

# FM/AM STEREO RECEIVER

## AX-7600

• OPERATING INSTRUCTIONS

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# AIWA®

## MAIN FEATURES

- A differential first stage pure complementary OCL circuit is employed in the power section for a high output power of 45W + 45W (4 ohms)
- Wide dynamic range with minimized distortion is provided by the dual positive and negative power supply system used in the pre-amplifier and main amplifier.
- Not only are MOS FETs employed in the RF and mixing stages but also a ceramic filter with an excellent group delay response and frequency linear 4-gang variable capacitor for high sensitivity, high selectivity and low distortion.
- Two stage differential amplifier circuit employed in the equalizer amplifier reduces distortion and assures wide dynamic range with an acceptable maximum input of 200 mV.
- High precision RIAA curve deviation is within 0.3 dB from 30 Hz to 15,000 Hz.
- The turnover frequency of the tone circuit can be switched between two stages for both the bass and the treble, and there is a defeat switch, too.
- Extremely effective muting circuit dispels earlier reservations regarding receivers.
- Rumble filter switch reduces low frequency noise such as from record cutting.
- The model also comes equipped with a high-cut filter that effectively cuts out noise in the high frequency range.
- The beat-cut filter circuit effectively eliminates the noise components which are produced by proximity interference when the model is receiving an FM stereo broadcast.
- Front panel DIN jack is highly convenient for dubbing, etc.
- Two sets of stereo speaker systems (A and B) can be connected and a selector switch allows both systems to be used simultaneously or separately.
- Valuable built-in protection circuit.

## CAUTIONS

Please note the following points in order to enjoy full performance from this set.

1. Avoid installing in locations that are in direct sunlight, near heaters or other heat sources.
2. Full performance may not be obtained if used in an extremely cold environment. Rated operating temperature range is 0°C to 35°C (about 32°F to 100°F).
3. Do not obstruct the ventilating holes. Avoid placing other components or objects on top of this set, as the increased internal temperature may affect the electronic parts. Also note that considerable heat is produced when operating under high power for extended periods of time.
4. Select an installation site that is free from excess humidity and dust, and where ventilation is good.

## Voltage Selector Switch Setting

This set has been preadjusted to operate from the local power supply voltage in the area of sale. Before using it, confirm that the power supply voltage has been properly set.

### 120 V Locations

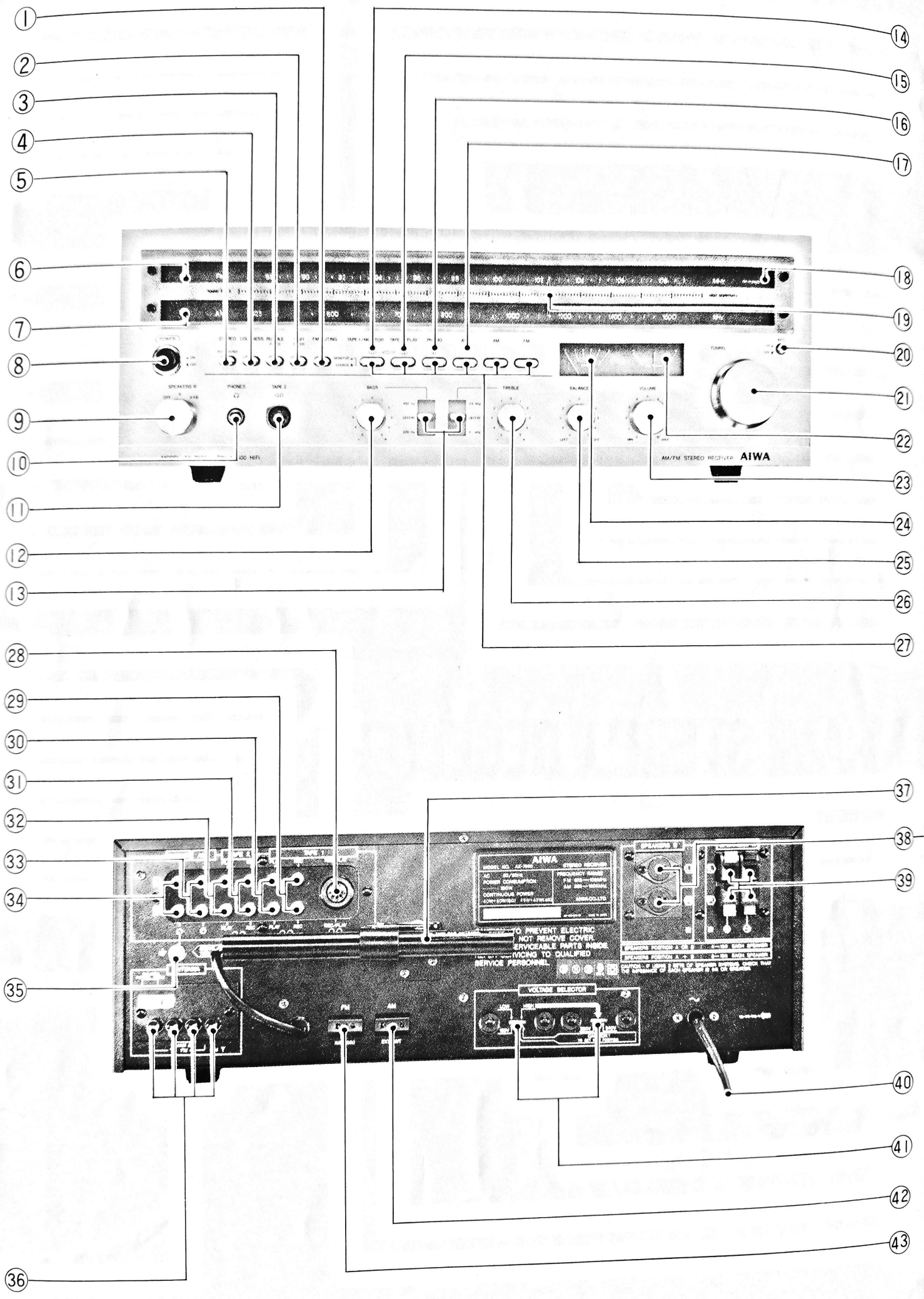
Set the HIGH/LOW selector switch to LOW (120 V) position.

