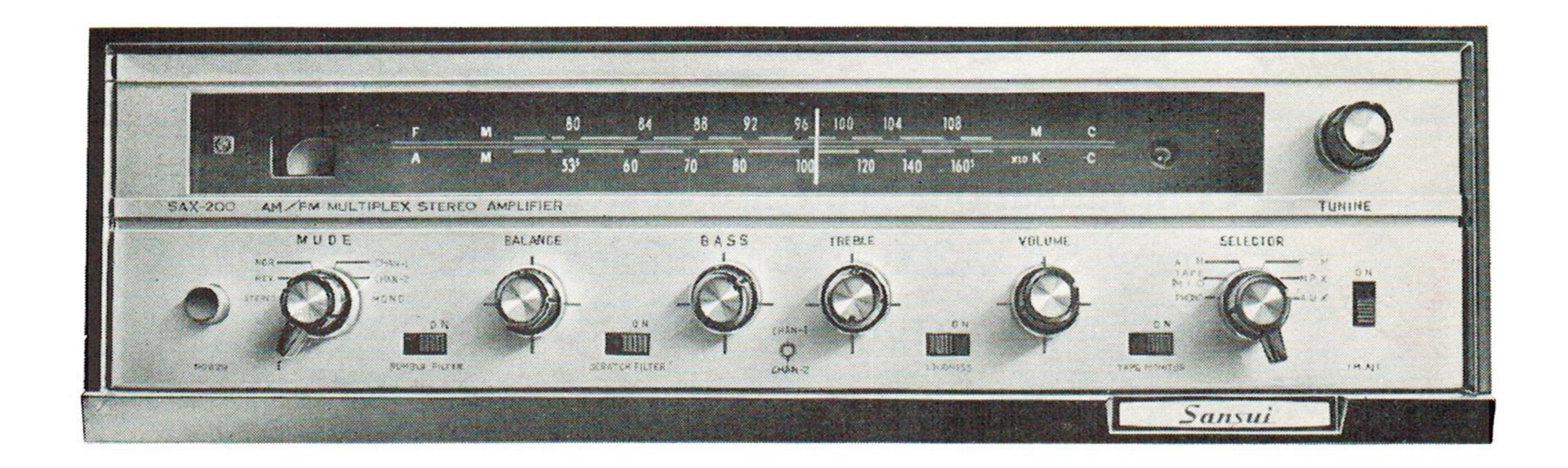
OPERATING INSTRUCTIONS & SERVICE MANUAL

AM/FM MULTIPLEX STEREO TUNER AMPLIFIER

SANSUI MODEL SAX-200





SANSIJI

AM/FM MULTIPLEX
STEREO TUNER
AMPLIFIER

MODEL SAX-200

Congratulations, you are now the owner of a new SAX-200 FM multiplex stereo amplifier manufactured by SANSUI, the leading manufacturer of amplifiers, transformers and other stereo audio sets.

SANSUI's technical staff has always endeavored to produce amplifiers that give stereo fans every convenience and advantage possible. This booklet explains the steps necessary for operating and caring for your new SAX-200. Read it carefully and retain for future use.

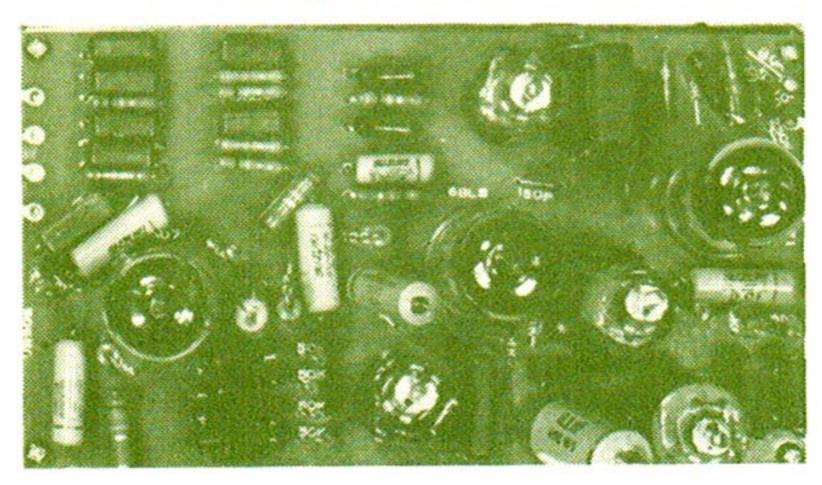
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FEATURES

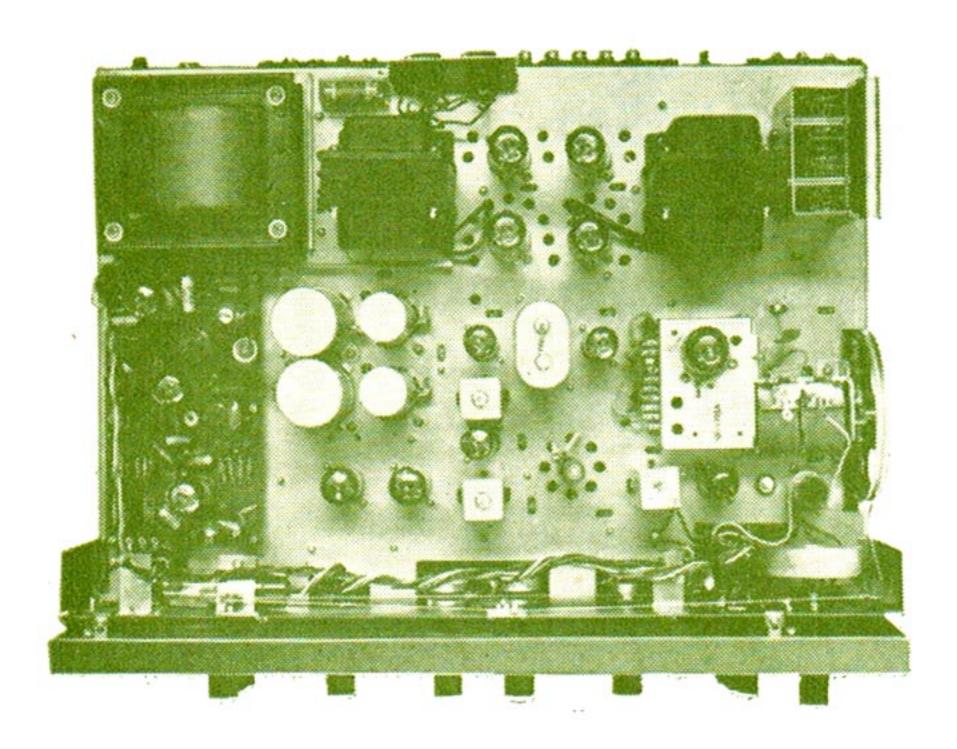
HIGH-STABILITY FM MULTIPLEX CIRCUIT

The SAX-200 employs the most advanced switching matrix circuit, featuring the outstanding performance characteristics. The channel separation is better than 35 db at 1000 cps! The distortion is less than 1%! For easier correct tuning, this new unit is provided with a stereo indicator.



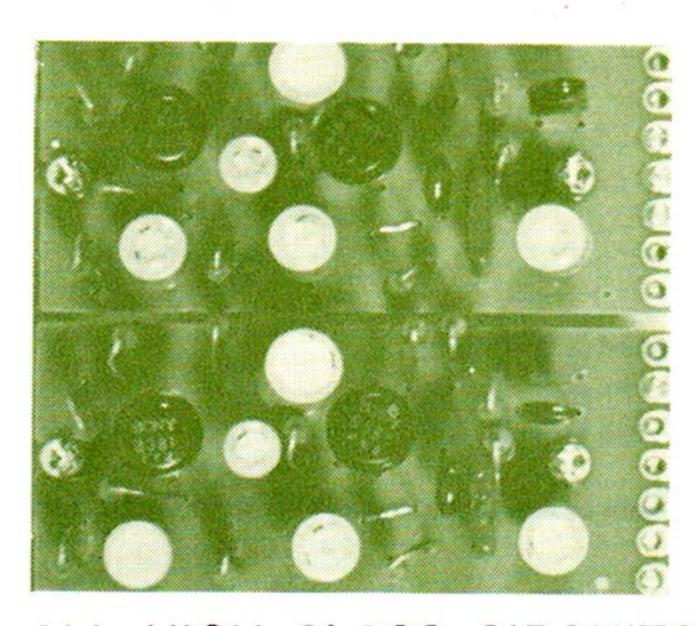
40-WATT POWER AMPLIFIER WITH EXCELLENT DAMPING FACTOR

The push-pull main amplifier with high-performance 6BM8 multiunit power tubes (triode-pentodes) allows to handle 40-watt power. Since voltage negative feedback of more than 16 db is applied to the power stage, the internal impedance is reduced to nearly one-sixth of its initial value and the damping factor of better than 2.5 is obtained. These assure of clear and crisp bass notes.



4-TRANSISTOR HEAD AMPLIFIER

Sansui's famous precision-made 4-transistor head amplifier is free from any hum. Even the low-output magnetic pickup, tape deck (direct tape head) and microphone can be used effectively and efficiently with the SAX-200.

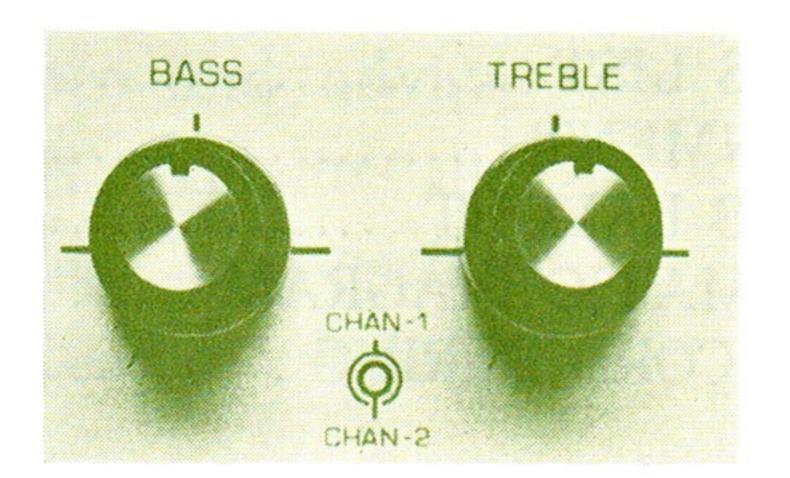


ALL HIGH-CLASS CIRCUITS AVAILABLE

The SAX-200 is equipped with all the high-class circuits such as rumble filter, scratch filter, loudness control, tape monitor, and tape recording-playback plug.

FRICTION DOUBLE-KNOB TONE CONTROLS

For easier adjustment of tones, both TREBLE and BASS controls have coaxial dual knobs.

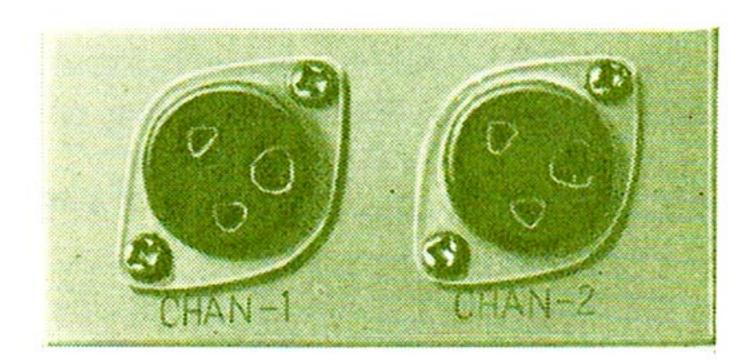


SPECIAL OUTLETS FOR CONDENSER TWEETER

The SAX-200 is provided with the two special outlets for the condenser (electrostatic) tweeter that has won a high reputation among the hi-fi stereo enthusiasts.

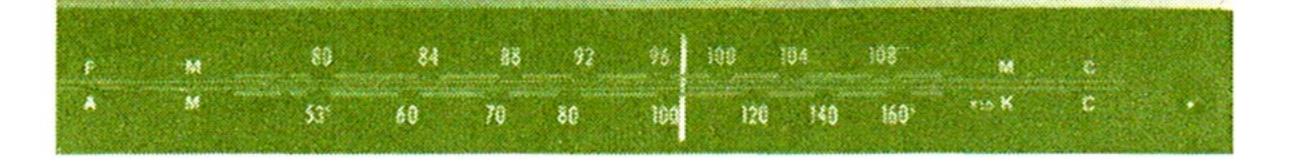
3-DIMENSIONAL DIAL SYSTEM

For easier selection of the desired station, the frequency calibration scales light up when the power switch is pushed on.



REFINED FUNCTIONAL DESIGN

The functional design of the SAX-200 is years ahead of its time. All the Sansui's technical advancements reflect even on a knob.



SPECIFICATIONS/CHARACTERISTICS

SPECIFICATIONS

POWER AMPLIFIER:

MAXIMUM OUTPUT 40 watts total, 20 watts pe channel
FREQUENCY RESPONSE 20 to 80,000 cps -2 dB
DISTORTION Less than 1% at 13 watt
OUTPUT IMPEDANCE 8, 16 and 32 ohms, each chan nel

PREAMPLIFIER:

SENSITIVITY & GAIN:

PHONO MAG: 77 dB 12 watts at 2 mV Input X-TAL: 49 dB 12 watts at 50 mV Input TAPE(MIC): 82 dB 12 watts at 1.1 mV Input AUX(TAPE MON-OUT): 46 dB 12 watts at 70 mV Input

SIGNAL-TO-NOISE RATIO better than 55 dB at TAP terminal

TONE CONTROL

CR type, $+13 \sim -15 \, \text{dB}$ (50cps $+10 \sim -14 \, \text{dB}$ (10 kc

EQUALIZER

NF type, PHONO: RIAA

TAPE: BTS

FM TUNER:

FREQUENCY RANGE 80 to 108 MC

CHARACTERISTICS

FREQUENCY CHAN - L CHAN - R CHAN - R CHAN - R CHAN - R 20 30 50 100 300 500 1K 3K 5K 10K 30K 50K C

BANDWIDTH

200 kc within -3 dB

FIDERITY SENSITIVITY \pm 2 dB, 30 to 15,000 cps

1.8 μV (S/N 30 dB 83 MC, 1 kc

100% MOD at 0.5 watts)

INTERMEDIATE FREQUENCY 10.7 MC

AM TUNER:

FREQUENCY RANGE 535 to 1605 kc

BANDWIDTH

6 kc within -3 dB

SENSITIVITY

better than $50 \,\mu\text{V}$ (S/N $20 \,\text{dB}$ 1 MC, 400 cps 30% MOD at

0.5 watts)

INTERMEDIATE FREQUENCY 455 kc

FM MULTIPLEX DEMODULATION CIRCUIT:

FREQUENCY RESPONSE 50 to 15,000 cps ± 2 dB

CHANNEL SEPARATION 35 dB at 1 kc

DISTORTION

Less than 1% at 1 kc, 0.3 to

3 V input

OTHER MAIN CIRCUITS:

LOUDNESS CONTROL

on-off switch 50 cps

10 kc

+8 dB

SCRATCH FILTER

 $+8 \, dB \, (1 \, kc : 0 \, dB)$

on-off switch

10 kc

 $-9 \, dB \, (1 \, kc : 0 \, dB)$

RUMBLE FILTER

on-off switch

20 cps

-18 dB

100 cps

-4 dB

FM-AFC TAPE MONITOR

on-off switch

on-off switch

FM STEREO INDICATOR

CONDENSER SPEAKER OUTLETS

TUBES, DIODES & TRANSISTORS:

 $6AQ8 \times 3$, $6BE6 \times 1$, $6BA6 \times 3$, $6BM8 \times 4$, $6BL8 \times 1$, 6DA5

 \times 1, 12AT7 \times 1 & 12AU7 \times 1;

OA-91 (germanium diode) \times 9, SW-0.5B(silicon diode) \times 2

& TC-0.2P(selenium diode) \times 1;

