FM/AM DIGITAL SYNTHESIZED TUNER PIONEER

TX-D1000 S, S/G

OPERATING INSTRUCTIONS

Before turning on the power, please confirm the setting of the line VOLTAGE SELECTOR switch on the rear panel. If it is not set properly, change the setting of it according to the LINE VOLTAGE SELECTOR SWITCH on page 3.

NOTE:
The operating instructions apply to two versions of the TX-D1000. The TX-D1000/S/G model is supplied with the rack mount adaptors as an accessory, while the TX-D1000/S model is not supplied with it. Follow the procedure outlined below for attaching the rack mount adaptors to the TX-D1000.

MOUNTING THE RACK MOUNTING ADAPTORS (Applicable S/G model only)

If you mount the accessory rack mount adaptor onto the TX-D1000, you will be able to install the TX-D1000 into a rack designed to meet EIA standards (like the Pioneer JA-R2S) with a 2 unit mounting pitch.

Mounting Procedure

1. Detach the rubber bushes from both sides of the TX-D1000.
2. Secure the rack mount adaptors onto the side panels with the accessory mounting screws (M4x10). (Fig. A)

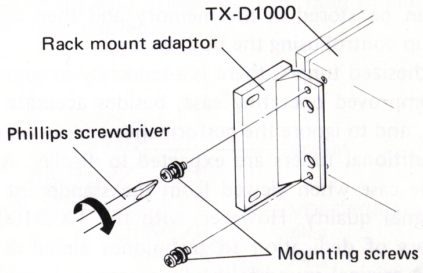


Fig. A

Rack Mounting

1. Remove the rubber feet (4) from the TX-D1000, using a Phillips screwdriver (this is not necessary if you leave a gap between the components).
2. Insert the TX-D1000 and align with the EIA standard mounting holes (mounting pitch: 2U).
3. Screw the TX-D1000 into place using the accessory oval countersunk screw (M5x16), angular washers and plastic rings (four of each) and a Phillips screwdriver.

NOTE:
The rack mount adaptors are 3 mm thick. When aligning them with other Pioneer stereo components with a thickness of 5 mm, slide the accessory spacers behind the adaptors and then attach (Fig. B).

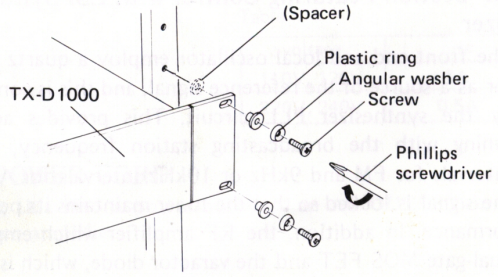


Fig. B

List of Parts for Rack Mount Adaptor

Mounting screws (M4x10); 4, Oval countersunk screws (M5x16); 4, Angular washers; 4, Plastic rings; 4, Spacers (t: 2mm); 4,

CONTENTS

The big features with a digital synthesized tuner are pronounced tuning ease and accurate tuning. Three different tuning methods are possible with the TX-D1000.

1. **Auto Scan Tuning:** By depressed the UP and DOWN tuning switches, the tuning automatically stops when a broadcast is received.
2. **Manual Tuning:** When the tuning mode switch is set to MANUAL, manual tuning is possible at every 50kHz for FM reception and at every 1kHz for AM reception.
3. **Preset Tuning:** Up to six stations each for FM and AM can be stored in the memory and then called by fingertip control using the push buttons.

With synthesized tuners, there is a tendency to concentrate only on improved operating ease, besides accurate tuning of course, and to ignore the performance and sound quality which traditional tuners are expected to display. At least, this is the case when viewed from the standpoint of the output signal quality. However, with the TX-D1000, our many years of dedication to techniques aimed at reproducing the original sound faithfully merge with our quartz synthesized techniques to bring you a superior audio program source in which we have the utmost confidence.

FEATURES

RF Section Featuring Control with LSI Synthesizer

The front end and local oscillator employ a quartz oscillator as a source of the reference signal, and this is controlled by the synthesizer PLL circuit. This provides accurate tuning with the broadcasting station frequency, 50kHz intervals for FM and 9kHz or 10kHz intervals for AM, and the signal is locked so that the tuner maintains its peak performance. In addition, the RF amplifier which employs a dual-gate MOS FET and the varactor diode, which is selected under strict quality control standards, enhance the noise factor, and by their sensitivity and ability to suppress interference they home in on the desired signals in a complex signal environment.

