all the adjustment required. As a further check, remove the main channel modulation, turn on the 19 kc pilot, switch the function switch to pilot injection, adjust for 10% injection on

the left meter of the BW-74. The modulation meter of the main channel monitor should read close to 10%. Note: This lower portion of the main channel modulation meter may be in slight error.

The unit is now ready for operation. Place the function switch in the pilot injection position. Adjust the pilot amplitude control on the stereo generator until the left meter reads from 8 to 10% injection on the top scale. Turn the function switch back to the left position. Add modulation to the left input of the stereo generator until the left meter reads 90%. The right meter should now read near zero modulation if everything is functioning properly. If you have a reading on the right meter, a slight adjustment of the phasing control may correct this, but use caution before making this adjustment as there may be an error in the composite signal coming into the BW-74. Any such discrepancy should not be corrected by the phase control since this will reduce separation in properly operating equipment.

Connect a wide-band scope to the composite output on the front panel of the BW-74. The display should look like Figure 4A and 4B. If the base line is straight and the pilot phase is correct, refer to Figure 5B for correct pilot phasing. Figure 5A denotes a 45° phase error. If the conditions in Figure 4A and 5B are met, then adjust the phasing control on the BW-74 for minimum reading on the right meter.

If the display looks like Figure 6A or 6B, remember that this error may be in the stereo generator, exciter, or main channel monitor.

Disconnect the input from the main channel monitor and feed the output from the stereo generator directly into the input of the BW-74. The level control will have to be readjusted for proper input. With the level control turned fully clockwise, a composite signal of 1 volt peak-to-peak is required for proper operation. This condition can be met with the RCA BTS-1A.

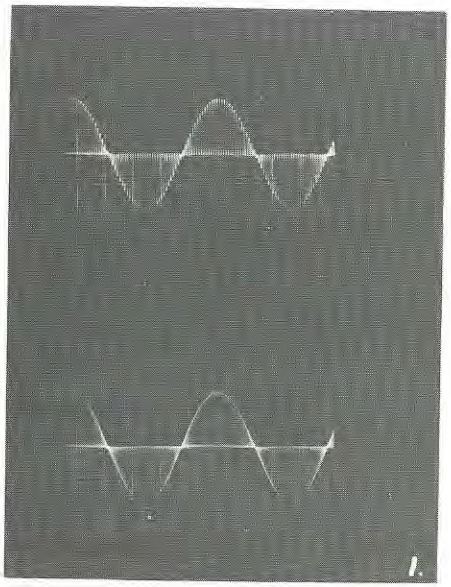


Figure 4. Waveforms Showing Proper Ratio of L+R and L-R (DSB) Signals

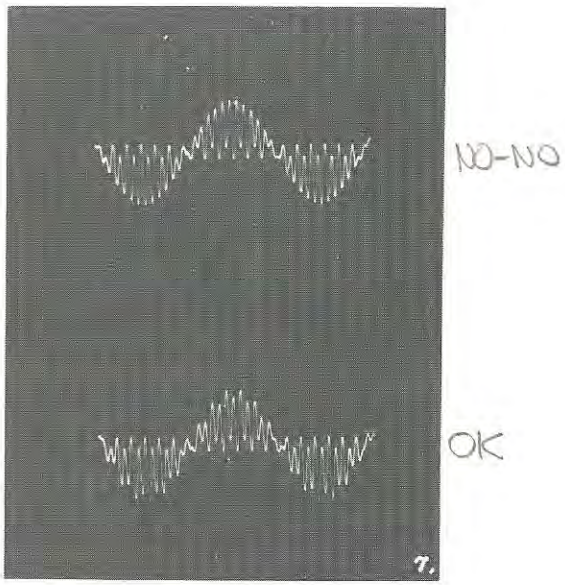



Figure 5. Effects on Composite Signal Due to Pilot Phasing

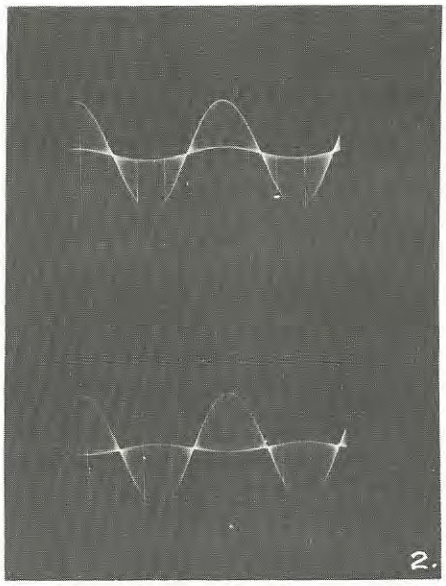



Figure 6. Waveforms Showing Amplitude
of L-R (DSB) Too Low and Too High

If the display looks like Figure 6A or 6B and the pilot phasing is correct, then the trouble is in the exciter or the main channel monitor.

## MAINTENANCE

General:

If the BW-74 fails to function properly, first be sure that the input level is correct. Check B+ voltages. Check the tubes before making any adjustments.

Calibration:

The BW-74 has been properly calibrated at the factory and should not require calibration. However, if the unit requires calibration after a period of time, the procedure given below should be followed:

1. Composite Balance Control R14:

   Feed a 1000 cps audio sine wave signal at 1 volt peak-to-peak into J1. Turn the level control R4 fully clockwise. Note: This must not be changed until all calibrations are completed. Connect a VTVM to test point A. Adjust R14 for minimum voltage at this point.