2SB-381 (transistor) × 4, IS-352 (variable capacitor)

TUNING INDICATOR

magic eye (both AM & FM

tuners)

POWER CONSUMPTION 120 VA

POWER SUPPLY

100V, 115V, 230V, AC 50, 60cps

DIMENSIONS

width $17^3/_{18}'' \times \text{depth } 13^9/_{18}''$

 \times height $5^{14}/_{18}''$

WEIGHT

29.3 lbs

STANDARD ACCESSORIES:

1 pc

FM antenna

2. AM antenna

1 pc

Pin jack

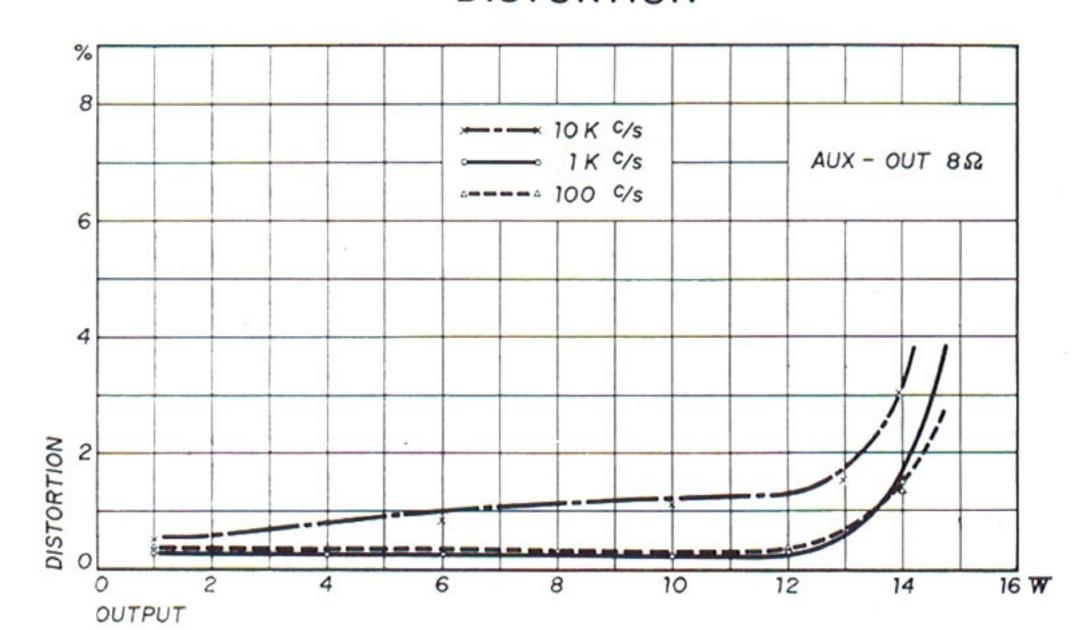
10 pcs

4. 3-pin jack

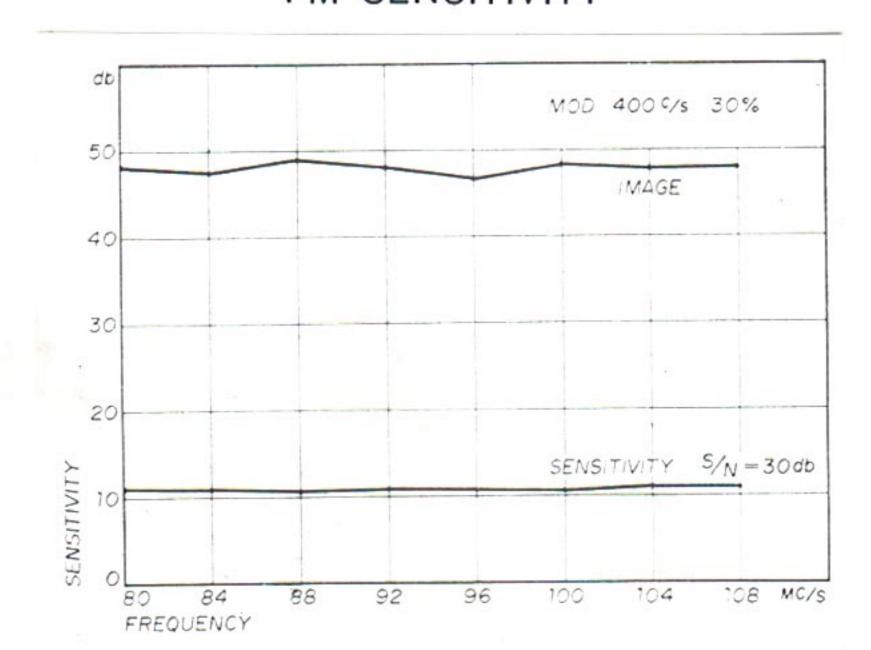
2 pcs

(Specifications subject to change without notice)

DISTORTION



FM SENSITIVITY



CONNECTIONS

NOTES:

In cases of 2-2 and 2-3 of the above subsections, a impedance-matching transformer should be used. The following are available at your Sansui dealer:

CT-50: for 8-ohm speaker; CT-60: for 16-ohm speaker.

CONNECTION OF LOUDSPEAKERS

When a speaker is connected to your SAX-200, the impedance should match to obtain proper performance. Carefully read this section to obtain the best amplifying result.

1 IN CASE OF USING ORDINARY CONE OR HORN SPEAKERS

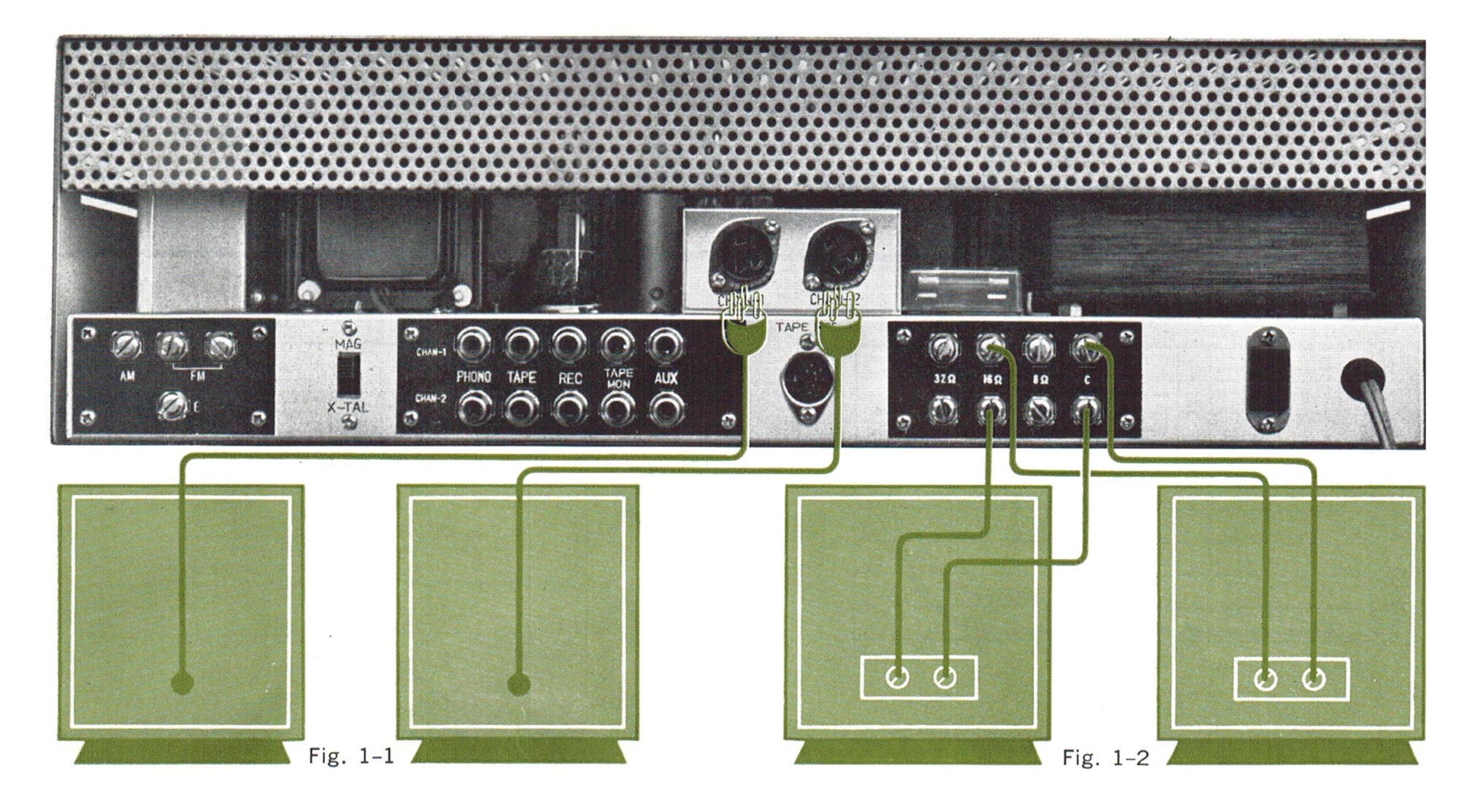
1-1 STEREO (Fig.1-2)

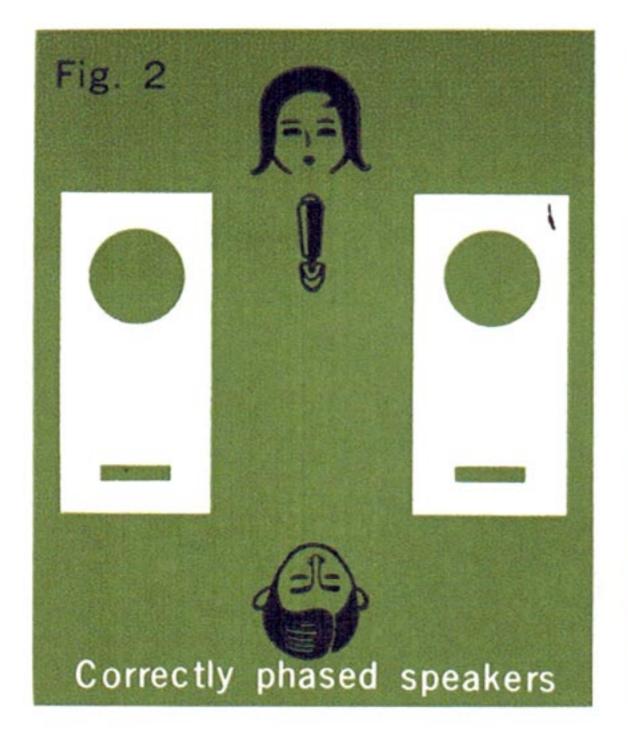
Connect the possitive terminal of the right speaker (channel-1) to one of the upper terminals marked 8, 16 and 32 ohms at the back of your SAX-200, depending on the impedance of the speaker used. Then connect the negative terminal to the upper C terminal.

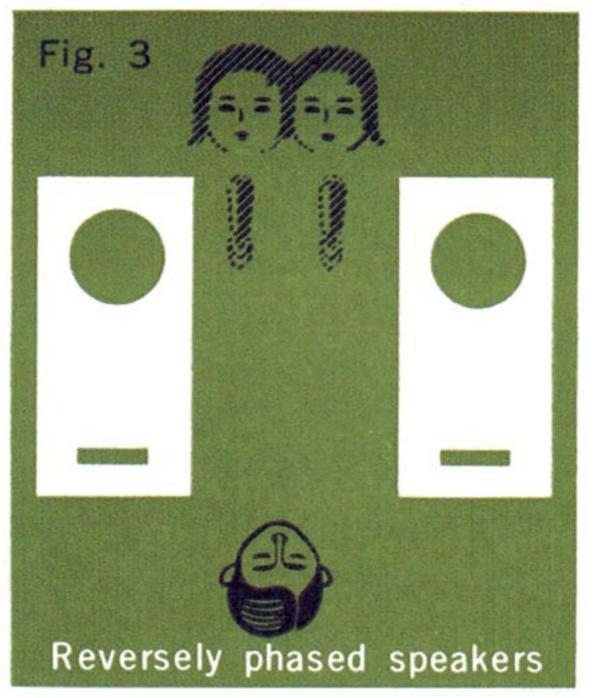
Connect the positive terminal of the left speaker (channel-2) to one of the lower terminals marked 8, 16 and 32 ohms at the back of your SAX-200, depending on the impedance of the speaker used. Then connect the negative terminal to the lower C terminal.

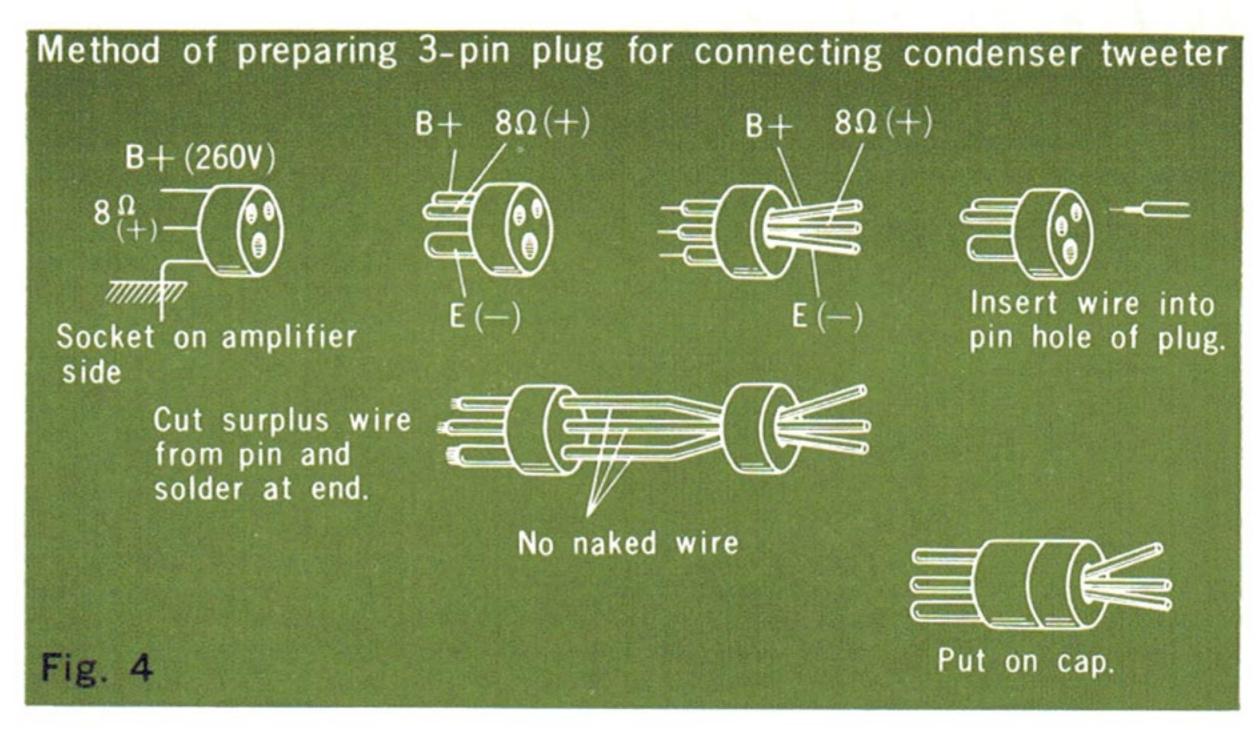
1-2 MONO

If speaker systems are used as a monophonic system (theimpedance of the speaker is 16 ohms, for example), connect the positive terminals of the right and left speakers to the upper and lower terminals marked 32 ohms at the back of your SAX-200, and then the negative terminals to the upper and lower C terminals.









2 IN CASE OF USING CONDENSER (ELECTROSTATIC) TWEETER IN 2-WAY OR 3-WAY SPEAKER SYSTEM

- 2-1 In case of using condenser speakers with built-in polarized power supply (250/260V) or use of low-impedance speakers with buil-in network, connect them depending on their impedance as described in the preceding section (Fig. 1-2).
- 2-2 If a 8-ohm woofer/midrange is used together with the condenser tweeter, connect as shown in Fig. 5 and Fig. 1-1 by using a 3-pin plug* (Fig. 4).

