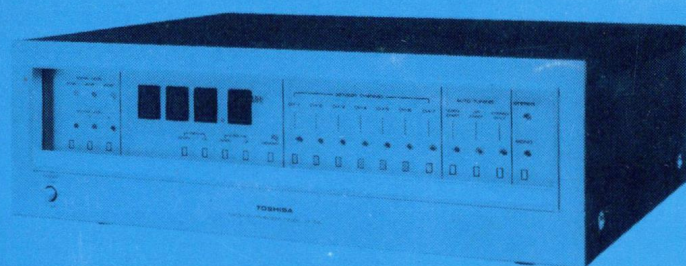


TOSHIBA

DIGITAL SYNTHESIZER TUNNER

ST-910



We are very proud to count you as another TOSHIBA digital synthesizer tuner ST-910 user. This ST-910 you kindly purchased is the high performance tuner adopted many new techniques and circuits. This owner's manual will tell you all about the advantage and operation of the ST-910.

Please read this owner's manual carefully before start using the ST-910. You will find many hints which will help you to keep the ST-910 is first-class condition.

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REQUEST TO USERS

This tuner you kindly purchased has been manufactured under strict quality control. However, in the unlikely event of damage or trouble on the unit which may be caused during transportation, please contact your nearest TOSHIBA Representative or Agent which this set was purchased for servicing as soon as possible.

LOCATION

This set is high performance tuner adopted many high reliability ICs and transistors. Please use this set in a dry and clean place air is flowing.

As the heat diffusion effect will be disturbed, avoid using the set in a narrow place, covering something on the set and laying a thick cloth beneath the set.

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

CONTROLS AND THEIR FUNCTIONS (FRONT PANEL)

③ SIGNAL LEVEL indicators

This indicators are used to indicate the signal level as follows;
 No lamp is put on under 20 dB
 One lamp is put on beyond 20 dB
 Two lamps are put on beyond 40 dB
 Three lamps are put on beyond 60 dB

② MUTING LEVEL switches

You can use it when changing the sensitivity of the automatic tuning operation. There are three levels. By touching the switch, you can select the following levels.

MUTING LEVEL 1 beyond 20 dB
 MUTING LEVEL 2 beyond 40 dB
 MUTING LEVEL 3 beyond 60 dB

When the radio waves have not enough level to reach the muting level, the automatic tuning operation should not be operated. The same situation is occurred when choosing the Manual or Preset tuning operation.

When touching the switch of MUTING LEVEL 1 and the green indicator lamp is turned off, the muting operation is not operated. The Manual or Preset tuning operation is chosed at that situation, the noise will be heard outside the broadcast frequency.

④ Frequency display

The frequency you chosed is shown by digital number.
 Display figures are 100 MHz, 10 MHz, 1 MHz, 0.1 MHz.

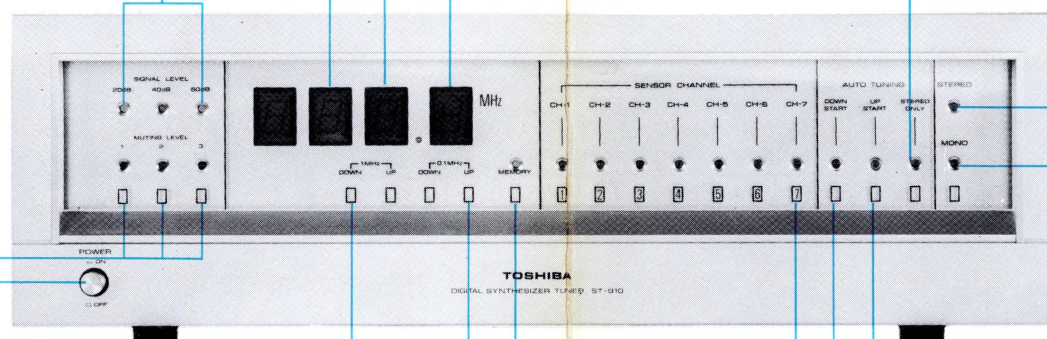
⑨ STEREO ONLY STOP switch

This switch has the stop operation only at the stereo broadcasts. Its operation can be released by operating the compulsive monoural switch as explained at 10.

⑩, ⑪ Compulsive monoural switch and STEREO indicator

This switch has the operation of changing stereo source to monoural compulsively. You can use this switch when you want to record the stereo broadcast having much noise to listen.