2. Modulator and Matrix Adjustment:

   Feed a 1 volt peak-to-peak 200 cps sine wave into the input J1. Disconnect the two wires from the 38 kc output transformer that feed the balanced modulator. Caution: Remember that these wires must go back to the same location when finished. Connect

a 6-volt battery across these two points of the balanced ring modulator. Depending on the polarity applied, the left or right meter will read near zero. Adjust the phase control on the front panel for zero. This should be at least 50 db below the reading on the opposite meter. This can be measured with a distortion analyzer connected to the corresponding terminal E on the rear terminal boards.

Switch the frequency of the generator to 8 kc, being sure the input voltage is 1 volt peak-to-peak. Adjust C8 for minimum reading on the distortion analyzer. Repeat the above two steps until no improvement can be made. The separation between the left and right channels and vice versa should be at least 50 db below the other side utilizing frequencies from 50 to 15,000 cps. This setup is simulating exactly the same condition as in operation, except this switching is done at 38 kc per second by the balanced ring modulator. If the two wires from the 38 kc output transformer become reversed, the two channels will be reversed.

3. Adjustment of the L1, L2, and L3:

   a. Remove V8 from the socket.

   b. Remove relay from its socket.

   c. Insert a jumper from pin #8 to pin #5 of the relay socket. This should activate the 38 kc oscillator.

   d. Connect a frequency counter to the outside terminals of the ring modulator A & B.

   e. Adjust L3 for a frequency of 38,000 cps. This is a free-running oscillator and it should stay within 8 to 10 cps of this frequency.

   f. Remove jumper and replace relay and tube V8.

   g. Connect the output of the BTS-1A stereo generator or equivalent to J1.

   h. Turn the pilot amplitude control up until the output of the BTS-1A is 0.1 volt peak-to-peak. The accuracy of this voltage determines the accuracy of the calibration of the BW-74.

   i. Switch the function switch to pilot injection.

   j. Adjust L1 and L2 for maximum reading on the top scale of the left meter:

      1. Adjust R82 located on the top of chassis for a reading of 10% injection.

      2. Adjust R-75 located adjacent to relay for proper relay operation. Relay should release with 5% injection.

4. Adjustment of Left and Right Modulation Meters:

   a. Feed a sine wave (monaural) signal into J1. This should be exactly 1 volt peak-to-peak. The accuracy of this voltage determines the accuracy of the calibration of the BW-74.

   b. Adjust R92 located on the top of the chassis for a reading of 100% modulation of the left meter.

   c. Adjust R37 located on the top of the chassis for a reading of 100% modulation of the right meter.

5. Phasing Control:

   a. The pilot phasing of the stereo generator must be correct. Refer to Figure 5B.

   b. Check this with an oscilloscope at the composite output.

   c. Apply 400 cps modulation to the left channel until meter reads 90%. Note: The waveform must look like Figure 4A. Again the accuracy of this waveform will determine the accuracy of calibration. Now the right meter should read near zero. If a reading is observed, adjust L1 for minimum reading. This should be done with a distortion analyzer connected to terminal E of the right audio output.

6. Proof of Channel Separation:

   The amount of separation in db's is the ratio of the peak-to-peak value of the composite to the baseline variation.