PLL Synthesizer which Adds a New Dimension to Operating Ease

Quartz PLL synthesizers have made it possible to receive signals stably and with a high degree of precision. This tuner, however, goes a step further. It offers FM auto scan tuning where the stations are tuned automatically, and manual tuning which enables stations to be picked up at fingertrip control at 50kHz intervals for FM reception and at 9kHz or 10kHz intervals for AM. Furthermore, there is a memory function capable of storing up to 6 stations each for AM and FM. Once the frequencies of the stations have been stored in the memory, they can be called back at the touch of a button. The reception mode is indicated by a digital display, and there is also a memory display and a signal indicator which makes tuning much easier.

High-performance IF Section

In order to do justice to the features of the high-performance quartz synthesizer system and also to obtain the best in audio specifications, a linear phase ceramic filter is employed which allows the group delay characteristics, which have a bearing on the distortion and resolution, to be flat.

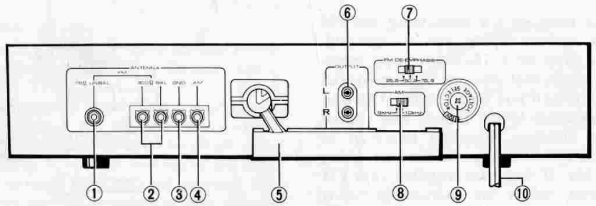
PLL MPX with Self-contained Auto Pilot Signal Canceler

This tuner incorporates Pioneer original auto pilot signal canceler which tracks the pilot signal level, and an NFB PLL MPX decoder. Together, they help yield improvements in the overall characteristics such as a signal-to-noise ratio of 72dB, distortion of 0.06% and a separation of 55dB as well as a wide-range frequency response of 20Hz to 15kHz$^{+0.2}_{-0.3}$ dB.

Off-air Recording Function

A built-in oscillator generates 330Hz reference signals (50% modulation) which are extremely handy for recording programs off the air (FM).

REAR PANEL FACILITIES



① FM ANTENNA INPUT TERMINAL FOR 75-OHM COAXIAL CABLE

Connect a 75-ohm coaxial cable to this terminal when using it as the feeder from the FM antenna.

② FM ANTENNA INPUT TERMINALS FOR 300-OHM TWIN-LEAD FEEDER

Connect a 300-ohm twin-lead feeder to these terminals when using it as the feeder from the FM antenna. Use these terminals when connecting the accessory T-type FM antenna.

③ GND TERMINAL

This is the ground terminal. From aspects of both safety and reduced noise, connect a ground lead to this terminal.

④ AM ANTENNA INPUT TERMINAL

When using an external AM antenna, connect it to this terminal.

⑤ AM BAR ANTENNA

This antenna is for AM broadcasts. Set it where the optimum reception is obtained.

⑥ OUTPUT JACKS

Connect these terminals with the tuner input terminals on your stereo amplifier.

⑦ FM DE-EMPHASIS SWITCH

This switch is used to select the de-emphasis value. Before the tuner leaves the manufacturing plant, it is set to the de-emphasis of the tuner's destination. For the U.S. and Canada, it is set to 75μs, and for other countries to 50μs. Check that the switch is set properly before use. If the switch is set to the wrong position, the high-frequency range sound will appear distorted during the reception of an FM broadcast. Contact your dealer and inquire if you are not sure about the de-emphasis in your area. (25μs: when receiving an FM Dolby broadcasting)

⑧ AM FREQUENCY LOCK SELECTOR

This switch is used to select the AM IF lock frequency. Set to 10kHz when receiving AM broadcasts in the U.S. since the broadcast station frequencies are set at 10kHz frequencies. Set at 10kHz frequencies. Set to 9kHz when receiving AM broadcasts in the area the frequency intervals between the AM broadcasts are set at 9kHz.

⑨ LINE VOLTAGE SELECTOR SWITCH

Check that the indication of the switch is same as your residence before plugging the power cord into the outlet. If it isn't or if you move to an area where the voltage requirements differ, change the switch setting as follows. Before adjusting, disconnect the power cord.

1. Unscrew the fuse cap with a Phillips screwdriver, then take out the fuse and plug.
2. Re-install the plug with its cutaway section exposing correct voltage indication as shown in Fig. A.
3. Refer to the table and install a replacement fuse (provided as an accessory).
4. Insert the fuse in the fuse cap, then fit the cap to the plug and tighten.