### 220/240 V Locations

Set the HIGH/LOW selector switch to HIGH, then set 220 V or 240 V switch according to local power source voltage.

## SECTION NAMES

- 1) FM MUTING
- 2) HIGH FILTER Switch
- 3) RUMBLE Switch
- 4) LOUDNESS Switch
- 5) STEREO/MONO Switch
- 6) FM Indicator Lamp
- 7) AM Indicator Lamp
- 8) POWER Button
- 9) SPEAKERS Selector Switch
- 10) PHONES Jack
- 11) TAPE 2 Jack (DIN jack)
- 12) BASS Control
- 13) Turnover Frequency/Defeat Selector Switches
- 14) TAPE 1 Indicator
- 15) TAPE 2 Indicator
- 16) PHONO Indicator
- 17) AUX Indicator
- 18) FM STEREO Indicator
- 19) Dial Needle
- 20) AFC Switch
- 21) Tuning Knob
- 22) Tuning Meter
- 23) VOLUME Control
- 24) Signal Meter
- 25) BALANCE Control
- 26) TREBLE Control
- 27) Selector Buttons
- 28) DIN Jack (for TAPE 1)
- 29) REC (Recording) Jacks (for TAPE 1)
- 30) PLAY Jacks (for TAPE 1)
- 31) REC (Recording) Jacks (for TAPE 2)
- 32) PLAY Jacks (for TAPE 2)
- 33) AUX (Auxiliary Input) Jacks
- 34) PHONO (Turntable) Jacks
- 35) SIGNAL EARTH Terminal
- 36) Antenna Terminals
- 37) Bar Antenna
- 38) DIN type Speakers B Jacks
- 39) Speakers A Terminals
- 40) AC Cord
- 41) Voltage Selector Switches
- 42) DIN type AM Antenna Jack
- 43) DIN type FM Antenna Jack



## CONNECTIONS - 1

### Speakers

Two sets of stereo speaker systems can be connected to this set. This allows speaker systems in 2 separate rooms to be selected to operate either separately or simultaneously.

Take care when connecting to correctly connect L and R channels. When connecting System A speakers, also use caution not to reverse + and - polarities.

Connect speakers provided with DIN connectors to System B.

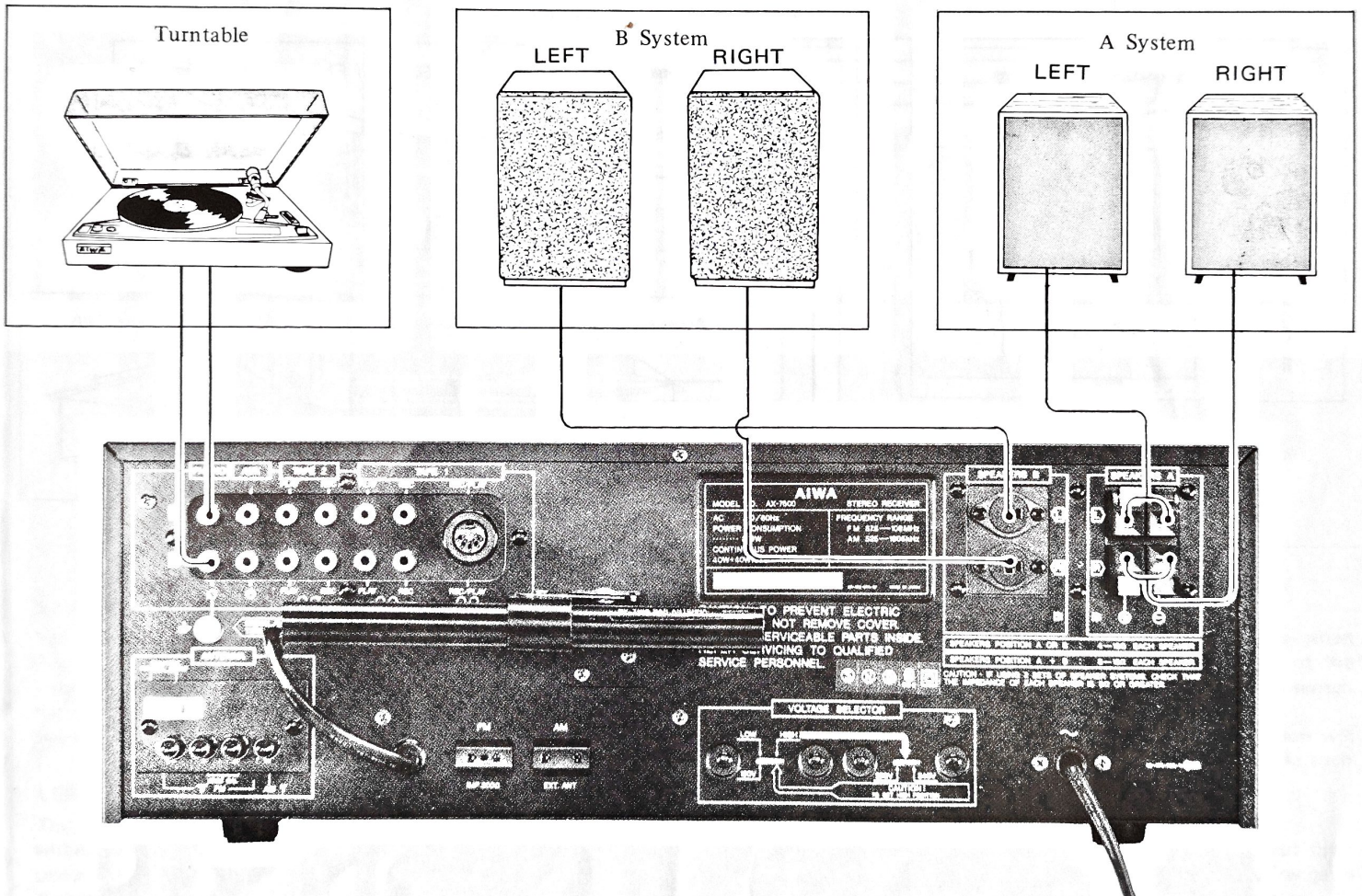
- When simultaneously using both A and B speaker systems, be sure that all speakers are 8 ohms or greater in impedance.

