

2500  
238



# SERVICE MANUAL 2500



**marantz.**

**model 2500**

*Stereophonic Receiver*

## TABLE OF CONTENTS

Section	Title	Page
1.	P.W. BOARDS	1
2.	TEST EQUIPMENT REQUIRED FOR SERVICING	2
3.	AM ALIGNMENT PROCEDURES	2
3.1	AM IF Alignment	2
3.2	AM Frequency Range and Tracking Alignment	2
3.3	AM Signal Strength Display Adjustment	2
4.	FM ALIGNMENT PROCEDURES	2
4.1	IF Frequency Range and Tracking Alignment	2
4.2	Stereo Separation Alignment	3
4.3	Muting Circuit Alignment	3
4.4	Dolby FM Tape Output Setting	3
5.	AUDIO ADJUSTMENT	3
6.	SCOPE DISPLAY ADJUSTMENT	4
6.1	AM Tuning Display Adjustment	4
6.2	FM Tuning Display Adjustment	4
6.3	FM Multipath Display Adjustment	4
7.	VOLTAGE CONVERSION FOR EUROPEAN MODEL	4
8.	DIAGRAMS	6
8.1	Block Diagram	6
8.2	Connection Diagram - U.S.A. & Canada	8
8.3	Connection Diagram - Europe	10
9.	SCHEMATIC DIAGRAMS AND COMPONENTS LOCATIONS	12
9.1	FM Front End Circuit Board - P100	12
9.2	AM Tuner, FM IF & MPX Stereo Decoder Circuit Board - P200	13
9.3	FM Noise Amp Circuit Board - PB00	16
9.4	FM Buffer Amp Circuit Board - PC01	16
9.5	Phono Amp & Selector Switch Circuit Board - P400	17
9.6	Power Supply Circuit Board - P800 - U.S.A. & Canada	18
9.7	Power Supply Circuit Board - P800 - Europe	19
9.8	Main Amp Circuit Board - P700	20
9.9	Pre & Tone Amp Circuit Board - PE01	22
9.10	Dolby NR Socket Circuit Board - PK01 - U.S.A. & Canada	24
9.11	Audio Muting Circuit Board - PN01	24
9.12	Buffer Amp for Scope Input - Circuit Board - PD01	24
9.13	Tape Copy, Tape Monitor & Scope Display Switches Circuit Board - PS01	25
9.14	Dubbing In & Out Jacks Circuit Board - PU01	25
9.15	Filter Amp Circuit Board - PT01	26
9.16	Speaker System Switches & Attenuator Circuit Board - PW01	27
9.17	Function Indicator Circuit Board - PY01	27
9.18	Dial Lamp Circuit Board - PZ01	27
9.19	Buffer Amp Circuit Board - PR50	28
9.20	Scope Amp Circuit Board - P900	28
9.21	Power Transistor Connection Circuit Board - PM01	28
9.22	Peak Indicator & Soft Start Circuit Board - PX01	29
10.	MAJOR COMPONENT LOCATIONS	30
10.1	Cabinet - Front View - U.S.A. & Canada	30
10.2	Chassis - Top View - U.S.A. & Canada	30
10.3	Cabinet - Rear View - U.S.A. & Canada	31
10.4	Chassis - Bottom View - U.S.A. & Canada	31

<b>11. EXPLODED VIEWS</b> .....	<b>32</b>
<b>11.1 Front Panel Exploded View</b> .....	<b>32</b>
<b>11.2 Chassis Exploded View</b> .....	<b>34</b>
<b>11.3 Rear Panel Exploded View - U.S.A. &amp; Canada</b> .....	<b>36</b>
<b>11.4 Rear Panel Exploded View - Europe</b> .....	<b>36</b>
<b>11.5 Packing Material Exploded View</b> .....	<b>37</b>
<b>12. PARTS LIST</b> .....	<b>38</b>
<b>13. TECHNICAL SPECIFICATIONS</b> .....	<b>54</b>
<b>14. SCHEMATIC DIAGRAMS</b> .....	<b>56</b>

**INTRODUCTION**

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model 2500 Stereophonic Receiver.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of the operation of the receiver.

The parts list furnishes information by which replacement parts may be ordered from the Marantz Company. A simple description is included for parts which can usually be obtained through local suppliers.

