STEREOPHONIC HIGH FIDELITY INSTRUMENTS BY PILOT

OPERATING INSTRUCTION MANUAL

for the

PILOT 264

POWER AMPLIFIER

PILOT RADIO CORPORATION
37-06 36th Street, Long Island City 1, New York.
FOUNDED 1919

92-201

C O N T E N T S

The instrument you have purchased is the result of years of engineering research in sound reproduction. A combination of many skills went into its design and manufacture. The more you know about its operation and functions, the more useful you will find it. The 264 is a precision electronic instrument. The more familiar you become with its operation, the easier it will become, for you, to derive the maximum listening pleasure it has been designed to deliver.

Should any technical question arise that is not covered in this manual, personalized assistance is available to you, by writing or telephoning:

Systems Engineering Manager
Pilot Radio Corporation
37-06 36th Street
Long Island City 1, New York

STillwell 4-5454

I.

GENERAL DESCRIPTION

The Pilot 264 is the finest amplifying instrument available to either the professional audio engineer or the most sophisticated audiophile. Its design and the resulting minimum distortion values make it the ultimate amplifier for a quality music reproducing system.

Only the finest parts have been used in its construction. It has been assembled by skilled technicians. Each instrument has been tested and adjusted for minimum distortion. The final test measurements for each instrument have been recorded - a copy of which accompanies this instrument.

II.

PACKING LIST

The following are packed with each instrument:

1- Warranty Card (To be filled out and mailed within ten days of purchase).

4--Chassis Mounting screws and washers.

1- Center Speaker Level Adjustment Panel

1- Six inch lead for Center Speaker Level Adjustment Panel.