The STEREO indicator lamp is turned on when received broadcast is stereo source. But when the compulsive monoural switch is operated, this lamp is not turned on. The compulsive monoural switch can be released by touching the switch twice.



① Power Supply switch

Push the button, Power Supply is put on. Push it twice, it is put off.

⑤ Manual tuning switch

By touching this switch (UP or DOWN), you can change the receiving frequency with a 1 MHz or 0.1 MHz interval.

⑦ MEMORY switch

This switch plays a role of the memorizing the received frequency by IC memory device. When touching this switch, the green indicator lamp is turned on and the device is under the memorization operation during about 3 seconds. You must touch one switch in SENSOR CHANNEL CH-1 ~ CH-7, while the green indicator lamp is turned on and lighted brightly and put off. At the same time, the green indicator lamp of the SENSOR CHANNEL related to the switch you touch is turned on. When you want to call the memorized and presetted frequency, you only touch the switch, You will be able to receive it easily.

⑧ AUTO TUNNING switches

By touching this switch, the frequency is increased (UP switch) or decreased (DOWN switch) and its operation is stopped when it accordes one of the broadcast frequencies. If it reaches the maximum (107.9 MHz) or minimum (87.5 MHz) value, its operation is reverced. When you want to choose the automatic tuning operation, pay attention to the things as follows;

- If receiving signal level does not reach beyond the input level, the tuning operation cannot be stopped.
- As explained at 9, you can use this switch only for stereo broadcasts.

CONTROLS AND THEIR FUNCTIONS (REAR PANEL)

⑬ MPX OUT terminals
When FM broadcasts by 4 channel will be started, you can enjoy the 4 channel broadcasts by using the adapter.

⑫ FM antenna terminals
This set has two terminals for 75Ω coaxial cable and for 300Ω feeder cable. Both cable can be used, but you must avoid connecting two cables at the same time.

⑮ MULTIPASS OUTPUT terminals
They are used to find the most suitable location of the antenna by using the oscilloscope as explained at another page.

⑭ OUTPUT terminals
There are two terminals as follows;
FIXED connected to LINE IN terminals of the Tape Deck and so on.
VARIABLE connected to the terminals of Amplifier using attached code. It should be connected the L and R compatible to each set.

⑮ Remote control terminal
You can enjoy controlling this set remotely by using remote control unit offered by TOSHIBA CO, LTD.

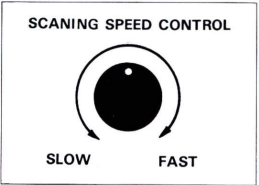
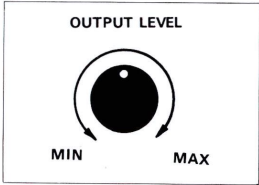
⑲ AC LINE PROTECTOR RESET BUTTON
This button is used to cut an electric current from the Power Supply when an electric current to the circuit is overflowed. At the same time, the red button is broken out from Rear panel.
When it is operated by unknown origin, contact your serviceman.
After tracing it and repairing it, the red button is pushed. Power Supply will be put on.

⑳ AC Spare Receptacle
This Receptacle supply AC 100/120/220/240V independent of Power Supply switch of this set. Please enjoy this Receptacle to use for Power Supply of another set, Tape Deck, Record Player and so on. But the Power consumption of these sets should be limited under 100W.