$$\text{Separation in db} = 20 \log \frac{A}{B}$$

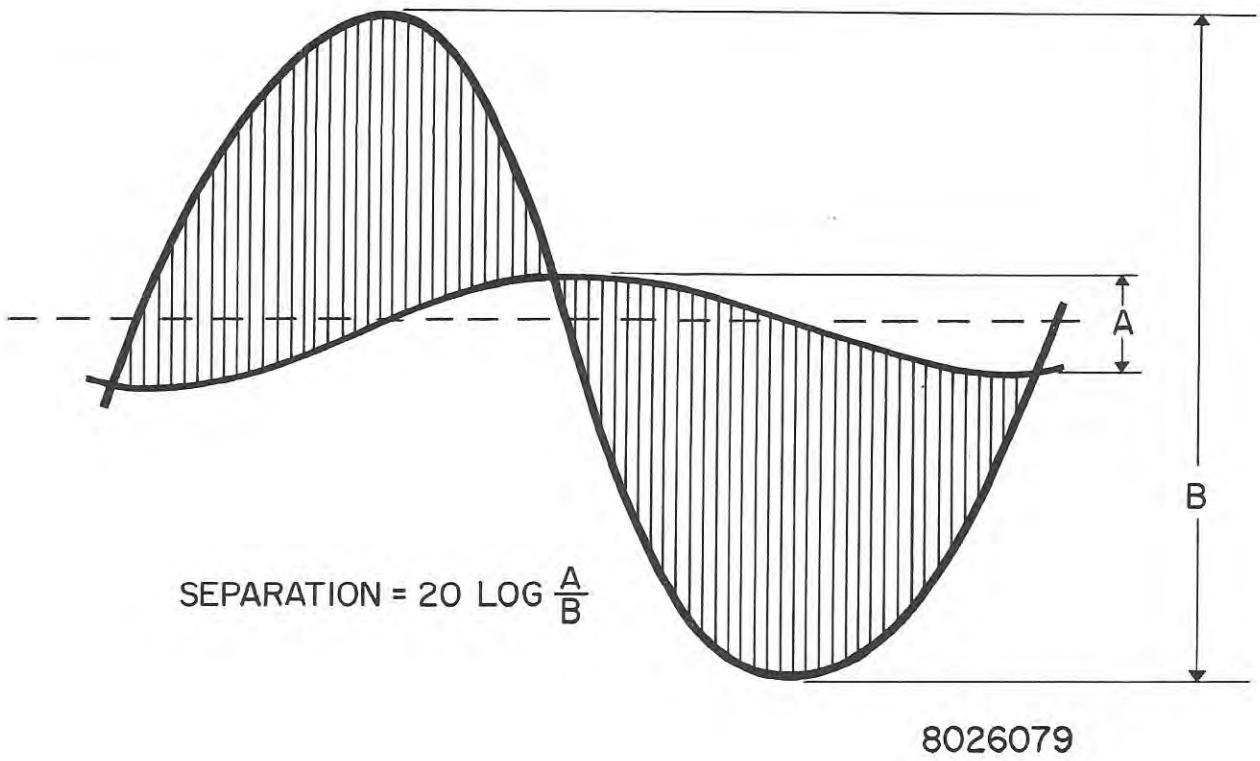



Figure 7. Illustration of Basic Method to Measure Separation

In actual practice, separation losses are attributable to a combination of both amplitude and phase inconsistencies that exist somewhere in the system.

## TYPICAL TUBE SOCKET VOLTAGE CHART
## BW-74 FM STEREO MONITOR

| Tube Symbol | Tube Type | Pin Number | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| V1 | 12AT7 | 83 | 6.1 | 7.8 | GND | GND | 200 | 25 | 35 | 6.3 AC |
| V2 | 6C4 | 95 | GND | 6.3 AC | GND | 95 | 16 | 22 | -- | -- |
| V3 | 6C4 | 45 | GND | 6.3 AC | GND | 45 | 0 | 1.3 | -- | -- |
| V4 | 6C4 | 89 | GND | 6.3 AC | GND | 89 | 20 | 34 | -- | -- |
| V5 | 12AU7 | 128 | 16 | 36 | GND | GND | 129 | 16 | 36 | 6.3 AC |
| V6 | 12AX7 | 110 | 0 | 0.8 | GND | GND | 90 | 0 | 0.45 | 6.3 AC |
| V7 | 6SN7 | 0 | 88 | 2.1 | 0 | 184 | 4.5 | 6.3 AC | GND | -- |
| V8 | 6AG5 | 0 | 1.5 | 6.3 AC | GND | 110 | 110 | 1.5 | -- | -- |
| V9 | 5BQ7 | *244 | *3.8 | *13 | | | *244 | *0 | -- | |
| | | 0 | 0 | 0 | GND | 5 AC | 0 | 0 | 0 | 0 |
| V10 | 5BQ7 | *165 | *0 | * 2 | | | *260 | *0 | | |
| | | 0 | 0 | 0 | GND | 5 AC | 0 | 0 | GND | GND |
| V11 | 12AX7 | 110 | 0 | 0.8 | GND | GND | 90 | 0 | 0.45 | 6.3 AC |
| V12 | 6SN7 | 0 | 88 | 2.1 | 0 | 184 | 4.5 | 6.3 AC | GND | -- |
| V13 | OA2 | 150 | GND | -- | GND | 150 | -- | GND | -- | -- |
| V14 | OA2 | 260 | 110 | -- | 110 | 260 | -- | 110 | -- | -- |
| V15 | OB2 | 110 | GND | -- | GND | 110 | -- | GND | -- | -- |

Voltages measured with a vacuum tube voltmeter (VTVM) from tube socket pins to ground and with no stereo signal.

*Voltages with a 19 kc pilot injection.