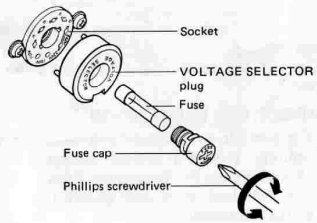


Fig. A

Table

voltage	fuse
110V, 120V	1A
220V, 240V	0.5A

⑩ POWER CORD

Plug this into a power outlet or an AC OUTLET on the stereo amplifier.

ANTENNA AND GROUND CONNECTIONS

There are two methods for connecting the FM antenna to the antenna inputs: you can use 300-ohms twin-lead wire or a 75-ohm coaxial cable. Pioneer recommends that you use 75-ohm coaxial cable (RG-59U, etc.) if you want the TX-D1000 to display its capabilities to the fullest. The coaxial cable is more effective than the twin-lead in keeping external interference noise from impairing the sound quality. If you have installed your FM antenna outdoors, follow the instructions below and connect the antenna to the antenna terminals, and ground lead to the GND terminal.

CONNECTIONS USING A 75-OHM COAXIAL CABLE

The accessory F-type plug is for use with the RG-59U coaxial cable. For all other coaxial cables use the optional F-type plug.
For connections using the F-type connector prepare the end of the coaxial cable and attach it to the 75Ω-UNBAL terminal (Figs. 1 & 2).

Mounting the F-type plug

1. Strip away the covering of the coaxial cable. (If the core wire is stranded, solder it.)
2. Slip the accessory ring over the coaxial cable and then bend back the shield.
3. Insert the F-type plug between the core wire and the shield.
4. Cut off the projecting shield and tighten the ring.

CONNECTIONS USING 300-OHM TWIN-LEAD

If it is possible to use only twin-lead wire with a community receiving system antenna, refer to Fig. 3 and follow the procedure. Prepare the ends of the twin-lead wire and attach them to the 300Ω-BAL antenna inputs.
Then make the twin-lead wire as short as possible. Do not bundle the wires or run them loose on the floor.

ACCESSORY T-TYPE ANTENNA

This antenna is designed for FM reception in areas where strong signals until you install your FM antenna. As shown in Fig. 3, attach the antenna to the 300Ω-BAL antenna inputs and then tune an FM station, following the instructions listed "LISTENING TO THE BROADCASTS" on page 8. Extend both ends of the antenna horizontally, locate the optimum reception point by moving it to the left or right, up or down, and then secure it to the ceiling or wall.

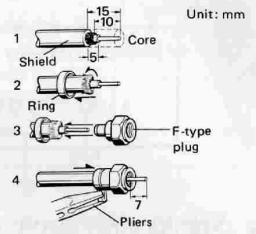


Fig. 1

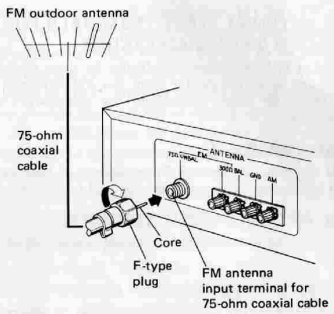


Fig. 2

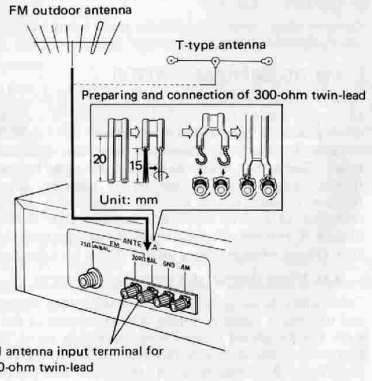


Fig. 3

AM ANTENNAS

For listening to AM programs, move the rear panel ferrite bar antenna and position it for best reception.

- If the bar antenna is insufficient for adequate reception, an indoor AM antenna can be made from a length (5 to 6m) of vinyl insulated wire. As shown in Fig. 5, connect one end of the wire to the AM antenna terminal and suspend the free end from an wall or ceiling as high as possible.
- If reception is still poor with an indoor antenna, use vinyl insulated wire to erect an outdoor AM antenna between two supports as shown in Fig. 5.

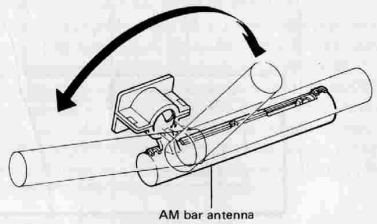


Fig. 4

GROUNDING

For reducing noise, Pioneer recommends that you ground as shown in Fig. 5. Connect the ground lead to the GND terminal. Never connect it to a gas pipe or other dangerous location.

