ULTIMATE HIGH FIDELITY STEREO COMPONENT

LUXMAN

T-110

▶OWNER'S MANUAL◀

SOLID STATE /FM STEREO TUNER

CONTENTS

WARNING: TO PREVENT FIRE OR SHOCK HAZARD DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Thank you for your purchasing one of our quality products, the LUXMAN T-110. With natural care, it will give you many years of outstanding performance and personal delight. Please read this owner's manual carefully before operating the unit, which will give detailed descriptions and operating procedures for the electronic and mechanical components of the T-110. Again, thank you for your selection, and may "good listening" be your daily pleasure.

T-110

SWITCHES & CONTROLS

1. POWER SWITCH

The power switch is of an alternating push-on, push-off type. Press in this switch and AC power is supplied to the tuner and indicated on the dial scale. A time delay muting circuit is integrated which comes to function at the time turning the unit on to eliminate unpleasant "thump noise." Because of this circuit, the tuner is muted for a few seconds until all circuits are put into stable operational condition.

2. MONAURAL FORCING SWITCH

a. When this push switch is OFF (not pressed in), the tuner circuit automatically selects stereo or monaural broadcasting. Stereo boradcasting whose signals are extremely weak is automatically switched to manuaral reception.
b. When this switch is ON (pressed in), the tuner circuit is forced to receive all FM in monaural mode. This control is useful to receive a weak FM stereo signal as the S/N ratio can be improved.

3. FM MUTING SWITCH

a. With this switch ON, (not pressed in), interstation noise which is possible should some drift occur can be filtered. Also all signals below a predetermined level are automatically muted. For visual indication, a dial built-in winker is provided. When correctly tuned on, the winker light is off.
b. With this switch OFF (pressed in), the muting circuit of this tuner is bypassed. The dial pointer never blinks at all tuning points.

4. STEREO INDICATOR

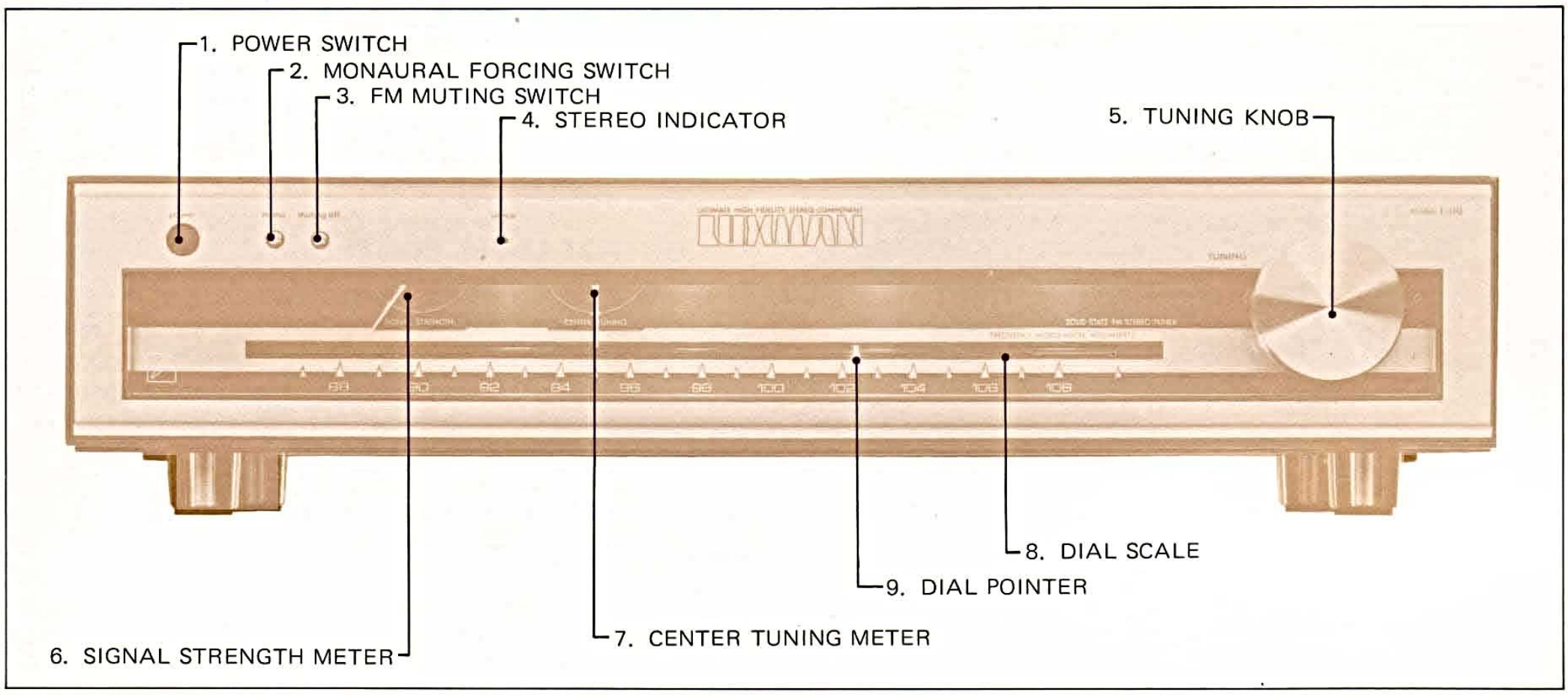
The indicator lights up to identify stereo FM reception when the MONAURAL FORCING SWITCH(2) is OFF. FM stereo broadcasting of impractically low level is automatically received in monaural mode and accordingly the indicator does not light. When the MONAURAL FORCING SWITCH(2) is ON, stereo broadcasting is received in monaural mode and the indicator does not light.

5. TUNING KNOB

Use this knob to tune to desired stations. When tuned in to a desired station, a needle of the SIGNAL STRENGTH METER(6) gives the maximum swing. Also a pointer of CENTER TUNE METER(7) comes to the exact center position.

6. SIGNAL STRENGTH METER

An accurate tuning point can be verified by the maximum swing of the needle of this meter. The needle movement is proportionate to the receiving FM radio wave strength. All FM stereo broadcasts received in stereo mode (Muting switch ON) are considered to have practical field strength for enjoying hi-fi stereo playback.



7. CENTER TUNING METER

When there is no signal, this meter remains at center. When tuned to a broadcast, with the needle of SIGNAL STRENGTH METER swinging to right side, the needle will once go out of the center, and as optimum tuning point is obtained, the needle will again come back to the center.

8. DIAL SCALE

The dial scale is calibrated for FM broadcast frequencies only (88MHz to 108MHz). Turn the DIAL KNOB(5) and the dial pointer gives a winking indication and when exactly tuned to a station, it stops to blink.

9. DIAL POINTER

The DIAL POINTER is coupled to the TUNING KNOB to indicate receiving frequency. The Pointer is illuminated by a lamp behind the DIAL SCALE(8).

a. With the FM MUTING SWITCH(3) ON, when the dial pointer is at interstation position, it gives winking signs. When tuned to a desired station, with the maximum swing of the SIGNAL STRENGTH METER(6), the winking sign stops.
b. With the FM MUTING SWITCH(3) OFF, the dial pointer will not give any winking signs, and it will continue to light.

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INPUT & OUTPUT TERMINALS

10. OUTPUT TERMINALS (VARIABLE OUTPUTS)

Output signals are normally taken from these termianls for connection to TUNER or AUX input terminals of an audio amplifier. These are provided with OUTPUT LEVEL CONTROL (11) to permit to adjust an output level to accord to that of other program sources.

11. OUTPUT LEVEL CONTROL

This control is provided for the OUTPUT TERMINALS(10) to permit output level adjustment. This control is useful when an audio amplifier is connected to various other program sources such as record player, tape deck, etc. When this control knob is turned to the extreme left end, outputs from the OUTPUT TERMINALS (10) are not available.

12. OUTPUT TERMINALS (FIXED OUTPUTS)

Same use as those for the NO.10 OUTPUT TERMINALS, except for the function of output level controls. These terminals are independent of the OUTPUT LEVEL CONTROL(11) and constant outputs are always obtained. Useful for recording on a tape with direct connection to LINE IN (or AUX) terminals of a tape deck.