### Turntable

Connect the output cords of the turntable to the PHONO jacks. Use care to connect the left and right cords properly with the R and L jacks, then connect the ground lead of the turntable to the SIGNAL EARTH terminal.

Employ a turntable equipped with a magnetic cartridge. Magnetic cartridges are available in moving magnet (MM), induced magnet (IM), and moving coil (MC) types.

- Although all of the above three types can be used with this set, the low output voltage moving coil (MC) type (less than 1 mV) requires an accessory separately sold boosting transformer. See cartridge instructions or consult high fidelity dealer.



## CONNECTIONS - 2

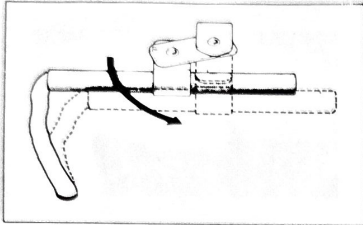
### Antennas

Antennas are vital elements for receiving radio broadcasts. Particularly in order to enjoy high quality FM sound, it is important to select the proper antenna and install it carefully.

### AM Antenna

This set incorporates a built-in high sensitivity ferrite bar antenna. Raise the rear panel antenna as shown in the figure when employing.

- When using a DIN connector equipped antenna, connect it to the DIN type AM antenna jack.



Receiving conditions can become unfavorable if the broadcast station is distant or the set is being used in a ferro-concrete or or similar building. In these cases install an outdoor antenna and connect it to the AM Antenna terminal.

### FM Antenna

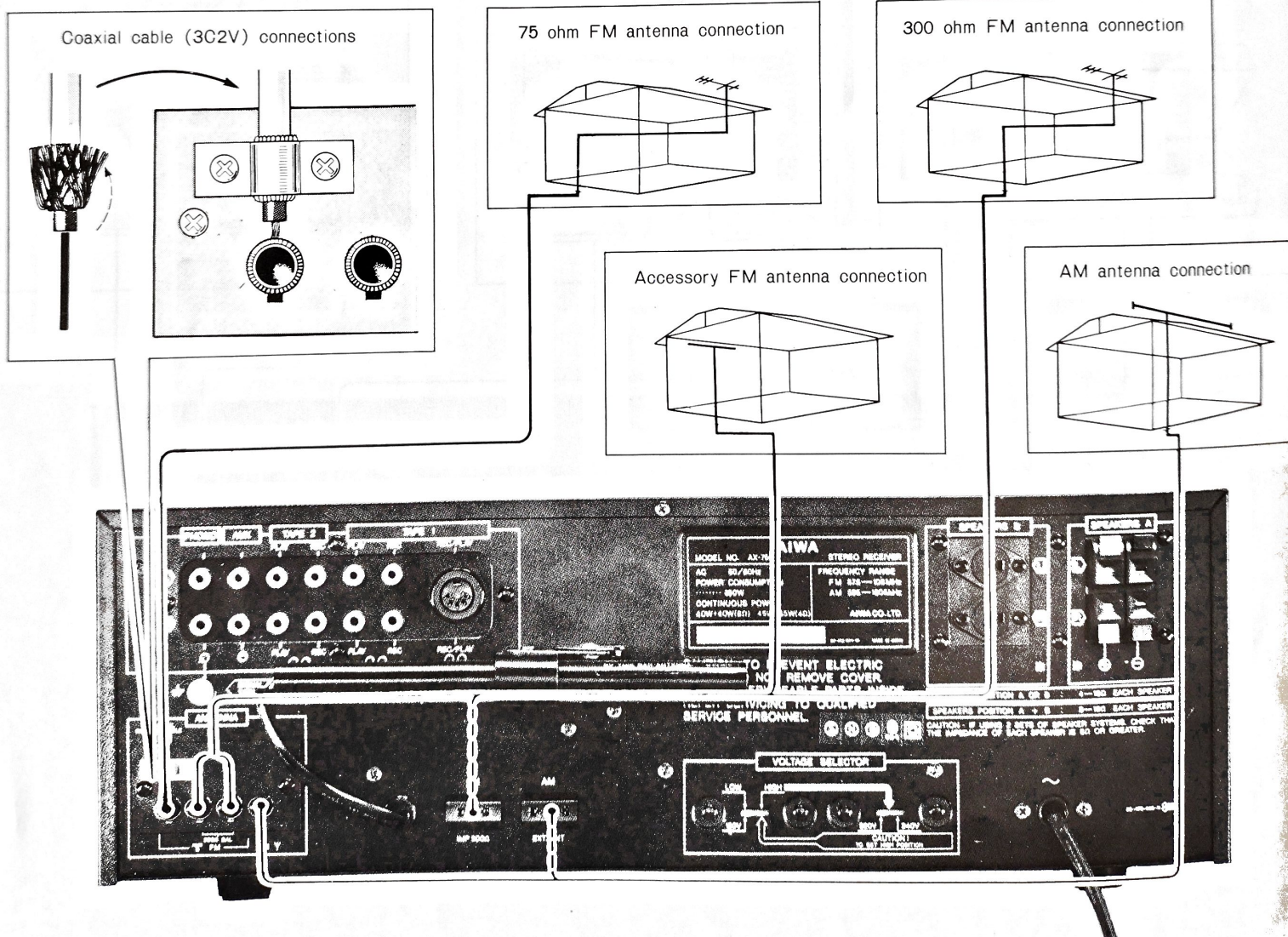
Connect the accessory feeder antenna to the 300 ohm FM Antenna terminals. Spread the antenna into a T shape and attach it to a wall, etc., in a position for best sensitivity (maximum deflection of the Signal meter).

- Install antenna away from metallic structures such as metal window frames.

FM signals possess line of sight properties similar to light. Thus, if the station is distant or obstructed by buildings, etc., the signal strength becomes reduced and the accessory antenna may not provide sufficient input. In this case, an outdoor FM antenna becomes required.

Outdoor FM antennas are available in 300 ohm and 75 ohm types. Connect the antenna to the terminal that matches its impedance. In long distance reception of stereo broadcasts, the receiving quality is strongly governed by the antenna direction. Determine the most favorable height and orientation when installing the antenna.