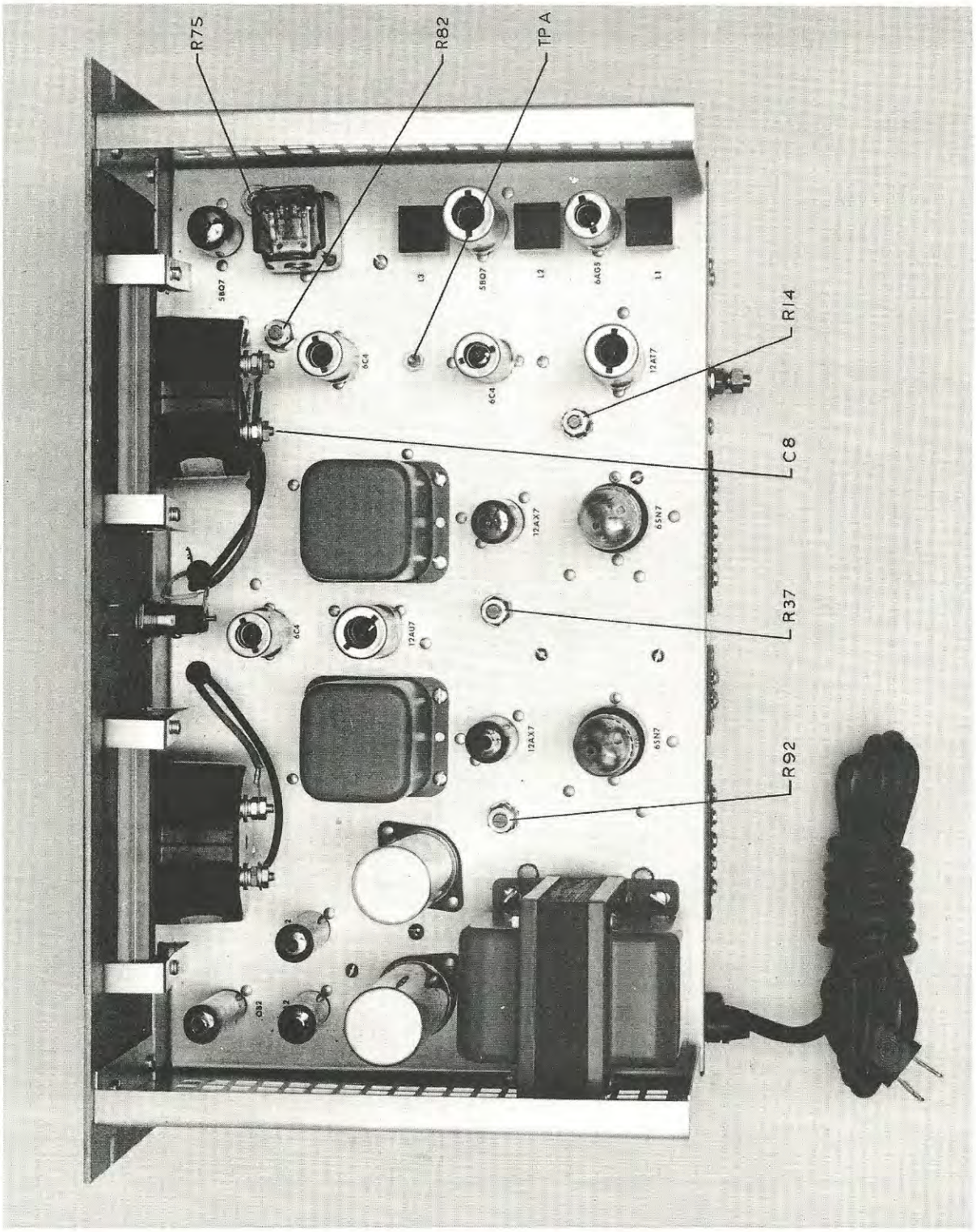
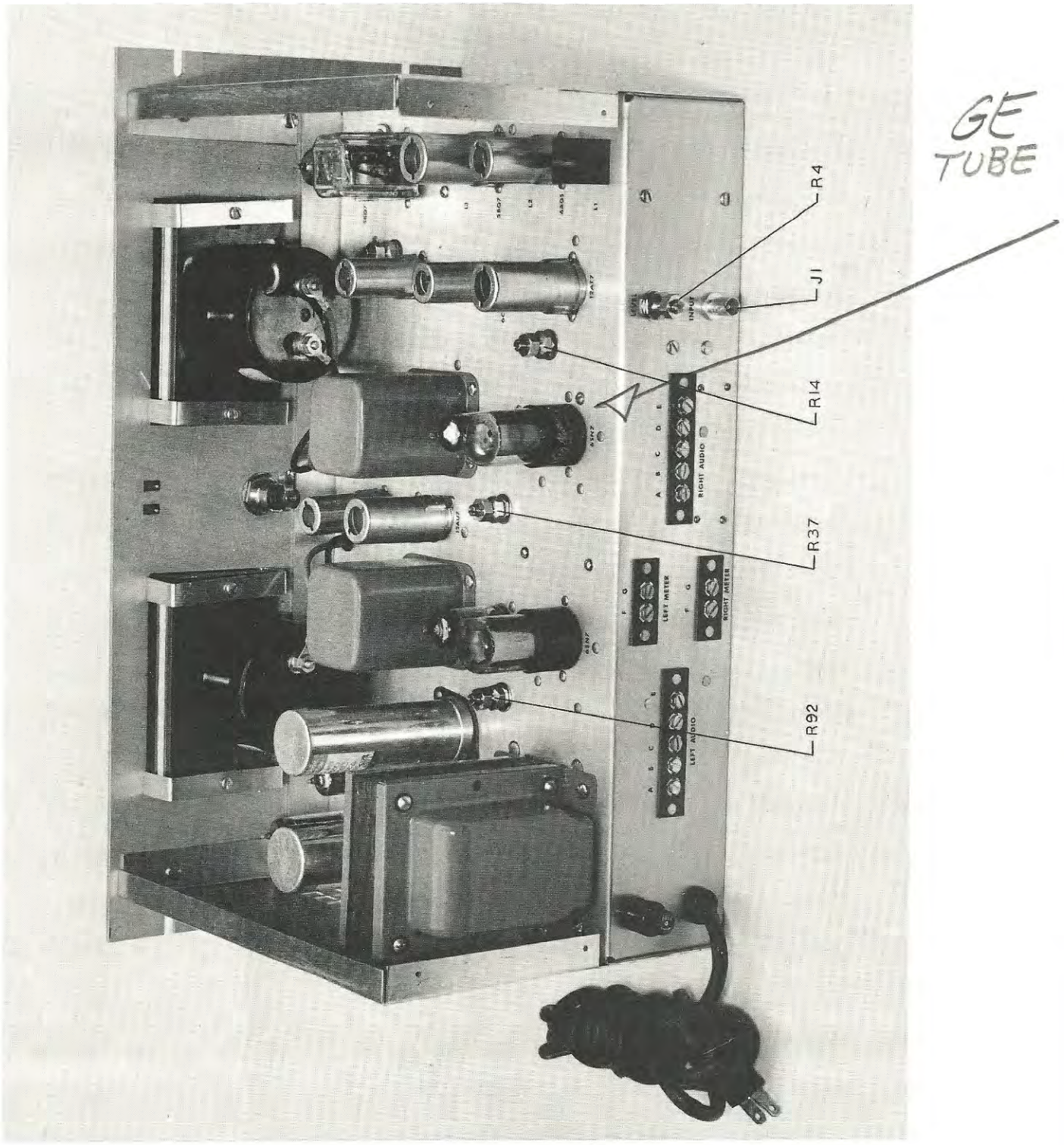