13. MULTI-PATH OUTPUT TERMINALS

The connectors are provided for detection of multi-path. Some locations may present multi-path impediments causing deterioration of FM broadcast quality. To eliminate such impediments, FM antenna has to be set up at the optimum direction. The MULTI-PATH OUTPUT TERMINALS are provided to enable visible identification of correct antenna direction by connection to an oscilloscope. Connect the horizontal output(HORIZ) to the horizontal input of the oscilloscope. Likewise, the vertical output(VERT.) to the vertical input of the oscilloscope. The multipath interference is minimized when the waves showing the vertical elements on the oscilloscope are minimized. For further details, see "MULTI-PATH MEASURES" section given in the latter part of this manual.

14. 4-CHANNEL DECODER TERMINAL

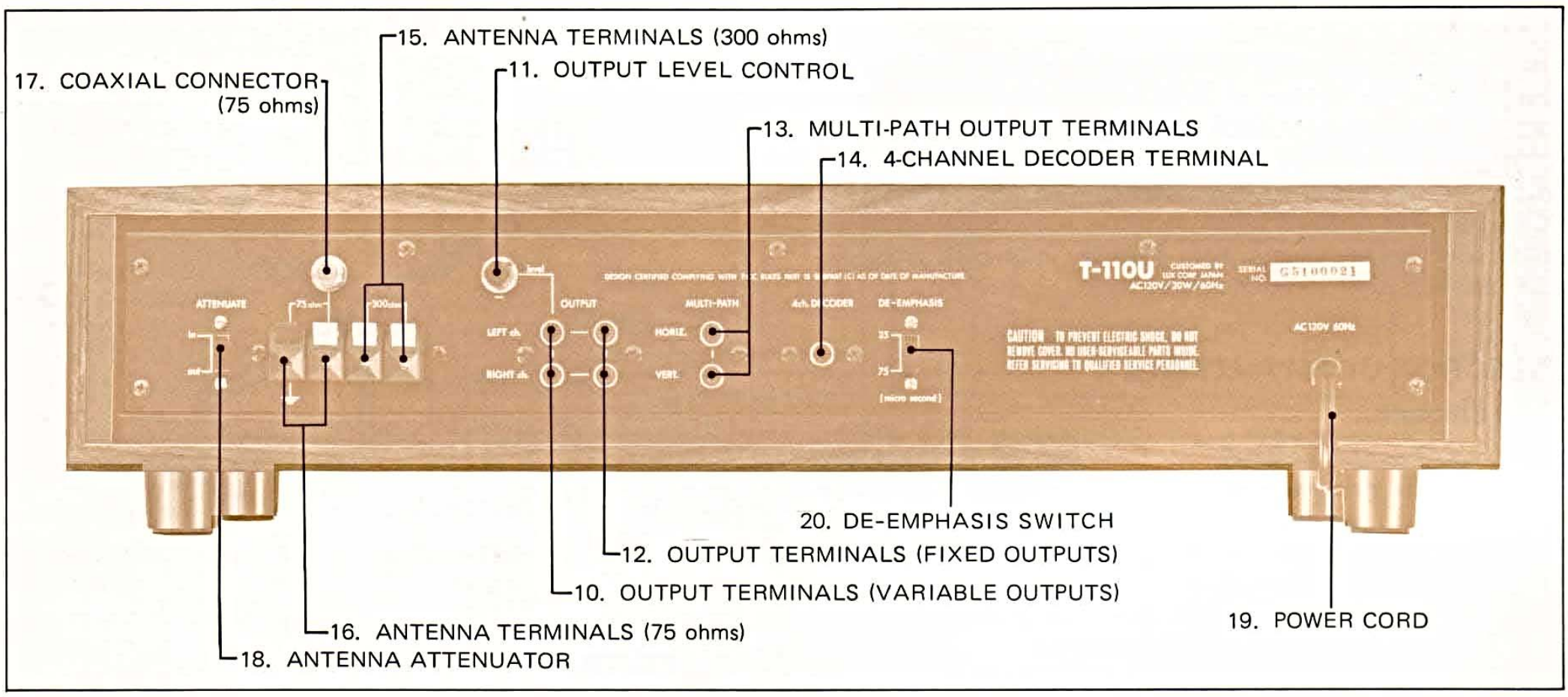
The terminal is provided for connection to a 4-channel decoder designed for possible 4-channel FM broadcast.

15. ANTENNA TERMINALS (300 ohms)

To these terminals, connect the standard di-pole indoor antenna provided (impedance 300 ohms) or an FM antenna with TV feeder cable as lead-in wire. For further details, see "FM ANTENNA" section of this manual.

16. ANTENNA TERMINALS (75 ohms)

Function of these terminals are identical to that of the COAXIAL CONNECTOR(17) below. Use these terminals for connection of an FM antenna with 75-ohm coaxial cable as lead-in wire. Connect the core conductor to the 75-ohm terminal (right) and the outer shield wires to the GND terminal (left). For further details, see "FM ANTENNA" section of this manual.



17. COAXIAL CONNECTOR (75 ohms)

The coaxial connectors provided are used for connection of an antenna with a 75-ohm coaxial cable. This can be easily connected to the coaxial cable without soldering. If an FM antenna of 300-ohm impedance is used, a matching transformer (300 : 75-ohm) must be provided adjacent to the antenna so that the 75-ohm coaxial cable can be used as a lead-in wire. For further details see the "FM ANTENNA" section of this manual.

18. ANTENNA ATTENUATOR

Since the front end of this tuner adopts dual gate MOS FETs, normally, this attenuator should be left at the "OUT" position. When very close to a broadcast station, where problems occur, use this attenuator — to slide it to the "IN" position.

19. POWER CORD

Plug the power cord to an appropriate AC outlet. Or by plugging in to an AC outlet (SWITCHED) of amplifier, switching can be made by the power switch of such audio amplifier.

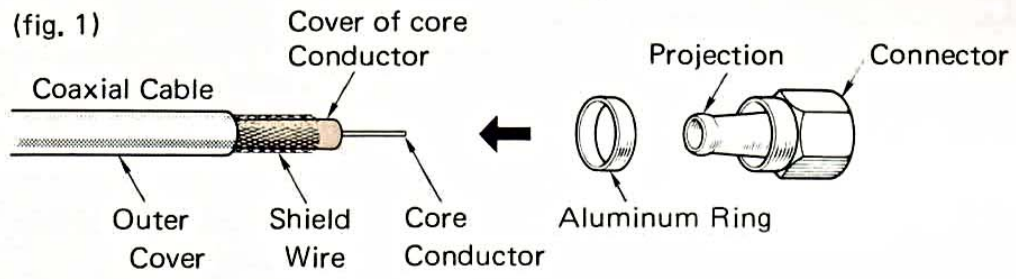
20. DE-EMPHASIS SWITCH

This switch changes the time constant of de-emphasis circuit either at 75μsec. or 25μsec.
When the reception of normal FM program is desired, set this switch to 75μsec. This position has also compatibility against Dolby FM program. In case you have a separate Dolby decoder unit, set this switch to 25μsec. and connect the output of this tuner to the input of the Dolby decoder. Perfect reception of Dolby FM can be possible by means of the above stated procedure.
NOTE: This switch is only available for the models toward U.S.A. and CANADA.

[HOW TO USE COAXIAL CONNECTOR]

As shown in the Figure 1, peel off the outer cover and insert the projected section of the connector in between the shield wire and the core conductor cover. Then firmly fasten the aluminum ring, as shown by the Figure 2, by means of plier.

(fig. 1)



(fig. 2)

BEFORE SWITCHING ON THIS TUNER

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FM ANTENNA

The greatest advantage of FM broadcasting is that the playback sound is superior to that of AM. However, because of the inherent characteristics of FM broadcast frequencies (VHF band), even when high quality tuner is used, incorrect selection of antenna and its feeder cable may easily impair the advantage of FM. The FM antenna system must be set up in deliberate precautions for the electric field strength, multi-path problems, noise sources, tuner location and so forth.