- When using a DIN connector equipped antenna, connect it to the DIN type FM antenna jack.



## CONNECTIONS - 3

### Tape Decks

Two tape decks can be connected to this set and used simultaneously for recording or dubbing (dubbing from TAPE 2 to TAPE 1).

### Record Jacks (REC)

Connections for tape recording. Connect to LINE IN (or AUX IN) jacks of the tape deck.

### PLAY Jacks

Connections for tape playback. Connect with LINE OUT jacks of the tape deck.

### DIN (REC/PLAY) Jacks

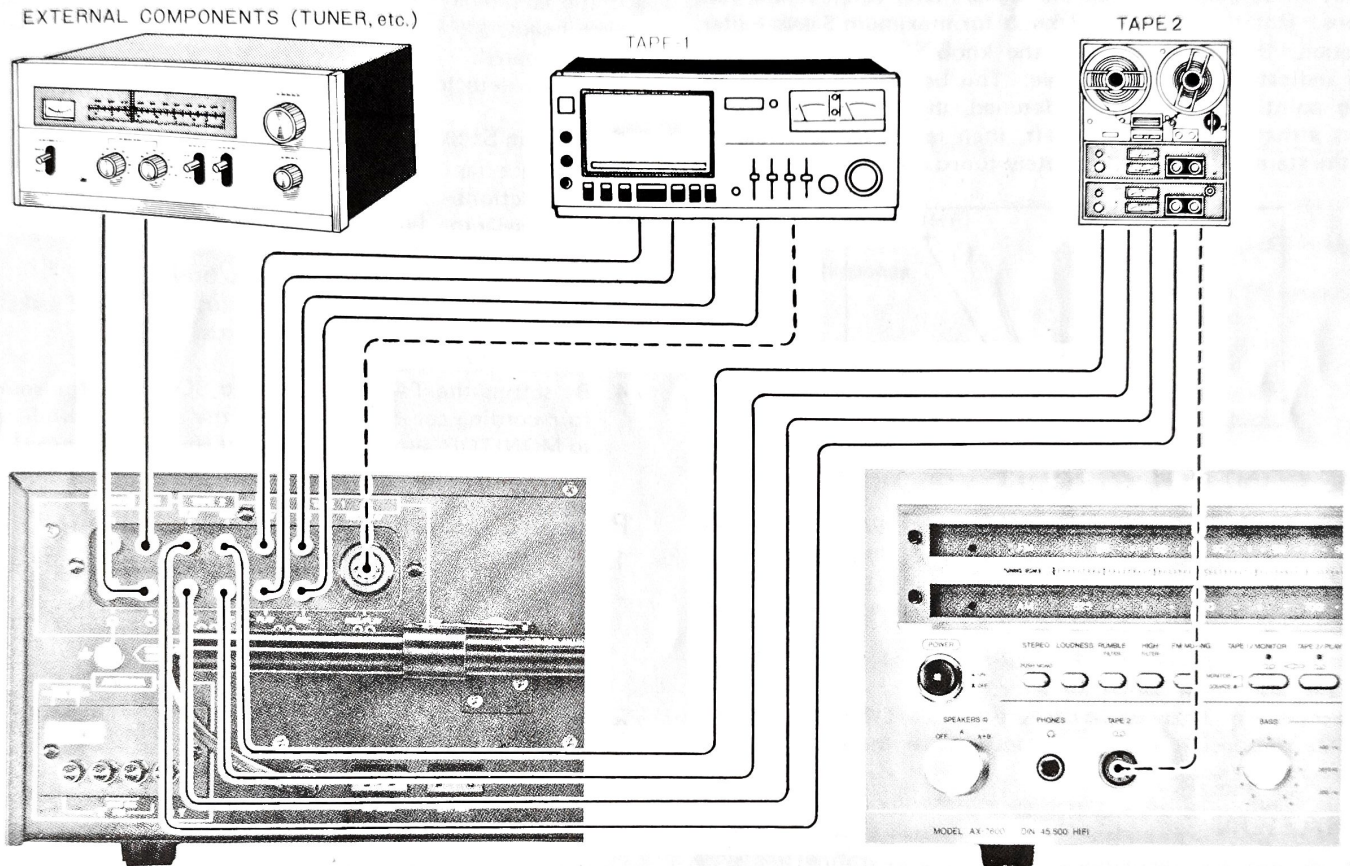
Connect a DIN cord equipped tape deck to one of these jacks. This allows both recording and playback connections to be performed with a single cord.

- If a tape deck is connected to the TAPE 1 (TAPE 2) jacks, connect a second tape deck to either the DIN jack or REC and PLAY jacks.

### External Components (Tuner, etc.)

### Auxiliary Input Jacks (AUX)

Connect with the output jacks of an external tuner or other component.



### AFC Switch

The AFC switch is provided for stabilizing FM reception. Set this switch to OFF when tuning in desired station and to ON after station has been selected. However, when the signals from the desired station are weak, or when a strong station is near the desired station, set the AFC switch to OFF.

### LOUDNESS Switch

The human ear is less responsive to low and high frequencies when listening at low volume levels. The loudness circuit compensates for these characteristics by enhancing the low and high frequencies. Set this switch to ON when listening at low volume for an improved high fidelity effect.

### RUMBLE Filter Switch

Low synchronous vibrations, such as arise from record cutting, can be effectively blocked by setting this switch to ON.

### FM MUTING Switch

A characteristic noise can be heard between stations when tuning FM stations. Cutting this noise is the function of the muting circuit. To use the circuit, press the FM MUTING switch to where it locks in the ON position.

In some cases when the desired station is weak, reception will not be obtained with the switch in the ON position. At such times set the switch to OFF.

### High Filter Switch

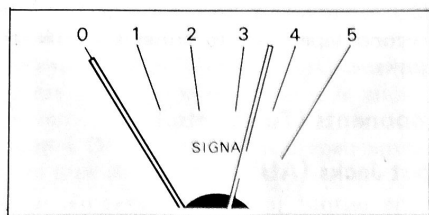
When this switch is set to the ON position, the high-cut filter circuit is actuated and noise in the high frequency range is effectively suppressed for a crystal clear sound reproduction.