Figure 2. Top View of Stereo Monitor




Rear View of Stereo Monitor

REPLACEMENT PARTS LIST
BW-74

| Symbol | Description | Stock No. |
|---|---|---|
| C-1 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-2 | Electrolytic, 40 mfd, 150 v | 60-2 |
| C-3 | Electrolytic, 40/40/40/40 mfd, 450 v | 60A-13 |
| C-4 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-5 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-6 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |
| C-7 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |
| C-8 | Variable Mica, 360-1000 pf, 600 v | 66-9 |
| C-9 | Nominal Value, Dipped Mica, 47 pf, ±5%, 500 v | 65-23 |
| C-10 | Electrolytic, 10 mfd, 450 v | 60-16 |
| C-11 | Nominal Value, Dipped Mica, 47 pf, ±5%, 500 v | 65-23 |
| C-12 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-13 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-14 | Electrolytic, 40 mfd, 150 v | 60-2 |
| C-15 | Dipped Mica, 470 pf, ±5%, 500 v | 65-25 |
| C-16 | Electrolytic, 50 mfd, 6 v | 60-5 |
| C-17 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-18 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-19 | Electrolytic, 50 mfd, 6 v | 60-5 |
| C-20 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-21 | Dipped Mica, 3600 pf, ±5%, 500 v | 65-37 |
| C-22 | Metalized Paper, 1 mfd, ±10%, 400 v | 63B-7 |
| C-23 | Dipped Mica, 24 pf, ±10%, 500 v | 65-19 |
| C-24 | Variable Ceramic, 7-45 pf, 500 v (Part of L-1) | |
| C-25 | Metalized Paper, 1 mfd, ±10%, 200 v | 63B-3 |

| Symbol | Description | Stock No. |
|---|---|---|
| C-26 | Metalized Paper, .05 mfd, ±10%, 400 v | 63B-6 |
| C-27 | Variable Ceramic, 7-45 pf, 500 v | 66-12 |
| C-28 | Dipped Mica, 330 pf, ±10%, 500 v | 65-13 |
| C-29 | Dipped Mica, 330 pf, ±10%, 500 v | 65-13 |
| C-30 | Dipped Mica, 270 pf, ±5%, 500 v | 65-11 |
| C-31 | Dipped Mica, 220 pf, ±5%, 500 v | 65-18 |
| C-32 | Dipped Mica, 3000 pf, ±5%, 500 v | 65-9 |
| C-33 | Electrolytic, 10 mfd, 450 v | 60-16 |
| C-34 | Electrolytic, 40 mfd, 250 v | 60-12 |
| C-35 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-36 | Dipped Mica, 470 pf, ±5%, 500 v | 65-25 |
| C-37 | Electrolytic, 40 mfd, 150 v | 60-2 |
| C-38 | Electrolytic, 40/40/40/40 mfd, 450 v | 60A-13 |
| C-39 | Dipped Mica, 15 pf, ±5%, 500 v | 65-33 |
| C-40 | Electrolytic, 2 mfd, 25 v | 60-15 |
| C-41 | Mylar, .01 mfd, ±20%, 600 v | 63-23 |
| C-42 | Mylar, .01 mfd, ±20%, 600 v | 63-23 |
| C-43 | Mylar, .01 mfd, ±20%, 600 v | 63-23 |
| C-44 | Dipped Mica, 3600 pf, ±5%, 500 v | 65-37 |
| C-45 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-46 | Metalized Paper, 1 mfd, ±10%, 400 v | 63B-7 |
| C-47 | Electrolytic, 50 mfd, 6 v | 60-5 |
| C-48 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-49 | Metalized Paper, .25 mfd, ±10%, 400 v | 63B-2 |
| C-50 | Electrolytic, 50 mfd, 6 v | 60-5 |
| C-51 | Electrolytic, 10 mfd, 450 v | 60-16 |
| C-52 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |

| Symbol | Description | Stock No. |
|---|---|---|
| C-53 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |
| C-54 | Dipped Mica, 220 pf, ±5%, 500 v | 65-18 |
| C-55 | Dipped Mica, 220 pf, ±5%, 500 v | 65-18 |
| C-56 | Electrolytic, 10 mfd, 450 v | 60-16 |
| C-57 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |
| C-58 | Metalized Paper, 4 mfd, ±20%, 150 v | 63A-1 |
| C-59 | Electrolytic, 10 mfd, 450 v | 60-16 |
| | Resistor, Composition Carbon - Unless Otherwise Specified | |
| R-1 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-2 | 330, ±10%, 1/2 w | 50A-54 |
| R-3 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-4 | Variable, 10 k, ±10%, 2 w | 42-10 |
| R-5 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-6 | 270, ±10%, 1/2 w | 50A-40 |
| R-7 | 3900, ±10%, 1/2 w | 50A-37 |
| R-8 | 150 k, ±10%, 1/2 w | 50A-24 |
| R-9 | 18 k, ±10%, 1/2 w | 50A-51 |
| R-10 | Deposited Carbon, 9090, ±1%, 1/2 w | 54-14 |
| R-11 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-12 | 1500, ±10%, 1/2 w | 50A-3 |
| R-13 | Deposited Carbon, 7500, ±1%, 1/2 w | 54-10 |
| R-14 | Variable, 2500, ±10%, 2 w | 42-4 |
| R-15 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-16 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-17 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-18 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |

| Symbol | Description | Stock No. |
|---|---|---|
| R-19 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-20 | Variable, 100 k, ±10%, 2 w | 42-9 |
| R-21 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-22 | Nominal Value, 47 k, ±10%, 1/2 w, Factory Adjusted | |
| R-23 | Nominal Value, 1000, ±10%, 1/2 w, Factory Adjusted | |
| R-24 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-25 | Deposited Carbon, 40.2 k, ±1%, 1/2 w | 54-11 |
| R-26 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-27 | 2.2 Meg., ±10%, 1/2 w | 50A-17 |
| R-28 | 270, ±10%, 1/2 w | 50A-40 |
| R-29 | Deposited Carbon, 10 k, ±1%, 1/2 w | 50A-1 |
| R-30 | Deposited Carbon, 12.1 k, ±1%, 1/2 w | 54-12 |
| R-31 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-32 | 2.2 Meg., ±10%, 1/2 w | 50A-17 |
| R-33 | 1000, ±10%, 1/2 w | 50A-2 |
| R-34 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-35 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-36 | 270, ±10%, 1/2 w | 50A-40 |
| R-37 | Variable, 1500, ±10%, 2 w | 42-5 |
| R-38 | Nominal Value, 47 k, ±10%, 1/2 w, Factory Adjusted | |
| R-39 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-40 | 220 k, ±10%, 1/2 w | 50A-9 |
| R-41 | Nominal Value, 560, ±10%, 1/2 w, Factory Adjusted | |
| R-42 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-43 | 680, ±10%, 1/2 w | 50A-45 |
| R-44 | 22 k, ±10%, 1/2 w | 50A-4 |
| R-45 | 100 k, ±10%, 1/2 w | 50A-7 |

| Symbol | Description | Stock No. |
|---|---|---|
| R-46 | 680, ±10%, 1/2 w | 50A-45 |
| R-47 | 47 k, ±10%, 1 w | 50A-5 |
| R-48 | 5600, ±10%, 2 w | 52A-9 |
| R-49 | Nominal Value, 3300, ±10%, 1/2 w, Factory Adjusted | |
| R-50 | Nominal Value, 270 k, ±10%, 1/2 w, Factory Adjusted | |
| R-51 | 27 k, ±10%, 1/2 w | 50A-14 |
| R-52 | Nominal Value, 15 k, ±10%, 1/2 w, Factory Adjusted | |
| R-53 | 1500, ±10%, 1/2 w | 50A-B |
| R-54 | Deposited Carbon, 10 k, ±1%, 1/2 w | 54-1 |
| R-55 | 22 k, ±10%, 1/2 w | 50A-4 |
| R-56 | 22 k, ±10%, 1/2 w | 50A-4 |
| R-57 | 150, ±10%, 1/2 w | 50A-19 |
| R-58 | 220 k, ±10%, 1/2 w | 50A-9 |
| R-59 | 220 k, ±10%, 1/2 w | 50A-9 |
| R-60 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-61 | 1200, ±10%, 1/2 w | 50A-35 |
| R-62 | 820 k, ±10%, 1/2 w | 50A-44 |
| R-63 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-64 | 1500, ±10%, 1/2 w | 50A-3 |
| R-65 | 1500, ±10%, 1/2 w | 50A-3 |
| R-66 | 1500, ±10%, 1/2 w | 50A-3 |
| R-67 | 1500, ±10%, 1/2 w | 50A-3 |
| R-68 | 1500, ±10%, 1/2 w | 50A-3 |
| R-69 | 1500, ±10%, 1/2 w | 50A-3 |
| R-70 | 1500, ±10%, 1/2 w | 50A-3 |
| R-71 | 2.2 Meg., ±10%, 1/2 w | 50A-17 |
| R-72 | 1000, ±10%, 1/2 w | 50A-2 |