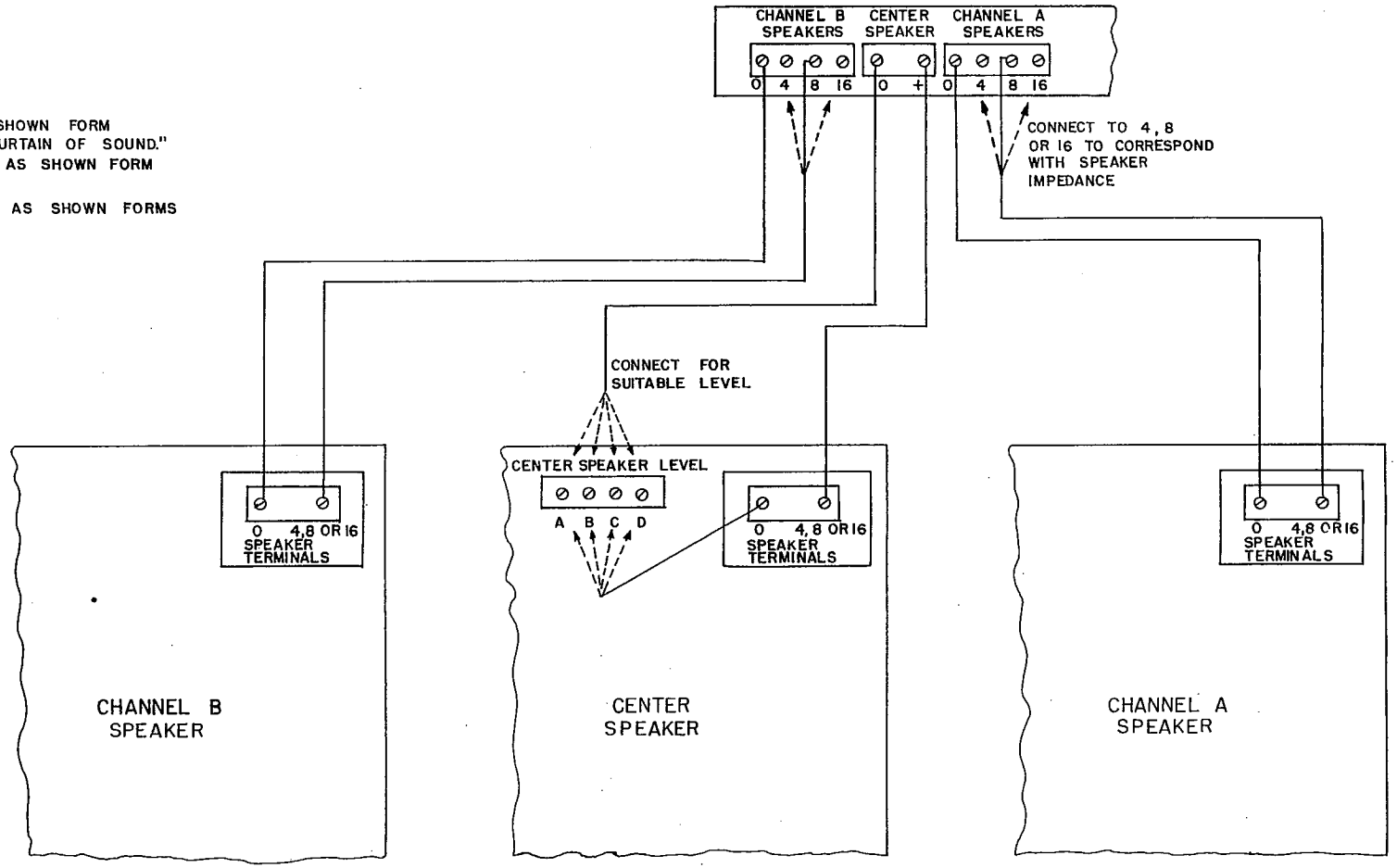
INSTALLATION

The 264 is designed and engineered to operate in its own attractively styled enclosure.

PILOT

"STEREO PLUS" "CURTAIN OF SOUND"

THREE SPEAKERS AS SHOWN FORM "STEREO PLUS" "CURTAIN OF SOUND."
TWO OUTER SPEAKERS AS SHOWN FORM REGULAR STEREO.
ONE CENTER SPEAKER AS SHOWN FORMS MONOPHONIC.



PILOT RADIO CORPORATION LONG ISLAND CITY, NEW YORK		
DATE 9-16-60	APP BY	DWN BY HBA
264	CKD BY Sol A.	
SPEAKER CONNECTIONS		
	DWG NO.	95-204

III.

C O N N E C T I N G

S U B S I D I A R Y E Q U I P M E N T

CAUTION: THE POWER LINE CORD MUST BE PLUGGED INTO A 105-120 VOLT 60 CYCLE, AC LINE ONLY!

CONNECTING A PREAMPLIFIER

The two signal cables from the preamplifier outputs A and B should be connected to the 264 Inputs A and B.

SPEAKER CONNECTIONS

Although the 264 will most often be used in a two speaker stereophonic system it can, because of its "Stero-Plus Curtain-of-Sound" center speaker connections, accommodate more elaborate systems such as Pilot's Exclusive "Curtain-of-Sound" which requires three speakers.

Connections for all speaker arrangements are outlined on Drawing No. 95-204 on Page 4.

CONNECTIONS FOR TWO SPEAKER STEREOPHONIC OPERATION

Connect the left speaker (As viewed from the rear) to the CHANNEL B SPEAKERS terminal strip on the rear apron of the 264. One terminal of the speaker should be connected to the 264 terminal designated "0". The second terminal should be connected to either 4, 8 or 16 to correspond with the impedance of your speaker. In most instances at least one terminal on your speaker will be identified. Usually, this will be the numbered terminal (4, 8 or 16). This numbered terminal should be connected to the like terminal on the 264. Connect the second speaker to the CHANNEL A SPEAKERS terminal strip. If your speaker terminals are not identified, make the connections to the terminals either way. It will be necessary to check the speaker phasing, however, correcting speaker phase is simple and can be easily accomplished after all connections are made and the unit is operating. Refer to paragraph titled SPEAKER PHASING PROCEDURE found in the TECHNICAL AND SERVICE INFORMATION section.

Connections for Three Speaker Sterio - Pilot's "Curtain-of-Sound"

Often, because of room decor or location and size of the listening area, the two speakers in a stereophonic system are widely spaced. This kind of speaker arrangement tends to develop a zone of silence in the center area. A third speaker, placed between the outside speakers can fill this annoying "hole-in-the-middle". The center speaker in a three speaker system should operate at a somewhat lower volume than the other two speakers. If its volume is too high, it will dominate and decrease the stereo effect. If too low, it will not fill the "hole-in-the-middle." What the correct volume will be depends on the placement of the other two speakers and the size of the listening room. Therefore, the volume of this third speaker must be adjustable. The device for making this adjustment is the CENTER SPEAKER LEVEL ADJUSTMENT panel.