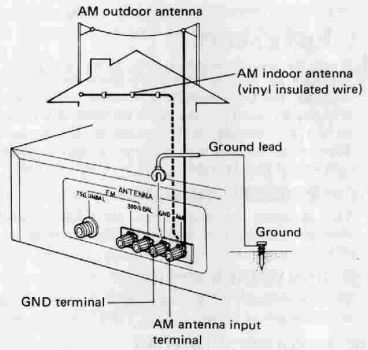


Fig. 5

STEREO AMPLIFIER CONNECTION

Connect the OUTPUT jacks to the TUNER jacks on the stereo amplifier using the accessory connecting cords, making sure that the power to the stereo system is switched off before-hand.
The top output is for the left (L) channel and the bottom for the right (R) channel. When connecting these to the inputs of a stereo amplifier, first check the channel indications and then connect firmly.

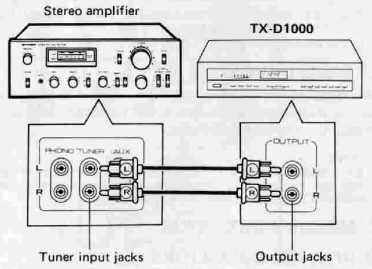
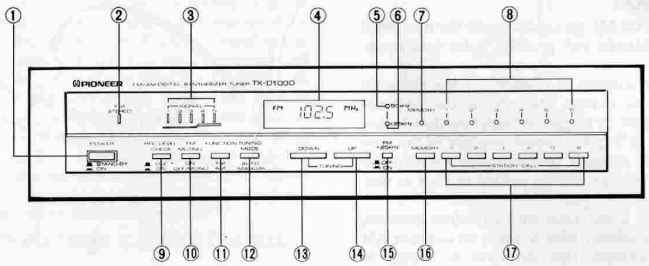


Fig. 6

FRONT PANEL FACILITIES



① POWER SWITCH

When this switch is set to ON, power is supplied to the tuner's main circuits. The unit's power switch is geared to selecting the transformer's secondary and so even at the STAND-BY position, the unit's circuitry will work as long as the power cord is connected to the power outlet. Disconnect the power cord from the power outlet when you do not plan to use the unit for a long period of time.

② FM STEREO INDICATOR

This indicator lights up when the tuner is receiving a stereo program if the FM muting/mode switch is set to ON.

③ SIGNAL INDICATORS

These indicator "1" through "5" light up in accordance with strength of signal.

④ FREQUENCY DISPLAY

⑤ 50kHz INDICATOR

When this indicator comes on, it means that the frequency of the station being received is the value indicated on the frequency display plus 50kHz.

NOTE:
The 50kHz indicator goes off when the function indicator is returned to FM after having been set to AM.
In this case, depress the UP tuning switch once.

⑥ 25kHz INDICATOR

When this indicator comes on, it means that the frequency of the station being received is the value indicated on the frequency display plus 25kHz.

NOTE:
When both the 25kHz and 50kHz indicators come on, it means that the frequency of the station being received is the value indicated on the frequency display plus 75kHz.

⑦ MEMORY INDICATOR

⑧ STATION INDICATORS

⑨ RECORDING LEVEL CHECK SWITCH

Set this switch to OFF for normal FM reception and to ON for a recording reference level used for FM broadcasts.

⑩ FM MUTING/MODE SWITCH

Set this switch to ON, the muting switch is actuated for FM reception and the OFF position the program is received in mono when the broadcast station is located far away or when the signals are weak.

⑪ FUNCTION SWITCH

Set this switch to FM for tuning an FM broadcasts.
Set this switch to AM for tuning an AM broadcasts.

⑫ TUNING MODE SWITCH

Set this switch to AUTO for auto scan tuning.
Set this switch to MANUAL for manual tuning. When the tuning switches are depressed, the frequencies will change in 50kHz steps for FM reception and 1kHz steps for AM reception.

⑬ TUNING SWITCH DOWN

Depress when tuning a station with a frequency lower than that indicated on the frequency display.

⑭ TUNING SWITCH UP

Depress when tuning a station with a frequency higher than that indicated on the frequency display.

⑮ FM +25kHz OFFSET SWITCH

When this switch is set to the depressed position, a frequency of 25kHz is added to the value indicated on the frequency display. (The 25kHz indicator comes on.)

⑯ MEMORY SWITCH

Use this switch to store frequency of broadcast station in the memory.

⑰ STATION CALL SWITCHES

Depress these switches when tuning a preset station or call out the station.