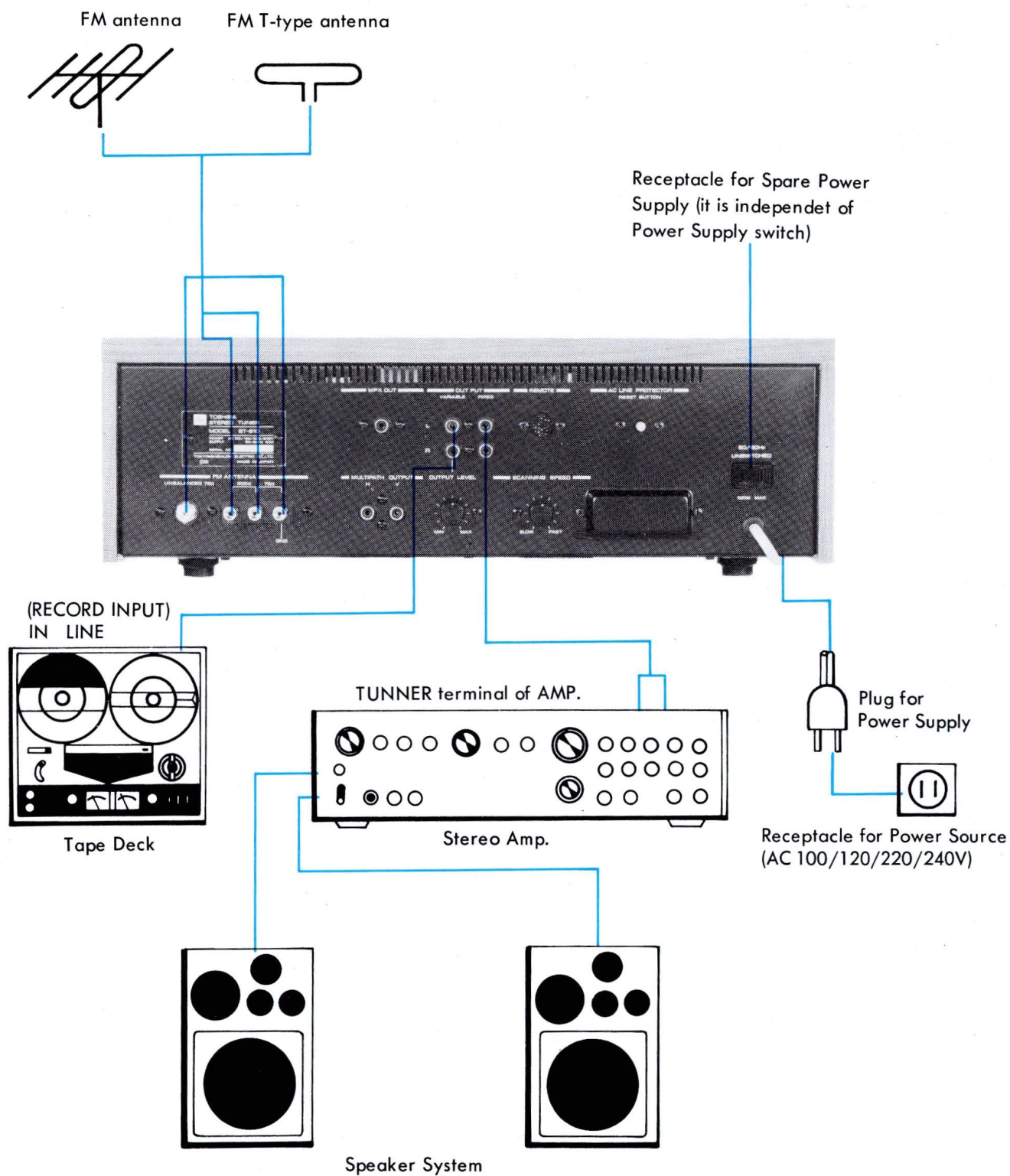
⑮ SCANNING SPEED control knob
This knob is used to vary the speed of the automatic tuning operation. Right turning fully of the knob indicates maximum speed, 2~3 times/sec at 0.1 MHz unit. Left turning fully of the knob indicates minimum speed, 20~30 times/sec at a 0.1 MHz unit.

㉑ Power Supply voltage selector
We adjust your set's selector for your local power line voltage.
Available power supply voltages are as follows;
100V/120V/220V/240V.
However, we adjusted your ST-910 selector for your local power line voltage. In case you want to use your ST-910 in the different voltage area, please contact your local dealer.

⑰ OUTPUT LEVEL control knob
This knob is used to adjust the output level of VARIABLE output terminal. Right turning of the increases output level. Left turning decreases it and full turning of it indicates zero output level.