 * Included in the standard accessories of your SAX-200.
- 2-3 If a 16-ohm woofer/midrange is used together with the condenser tweeter, the latter should be, by using the 3-pin plug, connected as shown in Eig. 6. The woofer/midrange should be connected to the C and 16-ohm terminals in accordance with its impedance.
- 2-4 If a condenser tweeter with built-in high-impedance network is used, remove the network from the tweeter and then connect as described in subscription 2-2 or 2-3.

CAUTION: Be sure to use the 3-pin plug correctly as illustrated Fig. 8, or the amplifier and speaker may be damaged.

WARNING: Never attempt to touch the power supply built into the condenser speaker because of the high tension of 260V.

NOTES:

- 1. The two speakers or groups of speakers must be properly phased. The speakers for the two channels must push the sound waves out together. If one pushes while the other pulls, there is sound cancellation at some frequencies or in some listening locations. If so, reverse the phase (+ and -) of either group of speakers.
- 2. The proper connection of the speakers is vital to maintain long life and high performance of the amplifier. After connecting, make sure that one terminal is not in contact with another terminal.

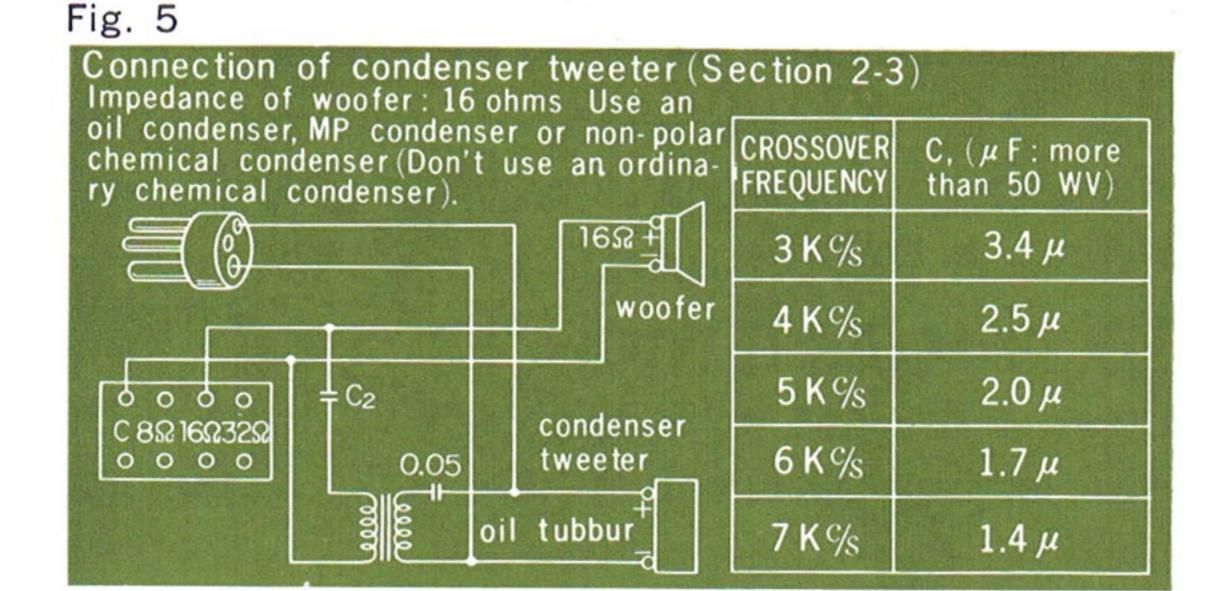
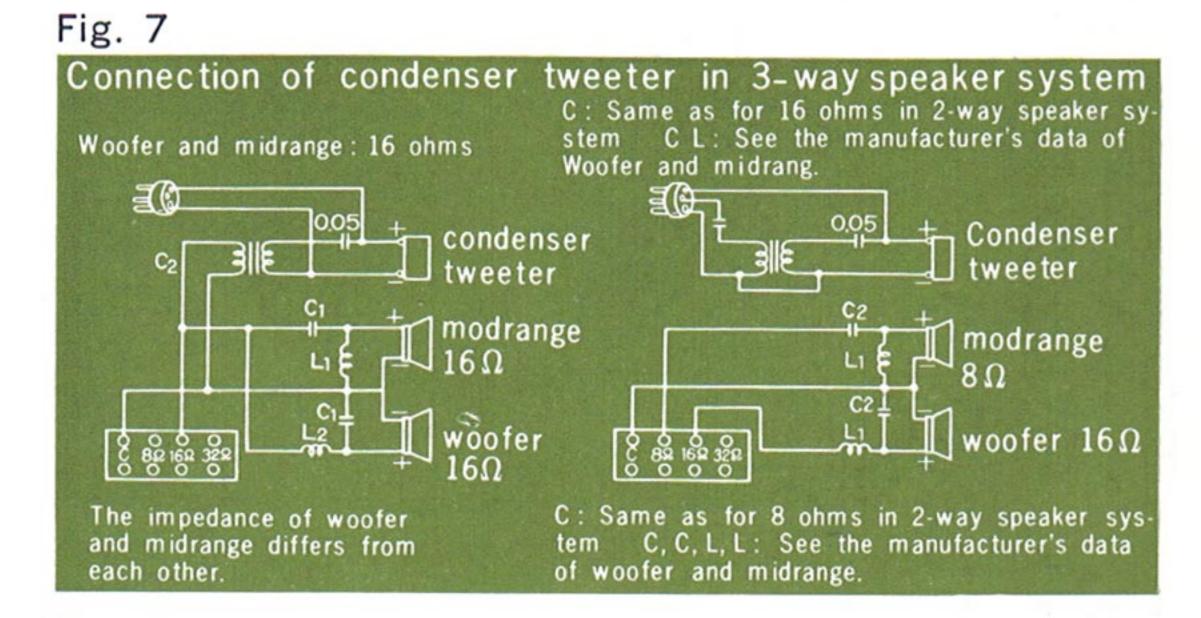
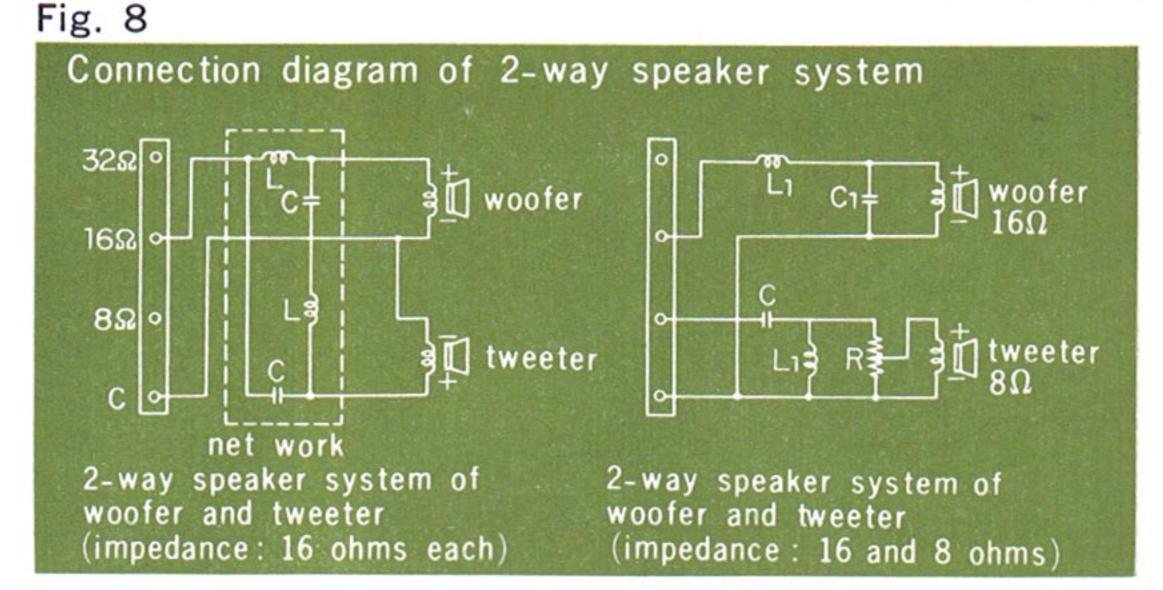


Fig. 6 Connection of condenser tweeter (Section 2-2) Impedance of woofer: 8 ohms CROSSOVER C, (µF: more than 50 WV) FREQUENCY 88+ 3 K% 6.8μ woofer Use an oil 4 K % 5μ cndenser, MP condenser or 5 K% 4 μ non-polar chemical condenser € 0.05 Oil 6 K % 3.4μ (Don't use an tubrer ordinary chemi-7 K% cal condenser) 2.8μ condenser tweeter





CONNECTIONS

1. CONNECTION OF THE ANTENNA

The AM and FM antennas are included in the standard accessories of your SAX-200. Properly connect as follows:

1-1 AM ANTENNA

Connect the AM antenna (blue PVC wire) to the AM antenna terminal at the back of the amplifier.

NOTES:

1. STRONG SIGNAL STRENGTH

If the station signal is strong enough (in some places near the broadcasting station), only 2 or 3-meter indoor antenna is adequate. If a noise or hum is still heard due to the insufficient sensitivity, it should be properly installed on

the wall of the room.

2. WEAK SIGNAL STRENGTH

If the station signal is weak (in some places far away from the broadcasting station or in some thick-wall building), the outdoor antenna should be installed as illustrated in Fig. 11.

For stafety reason, install a lightning arrester to the outdoor antenna.

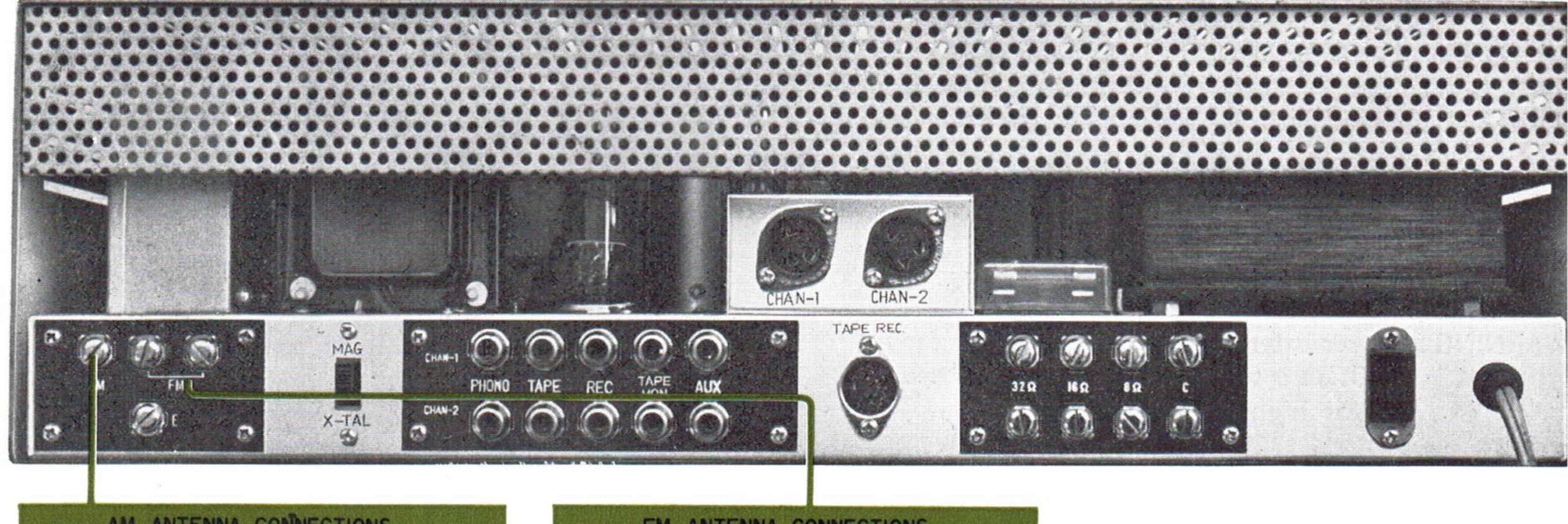
1-2 FM ANTENNA

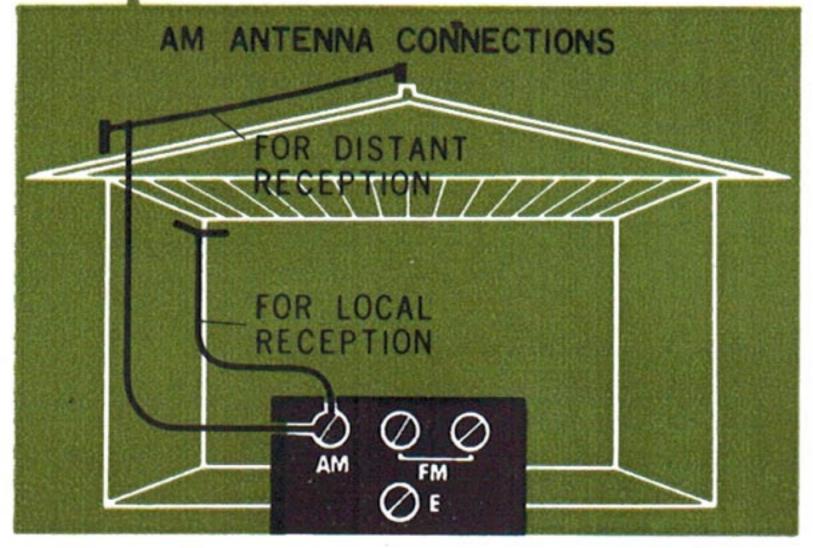
Connect the FM antenna (feeder wire) to both FM and E terminals at the back of the amplifier.

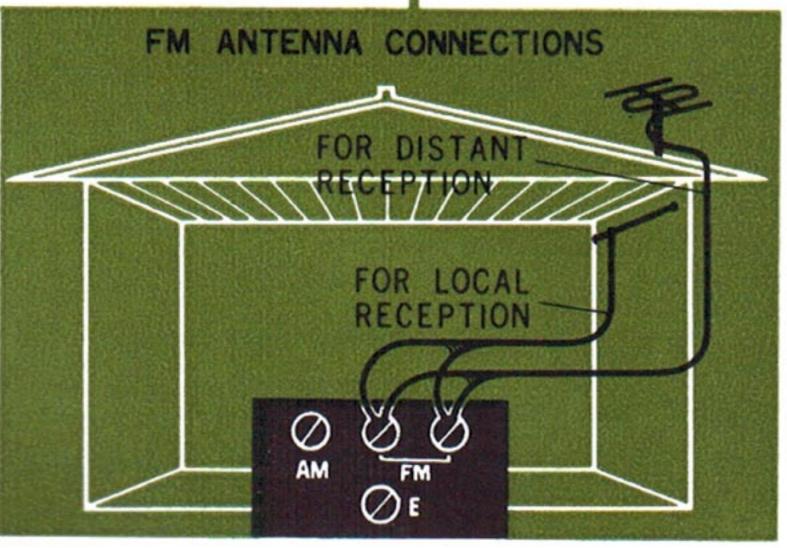
NOTES:

1. STRONG SIGNAL STRENGTH

If the station signal is strong (in some places near the broadcasting station,) the indoor antenna should be installed in a "T" shape to







obtain the highest sensitivity.

2. WEAK SIGNAL STRENGTH

If the station signal is weak (in some places far away from the broadcasting station or in some thick-wall buildings), the outdoor TV antenna should be used.

3. For the best antenna effect, pay a special attention to its height and direction rather than its length. One person should listen while another installs it to the proper position.