CONTROL SUMMARY

MEMORY SWITCH

Use when storing the frequencies of the broadcast stations by operating the station call switches 1 through 6. Simply depress the memory switch when storing the desired frequency and this operation will cause the memory indicator to light up (for a period of about 2 seconds). Depress the station call switch while this indicator is still on. The frequency of the broadcast station indicated on the frequency display will then be stored by the switch.

STATION CALL SWITCHES (1, 2, 3, 4, 5, 6)

Depress to call out the station whose frequency has been stored (preset). To call out an FM station, set the function switch to FM and then depress the appropriate station call switch. To call out an AM station, set the function switch to AM and then depress the appropriate station call switch.

FM MUTING SWITCH

When this switch is set to ON and you operate the tuning switches to tune in an FM program, the tuner's built-in muting circuit will be actuated to suppress interstation noise. But if the signals of the station whose program you are receiving are exceptionally weak, set the FM muting switch to OFF/MONO. You will then be able to receive the program although there may be some interference. If the program is being broadcast in stereo, you will hear it in mono in this mode.

FREQUENCY DISPLAY

Indicates frequency which is tuned. With FM reception, the letters 'FM' appear on the left of the display and 'MHz' on the right. With AM reception, 'AM' appears on the left and 'kHz' on the right. These change when the function switch position is changed. When the recording level check switch is set to ON, 'FM', 'MHz' and the decimal point are no longer displayed and all that is displayed is the tuned frequency.
During the reception of an FM broadcast the frequency display does not indicate the 10kHz digit. There are two indicators on the right of the frequency display. When one of these indicators, or both, lights up, add the corresponding frequency (25kHz or 50kHz, or 75kHz if both light up) to the frequency indicated on the display. This will then give you the correct frequency.

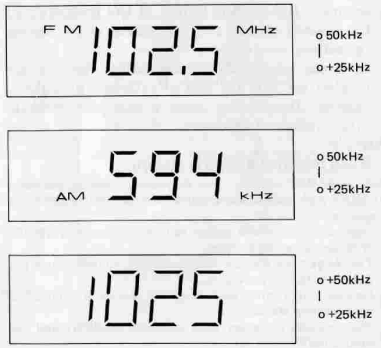
RECORDING LEVEL CHECK SWITCH

The recording level must be set correctly for good quality FM broadcast. However, this is not easy since the output level is fluctuating all the time.
By setting the recording level check switch to ON, it is possible to make available an approximately 330Hz reference signal at a level which is equivalent to a 50% FM modulation. This means that it is possible to set the recording level optimally, irrespective of the program being received.

Setting the recording level.

1. Connect the tape deck.
2. Set the tape deck to the recording standby mode.
3. Set the function switch to FM.
4. Set the recording level check switch to ON, and 330Hz signals will now be fed out to the OUTPUT jacks.
5. Adjust the recording level of the tape deck so that the recording level meter pointers deflect within the following ranges:
   - 0 to +2dB with an open-reel deck
   - About −2dB with a cassette deck
6. Tune in to the desired FM station and start recording after setting the recording level check switch to OFF.

The output level of the signals is the same for both left and right channels, and so these signals can be used as reference signals to adjust the left/right channel volume balance of a stereo system connected to the OUTPUT jacks.



LISTENING TO THE BROADCASTS

The TX-D1000 tuner is a digital synthesized tuner with preset capability and so you have a choice between the following three tuning operations.
Before operation, set the recording level check switch to OFF and the FM muting/mode switch to ON/MONO.

USING THE AUTO SCAN METHOD

1. Switch on the power.
2. Set the function switch to FM or AM, depending on the program you want to listen to.
3. Set the tuning mode switch to AUTO.
4. Depress the DOWN or UP tuning switch lightly.
5. When the strength of the signals received exceeds a certain level, the tuning operation will stop and the frequency received will be indicated on the frequency display.
6. To tune into another station, depress the DOWN or UP tuning switch.

There is no auto stop with auto scanning when the broadcast frequencies are in 25kHz steps. Refer to the section "Using the manual scan method" and tune the station in manually.

USING THE MANUAL SCAN METHOD

1. Switch on the power.
2. Set the function switch to FM or AM, depending on the program you want to listen to.
3. Set the tuning mode switch to MANUAL.
4. Depress the DOWN or UP tuning switch lightly. Every time the tuning switch is depressed, the frequency will change in 50kHz steps for FM and 1kHz steps for AM. If the switch is kept depressed, the frequency is continuously scanned. Release the switch at the frequency of the desired station and this will stop the tuning operation.
   In areas where the broadcasting stations are located on the FM dial at intervals of 25kHz, operate the tuning switch and the +25kHz offset switch as follows.