SELECTION OF FM ANTENNA

Field Strength

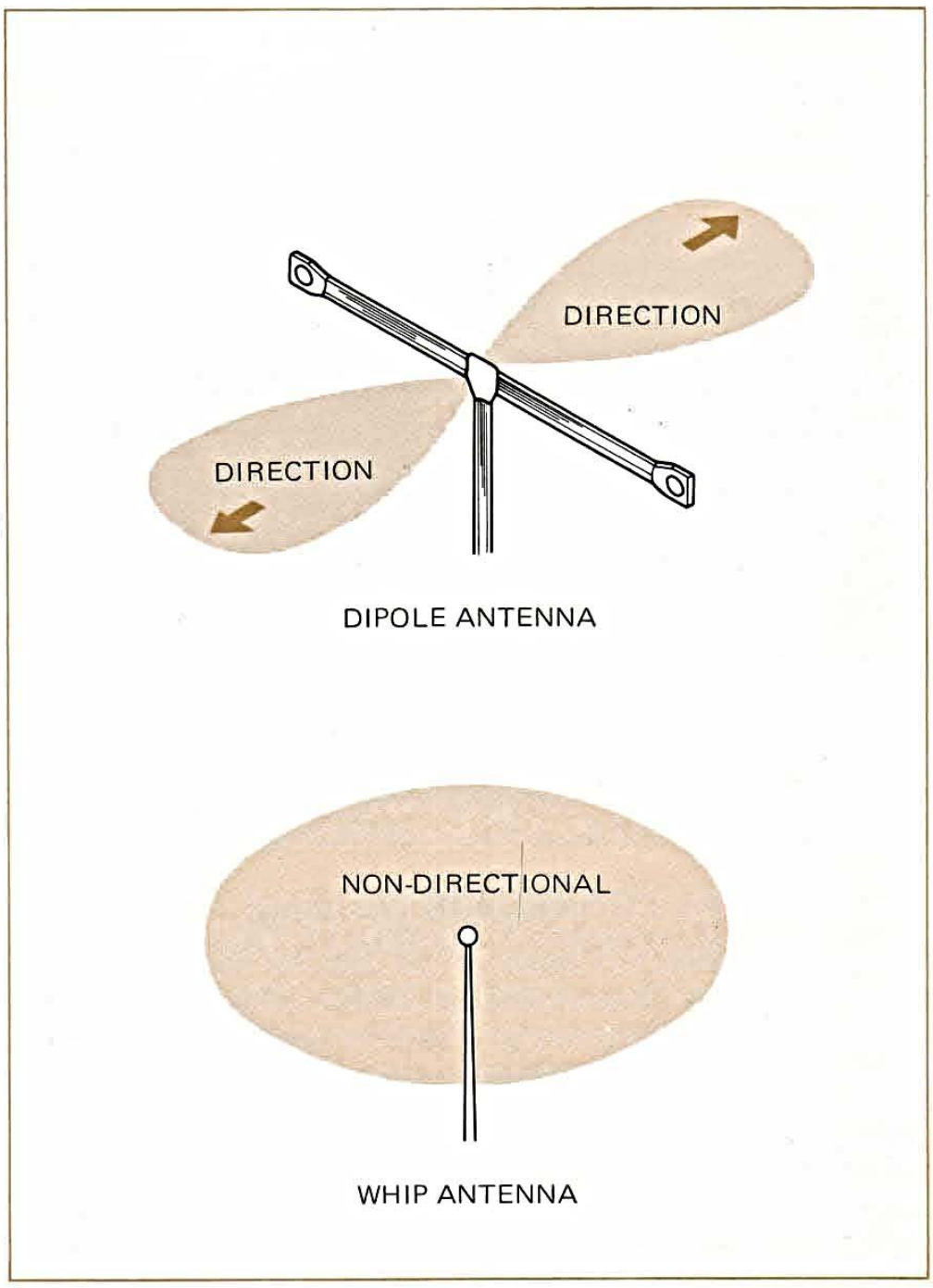
When receiving FM broadcasts far from stations, it is necessary to use a highly sensitive tuner to improve S/N ratio. However, if the FM antenna was inadequately selected, a user cannot take the advantage of such high sensitive tuner. For instance, comparison of the tuner/antenna combination shows:

(1) a tuner having IHF sensitivity of 1.7μV plus a simple single feeder antenna (a type of whip antenna)

(2) a tuner having IHF sensitivity of 2.5μV plus an exclusive 3-element FM antenna.

Evidently the latter combination gives better reception. This is because such simple single feeder antenna has a negative gain while an exclusive FM antenna has a positive gain. The gain factors of such exclusive FM antenna are, 3-4 dB with 2 elements, 4-5 dB, 3 elements, 5-7 dB, 5 elements and 6-8 dB, 7 elements. As the antenna gain is increased in proportion to the number of antenna element, selection of optimum FM antenna can be determined in consideration of field strength of FM wave where the tuner is installed. Needless to say, your audio shop will gladly assist you for optimum selection of the antenna.

In summary, where far from broadcast stations, high gain antennas are needed. If field strength is sufficiently strong, good reception is possible with the di-pole antenna (T type) provided.