**1. P.W. BOARDS**

As can be seen from the circuit diagram the chassis of Model 2500 consists of the following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

- 1. FM Front End . . . . . mounted on P.W. Board P100
- 2. AM Tuner, FM IF & MPX Stereo Decoder . . . . . mounted on P.W. Board P200

- 3. FM Noise Amp . . . . . mounted on P.W. Board PB00
- 4. FM Buffer Amp . . . . . mounted on P.W. Board PC01
- 5. Phono Amp & Selector Switch . . . . . mounted on P.W. Board P400
- 6. Main Amp . . . . . mounted on P.W. Board P700
- 7. Power Supply . . . . . mounted on P.W. Board P800
- 8. Pre & Tone Amp . . . . . mounted on P.W. Board PE01
- 9. Dolby NR Socket . . . . . mounted on P.W. Board PK01
- 10. Audio Muting . . . . . mounted on P.W. Board PN01
- 11. Buffer Amp for Scope Input . . . . . mounted on P.W. Board PD01
- 12. Tape Copy, Tape Monitor & Scope Display Switches . . . . . mounted on P.W. Board PS01
- 13. Filter Amp . . . . . mounted on P.W. Board PT01
- 14. Dubbing In & Out Jacks . . . . . mounted on P.W. Board PU01
- 15. Speaker System Switches & Attenuator . . . . . mounted on P.W. Board PW01
- 16. Function Indicator . . . . . mounted on P.W. Board PY01
- 17. Dial Lamp . . . . . mounted on P.W. Board PZ01
- 18. Buffer Amp . . . . . mounted on P.W. Board PR50
- 19. Scope Amp . . . . . mounted on P.W. Board P900
- 20. Peak Indicator & Soft Start . . . . . mounted on P.W. Board PX01
- 21. Power Transistor Connection . . . . . mounted on P.W. Board PM01

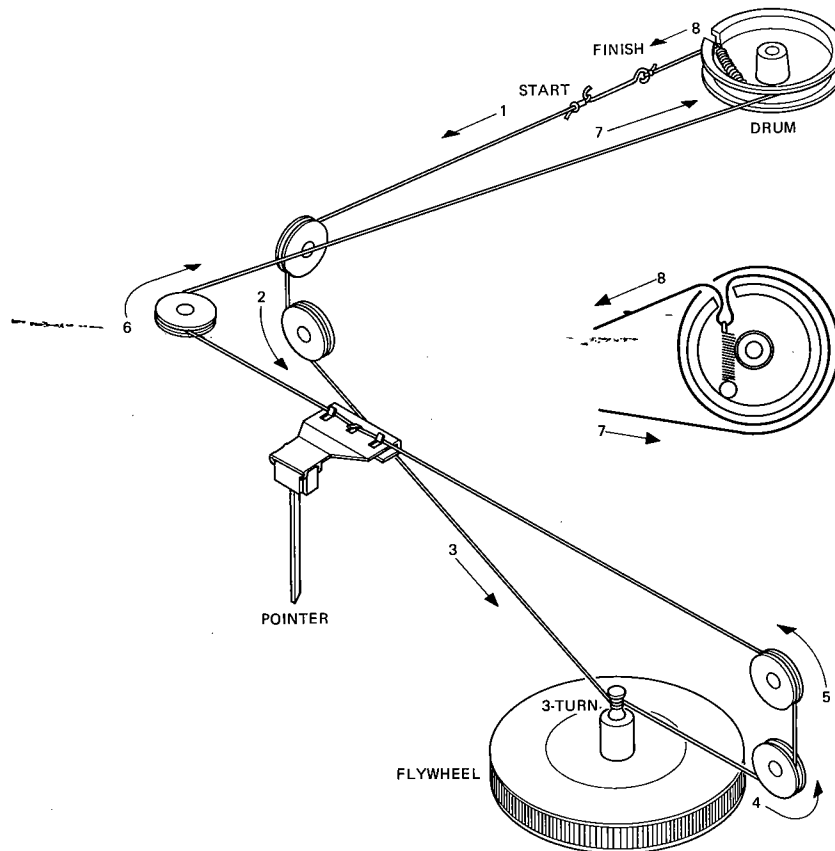


Figure 1. Dial Stringing

## 2. TEST EQUIPMENT REQUIRED FOR SERVICING

This table lists the test equipment required for servicing the Model 2500 Receiver.