The high-cut filter circuit features a sharp cut-off frequency of 8 kHz and 12 dB/oct. It is especially effective in eliminating high frequency range noise during FM broadcasts and also tape hiss when a tape is being played back.

## METERS

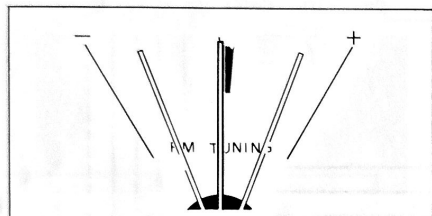
### Signal Meter

Indicates antenna input level. Tune stations for maximum deflection of the needle pointer toward the right.



### Tuning Meter

Employ in conjunction with the Signal meter when tuning FM stations. Rotate the TUNING knob for maximum Signal meter deflection, then carefully turn the knob so that the Tuning meter indicates at center of scale. This becomes the optimum tuning point. As a station is detuned, the Tuning meter will deflect either to the right or left, then return to center scale after the station has been completely tuned out.



## TONE CONTROL CIRCUIT

This model is provided with turnover frequency/defeat selector switches which allow the turnover frequency to be selected to either of two stages. You can set these switches to the preferred tone in accordance with the connected speakers or the music source.

The turnover frequency can be selected to 5kHz or 2.5kHz for the treble and to 400Hz or 200Hz for the bass.

Furthermore, if these switches are set to DEFEAT, a flat frequency response is yielded no matter what the setting of the treble and bass knobs.

## OPERATION

Please confirm the following points before operating this set.

1. Set the VOLUME control fully counter-clockwise to 0. This is to prevent a sudden surge of sound from possibly damaging the speakers.
2. Set TAPE 1 switch to SOURCE. If set to MONITOR, selector buttons will not function.

## PLAYING

1. Press POWER button to ON
2. Press desired selector switch buttons.
  - FM To listen to FM
  - AM To listen to AM
  - TAPE 1 or TAPE 2 To listen to tape
  - PHONO To listen to records
  - AUX To listen to external component connected to AUX jacks
3. If listening to AM or FM, turn the TUNING knob to select the desired station. Refer to Signal Meter and Tuning Meter sections for proper tuning method.
4. Adjust the VOLUME, BALANCE, BASS and TREBLE controls for desired volume, left and right speaker balance, and tone.

- The FM STEREO indicator lights red when a stereo signal is being received.

## DUBBING

This set can be used for dubbing from TAPE 2 to TAPE 1.

### Operating Steps

1. Connect two tape decks as illustrated in the Connections - 3 figure.
2. Press TAPE 2 selector button.
3. Use TAPE 1 for recording and TAPE 2 for playback. Operate tape decks according to their operating instructions.

## 3 HEAD TAPE DECK MONITOR

If the employed tape deck possesses separate record and playback heads, the sound before recording and after recording can be compared. This allows recording deficiencies to be immediately detected.

### Operating Steps

1. Connect tape deck to the TAPE 1 jacks as shown in the Connections - 3 figure.
2. Press selector button corresponding to the desired source for recording.
  - FM or AM Radio broadcasts
  - TAPE 2 Tape (using TAPE 2 jacks)
  - PHONO Records
3. Adjust TAPE 1 recording levels.
4. By setting the TAPE 1 button to SOURCE, the sound prior to recording can be heard from the speakers; while setting it to MONITOR allows the recorded sound to be heard.

## PROTECTION CIRCUIT

### 1. Muting Circuit

The muting circuit operates for about 4 seconds after the POWER button has been set to ON. This functions to disengage all circuits by a relay until they reach stabilized operation and does not indicate a set malfunction.

### 2. Overcurrent Protector Circuit

If the plus (+) and minus (-) speaker cords become accidentally shorted when using an output of more than 3 V (about 1 W with 8 ohm speaker), causing a current overload in the amplifier, this circuit functions to disconnect speakers and amplifier. The protector circuit also functions if 4 ohm speakers are operated at greater than normally rated output, thus protecting the amplifier from damage.

- The overcurrent protector circuit self-resets after about 10 seconds.

### 3. Midpoint Potential Detector Circuit

This is a protector circuit for preventing speaker damage in the event DC current appears in the output. Such DC current, which may occur due to an amplifier malfunction, is detected before it reaches the speakers. The amplifier and speakers becomes disconnected, thus protecting the speakers.