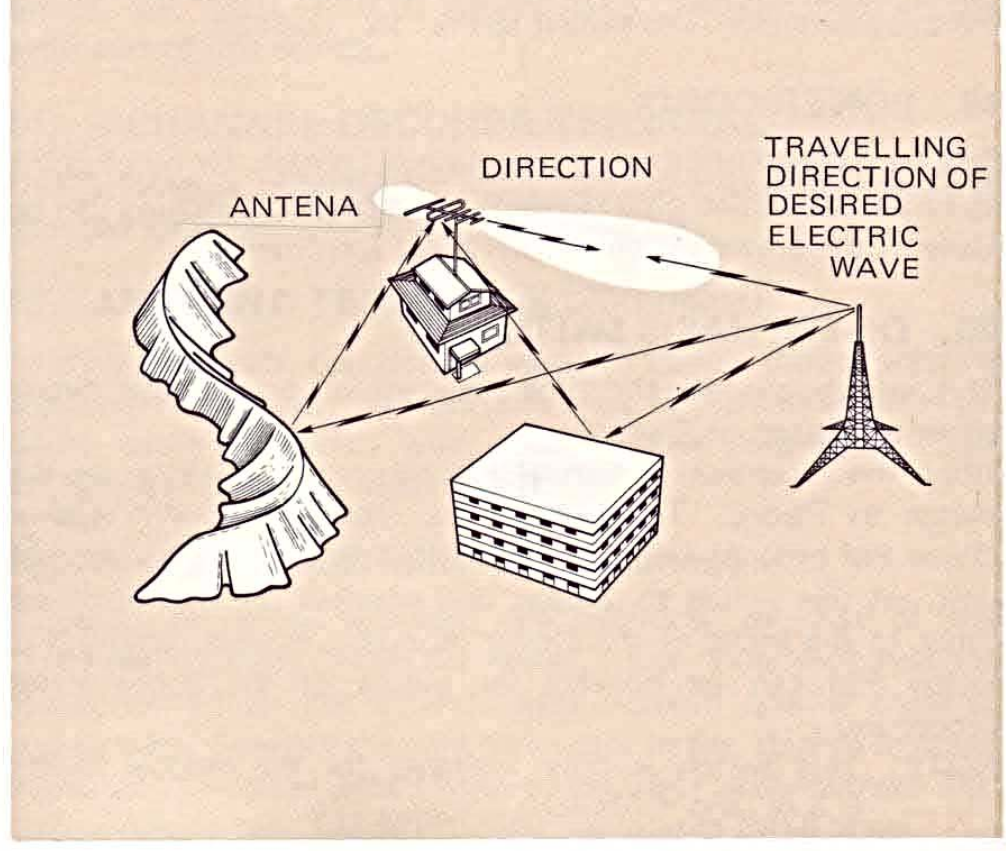
CONNECTION OF OUTPUTS TO AUDIO AMPLIFIER

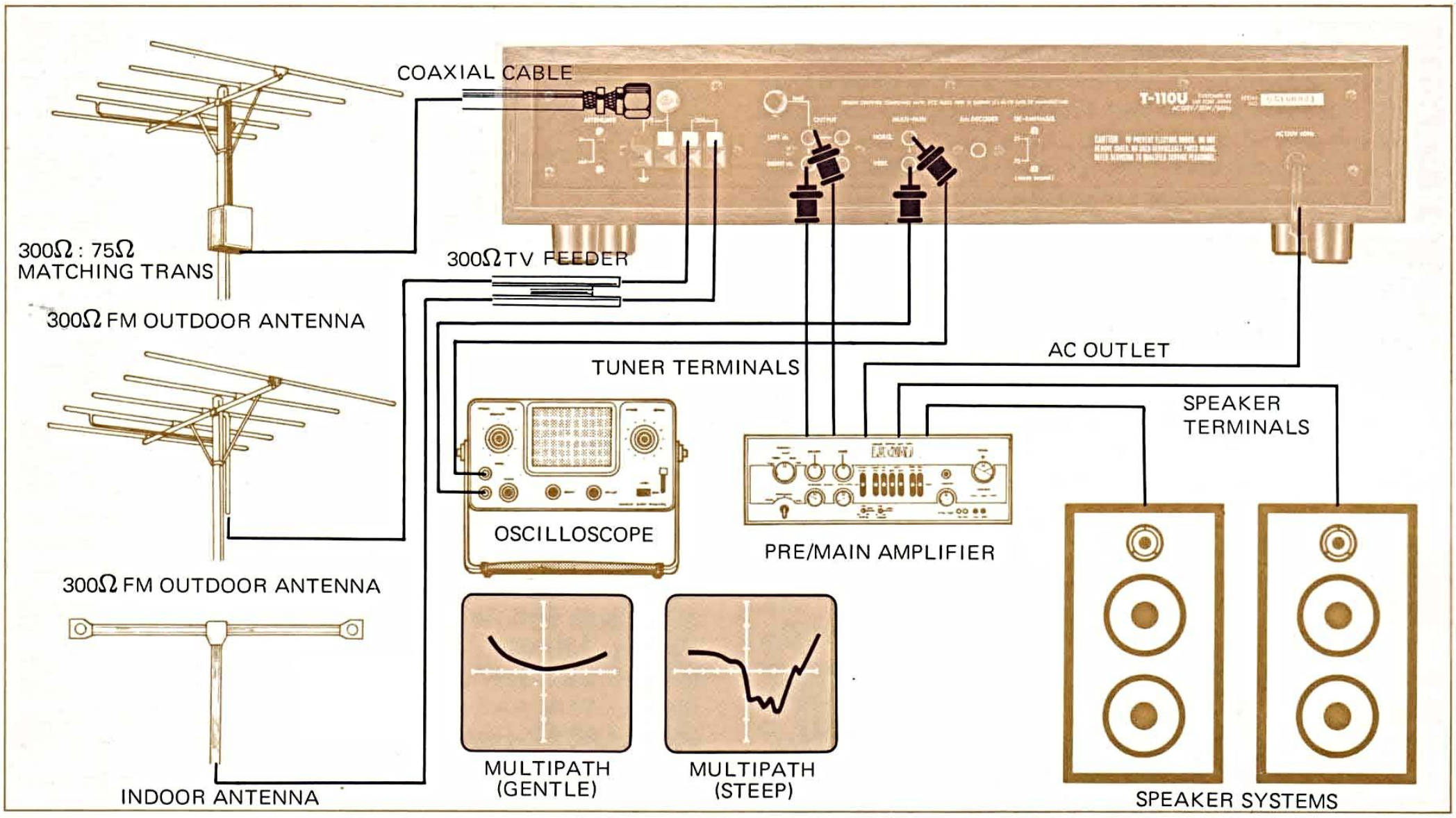
Connect the output terminals (10) or (12) to the TUNER or AUX terminals of an audio amplifier by means of pin jack cord provided. Left channel outputs must be connected to left channel inputs, and so with the right channel. Since the output terminals (10) are equipped with the output level adjustor (11), use of these terminals is normally recommended.

POWER CORD

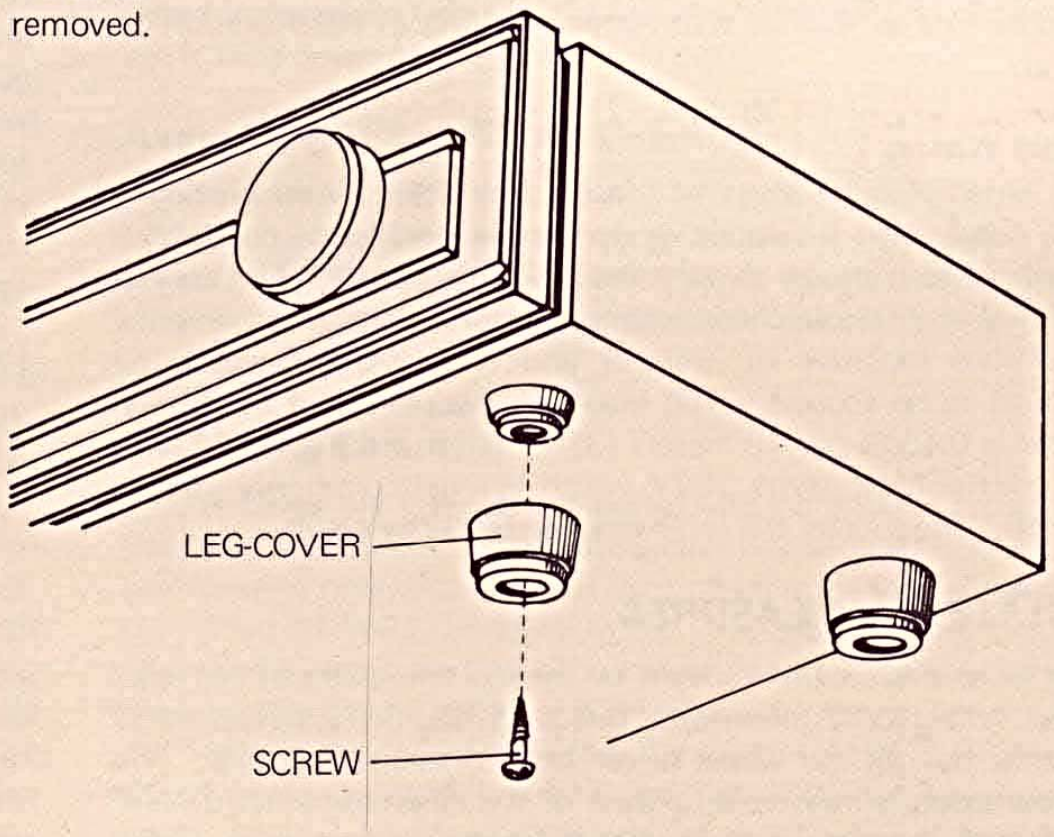
Plug in the AC POWER CORD (18) to an appropriate AC wall socket, or to the AC outlet of an audio amplifier. Switch on the POWER SWITCH (1) and the dial lamps light up. The tuner will be in full operating condition within a few seconds after switching on the POWER SWITCH.

If an audio amplifier provides the SWITCHED AC outlet, switching of the tuner can be simultaneously controlled by the POWER SWITCH of the audio amplifier.





The legs of the T-110 are of double-structure. The leg-covers are detachable by removing the fixing-screw. It is advisable to remove the leg-covers when the T110 is placed on the C-1000, L-100 etc., which will bring better designing harmony. When the T110 is placed single, however, the leg-covers should not be removed.



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OTHER CAUTION

LOCATION OF FM ANTENNA

Any good FM antenna cannot exhibit its designed performance if it is erected incorrectly - - - too low or hindered by surroundings. The FM antenna must be at least 4 meters (14 feet) high from the ground and clear of surrounding obstacles for 3 meters (10 feet) or more. Against possible pick-up of car ignition noise, or any other high frequency noises, the antenna must be set up as far as possible from such noise generating sources.

ANTENNA CABLE

Selection of Cable and Connection

Selection of cable and its connection is as well important. There are two types of FM antenna cable, one is the ribbon feeder antenna having 300-ohm impedance and other is the coaxial cable having 75-ohm impedance.

The 300-ohm ribbon feeder cable is identical to what is used for the standard di-pole antenna provided, and it can be used for extension of the di-pole antenna for connection into the 300-ohm FM antenna terminals. The 75-ohm coaxial cable is used for connection of the 75-ohm FM antenna with the FM tuner. This coaxiable cable is more stable than the ribbon feeder against environment conditions (weather). Also it is less influenced by external noises. Therefore if use of the coaxiable cable is desired for connection of a 300-ohm FM antenna, it is necessary to provide a matching transformer (300-ohm : 75-ohm) close to the antenna. In this case connect the core conductor to the 75-ohm terminal of the tuner and the shield wire to the GND terminal of the tuner. The coaxial cable is normally supplied in two different impedance type: 75-ohm which can be identified by the black color external cover, and 50-ohm by the grey color external cover. For use with a 50-ohm cable, a special matching transformer is additionally necessary. Impedance matching between the antenna, cable and antenna terminals is very important. When mismatched, it will cause generation of standing wave which presents similar impediments as that of multi-path resulting in deterioration of sound.