Item	Manufacturer and Model No.	Use
AM Signal Generator		Signal source for AM alignment
Test Loop		Use with AM Signal Generator
FM Signal Generator MPX Signal Generator	Sound Technology Model 1000A	Signal source for FM alignment Stereo separation alignment and trouble shooting
Distortion Analyzer Audio Oscillator AC VTVM	Sound Technology Model 1700A	Distortion measurements Sinewave and squarewave signal source Voltage measurements (AC)
Oscilloscope	Tektronix Model T932 Philips Model 3232	Waveform analysis and trouble shooting and ASO alignment
Frequency Counter	Fluke Model 1900A	MPX Oscillator adjustment (VCO)
Circuit Tester		Trouble shooting
DC VTVM	Fluke Model 8000 "Digital" Simpson Model 313, Triplet Model 801	Voltage measurements (DC)
AC Wattmeter	Simpson Model 1379	Monitors primary power to amplifier
AC Ammeter	Commercial Grade (1-30A)	Monitors amplifier output under short circuit condition
Line Voltmeter	Simpson Model 1359	Monitors potential of primary power to amplifier
Variable Autotransformer	Superior Electronic Co., Powerstat Model 116B-10A	Adjusts level of primary power to amplifier
Shorting Plug	Use phono plug with 600-ohm across center pin and shell	Shorts amplifier input to eliminate noise pickup
Output Load (8 ohms, 0.5%, 300 W)	Commercial Grade	Provides 8-ohm load for amplifier output termination
Output Load (4 ohms, 0.5%, 500 W)	Commercial Grade	Provides 4-ohm load for amplifier output termination

## 3. AM ALIGNMENT PROCEDURES

### 3.1 AM IF ALIGNMENT

1. Connect a sweep generator to the J229 and an alignment scope to the test point B.
2. Rotate each core of IF transformers L153 and L154 for maximum height and flat top symmetrical response.

### 3.2 AM FREQUENCY RANGE AND TRACKING ALIGNMENT

1. Set AM signal generator to 515 kHz. Turn the tuning capacitor fully closed (place the tuning pointer at the low end) and adjust the oscillator coil L152 for maximum audio output.
2. Set the signal generator to 1650 kHz. Place the tuning pointer in the high frequency end and adjust the oscillator trimmer on the oscillator tuning capacitor for maximum audio output.
3. Repeat steps 1 and 2 until no further adjustment is necessary.
4. Set the generator to 600 kHz and tune the receiver to the same frequency and adjust a slug core of AM ferrite-rod antenna L002 and RF coil L151 for maximum output.

5. Set the generator to 1400 kHz and tune the receiver to the same frequency and adjust both trimming capacitors of antenna and RF tuned circuit for maximum output.
6. Repeat steps 4 and 5 until no further adjustment is necessary.

**NOTE:** During tracking alignment reduce the signal generator output as necessary to avoid AGC action.

### 3.3 AM SIGNAL STRENGTH DISPLAY ADJUSTMENT

Set an AM signal generator to 1000 kHz at 100 dB/m, and adjust R163 so that the spot may meet upper mark.

## 4. FM ALIGNMENT PROCEDURES

### 4.1 FM FREQUENCY RANGE AND TRACKING ALIGNMENT

1. Connect an FM signal generator to the FM ANTENNA terminals and an oscilloscope and an audio distortion analyzer to the TAPE MONITOR OUT jacks on the rear panel.
2. Set the signal generator to 87.4 MHz and provide about 3 to 5  $\mu$ V. Place the tuning pointer at the low frequency end by rotating the tuning knob and adjust the core of