First, install the third speaker as follows:

1. Connect the numbered terminal of the speaker, regardless of what its impedance is, to the terminal of the CHANNEL B SPEAKER terminal strip.

2. Connect terminal "0" of the CHANNEL A SPEAKER Terminal strip to terminal A of the CENTER SPEAKER LEVEL ADJUSTMENT panel.

3. Connect the six inch lead between terminal D of the CENTER SPEAKER LEVEL ADJUSTMENT panel and the remaining terminal on your speaker.

When the third speaker is connected as outlined above, it will be set to deliver minimum volume. To increase the volume shift the leads on the CENTER SPEAKER LEVEL ADJUSTMENT panel in the following order:

A and D - Minimum Volume

B and D

C and D

A and C

A and B

B and C

A and A - Maximum Volume

Wood screws have been provided to mount the CENTER SPEAKER LEVEL ADJUSTMENT panel to the back of the center speaker.

IV.

TECHNICAL & SERVICE INFORMATION

DISASSEMBLY OF UNIT FOR SERVICING OR TUBE REPLACEMENT

1. Remove two screws located at the bottom edge of each side.
2. Life enclosure.

No further disassembly is necessary for tube replacement. For internal servicing the bottom plate can now be removed.

SPEAKER PHASING PROCEDURES

When the terminals on your speakers are not indentified, it is necessary to establish whether phase is correct or not, by electrical means, as follows:

1. Feed a monophonic signal through the amplifier.
2. Rotate the balance control on your preamplifier until the apparent source of sound seems to be located midway between the two speakers. If such adjustment cannot seem to be made, reverse the connections of one speaker at the 264 terminal strip and attempt adjustment again. When the adjustment as described is accomplished, phase will be correct.

TECHNICAL ADJUSTMENTS

Adjustment Controls - Independent bias, DC Balance and Signal (AC) Balance controls are provided for each channel.

Though easily reached for adjustment purposes, they are so located on the chassis as to make accidental movement virtually impossible. Additionally, each control is locked by means of a lock nut. All six controls have been adjusted at the factory, to reduce distortion, to an absolute minimum over the entire audio frequency range.

Bias and DC Balance Adjustment

When one ore more output tubes are replaced, it is advisable to check Bias and DC Balance. Slight adjustments will correct for mismatch in output tubes and insure continued low distortion. In order to make these adjustments you will need a (0-3 volts or less) DC Voltmeter. The adjustment procedure is as follows:

1. Remove 5 pin shorting plug from test socket.
2. Remove locknuts from Bias and DC Balance controls.
3. Connect the DC Voltmeter to pins 3 and 4 of the test socket.
4. Adjust Channel B DC Balance control for zero volt reading.
5. Disconnect Voltmeter from pins 3 and 4 and connect to pins 1 and 2.
6. Adjust Channel A DC Balance control for zero volts reading.
7. Connect the positive terminal of the Voltmeter to pin 3 and the negative terminal to chassis.

8. Adjust Channel B Bias control for 0.82 volts DC reading. (This voltage is the drop across a 20 ohm precision resistor when 41 milliamperes cathode current per output tube is flowing).
9. Remove positive Voltmeter terminal from pin 3 and connect to pin 1.
10. Adjust Channel A Bias control for 0.82 volts DC reading.
11. Re-check DC balance (Steps 3-6).
12. Replace shorting plug.
13. Lock all controls.

DISTORTION TESTING INFORMATION

Because of the extremely low distortion of the 264, and its balanced to chassis ground output circuits, the test equipment used in measuring distortion must meet certain rigid requirements to insure accurate results. Following is a discussion of test equipment requirements and test procedure:

In making distortion measurements, the amplifier is fed by a signal generator and its output is measured by a distortion analyzer. Since the analyzer indicates the distortion of not just the amplifier, but the entire system...signal generator, amplifier and the analyzer itself...it is necessary to first make certain that the

distortion of the test equipment is considerably lower than the distortion to be measured from the amplifier. An acceptable value for the residual distortion of the test equipment is 0.1%.