Cable Wiring

The antenna cable must be placed carefully. Avoid placing it near conductive substance or to put in parallel to conductive substance as it causes to vary the cable impedance. The coaxial cable has more stable characteristics against various environmental conditions inclusive of weather and it is less influenced by external noise sources. The insertion dissipation of the ribbon feeder is 0.45dB per 10 meters (33 feet) for the FM band, while the coaxial cable, type 3C2V which is most commonly used, is 1.35dB. The shorter the cable length, the better result.

MULTI-PATH MEASURES

The terms multi-path is meant by the multiple paths of FM radio waves reflected by mountains, buildings, etc. that are received by antenna besides the waves direct from broadcast stations. This phenomenon is inevitable because of the inherent nature of VHF (very high frequency) transmission waves. In case of television receiver, presence of this multi-path impediments are visibly recognized by so-called "ghost" phenomenon and everyone is sensitive for proper setting of TV antenna. However in case of FM reception, multi-path impediments may only be perceivable in deteriorated playback stereo sound. Very frequently, such deterioration is attributed to program source. Correction of multi-path impediments can sometimes be made by use of an FM tuner having excellent limitter characteristics, but normally there would be no other measures than to provide an optimum FM receiving condition by selection of antenna, location, direction, height, etc. An effective way to filter harmful multi-path waves coming from all conceivable directions by reflection, and to catch the direct wave only, is a use of directional FM antenna as explained in the "Field Strength" Section of this manual. Since such antenna not only possesses gain but also directivity, when it is directed to broadcast stations, it filters out waves coming from other directions. The directivity sharply increases as the number of antenna element increases. When sharp cut-off of multi-path waves is desired, use of an antenna having more elements is necessary. The standard di-pole antenna (T-type) has such directivity as may be described by the numerical "8". This means when multi-path waves come from the oppositive direction of broadcast stations it is subjected to multi-path influence. To the horizontal direction (parallel to antenna leads), since gain is lowered, multi-path waves coming from that direction can be filtered. With this knowledge, the di-pole antenna may be very useful. (See the drawing on the page 6).

The whip antenna which is provided for portable transistor radios has no directivity. This means where multi-paths are present, it is completely subjected to their influence.

Measures againt multi-path trouble must be taken after verifying the cause of multi-paths occurrence by which optimum measures can be known - - - use of directional antenna such as exclusive FM antenna, standard di-pole antenna, etc. and also its correct placement and setting up. If multi-path impediments are present at a place close to broadcast stations (sufficient field strength), it is suggested to procure a 1 - 2 element compact FM antenna at an audio shop. This antenna has little or no gain but has very good directivity and optimum for multi-path measures at a place with strong field strength. When using standard di-pole antenna (provided as accessory), it is also recommended to set it outdoors in order to avoid possible influence of metalic accessories such as curtain rails, etc., not to speak of steels used in ferro-concrete structure.

HOW TO DETECT MULTI-PATH

The MULTI-PATH OUTPUT TERMINALS (17) are provided in the rear panel of this tuner which serve for easy finding of multi-path impediments. Connect the horizontal output terminal (HORIZ.) to the horizontal input terminal of an oscilloscope and the vertical output terminal (VERT.) to the vertical input terminal of the oscilloscope. Tune on an FM broadcast and adjust the direction of antenna so that the maximum horizontal elements can be obtained with the mimimum vertical elements on the oscilloscope. If the oscilloscope is not available, connect the vertical output terminal with the AUX. or TUNER terminal of an audio amplifier and make antenna setting where the output level is minimum.

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CIRCUIT DESCRIPTION

CIRCUITRY

In the T-110 there are 4 basic function blocks; these being the Front End, the I.F. strip together with the audio recovery circuit and the Stereo decoder section, plus of course the Power supply and switching.

The Front End

This is the most important section of the tuner as it decides most of the basic characteristics. So the radio signals are picked up by the antenna and enter the tuner at the antenna terminals. They go through an impedance matching network known as a balun transformer to be at a suitable impedance for the Front End proper.

This Front End has been designed bearing in mind many problems of spurious rejection and cross modulation (cross modulation occurs when a powerful transmitter close by of unrelated frequency saturates the front end and generates many harmonics which often are then related to the desired frequency and block the tuner to give poor performance).

Therefore we use MOS FET's which are known to have very good linearity and can handle strong signals very well in the R.F. amplifier and mixer stages, together with 3 tuned R.F. stages to provide the required selectivity and reduce various spurii to manageable amounts.

The local oscillator in the Front End must be very carefully designed as its output is mixed with the desired signal to produce the I.F. output. So it must also have a very pure fundamental output because harmonics are not at all desirable, therefore its coupling circuitry to the mixer is very important to ensure very high isolation from the incoming signals. Total drift is less than 10KHz at any time after switch on at reasonable ambient temperatures (10°C - 40°C or 50°F - 110°F)

This Front End has a total of five tuning elements as the tuning capacitor.

IF Amplifying & Detecting Circuitry

This circuitry offers very important role for various characteristics such as selectivity, distortion, separation, capture ratio or AM suppression ratio, all of which are to draw the excellent performance of the multiplex (MPX) circuitry where the composite signal is de-modulated into the stereophonic signal.

Low distortion is the most excellent point of the T-110, which entirely depends on the design of the element for the selectivity. On detecting the FM radio wave, no distortion will appear if the phase characteristic is perfectly linear against the frequency shift. However, in actual, it is necessary to provide selectivity, therefore some phase distortion is inevitable. The element for selectivity adopted in the T-110 has been designed with great stress on this phase characteristic.

Thus provided is the linear-phase LC block filter of 4-elements in which the group-delay time is kept within 0.5μ sec. ranging over 300KHz. Here two linear-phase LC block filters and the selected linear-phase ceramic filter are coupled to reduce the distortion by ensuring selectivity and keeping the group-delay time down to the minimum within the range.

The IF amplifying element has realized excellent limitter characteristic by adopting IC's of high integration for the simple differential amplifier, the three-stage differential amp of constant drive etc.

Multiplex Circuitry

The multiplex (MPX) circuitry de-modulates the left and the right signals of the stereophonic broadcasting. A selected IC of Phase Locked Loop type is adopted according to the philosophy of LUX.

The conventional MPX circuitry of discrete type has to produce the 38KHz signal for the switching operation, by repeating the pattern that the pilot signal included in the composite signal is tuned by the LC type tuning circuitry and then amplify the signal. But once the phase of this 38KHz signal drifts the separation and distortion will deteriorate. This has been solved by temperature compensation provided in the tuning circuitry.

As for the PLL IC, the Variable Controlled Oscillator (V.C.O.) is provided in the IC to produce the 38KHz signal for the switching, to constitute the phase locked loop which automatically controls these two phases of the V.C.O. and the pilot signal to be the same by comparing the oscillation frequency and the frequency of the pilot signal. Therefore even if the V.C.O. dirfts by the fluctuation of the ambient temperature, separation and distortion will not be deteriorated since the phase is automatically locked to the phase of the pilot signal.

Thus the PLL IC has excellent performance theoretically. Incidentally various types have been developed of late by the semiconductor manufacturers. But unfortunately these did not better the MPX circuitry due to the distortion problem. Recently, however, a reliable dual-in-line type with low distortion has been developed, enabling its adoption to the quality tuner.