- oscillator coil L106 to obtain maximum audio output.
3. Set the signal generator to 109 MHz and provide about 3 to 5  $\mu\text{V}$  output. Rotate the tuning knob and place the tuning pointer at the high frequency end and adjust the trimming capacitor C123 for maximum output.
  4. Repeat steps 2 and 3 until no further adjustment is necessary.
  5. Set the signal generator to 90 MHz and tune the receiver to the same frequency. Decrease signal generator output until the audio output level decreases with the decreasing generator output. Adjust the antenna coil L101, RF coils L102, L103 and L104 and IF transformer L105 for minimum audio distortion.
  6. Set the signal generator to 106 MHz and tune the receiver to the same frequency. Adjust the trimming capacitors CF01, CF02, CF03 and CF04 for minimum distortion.
  7. Repeat steps 5 and 6 until no further adjustment is necessary.
  8. Connect a VTVM (at DC 1 V range) across the J204 and J205. Adjust the secondary core (upper) of discriminator transformer L201 so that the VTVM indicates null reading (zero reading) at no signal. Set the FM signal generator to 98 MHz and increase its output level 1  $\mu\text{V}$  and tune the receiver to the same frequency so that the VTVM gives null reading. Adjust the primary core (lower) of L201 for minimum distortion. (Scope display can, of course, be used as tuning indicator instead of the VTVM, if the scope unit has been correctly adjusted as instructed in the "Scope Display Adjustment".)
  9. Set the signal generator to 98 MHz at 100  $\mu\text{V}$ , and adjust R278 so that the signal strength indicator spot just reaches upper mark.

#### 4.2 STEREO SEPARATION ALIGNMENT

1. Set the FM signal generator to provide 1  $\mu\text{V}$  at 98 MHz. Tune the receiver to the same frequency so that the center tuning indicator spot indicates its center.
2. Turn the signal generator modulation off (with the pilot signal turned off), connect a frequency counter to test point J238, and adjust R310 so that the frequency counter may precisely read 19 kHz.
3. Modulate the signal generator with stereo composite signal consisting only of subchannel signal (of course a pilot signal must be included).
4. Adjust the trimming resistor R319 for maximum and same separation in both channels.

#### 4.3 MUTING CIRCUIT ALIGNMENT

1. Set the FM signal generator to provide 6  $\mu\text{V}$  at 98 MHz and tune the receiver to the same frequency correctly.
2. Depress the FM MUTING pushswitch. Set R001 to MIN position (counterclockwise). Adjust R330 until the muting circuit is activated to produce output for exactly 6  $\mu\text{V}$  input.
3. In turn increase the FM signal generator output up to 50  $\mu\text{V}$ .
4. Set R001 to MAX position (clockwise). Adjust R347 until the muting circuit is activated to produce output for exactly 50  $\mu\text{V}$  input.
5. Turn R001 from MIN to MAX to assure the muting threshold level can change in the range of 6 to 50  $\mu\text{V}$ .

6. Adjust R001 until the muting threshold level is 12.5 V. Then, increase the FM signal generator output up to 1  $\mu\text{V}$  and shift its frequency up and down. Note both up- and down-shifted frequencies at which undesirable audio side responses are muted out. Adjust R280 until the muting circuit is activated when the oscilloscope trace deflects 10 to 20 mm.

#### 4.4 DOLBY FM TAPE OUTPUT SETTING

1. Set the modulation of FM signal generator to 400 Hz, 50% ( $\pm 37.5$  kHz Dev.).
2. Set the signal generator to provide 1  $\mu\text{V}$  at 98 MHz. Tune the receiver to the same frequency so that the center tuning meter pointer indicates its center.
3. Set the SELECTOR switch to the FM 25  $\mu\text{s}$  position. Set the trimming resistors RC01 and RC02 so that the output of the TAPE MONITOR OUT jacks R and L become 580 mV at VTVM.

#### 5. AUDIO ADJUSTMENT

1. Voltage adjustment  
Connect a DC voltmeter across the pins 4 and 3 on J805. Adjust the trimming resistor R819 until the DC voltmeter reads 32 V.
2. Main Amplifier DC off-set alignment  
Connect a DC voltmeter with 0.5 or 1 V range between the speaker terminals and adjust the trimming resistor R760 for "zero" DC output on the meter. Repeat the same procedure for the other channel.

**NOTE:** During this alignment no load should be connected to the speaker terminals.

3. Idle current adjustment  
Connect a DC voltmeter (in 50 mV range) across TP1 and TP2 on JX01. Adjust R716 on the P.W. board on the left side of the tunnel heatsink until the voltmeter reads 25 mV (32 mA). In turn, connect the voltmeter across TP3 and TP4 on JX02 and similarly, adjust R716 on the P.W. board on the right side of the tunnel heatsink until the voltmeter reads 25 mV (32 mA).
4. Check DC off-set voltage aligned in the procedure 3 and if any DC output is observed on the DC voltmeter, adjust the R760 again for "zero" output.