Example

- **When receiving a 90MHz station**

With a 90MHz station, the frequency display indicates 90.0MHz and neither the 25kHz nor the 50kHz indicator comes on.

1. *Depress the +25kHz offset switch to receive a 90.025 MHz broadcasting station.*
   The frequency display now indicates 90.0MHz and the 25kHz indicator comes on.
2. *Depress the tuning switch up to receive a 90.05MHz broadcasting station.*
   The frequency display now indicates 90.0MHz and the 50kHz indicator comes on.
3. *Depress the tuning switch up to receive a 90.075MHz broadcasting station and depress the +25kHz offset switch.*
   The frequency display now indicates 90.0MHz and both the 25kHz and 50kHz indicators come on.
4. *Depress the tuning switch up twice to receive a 90.1MHz broadcasting station.*
   The frequency display now indicates 90.1MHz and neither the 25kHz nor the 50kHz indicator comes on.

FREQUENCY MEMORY AND PRESET TUNING

Storing the broadcast station frequencies in the memory.

1. Tune in the desired station by auto scan or manual scan.
2. Depress the memory switch. The memory indicator will now light up. Now depress one the six station call switches while the indicator stays on. This will cause the corresponding station indicator to light up.

NOTE:
If the memory indicator goes off before the station call switch is depressed, the frequency of the station will not be memorized even if the switch is operated. The memory indicator remains on for about 3 seconds but if it has already gone off before the station call switch is depressed, depress the memory switch again and then the station call switch.

3. After depressing all the other station call switches, verify that the frequencies have been stored by depressing the switches again.
   The frequency of the broadcast station stored by the switch is indicated on the frequency display.
   The presetting operation can be performed any number of times. To change the broadcasting station which has been preset with the tuning switch, tune in the new station and this can now be preset when memorized under the procedure given above.
   The memorized broadcasting station is not erased even when the power is switched off.

TUNING BY CALLING OUT THE PRESET STATIONS

1. To call out an FM station, set the function switch to FM, and to call out an AM station, set it to AM.
2. Depress the station call switch corresponding to the station whose program you want to hear. The frequency of the broadcast station stored by the switch is indicated on the frequency display.

NOTES:

- *When the power switch is released (OFF) and then depressed (ON), the station that was received before the power was switched off will be received when it is switched on.*
- *A capacitor back-up system is used for the memory power supply. It does not go off even when the power switch is set to off. Disconnect the power cord when you do not intend to use the tuner for a long period of time. If the power cord is disconnected for three days or longer, the station stored in the memory will be erased.*

CONDITIONS FREQUENTLY MISTAKEN FOR MALFUNCTIONS

In event of suspected malfunction, check the following table and confirm proper operation of other connected equipment. If the difficulty cannot be corrected, turn off the power and contact a Pioneer authorized service center.

Symptom	Diagnosis check points	Remedy
Cannot receive FM stations.	• Power switch is STAND-BY. • Function switch is at AM. • Recording level check switch is at ON. • Signal indicators do not light up properly. • In the case of a far away broadcasting station or weak signals, all signals below the internal muting level are cut out.	• Set to ON (indicators will then come on). • Set to FM. • Set to OFF (transmission sound is audible). • In order to increase the antenna input of the radio signals, erect an exclusive FM outdoor antenna when listening with the indoor T-type antenna. • Set the FM muting/mode switch to OFF/MONO.
Cannot receive AM stations	• Signal indicators do not work properly indicating that signal strength at AM antenna is insufficient. • Function switch is set to FM.	• Adjust the bar antenna. • Install an outdoor antenna. • Set to AM.
No auto stop (figures on frequency display do not stop).	• Recording level check switch is ON. (No auto stop when this switch is on.) • Input signals are not strong enough.	• Set to OFF. • If the T-type antenna is being used, change over to an outdoor antenna. • Change the direction of antenna.
No stereo with stereo reception.	• FM muting/mode switch is set to OFF/MONO.	• Set the switch to AUTO position. The stereo indicator will then light up.
Memory function does not work.	• After memory indicator goes off, station call switches are depressed.	• Depress the station call switch immediately after depressing the memory switch again.
Cannot receive programmed station even when the station call switch is depressed.	• Power cord has been disconnected from tuner for a long time (more than 3 days) and so contents of memory have been erased.	• Perform memory operation again.
Cannnot scan frequencies even when the tuning switches are depressed.	• Tuning mode switch is set to MANUAL. (In this state, the frequencies can be scanned if the tuning switches are continuously depressed.	• Set to AUTO.