Low-Pass Filter

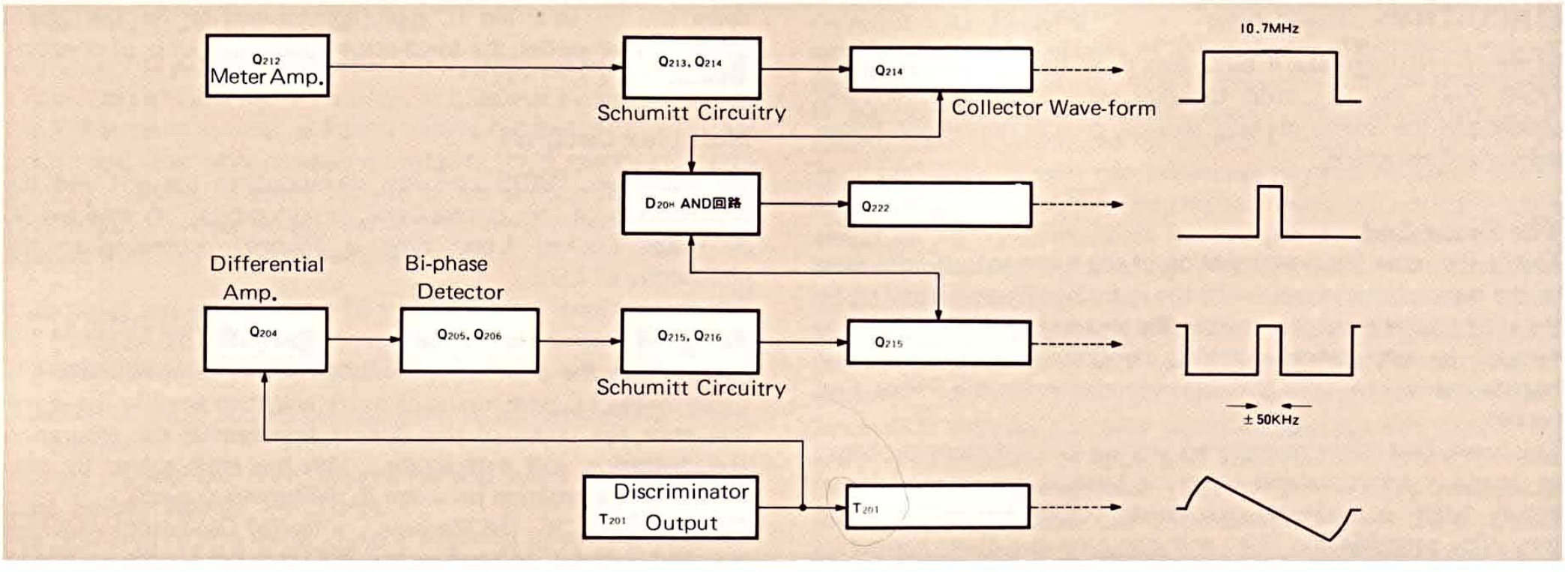
This filter removes the carrier leakage at the de-modulation into stereo signal. And careful attention has been paid to the delay-time for the audio frequency range. Also the residual carrier leakage is kept down to low limits.

Audio Output Amplifying Circuitry

A differential amplifier of (+) (—) two power supply is adopted to attain ultra low-distortion amplification of the audio signal which is de-modulated by the front-end, IF circuitry and MPX circuitry. Sufficient negative feedback ensures a low output impedance.

FM Muting Circuitry

This removes the inter-station noises which are found typically in the reception of FM. The muting circuitry adopted here ensures comfortable operation without the pop-up noise by electronically controlled reed-relay arranged in the time-delay muting circuitry. The conventional muting circuitry of simple structure controls the circuitry by the collector wave of Q214. As you can see from the drawing, the collector-wave is the control signal of wide range, therefore the muting operation starts even at the terribly distorted point, that is, detected at the ends of the S-curve of the output wave from the discriminator.



To eleminate the above weak point, each collector output of Q214 and Q215 is fed to the "AND" circuitry, whose muting width controls the muting circuitry. Therefore the muting operation will be started in the distortion-free condition.
Further thanks to the circuit design, the determined width of the muting threshold will remain stable from weak signals up to strong ones, therefore stable muting-feeling is realized. DC output voltage will never appear due to adoption of the differential IC of (+) (–) 2 power supplies at the final output stage, which is switched ON-OFF by a reed relay. Thus the pop-up noise is perfectly eliminated.

Time Delay Muting Circuitry

Any switch-on thumps caused not only during the operation but just before putting into operation or right after the termination of operation are designed to be removed. This circuitry, after all, removes the switch-on noises at the time of the ON-OFF operation of the power switch, the provision of which has not been adopted by the conventional tuners.
When the power switch is turned on, a time-constant circuitry composed of a resistor and a capacitor controls the transistor for relay-drive, which will keep controlling until each circuitry is put into stable operational condition. When it becomes stable, this circuitry is released to allow sound reproduction. When the power is off, the removing electricity is discharged quite quickly by the small time-constant circuitry composed of capacitors and transistors to make the muting circuitry operate. Thus undesired thump noises are removed by the time-delay muting circuitry both at the "ON" and "OFF" operation of the power switch.

Dial Pointer/Winker

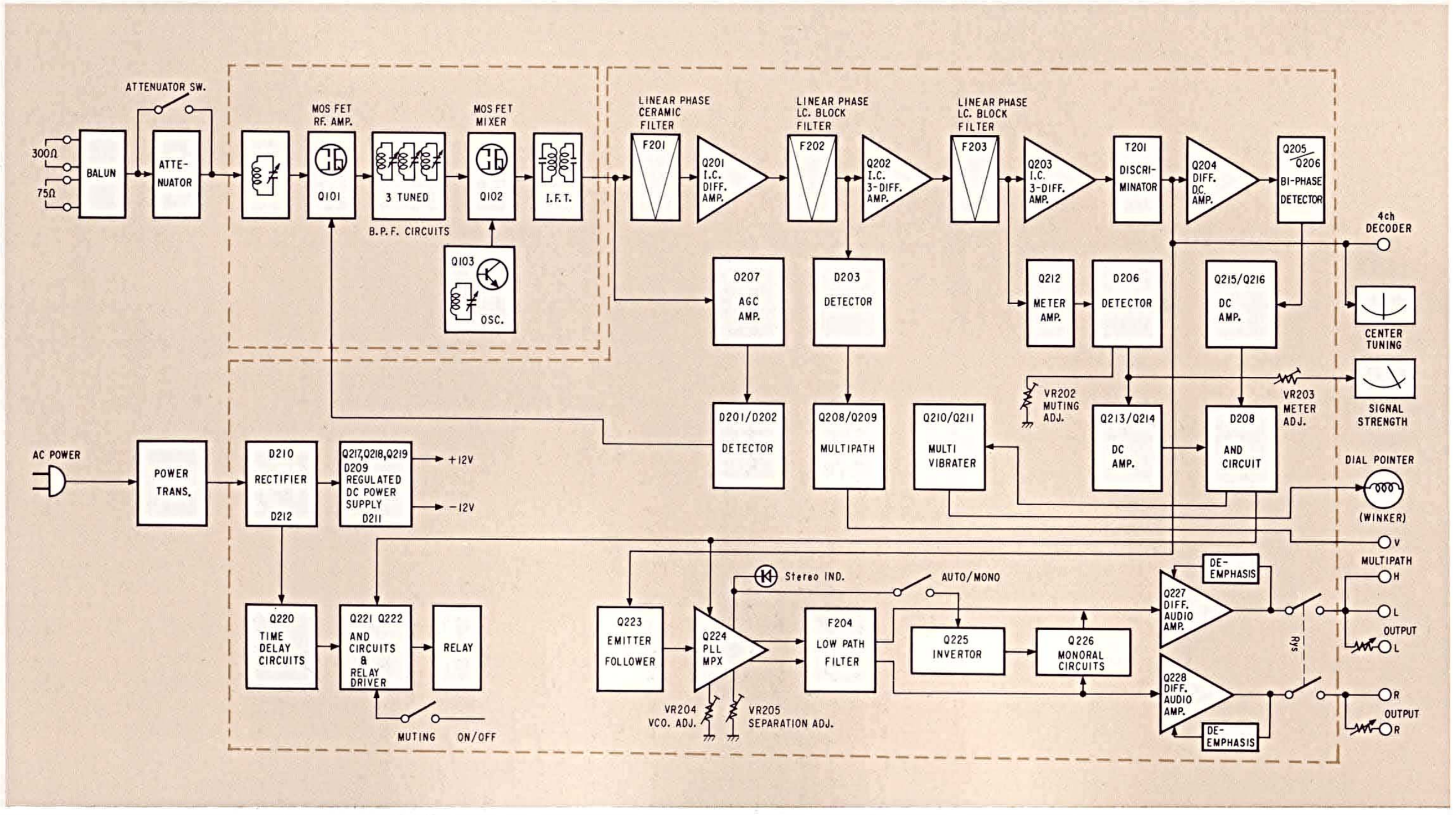
The dial scale consists of slender slits, and the illuminated dial pointer moves across just behind these slits, which is designed to blink to inform that the receiving signal is too weak for the reproduction when the signal is under a certain muting level, and that the tuning is incorrect in case it is at the inter-station receiving state when the FM muting switch is at "ON". The dial pointer is made to blink by the multi-vibration circuitry which is controlled by the "AND" output of the FM muting circuitry. When the FM muting switch is set at the "OFF" position to receive weak signals below the muting level, the dial pointer will not blink.