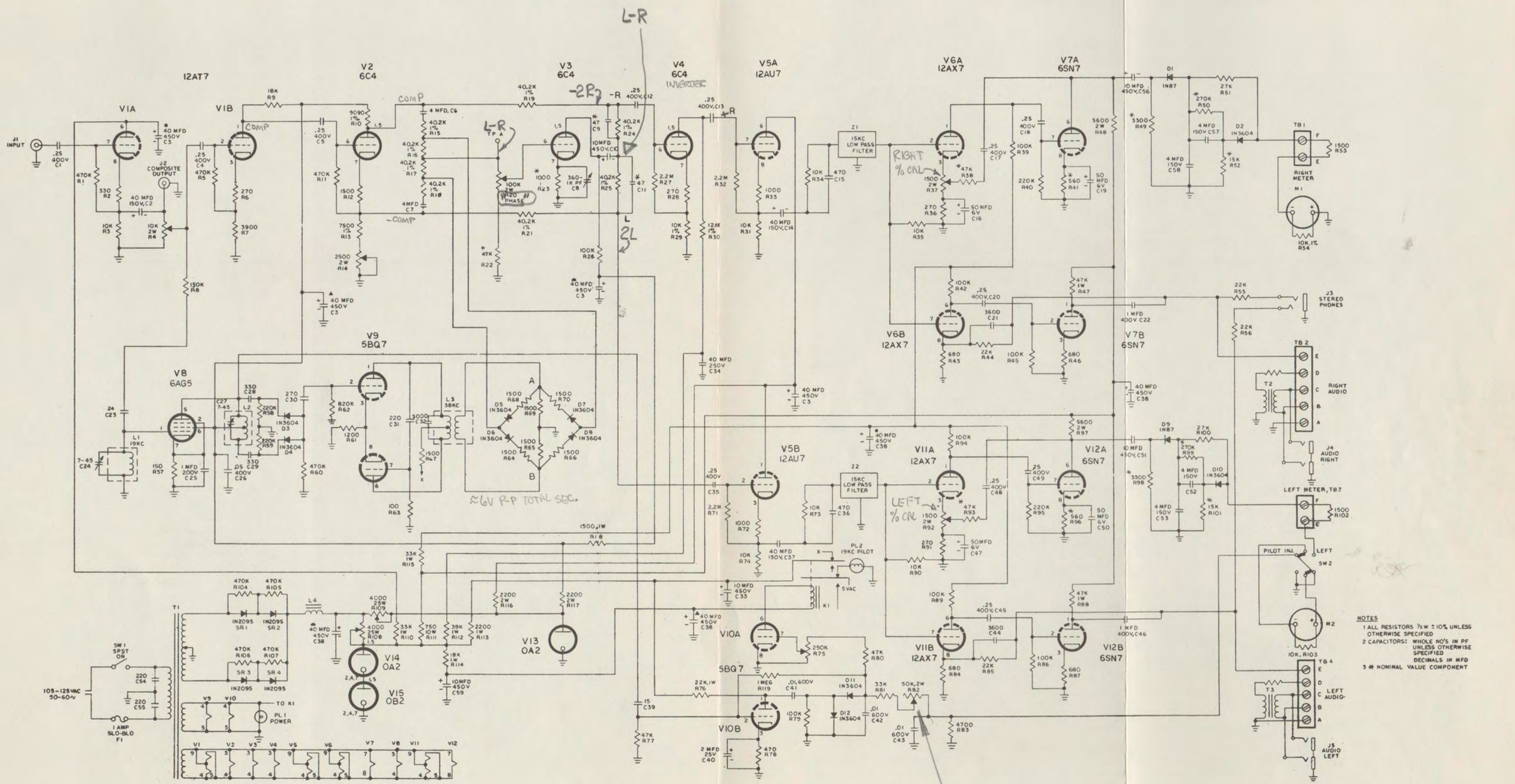
| Symbol | Description | Stock No. |
|---|---|---|
| R-73 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-74 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-75 | Variable, 250 k, ±30%, 1/2 w | 40-8 |
| R-76 | 22 k, ±10%, 1 w | 50A-4 |
| R-77 | 47 k, ±10 %, 1/2 w | 50A-5 |
| R-78 | 470, ±10%, 1/2 w | 50A-1 |
| R-79 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-80 | 47 k, ±10%, 1/2 w | 50A-4 |
| R-81 | 33 k, ±10%, 1/2 w | 50A-22 |
| R-82 | Variable, 50 k, ±10%, 2 w | 42-7 |
| R-83 | 4700, ±10%, 1/2 w | 50A-26 |
| R-84 | 680, ±10%, 1/2 w | 50A-45 |
| R-85 | 22 k, ±10%, 1/2 w | 50A-4 |
| R-86 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-87 | 680, ±10%, 1/2 w | 50A-45 |
| R-88 | 47 k, ±10%, 1 w | 50A-5 |
| R-89 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-90 | 10 k, ±10%, 1/2 w | 50A-25 |
| R-91 | 270, ±10%, 1/2 w | 50A-40 |
| R-92 | Variable, 1500, ±10%, 2 w | 42-5 |
| R-93 | Nominal Value, 47 k, ±10%, 1/2 w, Factory Adjusted | |
| R-94 | 100 k, ±10%, 1/2 w | 50A-7 |
| R-95 | 220 k, ±10%, 1/2 w | 50A-9 |
| R-96 | Nominal Value, 560, ±10%, 1/2 w, Factory Adjusted | |
| R-97 | 5600, ±10%, 2 w | 52A-9 |
| R-98 | Nominal Value, 3300, ±10%, 1/2 w, Factory Adjusted | |
| R-99 | Nominal Value, 270 k, ±10%, 1/2 w, Factory Adjusted | |