TECHNICAL DESCRIPTION

GENERAL DESCRIPTION

The TX-D1000 digital synthesized tuner employs the most advanced digital and analog techniques available today to achieve high degrees of precision and stability.

Outlined below is the basic principle behind the control circuit of the front end local oscillator based on a quartz PLL synthesizer which provides high precision.

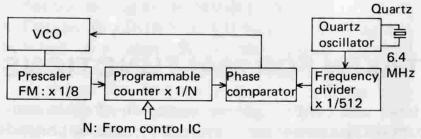


Fig. 7

The VCO is a voltage-controlled oscillator which is used in this synthesized tuner to replace the usual variable capacitor found in conventional tuners. By varying the voltage which is applied to this varactor diode, the frequency of the oscillator circuit is changed. The output signal of the VCO is used as the local oscillator signal and at the same time part of it enters the prescaler, and when an FM broadcast is being received, its frequency is scaled down by a factor of 8. Then the signal's frequency is divided by 1/N with the programmable counter, and the resulting signal is applied to the phase comparator.

While this is happening, the reference oscillator (6.4MHz) which employs a quartz crystal provides the 12.5kHz reference frequency signal after its frequency is divided by 512 with the frequency divider. The reference frequency signal is then applied to the phase comparator.

The phase comparator serves to compare the two frequencies and the difference between them is detected as a DC component. This component is applied to the varactor diode of the VCO, the difference is compensated for, and the VCO's oscillation frequency is controlled as the proper frequency of the local oscillator. This series of loop-like actions forms the basic principle of the synthesized tuner. In the TX-D1000, ICs serve to control the programmable counter. The synthesizer section is configured with a large-scale integrated (LSI) circuit in order to maintain the high level of operational stability.

1. FRONT END

Since this model is a synthesized tuner, the front end employs a varactor diode in place of the usual variable capacitor. The front end configuration breaks down into an ANT stage, two RF stages (M coupled) and an OSC. In terms of the conventional variable capacitor tuners, this model's front end is equivalent to a 4-gang construction.

2. IF AMPLIFIER, DETECTOR

The IF section incorporates two ceramic filters with flat group delay characteristics for improved sound quality. The IF amplifier employs the system IC PA-3001-A in order to enhance the stability.

The detector adopts a quadrature detector for a high signal-to-noise ratio and low distortion factor.

The system IC PA-3001-A provides signal indicator and muting voltages as well as other control voltages, and these are used for the IF auto stop signal.

3. MPX SECTION

The MPX section employs the special-purpose IC PA-1001A. This is an auto pilot canceler negative feedback type which helps increase the signal-to-noise ratio and decrease the distortion.

4. MUTING, AF AMPLIFIER

This section uses the special-purpose IC PA-1002A in order to amplify the signal which has passed through the MPX section and also to provide all the muting operations.

5. NOISE AMPLIFIER

This section is designed to prevent muting malfunctions caused by TV buzz signals and also by the effects from neighboring strong channels. As can be seen in the block diagram, the muting signals are supplied to the auto stop signals which help to safeguard against auto stop malfunctions.

6. AM SECTION

The AM section employs the special-purpose IC HA1138. The distortion is kept down to a minimum by the powerful AGC effect even when strong input signals are being supplied to the tuner during reception. The signal that configures the auto stop signal is amplified and detected via the narrow-band AM ceramic filter, and it then enters the Schmitt circuit since a separate AM auto stop intermediate frequency amplifier is provided.