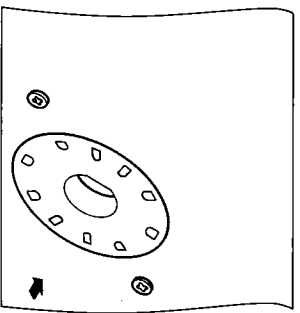
#### CAUTION: CONTINUOUS POWER OUTPUT TESTS.

Continuous sine wave tests at high audio power levels impose a maximum loading condition for the power supply, particularly when testing with 4 ohm output loads, and far exceeds power supply loading encountered with program materials. A primary line fuse has been selected for the Model 2500 which will open if the following 4 ohm testing periods are exceeded:

- A. At rated power of 330 watts per channel.  
Testing period- 45 minutes max.
- B. At power levels above 330 watts per channel.  
Individual tests- 1 minute max.

## DISPLAY ADJUSTMENT

the SELECTOR switch to the AUX position. The SCOPE LEVEL and VOLUME controls to the W position. Press the SCOPE DISPLAY ON and AUDIO push-buttons in. Adjust the CENTERING controls until the spot comes to the center of the small circle. At the BRIGHT control (R002) on the rear panel the brightness becomes dark a little. Adjust the FOCUS control so that the spot may be smaller and circular. Adjust the SCOPE LEVEL control to the FCW. Adjust a 150 mV, 1 kHz signal to the AUX INPUTS and adjust R928 (H. GAIN) until the horizontal deflection is around 3 cm. Adjust the CENTERING control to the 12-o'clock position and adjust R925 (H. CENTER) until the spot is in the horizontal deflection center. Finally, adjust R926 (V. CENTER) until the spot is in the vertical deflection center.



- ### 6.1 AM TUNING DISPLAY ADJUSTMENT
1. Depress the SCOPE DISPLAY ON and TUNING push-switches. Set the SELECTOR switch to the AM position.
  2. Adjust R931 until the spot comes in the center below the base line without tuning into a station.

- ### 6.2 FM TUNING DISPLAY ADJUSTMENT
1. Depress the scope DISPLAY ON and TUNING push-switches. Set the SELECTOR switch to the FM position.
  2. Connect FM signal input of 100  $\mu$ V (98 MHz, 400 Hz, 30% mod.) to the FM ANTENNA terminals and adjust R278 so that the spot does not frame out.

- ### 6.3 FM MULTIPATH DISPLAY ADJUSTMENT
1. Adjust R280 to obtain full deflection of the trace within both side marks, applying FM signal (1  $\mu$ V, 400 Hz, 100% mod.) to the FM ANTENNA terminals.

## 7. VOLTAGE CONVERSION FOR EUROPEAN MODEL

The European version of the Model 2500 is equipped with a universal power transformer that may be adjusted to operate at 110 V, 120 V, 220 V, or 240 V AC at 50 to 60 Hz. To convert the unit to a different power source voltage, reposition conversion plug as shown in Figure 1.

**CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE.**

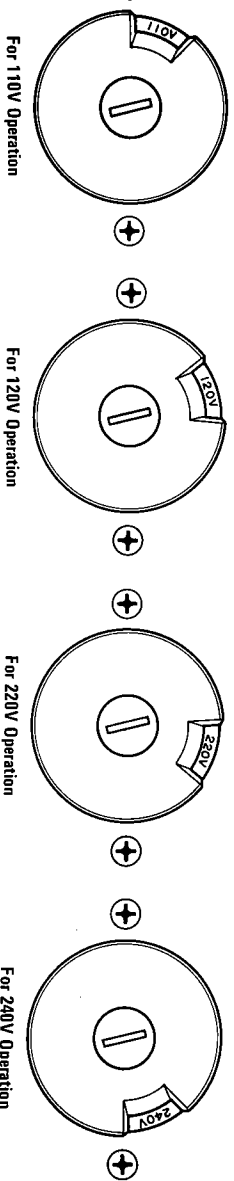
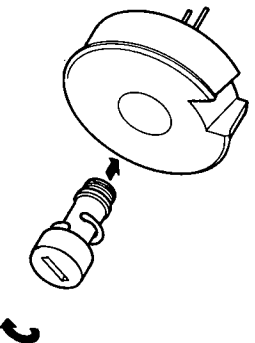