# SPECIFICATIONS

Semiconductors	1 IC, 3 FET, 68 transistors, 43 diodes, 7 LED	Frequency Response (Input with respect to REC jacks) PHONO (RIAA Curve) AUX & TAPE PLAY Tone Controls:	30 Hz—15 kHz $\pm 0.3$ dB 10 Hz—70 kHz BASS +8, -7 dB/+6, -5 dB (100 Hz) 400/200 Hz turnover frequency TREBLE +8, -9 dB/+5, -6 dB (10 kHz) 5/2.5 kHz turnover frequency 8 kHz (12 dB/oct) 30 Hz (6 dB/oct)
Power Supply	AC 120 V/220 V/240 V Switchable, 50/60 Hz 330W (MAX)	High Filter Rumble Filter Loudness Response (with volume at -40 dB)	+7 dB (100 Hz), +4 dB (10 kHz)
Power Consumption	450 (W) x 162 (H) x 365 (D) mm	S/N (IHF) PHONO AUX, TAPE PLAY 2 TAPE PLAY 1	More than 80 dB More than 80 dB More than 80 dB
External Dimensions	13 kg	FM Tuner Receiving Frequency Range Sensitivity (IHF) Capture Ratio (IHF) Effective Selectivity (IHF) SN Ratio Frequency Response Distortion Separation Image Ratio IF rejection Ratio Antenna Input Impedance	87.5—108 MHz (3.43—2.87 m) 1.8 $\mu$ V 1.2 dB 65 dB (400 Hz) 78 dB (mono), 73 dB (stereo) 30 Hz—15 kHz 0.25% (stereo), 0.15 (mono) 45 dB (at 1 kHz) 80 dB 100 dB 300 ohms (balanced), 75 ohms (unbalanced)
Weight		Spurious Rejection AM Suppression IF Frequency Muting Level	100 dB 55 dB 10.7 MHz 20 dB
Power Amplifier Circuit System	Differential 1st stage all stages direct coupled pure complementary OCL	AM Tuner Receiving Frequency Range Sensitivity (IHF)	525—1,605 kHz (571—187 m) 250 $\mu$ V/m, 48 dB (S/N 20 dB) (built-in ear antenna) 15 $\mu$ V (external antenna terminal)