Most Intermodulation Distortion Test Sets combine the signal generator and analyzer on one chassis. If the chassis ground is common to the test signal output and the analyzer input, the input should not be connected directly across the 8 or 16 ohm terminals. Such connection will short circuit part of the output transformer secondary and result in a large measurement error.

For IM measurement take the output voltage, regardless of load, from the ungrounded "0" terminal and the chassis grounded "4" terminal. The load should be connected across the appropriate output terminals. A voltimeter with no grounded terminal should be connected across the load resistor.

DISTORTION MEASUREMENT PROCEDURE

In order to duplicate the factory distortion measurements for this instrument, the test equipment must meet the requirements as outlined in the preceding paragraphs and the following procedure must be adhered to:

1. Adjust the DC Balance and the Bias controls as outlined on Page 10.

2. Connect Harmonic Distortion measurement equipment and drive the amplifier to full output at 1,000 cycles.

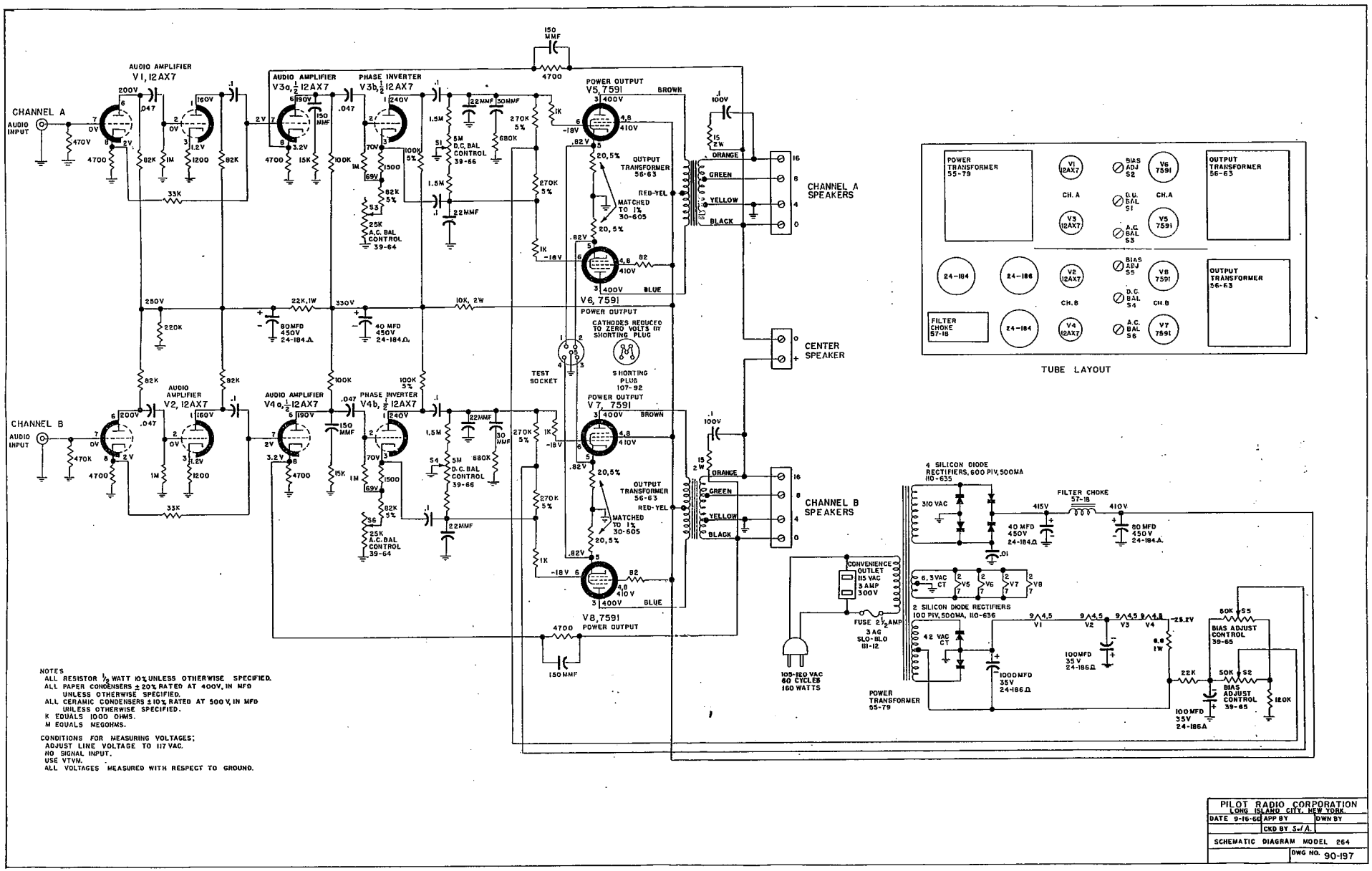
3. Adjust signal (AC) Balance control for minimum distortion. With this control correctly set, the distortion waveform displayed on a scope will be mainly third order distortion.