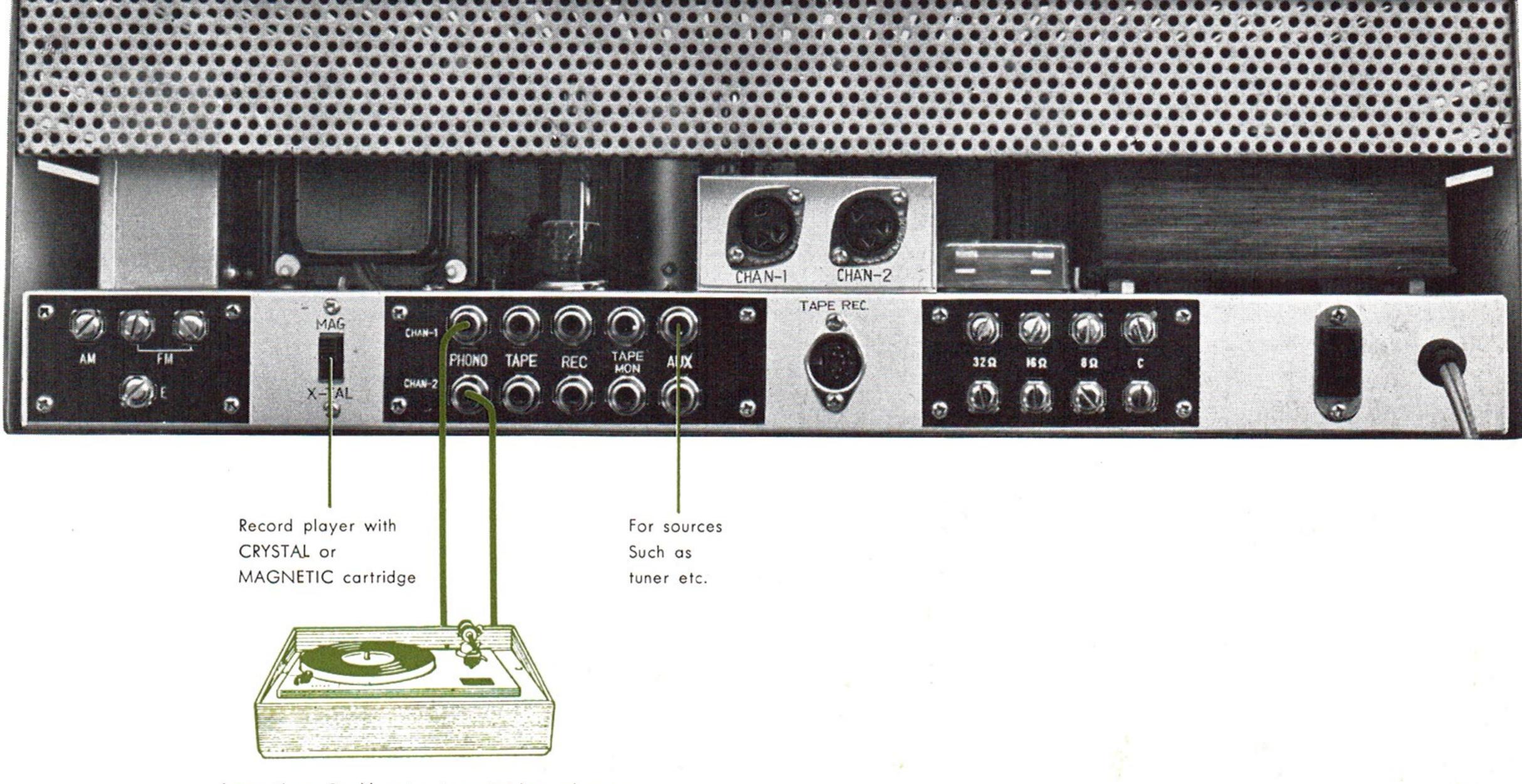
RECORD PLAYER

- a) Connect the right output of the record player to the PHONO CHAN-1 input at the back of the amplifier.
- b) Connect the left output of the record player to

- the PHONO CHAN-2 input at the back of the amplifier.
- c) Set the cartridge switch at the back of the amplifier to MAG or XTAL position, depending on the type of pickup cartridge used.
- d) Insert the record player plug into the amplifier outlet.

NOTES:

- 1. There are two categories of pickups, one using a crystal element and the other using a magnetic circuit. You can use either pickup with your SAX-200.
- 2. The record player connected is not switched on and off by the power switch of the SAX-200. It is, therefore, preferable to use a record player having its own power switch.



Less than 2 mV output cartridge player

CONNECTIONS

CONNECTION OF A TAPE RECORDER

1 RECORDING

1-1 TAPE RECORDER WITH RECORDING/PLAY-BACK CONNECTOR (ONE CONNECTION: DIN STANDARD)

By using shieldedwire, insert the recording/playback connector of the tape recorder into the REC outlets, or TAPE REC (DIN) socket of the amplifier.

1-2 TAPE RECORDER WITH PIN JACK

By using shielded wire, connect the recording input of the tape recorder to the amplifier CHAN-1 and CHAN-2 terminals marked REC for stereo recording or either terminal for monophonic recording.

2 PLAYBACK

2-1 TAPE RECORDER WITH RECORDING/PLA BACK CONNECTOR (ONE CONNECTION: D STANDARD)

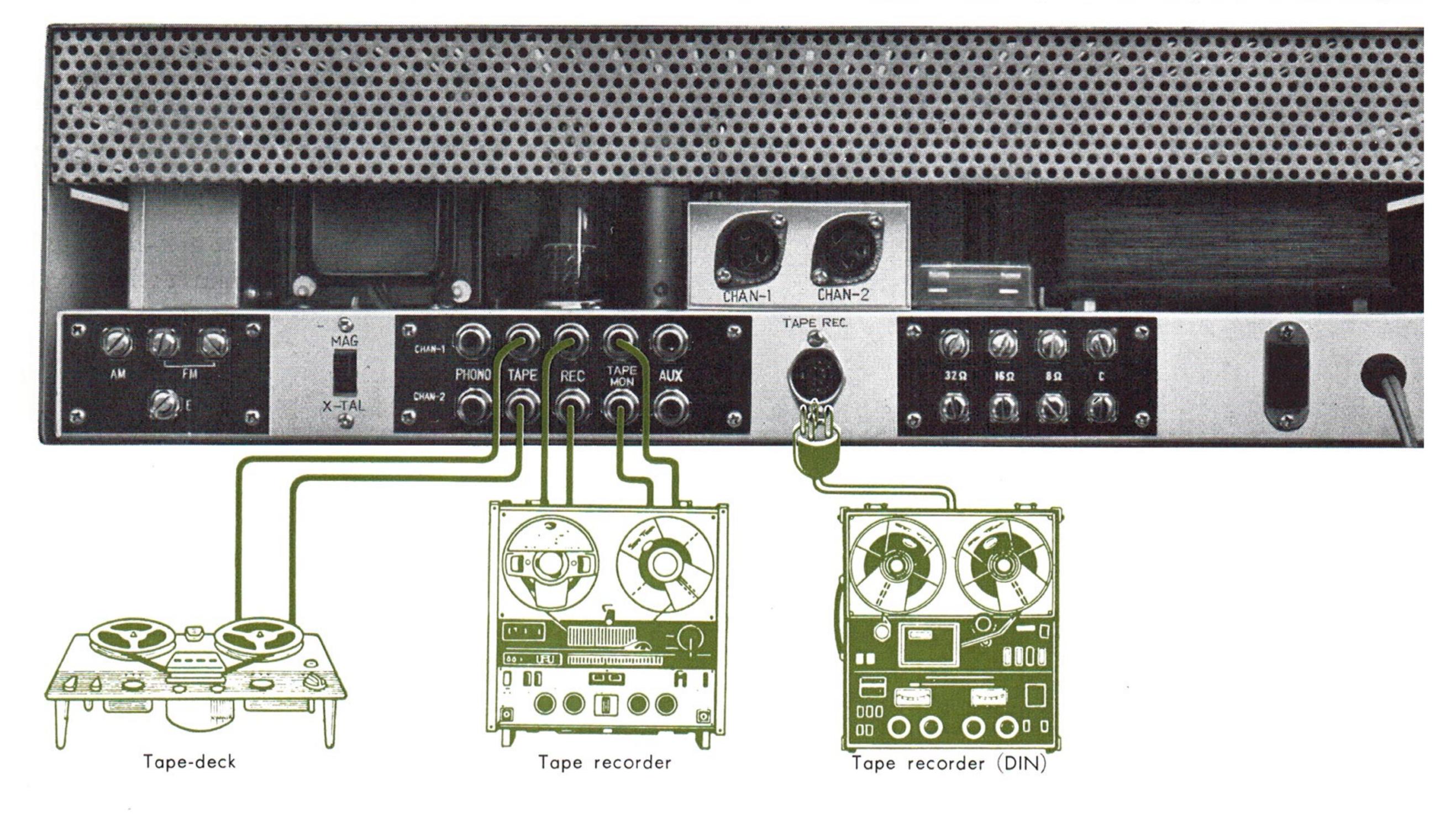
By using shielded wire, insert the recordin playback connector of the tape recorder in the TAPE MON outlets, TAPE REC (DII socket of the amplifier.

2-2 TAPE RECORDER WITH PIN JACK

Connect the tape recorder outputs to the amp fier CHAN-1 and CHAN-2 terminals mark TAPE MON for stereo or to either termin for monaural.

2-3 TAPE DECK(DIRECT TAPE HEAD)

Connect the tape deck outputs to the amplifi



CHAN-1 and CHAN-2 terminals marked TAPE for stereo or to either terminal for monaural.

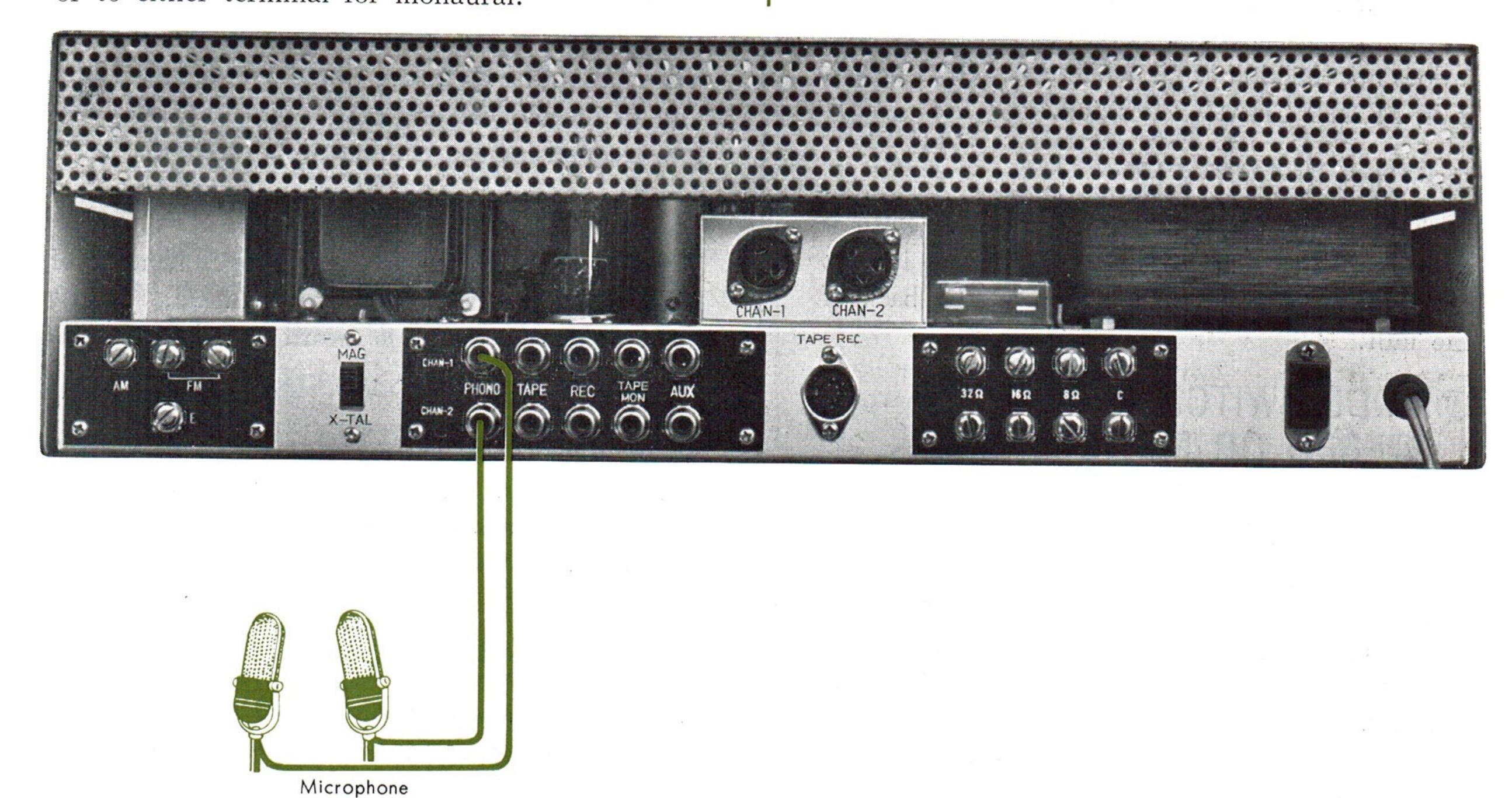
3 MONITORING

Your SAX-200 has a monitoring circuit for a 3-head tape recorder, making it possible to listen to the reproduced sound while recording. Connect it as in Section "RECORDING(1-1)" and "PLAY-BACK (2-1 and 2-2).

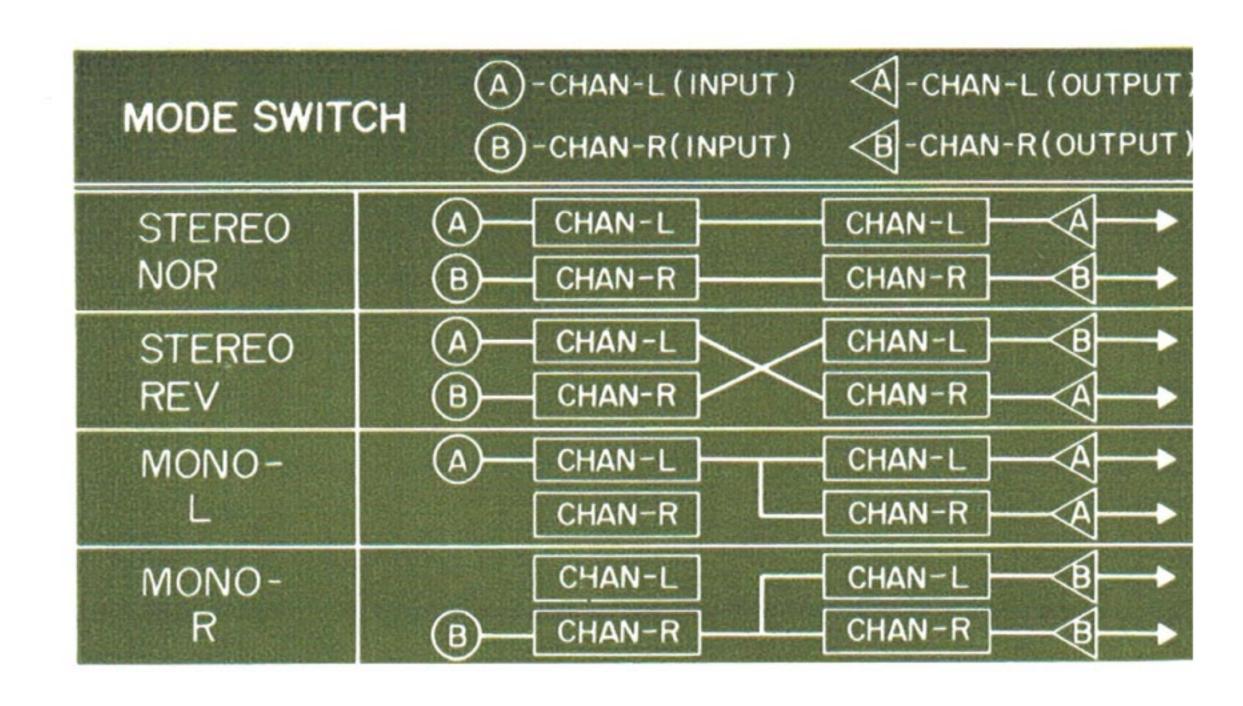
MICROPHONE

Use a high-impedance $50 \text{ k}\Omega$ crystal, dynamic or velocity microphone.