Continuous Power 20 Hz — 20 kHz both channels driven	45 W + 45 W (4 ohms) 40 W + 40 W (8 ohms)	Selectivity Distortion IF Rejection Built-in Antenna	30 dB 1% 40 dB 140 mm x 10 mm dia. (ferrite bar antenna) Unbalanced
Dynamic Power Output	65 W + 65 W (4 ohms)	External Antenna Terminal Image Ratio SN Ratio IF Frequency	40 dB 50 dB 468 kHz
Harmonic Distortion (at effective output)	0.2%		
Output Terminals SPEAKERS HEADPHONES	A, B, A + B, OFF 8 ohms (4 ohms — 20 ohms) 50 (8 ohms), 25 (4 ohms)		
Damping Factor	Less than 0.5 mV		
Residual Noise (8 ohms pre + main)			
Preamplifier Circuit System	+ , — dual power supply 2 stage differential amplifier + emitter follower NF type		
Equalizer Amplifier	+ , — dual power supply 2 stage direct coupled type + CR controls		
Control Amplifier	+ , — dual power supply 2 stage direct coupled type		
Buffer Amplifier			
Input Terminals (Sensitivity/Impedance)			
PHONO	2.5 mV/50 kohms		
PHONO Max. Rated Input	200 mV /560 mV (rms/pp)		
Pin Jacks (AUX, TAPE PLAY 1 & 2)	150 mV/500 kohms		
DIN Jacks (TAPE PLAY 1 & 2)	150 mV/500 kohms		
Output Terminals (Level/Impedance)			
Pin Jacks (TAPE REC 1 & 2)	150 mV/more than 50 kohms		
DIN Jacks (TAPE REC 1 & 2)	0.4 mV/kohms		

- External appearance and specifications are subject to change without notice due to product improvements.

### IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

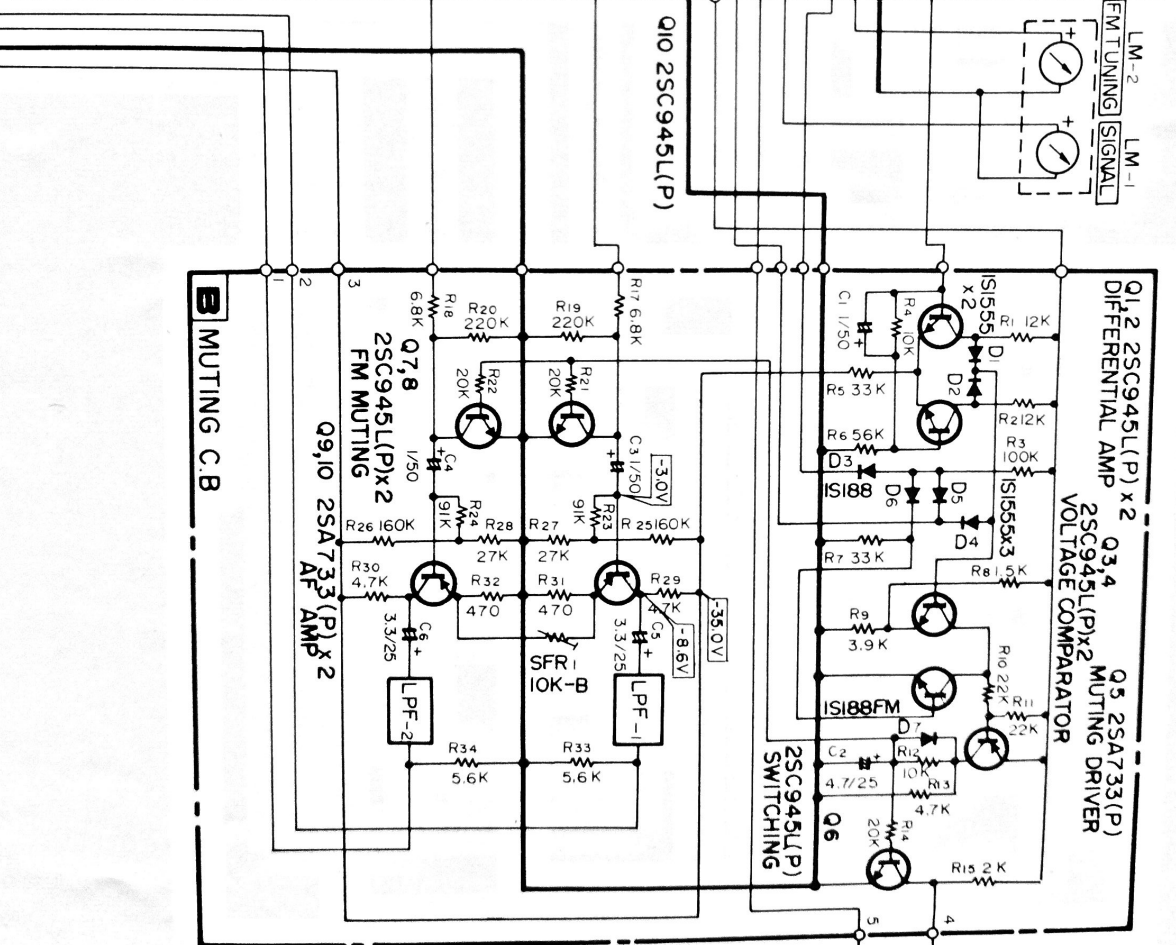
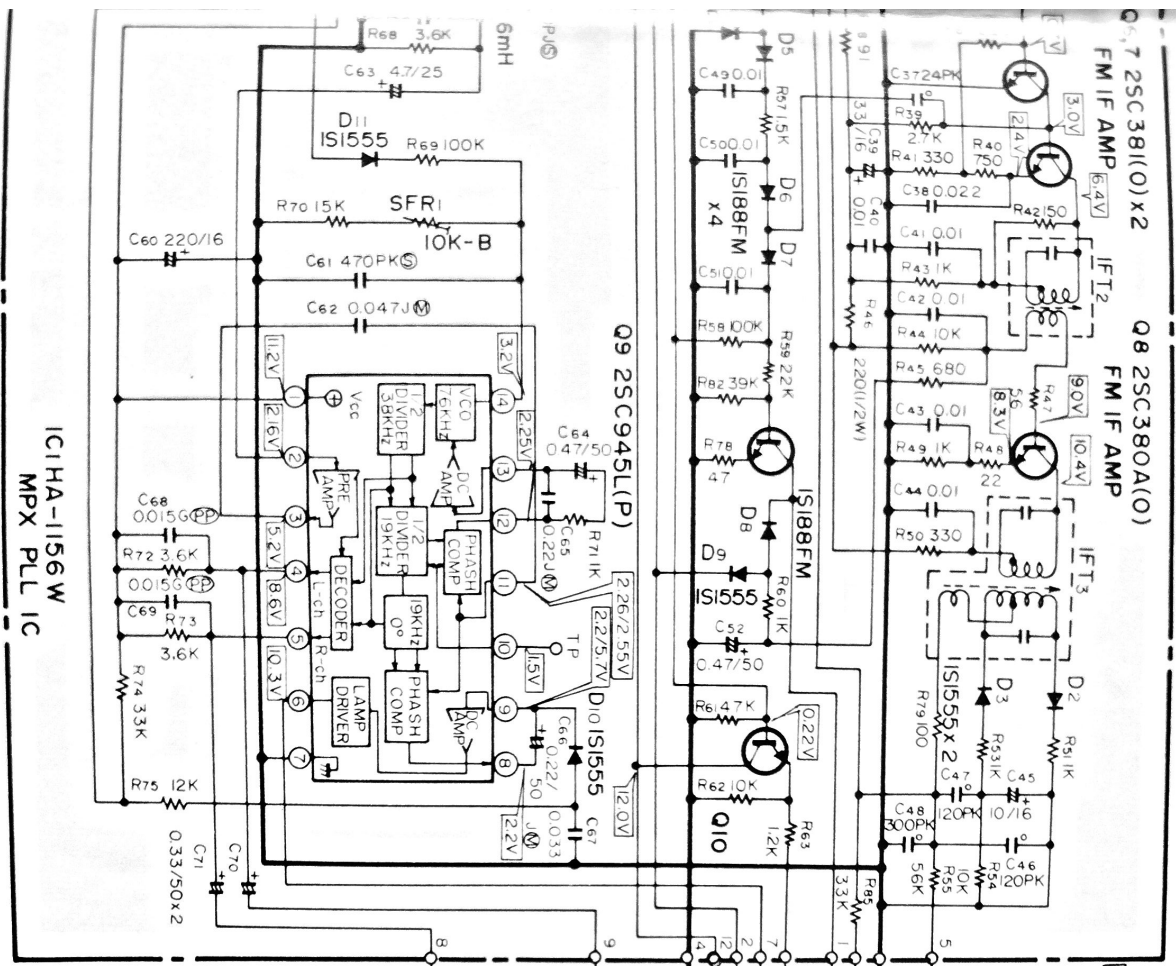
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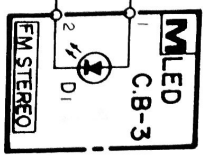