7. SYNTHESIZER SECTION

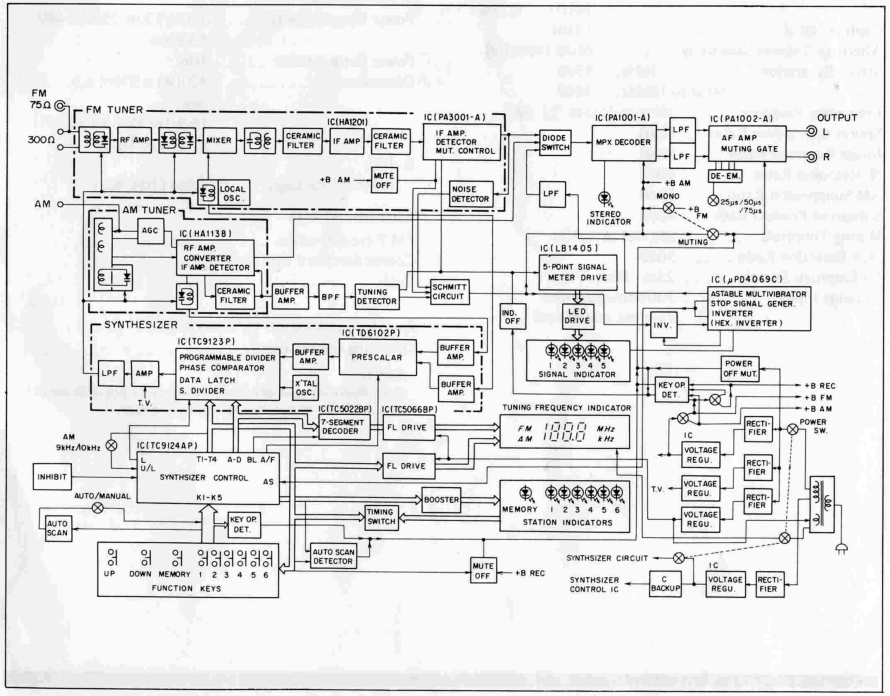
This section is made up of a synthesizer C MOS IC and a control C MOS IC. Control is complemented by entering pulses into the K1 through K5 input key switches in accordance with dynamic times T1 through T4.

The switch configuration is as follows:

1) Tuning mode switch AUTO/MANUAL
2) Tuning switches UP/DOWN
3) Memory switch
4) Station call switches 1 through 6

As shown in the block diagram, the time-starting input BCD code is entered from the control IC into the synthesizer IC. It is here that the frequency division is determined, and the FM and AM varactor diodes are controlled by the phase-compared output signal. At the same time the BCD code is decoded on the 7-segment display and the frequency is displayed as a time-sharing (dynamic) indication.

BLOCK DIAGRAM



SPECIFICATIONS

Semiconductors

ICs	15
FET	8
Transistors	45
Diodes	103

FM Section

Frequency Range		87.55 ~ 108.0MHz	
Usable Sensitivity	MONO;	10.8dBf (1.9μV)	
50dB Quieting Sensitivity	MONO;	16.2dBf (3.5μV)	
	STEREO;	38.5dBf (46.2μV)	
Signal-to-Noise Ratio at 80dBf	MONO;	72dB	
	STEREO;	70dB	
Distortion at 65dBf	MONO;	100Hz	0.05%
		1kHz	0.05%
		10kHz	0.1%
	STEREO;	100Hz	0.08%
		1kHz	0.08%
		10kHz	0.25%
Capture Ratio		1.0dB	
Alternate Channel Selectivity		60dB (400kHz)	
Stereo Separation	1kHz;	55dB	
	50Hz to 10kHz;	40dB	
Frequency Response	20Hz to 15kHz $^{+0.2}_{-0.5}$ dB		
Spurious Response Ratio	80dB		
Image Response Ratio	80dB		
IF Response Ratio	90dB		
AM Suppression Ratio	60dB		
Subcarrier Product Ratio	55dB		
Muting Threshold	25.0dBf (8.1μV)		
SCA Rejection Ratio	50dB		
De-Emphasis Switch	25μs - 50μs - 75μs		
Antenna Input	300-ohms balanced		
	75-ohms unbalanced		

AM Section

Frequency Range	
	531 ~ 1,602kHz (AM IF switch: 9kHz)
	525 ~ 1,605kHz (AM IF switch: 10kHz)
Sensitivity	
IHF, ferrite antenna	300μV/m
IHF, external antenna	30μV
Selectivity	30dB
Signal-to-Noise Ratio	45dB
Image Response Ratio	30dB
IF Response Ratio	60dB
Antenna	Built-in Ferrite Antenna

Audio Section

Output (Level/impedance)	
FM (100% mod.)	650mV/100Ω
AM (30% mod.)	200mV/100Ω
REC LEVEL	325mV/100Ω

Miscellaneous

Power Requirements	110V/120V/220V/240V, 50/60Hz
Power Consumption	10W
Dimensions	420(W) x 97(H) x 335.5(D) mm 16-9/16(W) x 3-13/16(H) x 13-3/16(D) in
Weight (Without Package)	4.8kg (10lb 9oz)

Furnished Parts

FM T-type Antenna	1
Connection Cord with Pin Plugs	1
Fuse 1A;	1
0.5A;	1
Rack Mount Adaptors (S/G model only)	2
Operating Instructions	1

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

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