Connect the microphone to the amplifier CHAN-1 and CHAN-2 terminals marked TAPE for stereo or to either terminal for monaural.



SWITCHES AND CONTROLS



1 MAGIC EYE

This device gives a visual indication of correct FM and AM tuning. The closed fluorescent pattern means that the tuning is correct.

2 MPX INDICATOR

This indicator is lit as soon as the signals of the desired stereo broadcast are correctly selected. It does not function for monaural FM broadcasting. Although it goes on when the power switch is turned on, it will go off in a short time.

3TUNING

This knob is used to select the signal of the desired FM or AM broadcast station. Note that it does not function at all while the MODE switch is in MONO CHAN-2 position.

4 POWER SWITCH

Push the button and the unit goes on. Push it again and the unit goes off. Note that it does not switch on and off the outlets at the back of the unit.

⑤ MODE SWITCH (SWITCH TO STEREO OR MONO)

STEREO NORMAL:

FM multiplex stereo broadcast, stereo record and stereo tape.

As illustrated below, the signal A of the channel 1 and the signal B of the channel 2 are driven from the speaker A and the speaker B respectively.

STEREO REVERSE: Same as above.

The signal A of the channel 1 and the signal

B of the channel 2 are driven from the speak B and the speaker A respectively.

If the sound from the right and left speake is heard reverse, the MODE switch should set to this position.

MONO CHAN-1:

FM broadcast, AM broadcast, monophor record and monophonic tape.

As illustrated below, the signal of the chant 1 is driven from both A and B speakers.

MONO CHAN-2: Same as above but rarely use The signal B of the channel 2 is driven fro both A and B speakers.

6 RUMBLE FILTER

Turn on this switch and the low-frequency vibition of mechanical origin or noises at relative low frequencies are eliminated or reduced.

7 BALANCE CONTROL

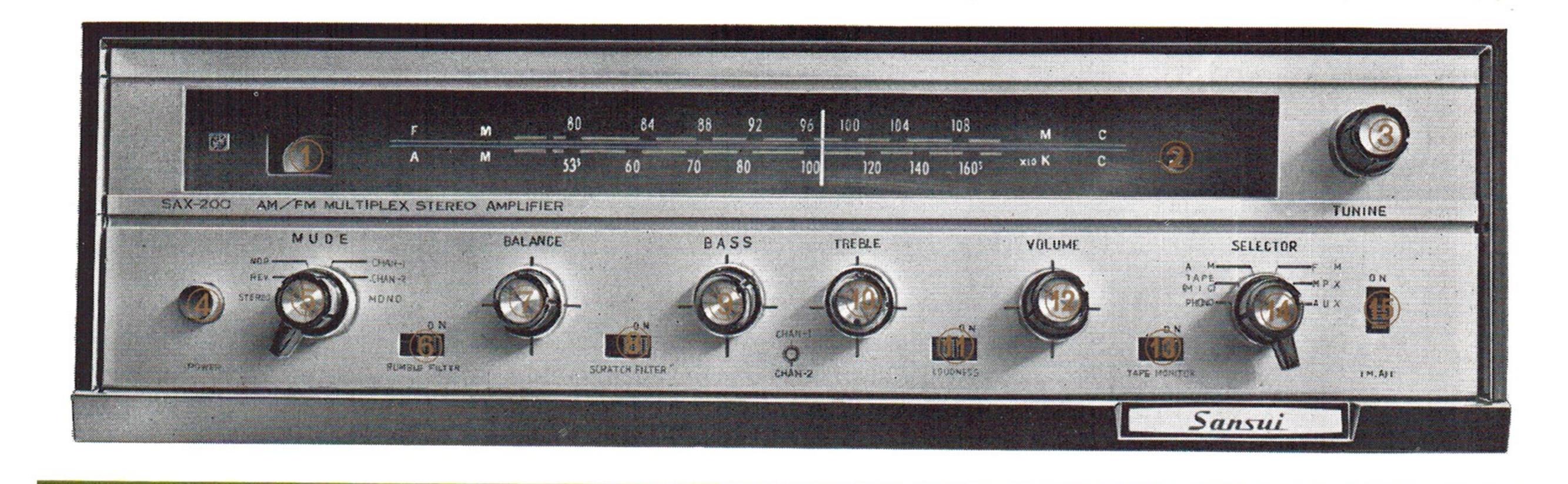
This control is used to keep proper balance sound volume between the two channels. Adjuit so that the sound is heard equally from the right and left speakers.

8SCRATCH FILTER

Turn on this switch and a record scratching nois radio noise caused by a fluorescent lamp and oth noises at relatively high frequencies are eliminat or reduced.

9 BASS CONTROL

As this control is turned from the center-s (FLAT) to right, the bass notes are more emph sized. As it is turned from the center-set to leave



they are less emphasized.

The outer knob and the inner knob of the control are for the channel 1 and the channel 2 respectively.

10TREBLE CONTROL

As this control is turned from the center-set (FLAT) to right, the high notes are more emphasized. As it is turned from the center-set to left, they are less emphasized.

The outer knob and the inner knob of the control are for the channel 1 and the channel 2 respectively.

11 LOUDNESS SWITCH

This switch is used to emphasize the high and low notes only when you enjoy a music with the volume largely reduced.

12 VOLUME CONTROL

When this control is turned clockwise, the volume is increased; when it is turned counter-clockwise, the volume is decreased.

13 TAPE MONITOR SWITCH

When you tape recorder using of a 3-head tape recorder, turn on this switch. And the sound recorded is reproduced at the same time.

When playing the tape back, turn this switch on. This switch must be always in OFF position except for the above uses.

14 SELECTOR

This switch is used to select the desired sound program:

PHONO: Playing of records.

TAPE (MIC): Tape deck (direct head) playback and microphone.

AM: AM broadcasting. FM: FM broadcasting.

MPX: FM multiple stereo broadcasting.

AUX: Reproduction by connecting other tuners, MPX adaptor, X-tal cartridges, etc.

15 FM-AFC

This prevents signals from FM station with drifting. This is likely to happen because of the very high frequencies used. If it occurs, the total quality deteriorates or you cannot hear the program at all. To avoid this, switch on the FM-AFC after tuning in the station of your choice. If you switch on the FM-AFC before tuning, you may not be able to tune the tuner as accurately. If the FM-AFC is kept on even when there are a number of stations nearly, you may suffer from their interference. In such a case, switch off the FM-AFC.

OPERATIONS

FOR RADIO RECEPTION

1. FM RECEPTION

- a) Set the SELECTIOR switch to FM position.
- b) Set the MODE switch to MONO CHAN-1 position.
- c) Select the signal of the desired station by means of the TUNING knob and the magic eye.
- d) Turn on the FM-AFC switch.
- e) Adjust other controls and switches properly.

2. AM RECEPTION

- a) Set the SELECTOR switch to AM position.
- b) Set the MODE switch to MONO CHAN-1 position.
- c) Select the signal of the desired station by means of the TUNING knob and the magic eye.
- d) Adjust other controls and switches properly.

3. FM STEREO RECEPTION

- a) Set the SELECTOR switch to MPX position.
- b) Set the MODE switch to STEREO NOR position.
- c) Select the signal of the desired station by means of the TUNING knob and the magic eye. When the FM stereo signals are correctly selected, the indicator lamp goes on.
- d) Turn on the FM-AFC swich.
- e) Set the BALANCE control to proper position.
- f) Adjust other controls and switches properly.

NOTES:

1. FM-AFC SWITCH

Your SAX-200 has a FM-AFC circuit which provides continuous automatic adjustment to the tuning, eliminating any trouble caused by the FM.

First, select the signals of the desired station and then turn on the FM-AFC switch, or may be hard to tune in.

2. FM MULTIPLEX STEREO

There are two systems in the FM multiple broadcasting: FCC system (GE-ZEMIT) system) and CROSBY system (FM-FM system Your SAX-200 can receive the signals of the FCC stereo system.

In the FCC system, also cllaed "Single Way AM-FM System", a signal which contains the sum of the left and right stereo channels (L+F is frequency-modulated in the main channel and a signal which is the difference betwee the left and right channels (L-R) is amplitude modulated in the subchannel. For easied demodulation, the SAX-200 employs the compatible system of the complex singulars to which the 19 kc pilot carrier and the 67 kc subsign of the SCA channel signal are added. With this system, you can enjoy clear and noisele stereo music.

FOR PLAYING OF RECORDS

- a) Set the SELECTOR switch to PHON position.
- b) Set the MODE switch to STEREO NO position.
- c) Switch on the record player at proper spectrum.
- d) Place a pickup on the record.
- e) Adjust the balance of sound levels between the right and left speakers by means of the BALANCE control.
- f) Adjust the VOLUME control properly.
- g) Adjust other controls and switches properl

USE OF A STEREO RECORD PLAYER

Follow the same procedure as for playing of stereo records for better result.

- 1. When the sound in the right channel is heard from the left speaker, and vice versa, the MODE switch should be set to STEREO REV position.
- 2. To obtain the best balance of sound levels between both channels, play a monophonic record just like a stereo and adjust the BALANCE control so that the sounds are heard from the middle between the right and left speakers.

FOR RECORDING AND PLAYBACK OF TAPE

1. TAPE RECORDING

- a) Set the SELECTOR switch to the program source which is going to be recorded.
- b) Set the MODE switch to STEREO NOR position for stereo recording or to either of MONO CHAN-1 and CHAN-2 positions for monophonic recording.
- c) Operate the tape recorder correctly.

NOTE:

The sound to be recorded on the tape is not controlled by the amplifier.

2. PLAYBACK

- a) In case of tape recorder (in Section 1–2–1 and 1–2–2), set on the TAPE MONITOR switch, In case of tape deck (in Section 1–2–3), set the SELECTOR switch to TAPE(MIC) position.
- b) Set the MODE switch to STEREO NOR position for stereo or to either of MONO CHAN-1 and CHAN-2 positions for monaural.
- c) Operate the tape recorder properly.

d) Properly adjust the controls and switches of the amplifier.

3. MONITORING

Operate as in the preceding section "PLAY-BACK".

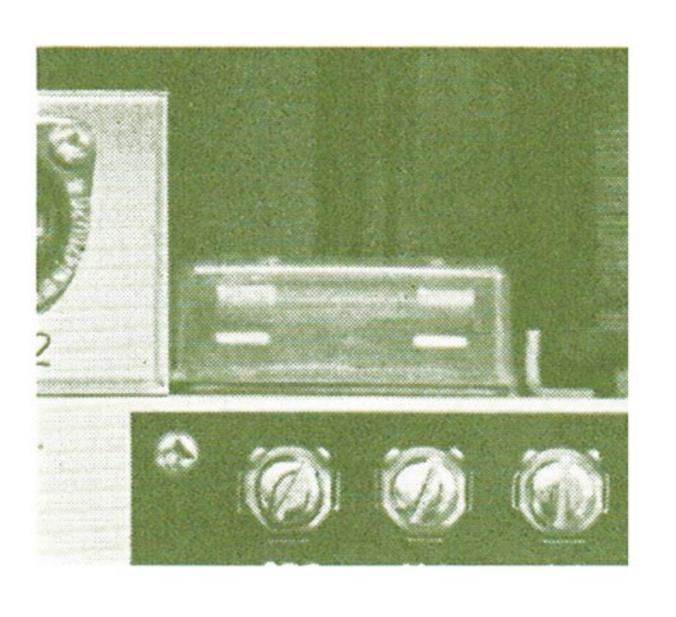
NOTES:

- 1. The sound level recorded is not related to that from the speakers.
- 2. Record playing and radio programs should be recorded on the tape by the use of the amplifier. Don't use a microphone placed in front of the speaker.
- 3. Before recording, be sure to look up the manufacturer's instructions to connect and operate the tape recorder correctly.
- 4. In case of record-to-tape recording, the MODE switch always functions as STEREO NOR even if it is set to any other position.
- 4. The TAPE MONITOR switch must be always in OFF position except for monitoring and playback.

FOR MICROPHONE

- a) Set the SELECTOR switch to TAPE(MIC) position.
- b) Set the MODE switch to STEREO NOR (or REV) position for the use of the two microphones or to CHAN-1 (or CHAN-2) position for the use of single microphone.
- c) Turn the BASS control fully in a counterclockwise direction.
- d) Adjust the TREBLE control clockwise to the right horizontal line through the center-set (FLAT).
- e) Adjust other controls and switches properly.

HOW TO KEEP YOUR SAX-200 IN TOP CONDITION



HOW TO ELIMINATE UNPLEASANT RADIO NOISE

1. AM BROADCASTING

- 1–1 An AM radio noise is often eliminated simply by replacing the antenna.
- 1–2 Too weak station signal may cause a noise to the amplifier. To eliminate it, install the indoor antenna properly on the wall of the listening room. If the noise is still heard or the sensitivity of the amplifier is still excessively low, the outdoor antenna should be installed.
- 1-3 To eliminate a modulation hum, connect amplifier to the ground or turn the power plug upside down.

2. FM BROADCASTING

- 2-1 There are two trouble-sources in the FM radio noises: one is caused by the insufficient antenna input and another is caused by other electrical appliances placed near the amplifier. To eliminate the former noise, check the antenna for improper installation and, if necessary, install an outdoor TV antenna or special FM antenna. When the FM antenna is used together with the TV antenna, it must be installed so that it does not affect the latter at all. A special divider is recommended for this use. To eliminate the latter noise, install noise limiters to them or the amplifier itself.
- 2–2 Note that an excessively long antenna may cause a noise.
- 2-3 The sensitivity of the amplifier varies, depending on the transmitting conditions of

the station and the performance of the antenna Therefore, it is not an amplifier trouble that the signal of the station A is well received but that of the station B is badly received.

3. FM AND AM BROADCASTINGS

To eliminate a noise caused by other electrica appliances, install noise limiters to them o the amplifier itself.

4. FM MULTIPLEX STEREO BROADCASTING

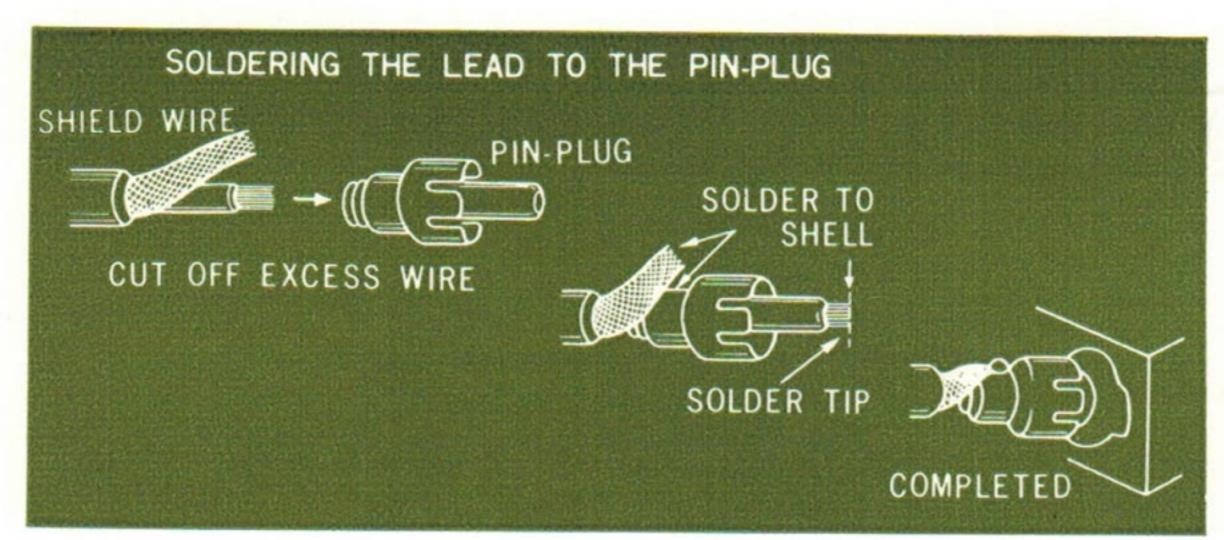
To eliminate a noise in the FM multiple: stereo, switch on the scratch filter and adjus the TREBLE control to FLAT (or give a little turn counterclockwise from the middle). Another way to eliminate is to listen to the FM multiplex stereo with the amplification operated for monophonic FM.