Constant Voltage Power Supply Circuitry

This is provided to ensure stable tuner operation against the fluctuation of the AC mains voltage or the fluctuation of the DC supply voltage caused by the various circuit operations in the tuner.
For the constant voltage circuitry, both (+) and (–) power supply system is provided. The former employs real constant voltage power supply circuit made by three transistors and zener diodes since it accepts rather heavy load, while the latter by zener diode only due to its light load. Thus stable operation is assured against the fluctuation of the AC mains voltage in the range of ±10%.

Location

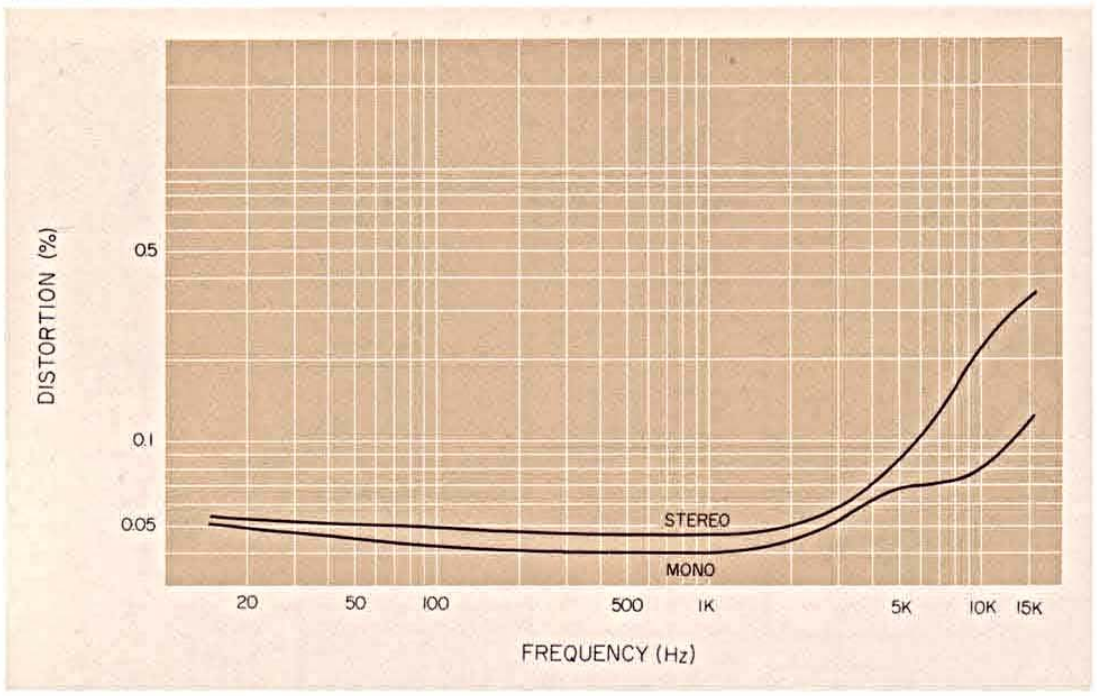
The tuner is designed to permit flexible selection of the location where it is installed - - - with more-than-necessary precaution in respect of change of ambient temperatures. However, since heat insulation provision is not made against possible heating from outside, placement of the tuner on a heat radiating surface such as an audio amplifier, etc. should be avoided - - - it causes unstable operation or trouble of the tuner by ambient temperature exceeding the allowable limit. Selection of the location at the place of a good ventilation and less temperature fluctuation can be recommended best.


ATTENUATOR SW.
300Ω
75Ω
BALUN
ATTE-
NUATOR
MOS FET
RF. AMP.
Q101
3 TUNED
B.P.F. CIRCUITS
MOS FET
MIXER
Q102
I.F.T.
Q103
OSC.
LINEAR PHASE
CERAMIC
FILTER
F201
Q201
I.C.
DIFF.
AMP.
LINEAR PHASE
LC. BLOCK
FILTER
F202
Q202
I.C.
3-DIFF.
AMP.
LINEAR PHASE
LC. BLOCK
FILTER
F203
Q203
I.C.
3-DIFF.
AMP.
T201
DISCRI-
MINATOR
Q204
DIFF.
DC.
AMP.
Q205
Q206
BI-PHASE
DETECTOR
4ch
DECODER
CENTER
TUNING
SIGNAL
STRENGTH
Q207
AGC
AMP.
D203
DETECTOR
Q212
METER
AMP.
D206
DETECTOR
Q215/Q216
DC
AMP.
VR202
MUTING
ADJ.
VR203
METER
ADJ.
D201/D202
DETECTOR
Q208/Q209
MULTIPATH
Q210/Q211
MULTI
VIBRATER
Q213/Q214
DC
AMP.
D208
AND
CIRCUIT
DIAL POINTER
(WINKER)
V
MULTIPATH
H
L
OUTPUT
L
R
OUTPUT
R
AC POWER
POWER
TRANS.
D210
RECTIFIER
D212
Q217,Q218,Q219
D209
REGULATED
DC POWER
SUPPLY
D211
+12V
−12V
Q220
TIME
DELAY
CIRCUITS
Q221 Q222
AND
CIRCUITS
&
RELAY
DRIVER
RELAY
MUTING
ON/OFF
Stereo IND.
AUTO/MONO
Q223
EMITTER
FOLLOWER
Q224
PLL
MPX
VR204
VCO. ADJ.
VR205
SEPARATION ADJ.
F204
LOW PATH
FILTER
Q225
INVERTOR
Q226
MONORAL
CIRCUITS
DE-
EMPHASIS
Q227
DIFF.
AUDIO
AMP.
Q228
DIFF.
AUDIO
AMP.
DE-
EMPHASIS
SW5