4. Change input signal frequency to 25 cycles and drive amplifier to full output. Make slight adjustment of DC Balance control to minimize distortion.

5. Change output signal frequency to 15,000 cycles. Drive amplifier to full output and test distortion - Distortion at any frequency between 25 and 15,000 cycles should measure less than 0.5%.

6. Connect SMPTE Intermodulation Distortion test equipment and drive the amplifier to full output.

7. Make a slight adjustment of the Bias control for minimum IM distortion and test - IM distortion for any combination of frequencies between 20 and 20,000 cycles should be less than 0.5%.



NOTES
ALL RESISTOR ½ WATT 10% UNLESS OTHERWISE SPECIFIED.
ALL PAPER CONDENSERS ± 20% RATED AT 400V, IN MFD UNLESS OTHERWISE SPECIFIED.
ALL CERAMIC CONDENSERS ± 10% RATED AT 500 V, IN MFD UNLESS OTHERWISE SPECIFIED.
K EQUALS 1000 OHMS.
M EQUALS MEGOHMS.

CONDITIONS FOR MEASURING VOLTAGES;
ADJUST LINE VOLTAGE TO 117 VAC.
NO SIGNAL INPUT.
USE VTVM.
ALL VOLTAGES MEASURED WITH RESPECT TO GROUND.

PILOT RADIO CORPORATION
LONG ISLAND CITY, NEW YORK
DATE 9-16-60 | APP BY | DWN BY | CKD BY S. of A.
SCHEMATIC DIAGRAM MODEL 264
DWG NO. 90-197

PILOT RADIO CORPORATION - 37-06 36th STREET - LONG ISLAND CITY 1, NEW YORK

CERTIFIED PERFORMANCE DATA

Pilot 264 Power Amplifier

Following are the final test measurements made on instrument Serial No. 269818.

HARMONIC DISTORTION: (Both channels operating delivering 30 watts RMS each).

Channel A:	25 cycles	0.4 %	Channel B:	25 cycles	0.25 %
	1 KC	0.05 %		1 KC	0.05 %
	15 KC	0.5 %		15 KC	0.33 %

INTERMODULATION DISTORTION: (Both channels operating delivering 30 watts equivalent sine wave power each).

60 and 7,000 cycles, 4:1 : Channel A 0.2 % Channel B 0.2 %

FREQUENCY RESPONSE: (Both channels operating delivering 15 watts RMS each - 20 to 20,000 cycles).

Channel A: + 0.5 db, − 0. db.

Channel B: + 0.5 db, − 0. db.

POWER RESPONSE: (Both channels operating delivering 30 watts RMS each - 20 to 20,000 cycles).

Channel A: + 0.5 db, − 0. db.

Channel B: + 0.5 db, − 0. db.

POWER OUTPUT: (At 0.5% distortion with both channels operating).

Channel A:	20 cycles	19 watts	Channel B:	20 cycles	19 watts
	20 KC	32 watts		20 KC	32 watts

These measurements were made using test equipment as specified in IHFM STANDARD A-20 "Methods of Measurement for Amplifiers".

Tester CSK220