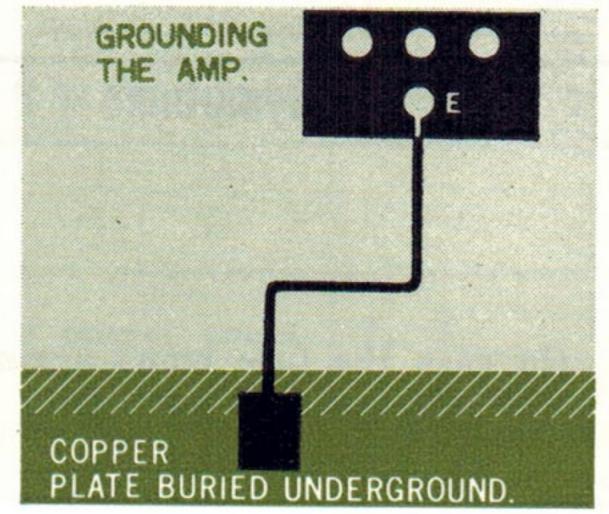
WRONG PHASED SPEAKERS

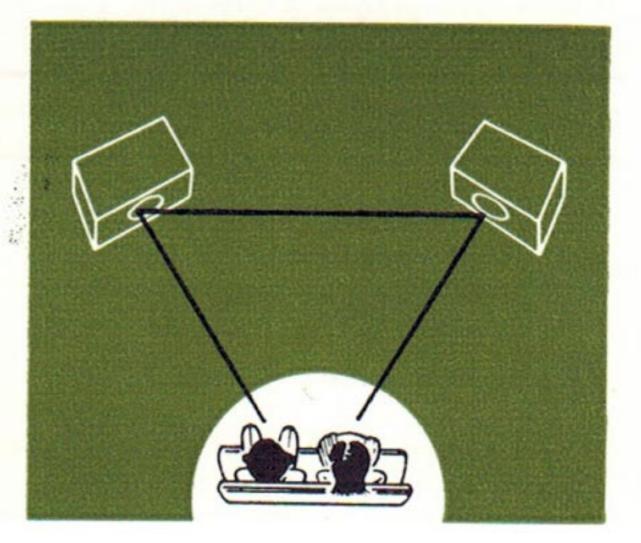
Incorrect phasing is evidenced by loss of bas when you are listening to a monophonic record at a point midway between the two speake systems. To phase them correctly, reverse the positive and negative terminals of either speake system.

BLOWN FUSE

If the unit does not function at all due to the blown fuse, remove its line cord from the outle and then replace the fuse. Use a 2-amperent cartridge fuse. Never attempt to use a wire of a fuse with improper capacity. Before replacing be sure to trace the trouble source and repair.







HOT AMPLIFIER

Don't worry about heat radiated from the amplifier. Air vents in the top and back plates assure of a long continuous use. Some precautions, however, should be observed: first, place nothing on the amplifier; second, don't install it into an air-tight box; and lastly, don't use it standing upright.

CONNECTION TO THE AMPLIFIER

Be sure to use a shielded wire for the connection of a tape recorder, record player etc. The use of an ordinary cord or PVC wire may cause buzz to the amplifier.

DEEP HOWLING

Deep howling or buzzing on record playing is caused not by the amplifier, but by the record player which is placed on or near the enclosure. To eliminate it, keep a proper distance between them or place the record player on a thick cushion.

Be sure to use a shielded wire for the connection of the record player and the tape recorder, or a noise or buzz may be made.

If the noise is still heard, check all the connections for wrong or bad grounding.

CONNECTING TO THE GROUND

Connect one end of a PVC wire or enamel wire to the E terminal of the amplifier and another end to the ground, as shown in Fig. 15. This eliminates or reduces a noise on radio reception and a howl on record playing.

RECORD NOISE

To eliminate a record noise, switch on the scratch filter. If the noise is still heard, check the needle for wear and the record for defect.

FOR THE BEST STEREO EFFECT

The spacing between speakers, the location of the listener, and room acoustics, all effect the performance of the stereo system.

Positioning of speakers is just as phasing in the stereo system. If the speakers are separated too much, or if the listener gets too close to the speakers, there may be a sound hole in the middle. Arrange them as illustrated in Fig. 16. The amplifier and the record player should be kept away from the speakers not only for convenience but for eliminating any troubles caused by the vibration of the reproduced sound.

WHERE TO BE PLACED

The amplifier should be installed to the place as given below:

- 1. Easy to ground;
- 2. Floor not vibrated;
- 3. Not wet and dusty;
- 4. Not exposed to the sun;
- 5. Well ventilated.

SERVICE NOTE

When the power switch is pushed, electric supply will not be on.

	Symptoms (1)	Symptoms (2)	Likely defective places
B . C .	Poor power switch. Poor power cord. Poor plug contact. Blown fuse.	(In case the fuse blows again upon fitting a new one)	Replace it. Replace it. Replace the plug or make the plug contact better. Replace it. Short-circuit rearing in the power transformer (T_6) or short-circuit of path condenser (C_{39}) .

When the power switch is pushed, electric supply will be on.

S	symptoms (1)	Symptoms (2)	Likely defective places
A. The at a		 Broken wires of vacuum tube heaters. In case there is something wrong in the vacuum tube and voltage in resp. places. In case there is nothing wrong in the vacuum tube and voltage in resp. places. 	
B. Only work	y the FM tuner does not k at all.	 Broken wires of vacuum tube heaters in the FM system. In case there is something wrong in the vacuum tube and voltage in resp. places in the FM system. In case there is nothing wrong in resp. places in the FM system. 	Check the places where there is something
	y the FM-MPX system not work.	the multiplex system.In case there is something wrong in the vacuum tube and voltage in resp. places in the multiplex system.In case there is nothing wrong in the	
	y the AM tuner does work	 Broken wires of vacuum tube heaters in the AM tuner system. In case there is something wrong in the vacuum tube and voltage in resp. places in the AM tuner system. In case there is nothing wrong in the vacuum tube and voltage in resp. places in the AM tuner system. 	V_5 , V_2 Check the places where there is something wrong in voltage. Poor IFT (T_5, T_2) and poor diode $(OA-91)$. Short-circuit of C_{13} and C_{14}
	phono, tape head sys- s and mike do not work.	 In case of poor the TR head amplifier. In case of the poor contact of the selector switch. In case there is something wrong in the input circuit. Poor condition of the attached appliances connected. Poor coupling condenser. 	Replace the TR head amplifier unit. Replace it or repair the contact. Poor contact and short-circuit of the input terminal and pin jack. C ₇₂ , C ₇₃ , C ₇₈ , C ₇₉

	Symptoms (1)	Symptoms (2)	Likely defective places
Α.	In case of small sounds of resp. AUX, FM (MPX), AM tuners, phono, tape recorder, mike etc.	In case there is something wrong in voltage in power circuit and resp. places.	Check the places where there is something wrong in voltage.
Α.	In case of small sounds of AUX with nothing wrong	1. Short-circuit rearing in the output transformer.	
	in voltage in resp. places.	2. Drop in condenser capacity and short-circuit.	Infufficient capacity of C_{96} , C_{97} , C_{100} , C_{101} , C_{114} , C_{115} , C_{122} , C_{123} , C_{124} , C_{125} , and tubular electrolytic condensers C_{98} , C_{99} , C_{112} , C_{113}
		3. Deterioration of vacuum tubes.	$V_9 \sim V_{14}$
В.	In case of small FM broad- casting sounds with nothing	1. Divergence in tracking regulation.	Refer to the regulation method of the FM tuner.
	wrong in voltage in resp. places.	2. Divergence in IFT regulation.	Refer to the regulation method of the FM tuner.
		3. Poor diode.	Germanium diode (OA-91)
		4. Drop in Q of coils etc.	L_1, L_2
		5. Poor condensers.	Insufficient capacity of C ₁₁ , C ₂₁
		6. Poor contact of the rotary switch.	Se5, Se6
С.	In case of small sounds of the FM multiplex stereo sys-	1. Insufficient capacity of the coupling condensers.	C ₄₇ , C ₄₈ , C ₅₅ , C ₆₀ , C ₆₁ , C ₆₂ , C ₆₃
	tem with nothing wrong in	2. Divergence in regulation of coils etc.	L ₆ , L ₈ , L ₉
	voltage in resp. places.	3. Change in capacity of the condensers in the tank circuit.	
		4. Deterioration of diode.	Germanium diode OA-91
		5. Poor contact of the rotary switch.	S _{2b} S _{e5} , S _{e6}
D.	In case of small AM broad- casting sounds with nothing	1. Divergence in tracking regulation.	Refer to the regulation method of the AM tuner.
	wrong in voltage in resp. places.	2. Divergence in IFT regulation.	Refer to the regulation method of the AM tuner.
		3. Poor diode.	OA-91
		4. Drop in Q of coils etc.	L_3 , L_4
		5. Poor condensers.	Insufficient capacity of C26
			R_8 , R_9
		6. Poor contact of the rotary switch.	Se5, Se6
Ε.	the phono, tape recording	 In case of the poor contacts of the selector switch. 	$S_{e_1} \sim S_{e_6}$
	systems and mike with nothing wrong in voltage in resp. places.	2. In case there is something wrong in the input circuit.	Poor contact of the pin jack or poor shielding wires.
	praces.	 Poor condition of the attached appliances connected. 	
		4. Poor coupling condensers.	$C_{74} \sim C_{79}$
		 Poor coupling condensers. Insufficient capacity of emitter bypass condensers. 	C ₈₀ , C ₈₁ , C ₉₃ , C ₉₄
Α.	In case the sounds from the	1. Deterioration of vacuum tubes.	$V_9 \sim V_{14}$
	AUX terminal are distorted much.	2. Partial short-circuit rearing in the output transformer.	T_7 , T_8
		3. Poor speaker.	
		4. Distortion resulted from the attached appliances connected.	

SERVICE NOTE

	Symptoms (1)	Symptoms (2)	Likely defective places
В.	In case the FM broadcast- ing sounds are distorted	1. Poor condition and small input of the antenna.	Refer to the Item, "How to install the antenna" in this manual.
٠	much.	2. Divergence in tracking regulation.	Refer to the regulation method of FM.
		3. Divergence in regulation of IFT.	Refer to the regulation method of FM.
		4. Poor germanium diode.	OA-91
		5. Insufficient capacity of the condensers in the FM tuner part.	C_{12} , C_{15} , C_{18}
С.	In case the sounds of the FM multiplex stereo system are distorted much.	 Sounds distorted at FM tuner. Poor regulation of the multiplex coil. Poor germanium diode. 	Refer to the Item B in Symptoms 1. Refer to the regulation method of the multiplex adaptor. (OA-91)
		4. Poor condensers.	Poor insulation of C_{60} , C_{61}
		5. Poor fixed resistors.	Broken wires of R ₃₇ , R ₄₃ , R ₅₀ , R ₅₅
D.	In case the AM broadcasting sounds are distorted much.	 Divergence in tracking regulation. Divergence in regulation of IFT. Poor germanium diode. Insufficient capacity of condenser and short circuit. 	Refer to the regulation method of AM. Refer to the regulation method of AM. OA-91 Insufficient capacity of C_{27} or puncture of C_{30}
Ε.	In case the sounds of the phono, tape recording systems and mike are distorted much.	 In case of much distortion in the attached appliances connected. Poor tubular electrolytic condensers. 	Puncture of C ₇₄ and C ₇₅
Α.	In case of big humming from the AUX terminal	1. Insufficient capacity of the electrolytic condensers.	C ₄₄ , C ₁₂₇ , C ₁₂₉ , C ₁₂₆
,		 Inner touch of vacuum tubes. Big humming in the attached appliances connected. 	$V_9 \sim V_{14}$
		4. Poor regulation of the hum balancer.	VR-1, VR-2
		5. Broken wires of the NF resistances.	R ₁₃₆ , R ₁₃₅
В.	In case of big humming in FM broadcasting.	 Hums generated when tuned to a channel. Inner touch of vacuum tubes. 	Reverse connection of the power plug or poor earthing condition of the chassis. $V_1 \sim V_4$
С.	In case of big humming in the FM multiplex circuit system.	 Hums generated from the above-mentioned causes. Inner touch of vacuum tubes. 	Reverse connection of the power plug or poor earthing condition of the chassis. $V_1{\sim}V_4,\ V_6{\sim}V_8$
D.	In case of big humming in AM broadcasting.	 Hums generated when tuned to a channel. Inner touch of vacuum tubes. 	Reverse connection of the power plug or poor earthing condition of the chassis. V_5 , V_2
Ε.	In case of big humming in the phono, tape recording systems and mike.	 Poor condition of shielding wires of sound appliances and their connection. Sound appliances and the shielding wires are subjected to external induction. Residual hums of sound appliances. 	Refer to the Item PRECAUTIONS in the this manual. Install them as far away as possible from the induction machines.

Symptoms (1)	Symptoms (2)	Likely defective places
A. In case of loud noises from the AUX terminal.	1. Break rearing in the fixed resistor wires and touch of parts.	R_{103} , R_{104} , R_{113} , R_{114} , R_{123} , R_{124} , R_{127} , R_{125} , R_{129} , R_{130}
	2. Short-circuit rearing at the condensers and touch of parts.	
	3. Break rearing in the primary side of the output transformers.	T_7 , T_8
	4. Inner touch of vacuum tubes.	V_9 , V_{14}
B. In case of a great many noise in FM broadcasting.	1. Small input voltage and poor condition of the antenna.	Refer to the Item "Antenna" in this manual.
	2. Poor vacuum tubes (high howling)	V_1
	3. Break rearing in the fixed resistance wires and touching of parts.	R_3 , R_6 , R_{11} , R_{15}
	4. Short-circuit of condensers and touch of parts.	C ₃ , C ₅ , C ₁₂ , C ₁₅ , C ₁₇
C. In case of a great many noises in FM multiplex stereo	1. Noises made by the above-mentioned causes.	Refer to symptoms (1).
system.	2. Break rearing in the multiplex coil wires.	$L_6 \sim L_9$
	3. Break rearing at the fixed resistances.	R ₄₀ , R ₄₅ , R ₆₅ , R ₆₄ , R ₆₆ , R ₆₈
	4. Short-circuit rearing at condensers.	C ₄₇ , C ₄₈ , C ₅₅ , C ₆₀ , C ₆₁ , C ₆₂ , C ₆₃ , C ₆₇
	5. Poor vacuum tubes.	$V_6 \sim V_8$
D. In case of a great many noises in the phono, tape	 Poor condition of fixed resistances and break rearing at the resistance wires. 	$R_{67} \sim R_{92}$
recording system and mike.	2. Poor condensers.	$C_{72}\sim C_{89}$
	3. Inner noises and poor connection of the	
	attached appliances connected.	
ing normally	1. The Magic eye does not work at all.	Deterioration of Magic eye.
	2. The Magic eye works slightly.	T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		 It is caused by poor condition of the FM antenna.
B. While the AM tuner is work- ing normally.		Deturiotion of Magic eye.
ing normany.	2. The Magic eye works slightly.	 It is caused by poor condition of the FM antenna.
C. The stereo indicator is not lighted at the time of FM	1. In case the multiplex adaptor does not work normally.	Refer to the Item "Symptoms" of respective multiplex.
stereo reception.	2. In case only the indicator does not work with the multiplex adaptor working nor-	Poor NL, broken wire of R ₃₃ and poor V ₆
	mally. 3 The indicator is kept lighting while the	Door OA 01 and 1 ' CTTD
	3. The indicator is kept lighting while the multiplex adaptor is working normally.	Poor OA-91 and poor regulation of VR-4.
D. Poor separation at the time of FM stereo reception.	1. In case the multiplex adaptor works nor- mally.	Poor regulation of VR-5 (Refer to the regulation method of multiplex).