| Symbol | Description | Stock No. |
|---|---|---|
| R-100 | 27 k, ±10%, 1/2 w | 50A-14 |
| R-101 | Nominal Value, 15 k, ±10%, 1/2 w, Factory Adjusted | |
| R-102 | 1500, ±10%, 1/2 w | 50A-3 |
| R-103 | Deposited Carbon, 10 k, ±1%, 1/2 w | 54-1 |
| R-104 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-105 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-106 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-107 | 470 k, ±10%, 1/2 w | 50A-10 |
| R-108 | Variable, Wire Wound, 4000, ±10%, 25 w | 53G-6 |
| R-109 | Variable, Wire Wound, 4000, ±10%, 25 w | 53G-6 |
| R-110 | 33 k, ±10%, 1 w | 51A-4 |
| R-111 | Wire Wound, 750, ±10%, 10 w | 53E-10 |
| R-112 | 39 k, ±5%, 1 w | 51B-1 |
| R-113 | 2200, ±10%, 1 w | 51A-10 |
| R-114 | 18 k, ±10%, 1 w | 51A-20 |
| R-115 | 33 k, ±10%, 1 w | 51A-4 |
| R-116 | 2200, ±10%, 2 w | 52A-5 |
| R-117 | 2200, ±10%, 2 w | 52A-5 |
| R-118 | 1500, ±5%, 1 w | 51B-3 |
| R-119 | 1 Meg., ±10%, 1/2 w | 50A-11 |
| | | |
| K-1 | Relay, DPDT 10,000 ohm Coil, Plug-in Type | 70-12 |
| SW-1 | Switch, Bat Handle, Toggle SPST | 48-1 |
| SW-2 | Switch, Rotary-Wafer, 1 Sec., 2 Pos. | 49-1 |
| | | |
| T-1 | Transformer, Power | 939 |
| T-2 | Transformer, Audio | 938 |
| T-3 | Transformer, Audio | 938 |

| Symbol | Description | Stock No. |
|---|---|---|
| L-1 | Coil, 19 kc Peaking | 93-1 |
| L-2 | Coil, 19 kc Doubler | 93-2 |
| L-3 | Coil, 38 kc | 964 |
| L-4 | Choke, Filter, 6 H @ 150 ma | 957 |
| Z-1 | Filter, 15 kc Low Pass | 994 |
| Z-2 | Filter, 15 kc Low Pass | 994 |
| F-1 | Fuse, 1 Amp., 125 v, Slo-Blo, Type 3AG | 1321 |
| J-1 | Connector, Coaxial - Female | 1357 |
| J-2 | Connector, Coaxial - Female | 1357 |
| J-3 | Connector - Female, 2 Conductor, Non-shorting | 1378 |
| J-4 | Connector - Female, 2 Section, 1 Conductor per section | 1379 |
| J-5 | Connector - Female, 2 Section, 1 Conductor per section | 1379 |
| TB-1 | Board, Terminal, 2 Screw Terminals | 1420 |
| TB-2 | Board, Terminal, 5 Screw Terminals | 1461 |
| TB-3 | Board, Terminal, 2 Screw Terminals | 1420 |
| TB-4 | Board, Terminal, 5 Screw Terminals | 1461 |
| M-1 | Meter, Right Modulation, 400 ua | 70-10 |
| M-2 | Meter, Left Modulation & Pilot Inj., 400 ua | 70-11 |
| PL-1 | Lamp, Pilot, 6 v, .20 Amps, Single Contact, Midget Type 328 | 29-3 |
| PL-2 | Lamp, 19 kc, Pilot, 6 v, .15 Amps, Bayonet Type 47 | 29-2 |

| Symbol | Description | Stock No. |
|---|---|---|
| V-1 | Tube, 12AT7 | 30-2 |
| V-2 | Tube, 6C4 | 30-27 |
| V-3 | Tube, 6C4 | 30-27 |
| V-4 | Tube, 6C4 | 30-27 |
| V-5 | Tube, 12AU7 | 30-4 |
| V-6 | Tube, 12AX7 | 30-1 |
| V-7 | Tube, 6SN7 | 30-20 |
| V-8 | Tube, 6AG5 | 30-29 |
| V-9 | Tube, 5BQ7 | 30-31 |
| V-10 | Tube, 5BQ7 | 30-31 |
| V-11 | Tube, 12AX7 | 30-1 |
| V-12 | Tube, 6SN7 | 30-20 |
| V-13 | Tube, 0A2 | 30-15 |
| V-14 | Tube, 0A2 | 30-15 |
| V-15 | Tube, 0B2 | 30-18 |
| | | |
| D-1 | Diode, Germanium, 1N87 | 22-6 |
| D-2 | Diode, Silicon, 1N3604 | 22-5 |
| D-3 | Diode, Silicon, 1N3604 | 22-5 |
| D-4 | Diode, Silicon, 1N3604 | 22-5 |
| D-5 | Diode, Silicon, 1N3604 | 22-5 |
| D-6 | Diode, Silicon, 1N3604 | 22-5 |
| D-7 | Diode, Silicon, 1N3604 | 22-5 |
| D-8 | Diode, Silicon, 1N3604 | 22-5 |
| D-9 | Diode, Germanium, 1N87 | 22-6 |
| D-10 | Diode, Silicon, 1N3604 | 22-5 |
| D-11 | Diode, Silicon, 1N3604 | 22-5 |
| D-12 | Diode, Silicon, 1N3604 | 22-5 |

| Symbol | Description | Stock No. |
|---|---|---|
| SR-1 | Rectifier, Silicon, 1N2095 | 22-1 |
| SR-2 | Rectifier, Silicon, 1N2095 | 22-1 |
| SR-3 | Rectifier, Silicon, 1N2095 | 22-1 |
| SR-4 | Rectifier, Silicon, 1N2095 | 22-1 |




Schematic of BW-74 Stereo Monitor


RADIO CORPORATION OF AMERICA

BROADCAST AND COMMUNICATIONS PRODUCTS

CAMDEN, N. J.