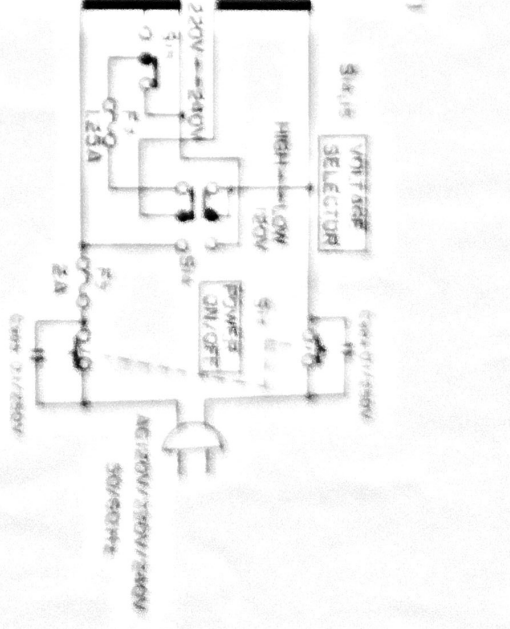
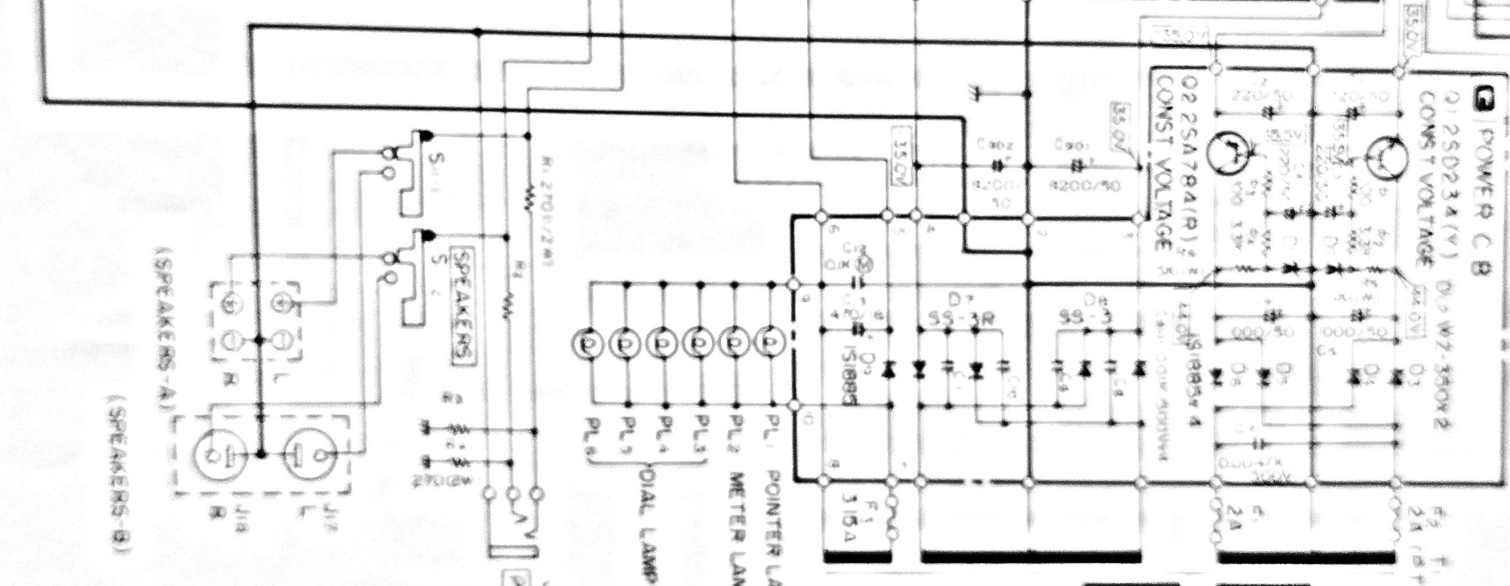
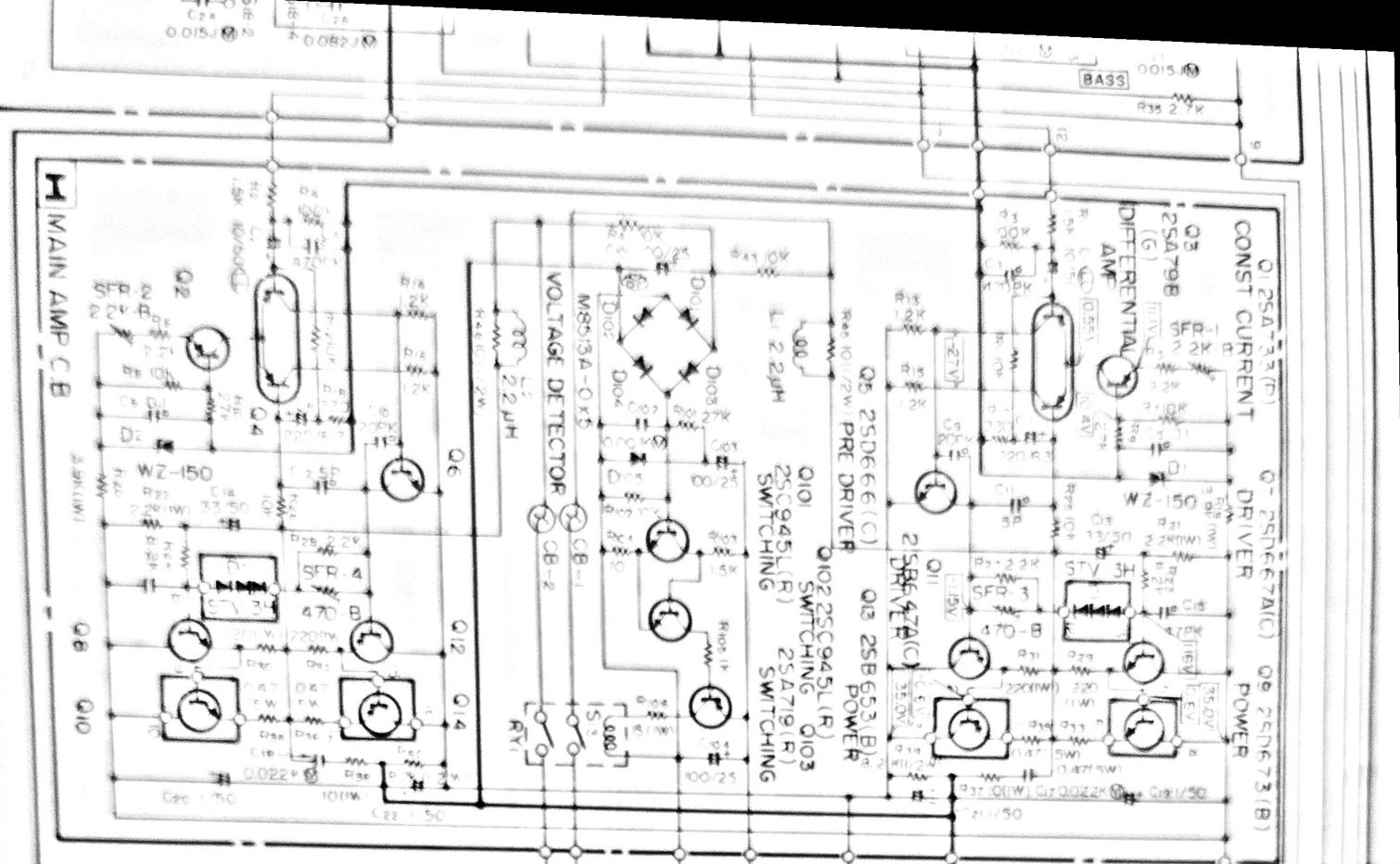




**POWER C.B**  
Q1 25D234(Y) D1,2 WZ-350x2  
CONST VOLTAGE 44.0V D3

F2 T1  
2A (PT)





- Switch..... FM (OFF)
- Switch..... AM (ON)
- Switch..... AUX (OFF)
- Switch..... PHONO (OFF)
- Switch..... TAPE2/PLAY (OFF)
- Switch..... TAPE1/PLAY (OFF)
- Switch..... AFC (ON)
- Switch..... FM MUTING (OFF)
- Switch..... LOUDNESS (OFF)
- Switch..... STEREO/MONO (STEREO)
- Switch..... SPEAKERS SELECTOR (A)
- Switch..... POWER ON/OFF (ON)
- Switch..... VARIABLE FILTER (OFF)
- Switch..... VOLTAGE SELECTOR-1 (HIGH)
- Switch..... VOLTAGE SELECTOR-2 (LOW)
- Switch..... HIGH FILTER (OFF)
- Switch..... TUNER/REQUENCY
- Switch..... DEFUALT SELECTOR (NORMAL)