PARTS LIST

	Dart	NIa		Naman	alatura		
- September	Part	INO.		Nomen	clature		
	RT	$1{\sf M}\Omega$	$\frac{1}{4}$ Watt	$\pm 10\%$	Corbon	Fixed	Resistor
	R ₂	150 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 3	10 ΚΩ	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R4	4.7 M Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 5	Ω 86	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R ₆	$4 \mathrm{K} \Omega$	2 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R7	$2M\Omega$	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 8	30 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R9	120 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 10	Ω 86	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 11	$4 \mathrm{K} \Omega$	2 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 12	50 K Ω	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 13	$2M\Omega$	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R14	15 K Ω	$\frac{1}{2}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 15	15 K Ω	1 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 16	100 K Ω	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 17	100 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 18	$2\mathrm{M}\Omega$	1/4 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 19	150 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 20	300 K Ω	1/4 Watt	±10%	Carbon	Fixed	Resistor
	R 21	150 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
	R 22	500 K Ω	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 23	$5 \mathrm{K} \Omega$	2 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R24		, .				Resistor
	R 25	50 Ω	1/4 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
	R 26						Resistor
	R 27						Resistor
	R 28		_			10000	Resistor
	R29				127	50,700	Resistor
	R 30				(9)		Resistor
	R 31		$\frac{1}{4}$ Watt				
	R 32						Resistor
	R 33		1/4 Watt				
	R 34		, -				Resistor
	R 35		A 0.00				Resistor
	R 36						Resistor
	R 37		,	50,000			Resistor
	R 38		1/4 Watt			- 1	
	R 39		1/4 Watt				
	R 40		$\frac{1}{2}$ Watt				
	R41		1/4 Watt				
	R 42		1/4 Watt				
	R43		1/4 Watt				
	R44	100. 101100000000	, .				Resistor
	R45		1/4 Watt				
	R 46	50 ΚΩ	1/4 Watt	±10%	Carbon	Fixed	Resistor

Part	No.		Nomer	nclature		
R47	50 KΩ	1/4 Watt	±10%	Carbon	Fixed	Resisto
R 48	50 KΩ	1/4 Watt	±10%	Carbon	Fixed	Resisto
R 49	50 KΩ	1/4 Watt	±10%	Carbon	Fixed	Resisto
R 50	20 M Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resisto
R 51	15 K Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resisto
R 52	15 K Ω	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resisto
R 53	20 K Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resisto
R54	20 K Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resisto
R 55	20 M Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resisto
R 56	50 KΩ	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resisto
R 57	50 K Ω	1/4 Watt	±10%	Carbon	Fixed	Resisto
R 58	10 KΩ	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resisto
R59	10 KΩ	1/4 Watt	$\pm 10\%$	Carbon	Fixed	Resisto
R 60		1/4 Watt				
R61		1/4 Watt				
R 62		1/4 Watt				
R 63		1/4 Watt				
R64		1/4 Watt				
R 65		1/4 Watt				
R66		10Watt				
R67		1/4 Watt				
R68		1/4 Watt				
R69		1/4 Watt				
R70		1/4 Watt				
R71		1/Watt				
R72		1/Watt				
R73		1/Watt				
R74		1/Watt				
R75		1/Watt				
R76		1/Watt				
R77		1/Watt				
R78		1/8 Watt				
R80		1/4 Watt				
R81		1/4 Watt				
R82		1/4 Watt				
R83		1/4 Watt				
R84		1/4 Watt				
R 85		1/4 Watt				
R86		1/4 Watt				
R 87		1/4 Watt				
R 88		1/4 Watt				
R89		1/4 Watt				
R 90		1/4 Watt				
R 91		1/4 Watt		100		
R 92		1/4 Watt				

Part	No.		Nomer	nclature		
R 93	зкΩѕ	½ Watt	±10%	Carbon	Fixed	Resistor
R 94						Resistor
R 95	*					Resistor
R 96						Resistor
R 97	500 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 98	500 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 99	100 KΩ	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 100	100 KΩ	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 101	$2 K\Omega$	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 102	$2 K\Omega$	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 103	150 K Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resistor
R 104	150 K Ω	$\frac{1}{2}$ Watt	±10%	Carbon	Fixed	Resistor
R 105	100 KΩ	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 106	100 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 107	15 K Ω	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 108	15 K Ω	$\frac{1}{4}$ Watt	±10%	Carbon	Fixed	Resistor
R 109	100 KΩ	1/4 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 110	100 KΩ	$\frac{1}{4}$ Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 111	$3 K\Omega$	1/4 Watt	$\pm 10\%$	Carbon	Fixed	Resistor
R 112		0.53				Resistor
R 113		A) 98				Resistor
R 114		504.73				Resistor
R 115		Secretary Sec				Resistor
R 116						Resistor
R 117		5 TO 10 ST				Resistor
R 118		$\frac{1}{4}$ Watt				
R119						Resistor
R120						Resistor
R121		$\frac{1}{4}$ Watt				
R122		1/4 Watt				
R123	470 KΩ					
R124	470 KΩ					
R126		1/4 Watt				
R120	150 KΩ	55/2 E				
R128	150 KΩ	(i) 1.75				
R129	150 KΩ					
R130	150 ΚΩ					
R131	500 KΩ	4.				
R132	500 KΩ					
R133	500 KΩ					
R134	500 KΩ					
R135		1/4 Watt				
R136		1/4 Watt				
R137		½Watt				
	10 ΚΩ	_				

Part	No.		Nomencl	ature	
R 139	1 ΜΩ	½Watt =	±10% C	arbon Fixed	Resistor
R 140		N	±10% C	arbon Fixed	Resistor
R 141	$700\Omega + 500\Omega$	10Watt	V	/ire Wound	Resistor
	30022				
C 1	10 pF	250 WV	±10%	Ceramic	tubular
C ₂	10 774			Ceramic	
C 3	2	250 WV	+ 100 %		
C4	,	250 WV	±10%		80 80
C 5	10 pF	250 WV	±10%	Ceramic	tubular
C6	12 pF	250 WV	±10%	Ceramic	tubular
C 7	7 pF	250 WV	±10%	Ceramic	tubular
C8	18 pF	250 WV	±10%		tubular
C9	0.002 μ F	250 WV	+ 100 %	Ceramic	tubular
C 10	10 pF	250 WV	±10%		tubular
C 11	0.01 μ F	250 WV	+ 100 %	Ceramic	tubular
C12	0.01 μ F	250 WV	+ 100 %	Ceramic	tubular
C 13	50 pF	250 WV	+ 100 %	Ceramic	tubular
C14	50 pF	250 WV	+ 100 %	Ceramic	tubular
C 15	0.002 μ F	250 WV	+ 100 %	Ceramic	tubular
C 16	50 pF	250 WV	+ 100 %	Ceramic	tubular
C 17	$0.01~\mu F$	250 WV	+ 100 %	Ceramic	tubular
C 18	0.01 μ F	250 WV	+ 100 %	Ceramic	tubular
C 19	50 pF	250 WV	+ 100 %	Ceramic	tubular
C 20	50 pF	250 WV	+ 100 %	Ceramic	tubular
C21	350 pF	500 WV	±10%	Mica	tubular
C 22	40 μ F	150 WV	+ 100 %	Electrolytic	tubular
C 23	0.01 μ F	250 WV	+ 100 %	Ceramic	tubular
C24	15 pF	250 WV	$\pm 10\%$	Ceramic	tubular
C25	300 pF	500 WV	±10%	Mica	tubular
C 26	50 pF	250 WV	+ 100 %	Ceramic	tubular
C 27		400 WV	$\pm 10\%$	Oil	tubular
C 28		400 WV	±10%	Oil	tubular
C 29	0.001 μ F		+ 100 %		
C 30		400 WV	±10%	Oil	
C 31		250 WV		Ceramic	
C 32	$25~\mu F$	50 WV		electrolytic	
C 33	200μ F	25 WV	+ 100 %	electrolytic	tubular
C 34	200 μ F	25 WV	+ 100 %	electrolytic	tubular
C 35	25μ F	50 WV	+ 100 %	electrolytic	tubular
C 36	25 μF	25 WV	+ 100 %	electrolytic	tubular

PARTS LIST

Part	No.	1	Vomencla	ture	
C 37	0.01 μF	250 WV	+ 100 %	Ceramic	tubular
C38	0.01 μF	250 WV	+ 100 %	Ceramic	tubular
C39	$0.005\mu\mathrm{F}$	600 WV	±10%	Oil	tubular
C40	0.005μ F	600 WV	±10%	Oil	tubular
C41	$0.005~\mu F$	600 WV	±10%	Oil	tubular
C42	200 μF	180 WV	+ 100 %	electrolytic	lug terminal
C43	200 μ F	180 WV	+ 100 %	electrolytic	lug terminal
C44	20 μ F	350 WV	+ 100 %	electrolytic	lug terminal
C45	3000 pF	250 WV	+ 100 %	Ceramic	
C46	0.01 μF	400 WV	±10%	Oil	tubular
C47		400 WV	±10%	Oil	tubular
C48	•	250 WV	+ 100 %	Ceramic	tubular
C49	150 pF	250 WV	+ 100 %	Ceramic	tubular
C50	1500 pF	250 WV	± 5 %	mica	tubular
C 51	$0.01~\mu F$	250 WV	± 5 %	mica	tubular
C52	200 pF	250 WV	± 5 %	mica	tubular
C53	300 pF	250 WV	± 5 %	mica	tubular
C54	$0.1 \mu F$	400 WV	±10%	Oil	tubular
C55	1000 pF	250 WV	+ 100 %	Ceramic	tubular
C56	$1~\mu F$	150 WV	+ 100 %	electrolytic	tubular
C 57	3000 pF	250 WV	± 5 %	mica	tubular
C58	100 pF	250 WV	+ 100 %	Ceramic	tubular
C59	100 pF	250 WV	+ 100 %	Ceramic	tubular
C60	0.001 μ F	400 WV	±10%	Oil	tubular
C61	0.001 μ F	400 WV	±10%	Oil	tubular
C62	0.003 μ F	400 WV	±10%	Oil	tubular
C 63	0.003 μ F	400 WV	±10%	Oil	tubular
C64	300 pF	50 WV	$\pm 10\%$	Stycon	tubular
C65	80 pF	250 WV	± 5 %	Stycon	tubular
C66	80 pF	250 WV	± 5 %	Stycon	tubular
C67		250 WV	± 5 %	Stycon	tubular
C68	430 pF	250 WV	± 5 %	Stycon	tubular
C69	500 pF	250 WV	± 5 %	Stycon	tubular
C 70	500 pF		± 5 %	Stycon	tubular
C71	40 μ F	300 WV	+ 100 %		lug terminal
C72	0.1 μF	50 WV	±10%	mylar	tubular
C73	0.1μ F	50 WV	±10%	mylar	tubular
C74	30 μF	10 WV		electrolytic	
C 75	•		73 APESCS	electrolytic	
			v		

Part	No.		Nomencla	ture	
C 76	30 µF	12 W V	+ 100 %	electrolytic	tubular
C 77		12 W V	7 7 0 0 0	electrolytic	
C 78	•	12 WV		electrolytic	
C79		12 WV		electrolytic	
C 80		10 WV		electrolytic	
	•				
C81		10 WV		electrolytic	
C 82	30 μF	10 WV	170	electrolytic	
C 83	30 μF	10 WV		electrolytic	
C84	0.006μ F	50 WV	±10%	mylar	tubular
C 85	0.006 μ F	50 WV	$\pm 10\%$	mylar	tubular
C 86	$0.025~\mu F$	50 WV	±10%	mylar	tubular
C 87	$0.025\mu\text{F}$	50 WV	$\pm 10\%$	mylar	tubular
C 88	0.01 μ F	50 WV	$\pm 10\%$	mylar	tubular
C89	0.01 μ F	50 W V	$\pm 10\%$	mylar	tubular
C 90	0.03 μ F	400 WV	$\pm 10\%$	Oil	tubular
C 91	$0.03~\mu F$	400 WV	$\pm 10\%$	Oil	tubular
C 92	100 pF	500 WV	±10%	mica	tubular
C 93	100 pF	500 WV	$\pm 10\%$	mica	tubular
C94	0.01 μ F	50 WV	$\pm 10\%$	mylar	tubular
C 95	0.01 μ F	50 W V	±10%	mylar	tubular
C96	$0.1~\mu F$	50 WV	±10%	mylar	tubular
C 97	$0.1~\mu F$	50 W V	±10%	mylar	tubular
C 98	30 μ F	6WV	+ 100 %	electrolytic	tubblar
C99	30 μ F	6WV	+ 100 %	electrolytic	tubblar
C100	0.03 μ F	400 WV	±10%	Oil	tubular
C101	$0.03~\mu F$	400 WV	±10%	Oil	tubular
C102	0.003 μ F	400 WV	±10%	Oil	tubular
C 103	0.003 μ F	400 WV	±10%	Oil	tubular
C104	0.001 μ F	400 WV	±10%	Oil	tubular
C 105	0.001 μ F	400 WV	±10%	Oil	tubular
C106	150 pF	500 WV	±10%	mica	tubular
C 107	150 pF	500 WV	±10%	mica	tubular
C 108	0.02 μ F	50 W V	±10%	mylar	tubular
C109	$0.02~\mu F$	50 WV	±10%	mylar	tubular
C110	500 pF	500 WV	±10%	mica	tubular
C111	500 pF	500 WV	±10%	mica	tubular
C112		400 WV	±10%	Oil '	tubular
C 113	•	400 WV	±10%	Oil	tubular
C114	•	400 WV	±10%	Oil	tubular
C115		400 WV	±10%	Oil	tubular
C116		400 WV	±10%	Oil	tubular
C117	1 1 1 1 1 1	400 WV	±10%	Oil	tubular
				electrolytic	
C118	50μ r	0 00 0	- 0%	electrolytic	Tobular

Part N	o.	١	lomencl	ature			
C119	50 μF	6 WV	+ 100 %	electrolytic	tubular		
C120	80 pF	500 WV	±10%		tubular		
C 121	· ·	500 WV	±10%		tubular		
C122	$0.01 \mu F$	400 WV	±10%		tubular		
C 123	$0.01 \mu F$	400 WV	±10%	Oil	tubular		
C124	$0.01 \mu F$	400 WV	±10%	Oil	tubular		
C125	$0.10\mu\text{F}$	400 WV	±10%	Oil	tubular		
C 126	20 μF	350 WV	+ 100 %	electrolytic	lug terminal		
C 127	20 μ F	350 WV	+ 100 %	electrolytic			
C 128	$20 \mu \text{F}$	350 WV	+ 100 %	electrolytic			
C129	20 μF	350 WV	+ 100 %	electrolytic	DATE OF THE RESERVE O		
	•				terminal		
VR-1	100 Ω	. /	JM	Balance			
VR−2	100 Ω	` '	JM	Balance			
VR-3	5 ΚΩ	. ,		Resistor Dri			
VR-4	100 ΚΩ	, ,		Resistor Driv			
VR-5	50 KΩ		Control of the contro	Resistor Dri			
VR-6	500 KΩ	, ,		Resistor 24¢			
VR-7	1 ΜΩ	, ,		Resistor 24¢	type		
VR-8	1 ΜΩ	(N) V	ariable	Resistor 24¢	friction type		
∨R-10	500 KΩ	(B) V	ariable	Resistor 24¢	b type		
VC-1	6~18	pF Variak	ole Cap	acitor (FM, R	F Luner)		
VC-2	6~18 ₁	oF Variak	ole Cap	acitor (FM O	scillator)		
VC-3	VC-3 8.8~32.8 pF Variable Capacitor (AM RF Luner)						
VC-4	8.8~32.8	oF Variab	le Capo	acitor (AM O	scillator)		
TC-1	15	oF Trime	er cond	denser			
TC-2	15	pF Trime	er cond	denser			
TC-3	15	oF Trime	er cond	denser			
TC-4	15	pF Trime	er cond	denser			
TC-5	15	oF Padd	ing co	ndenser			
V 1	6AQ		RF & mi	xer			
V ₂	6BA		F amp				
V 3	6BA			1 IF amp			
V4	6BA						
V 5	6BE		convert				
V6	12AT			Indicater a			
V7	6BL			chro & doub	ler		
V8	12AU			deemphasis			
V 9	6AQ	8 Pre	amp				