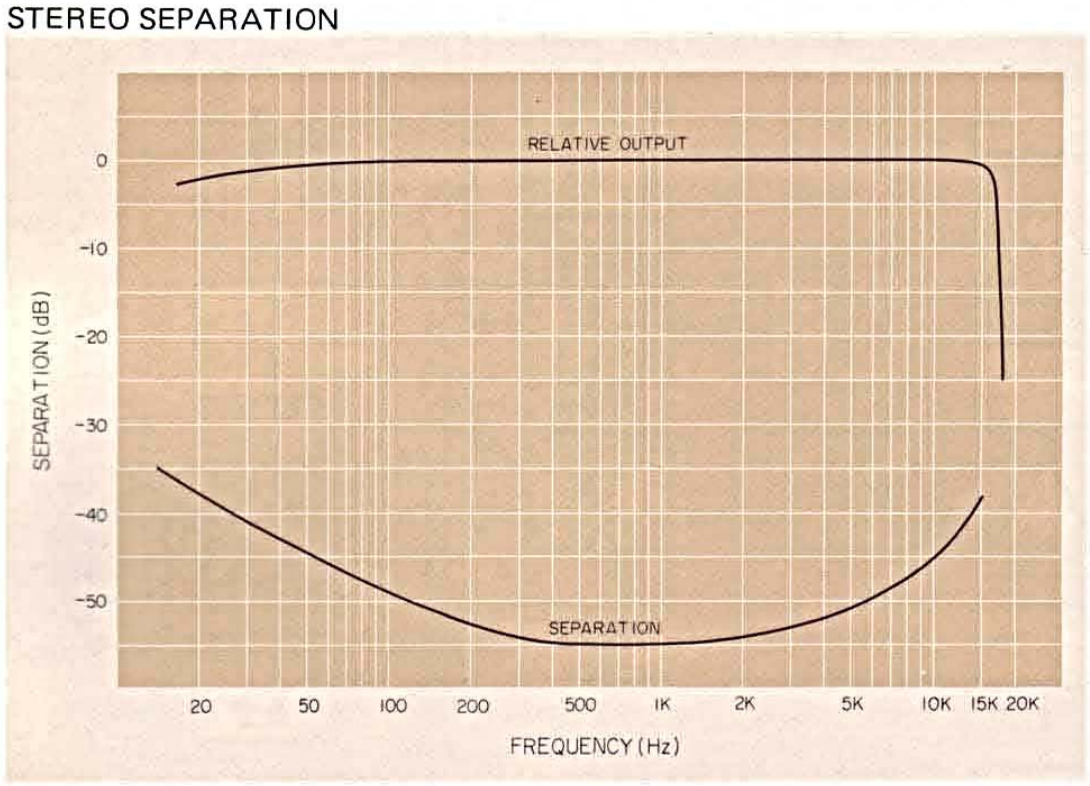
T-110

STANDARD CURVES

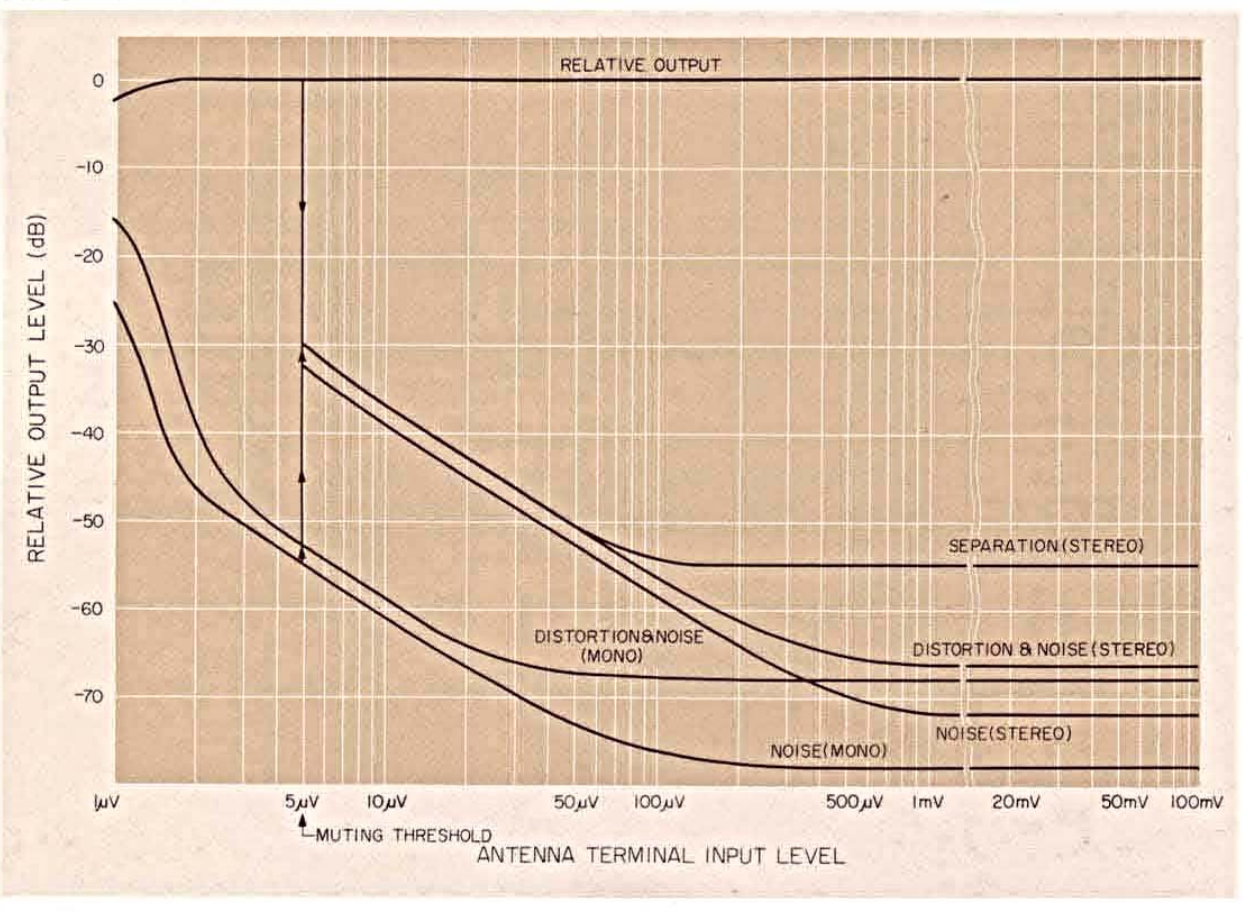
T.H.D. Vs. POWER



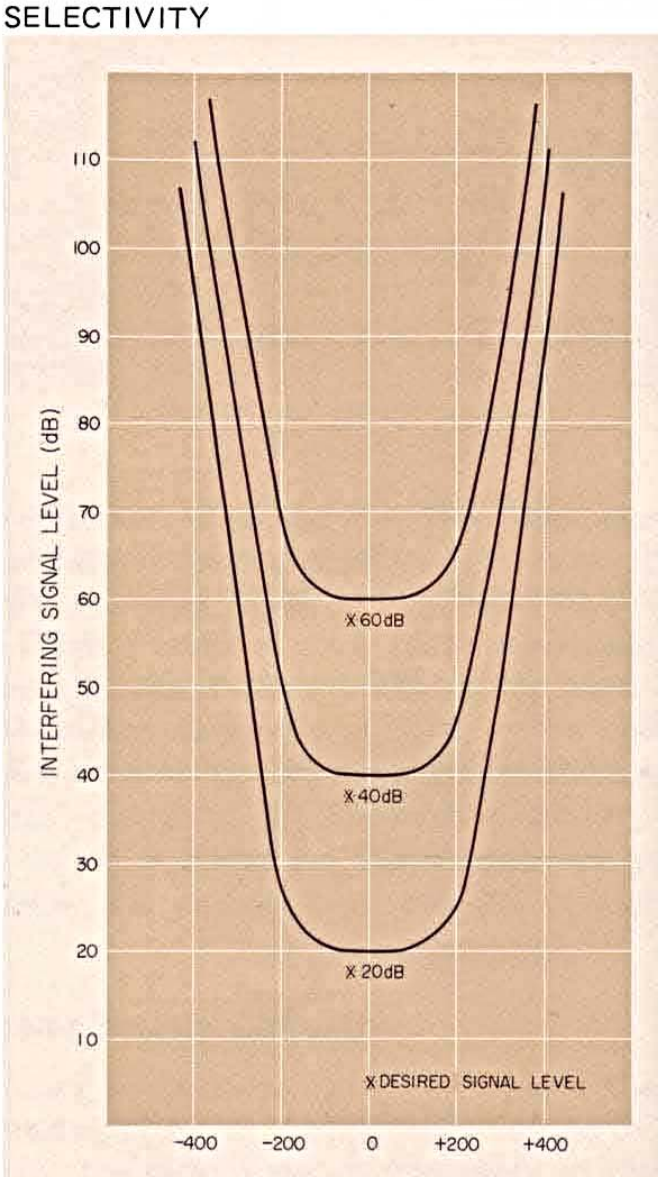
STEREO SEPARATION



FM CHARACTERISTICS



SELECTIVITY



T-110

SPECIFICATIONS

1) Frequency Range:		88 ~ 108MHz
2) IHF Usable Sensitivity:		1.6μV (9.3dBf)/98MHz
3) 50dB Quieting Sensitivity:		
mono		2.2μV (12 dBf)/75μ Sec.
		2.8μV (14 dBf)/50μ Sec.
stereo		3.4μV (35.8 dBf)75μ Sec.
		3.6μV (36.3 dBf)50μ Sec.
4) Selectivity:		70 dB/±400KHz, 100μV, mono
5) AM Suppression:		53 dB/1 mV
6) Capture Ratio:		1.3 dB/1 mV
7) Image Ratio:		100 dB/98MHz
8) IF Rejection Ratio:		100 dB/98MHz
9) Spurious Response:		100 dB/98MHz
10) Frequency Response		$^{+0.2}_{-1.5}$ dB/stereo, mono
	20Hz ~ 15,000Hz	
11) Total Harmonic Distortion:		
stereo	1000Hz	0.08%
	20Hz ~ 5000Hz	0.15%
	10KHz	0.3%
mono	1000Hz	0.08%
	20Hz ~ 10,000Hz	0.1%
12) Stereo Separation:		
	1000Hz	48 dB
	20Hz ~ 10,000Hz	38 dB
13) Carrier Leak:		74 dB
14) SCA Rejection:		70 dB
15) Stereo Threshold:		5μV
16) Muting Threshold		5μV
17) Output Voltage:		1.5V
18) Ultimate S/N:		
mono		78 dB
stereo		72 dB

Specifications and appearance design subject to possible change without notice.

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