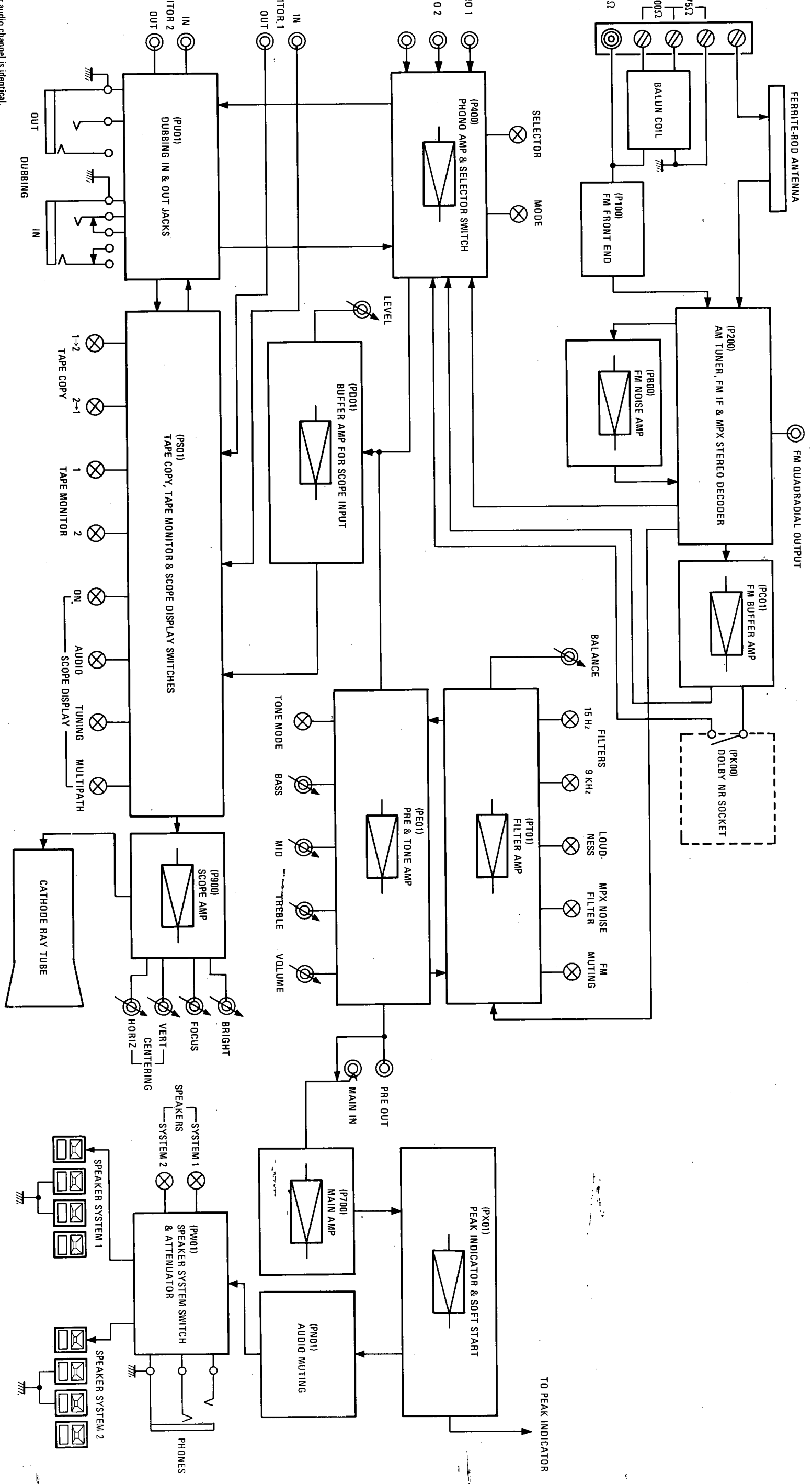
Figure 2. Voltage Conversion Chart

### FTZ REGULATION

Instruction for the use in the range other than specified in FTZ codes.

**Achtung für die Leute, die in dem Gebiet wohnen, wo die FTZ-Bestimmungen vorherrschend sind.**

Sollte das Gerät auch für Frequenzen ausserhalb des in den FTZ-Bestimmungen angegebenen Bereiches empfangsbereit sein, bitten wir, den Bereich durch Nachstellen des Kernes in der Oszillatorspule (in der Abbildung mit "FTZ" gekennzeichnet) so zu korrigieren, dass er den Bestimmungen entspricht.



audio channel is identical.