Part No.	Nomenclature							
	M8 Audio & power amp							
	M8 Audio & power amp							
	Q8 Pre amp							
	M8 Audio & power amp							
	M8 Audio & power amp							
V15 6A	D5 Magic eye							
TR1~4 2SB-	381 Transister							
L1 FM ante	enna coil							
L ₂ FM RF	& oscillater coil							
L3 AM ant	enna coil							
L4 AM osc	illater coil							
L ₅ Heater	coil 1 µH							
L6 MPX co	il							
L7 MPX co	il							
L8 MPX co	il							
L9 MPX co	il							
L10 FMRF co	oil							
	I.F.T 10.7Mc/s							
	I.F.T 10.7Mc/s & 2nd AM I.FT 455Ks/c							
	I.F.T 10.7Mc/s							
	Discriminater transformer							
	IFT 455Kc/s							
	tronsfomer							
	transfomer							
T8 Outpat	transfomer							
SE-0.56 Silico	SE-0.56 Silicon Diode AC (RMS) 180V I _D 150mA $-65^{\circ}\text{C} \sim 100^{\circ}\text{C}$							
OA-91 Germ	OA-91 Germanium Diode VD=90V $I_D=50 \mathrm{mA}$ $-55^{\circ}\mathrm{C} \sim 75^{\circ}\mathrm{C}$							
1S351 Variable capacitor (FMAFC)								
TC-0.2P Selenium diode AC45V ID 25mA								
NL PL-2	LA Neon Lamp							
F Fuse	4A							
Co (1 0)	Innert Calastan							
Se $(1 \sim 8)$	Input Selector							
Sm $(1\sim2)$	MODE Selector							
SS1 (a~b) MAG, X-tal								
SS2 (a \sim b) REC, TAPE MON SS3 (a \sim b) (Pumble) OFF ON								
SS4 (a∼b)	(LPF) OFF ON							
\$\$5 (a~b)								
SS6								
SW	Power Switch							
	. J J . J IIII							

FM ALIGNMENT PROCEDURE

- AFC-OFF

- 2. Turn tuning gang fully.
 3. Center carrier wave.
 4. Set pointer at reference mark.

STEP	ALIGN	GENERATOR	FEED SIGNAL	OUTPUT	DIAL	ADJUST	ADJUST FOR
1.	IF Transformer	10.7 MC ±400 KC	V ₃ Pin 1 6BA6	oscilloscope at 1		3rd IFT (T ₃) Primary & secondary	Best IFT Wave from
		10.7 MC ±400 KC	V ₂ Pin 1 6BA6	oscilloscope at 1		2nd IFT (T ₂) Primary & secondary	Best IFT Wave from
		10.7 MC ±400 KC	Couple Sweep Signal by a round tube V ₁ 6AQ8	oscilloscope at ①		1st IFT (T ₁) Primary & secondary	Best IFT Wave from
2.	Discrimi- nator	10.7 MC ±400 KC	Couple Sweep Signal by a round tube V ₁ 6AQ8	oscilloscope at ②		5th IFT (T ₅) Discriminator Transformer	S Curve
3.	OSC.	88 MC 400 c/s 100% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at oscillo load	80 MC	OSC. coil	Maximum
4.	OSC.	108 MC 400 c/s 100% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at oscillo load	108 MC	OSC. Trimmer TC ₂	Maximum
5.		Reiterate 3, 4					
6.	RF Amp.	88 MC 400 c/s 100% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at oscillo Load	80 MC	RF Amp. coil L ₁₀	Maximum
7.	Antenna circuit	104 MC 400 c/s 100% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at oscillo Load	104 MC	Antenna circuit Trimmer TC ₁	Maximum
8.		Reiterate 6, 7					

FM M.P.X ALIGNMENT PROCEDURE

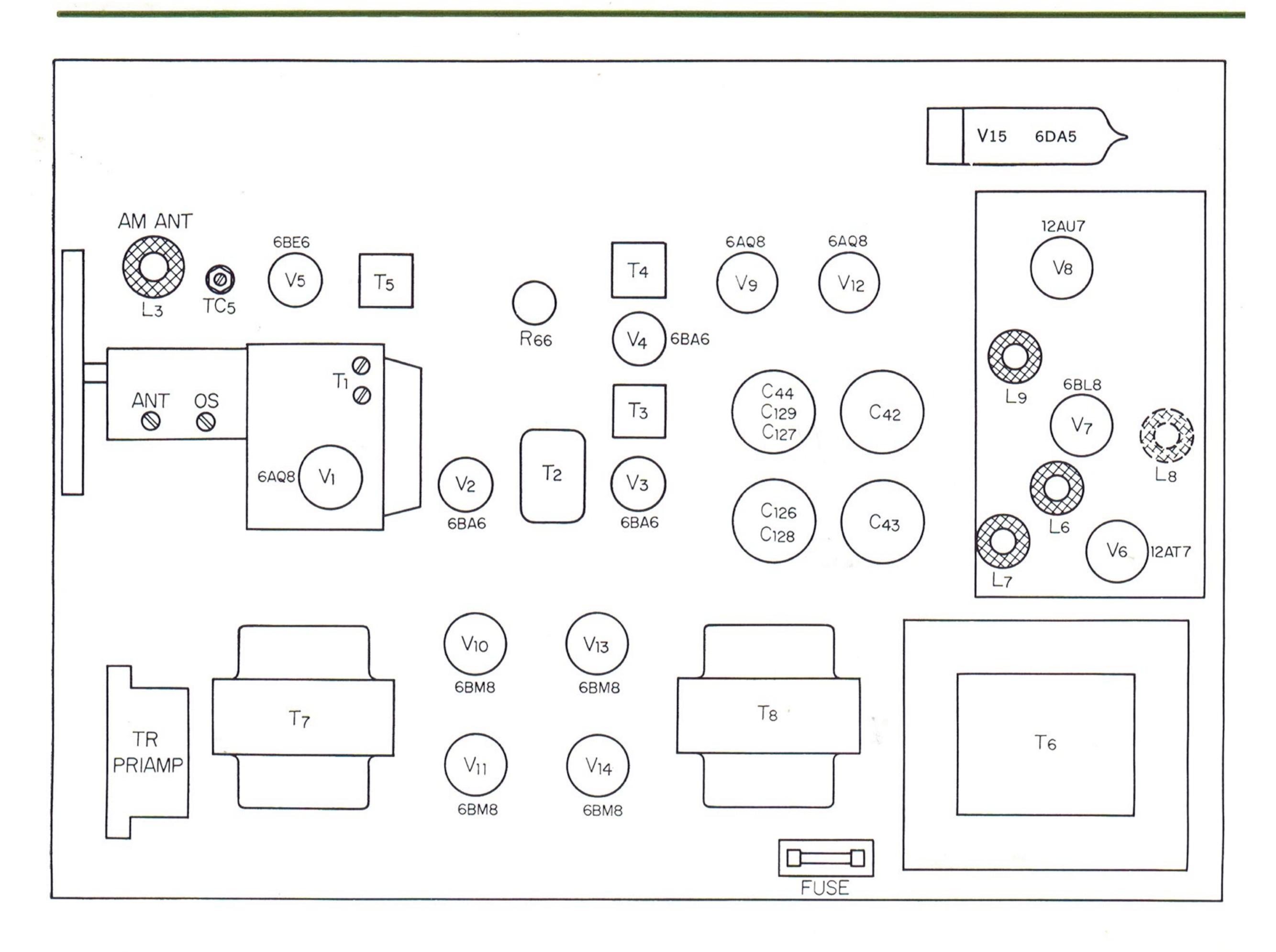
- 1. Do not attempt to align the Multiplex Circuit unless the following equipment is available:
- Multiplex Stereo Generator b. FM Signal Generator c. Oscilloscope d. Sweep Generator e. AC V.T.V.M.
- Audio oscillator

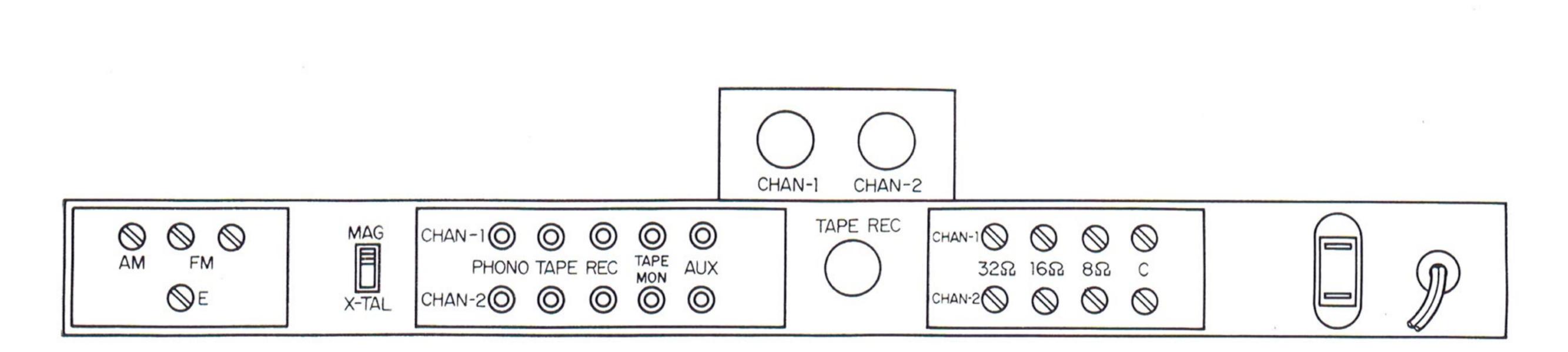
STEP	ALIGN	GENERATOR	FEED	OUTPUT	ADJUST	ADJUST FOR
1.	67 KC Trap	67 KC Audio Signal	Connect to T.P 4	V.T.V.M. at P.T ⑤	L ₇	Minimum
2.	19 KC coil Transformer	FM Signal Gen. Modulated 30% by Stereo Gen. sub-Channel	Antenna Terminals Tune to signal	V.T.V.M. & Oscilloscope at output load	L ₆	Maximum
3.	19 KC coil	Same	Same	Same	L ₈	Maximum
4.	38 KC Doubler	Same	Same	Same	L ₉	Maximum
5.	Separation VR	FM Signal Gen. Modulated 30% by Stereo Signal Gen. Channel-L	Same	V.T.V.M. & Oscilloscope at output load Channel-R	Separa- tion VR ₅	Channel-R Minimum

AM ALIGNMENT PROCEDURE

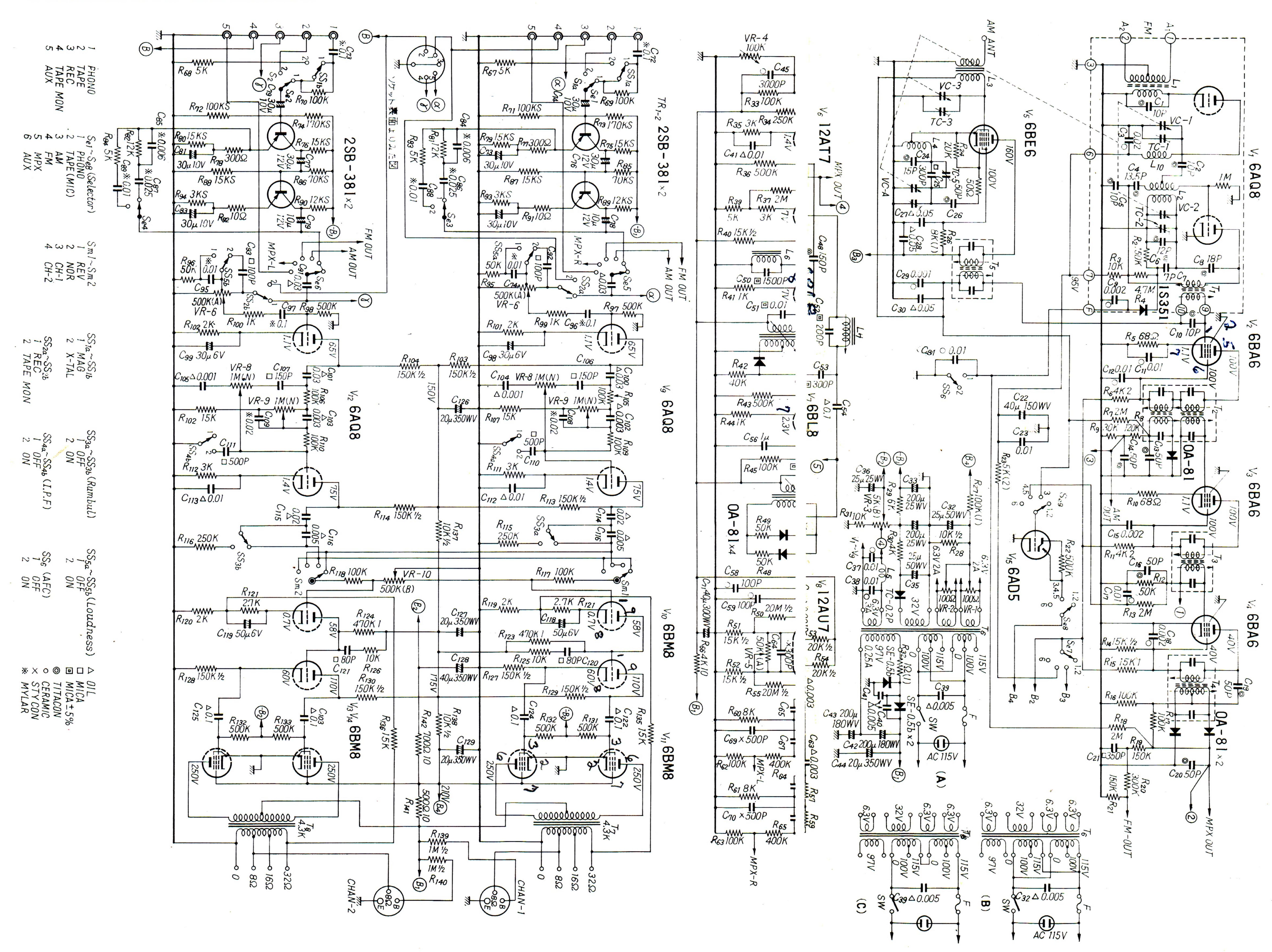
STEP	ALIGN	GENERATOR	FEED SIGNAL	OUTPUT	DIAL SETTING	ADJUST	ADJUST FOR
1.	IF Trans- former	455 KC ±30 KC sweep-generator	Pin 7 6BE6	Sweep input at 3		1st I.F.T (T ₅) Primary & secondary 2nd I.F.T (T ₂) Primary & secondary	Best I.F.T Wave form
2.	OSC.	AM-OSCILATOR 535 KC 400 c/s 30% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at output load	535 KC	OSC. coil TC-5	Maximum
3.	OSC.	1605 KC 400 c/s 30% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at output load	1605 KC	OSC. Trimmer TC-4	Maximum
4.		Reiterate 2, 3					
5.	Antenna circuit	600 KC 400 c/s 30% Modulation	Antenna Terminals	oscilloscope & V.T.V.M. at output load	600 KC	Ferrite Loop Antenna at coil L ₃	Maximum
6.	Antenna	1400 KC 400 c/s 30% Modulation		oscilloscope & V.T.V.M. at output load	1400 KC	Antenna circuit at Trimmer TC-3	Maximum
7.		Reiterate 5, 6					

PARTS LAYOUT





SCHEMATIC DIAGRAM



DIAL CORD STRING