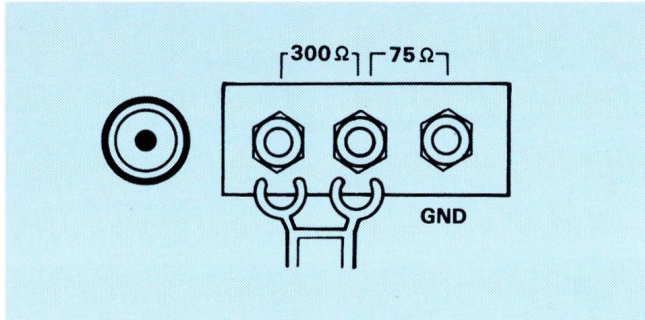
CONNECTING DIAGRAM



CONNECTING A ANTENNA

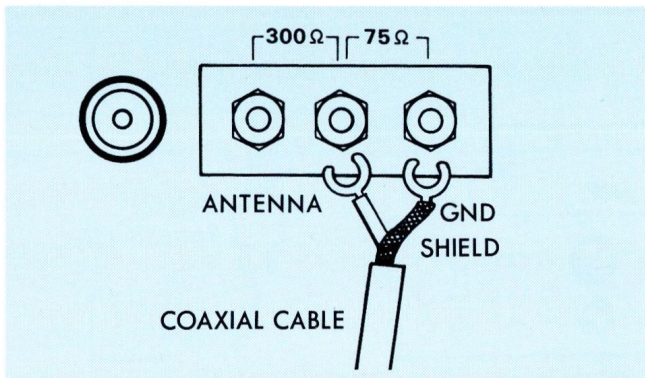
1. 300Ω antenna terminal(300Ω)

Connect the exterior antenna to this terminal by using a 300Ω feeder line. When using the attached feeder antenna, connect it to this terminal. By widening the T-shaped part of the antenna, determine the direction and hight which obtain the best listening effect. Lock the antenna at this position with thumbtacks or by other means.



2. 75Ω antenna terminal(75Ω)

Connect the antenna which is employed a 75Ω coaxial cable to this terminal or to the 75Ω coaxial connector terminal.

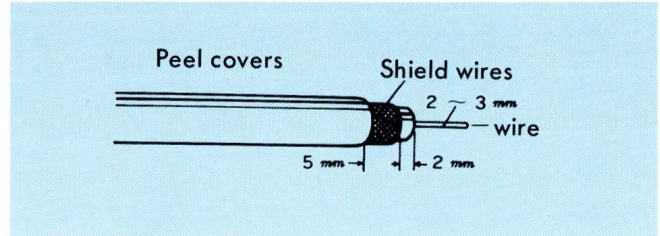


3. 75Ω coaxial connector terminal (75Ω UNBALANCE)

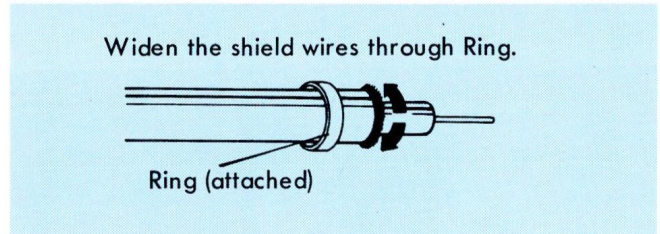
Connect the antenna which is employed a 75Ω coaxial cable using a attached connector (FP-5) for 5C-2V.

HOW TO MAKE A 75Ω COAXIAL CONNECTOR (FP-5 in ACCESSARY)

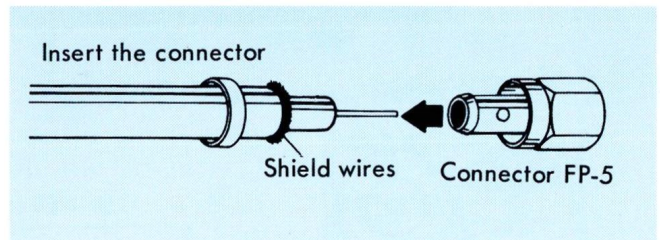
1. Peel the outer and inner insulator covers of coaxial cable by knife.



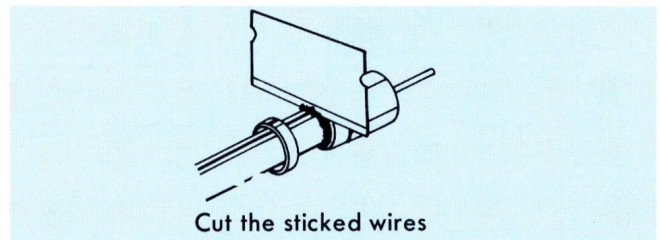
2. Pass the ring through the coaxial cable and widen the shield wires.



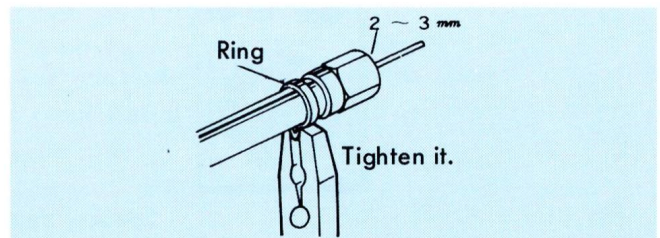
3. Insert the connector between the shield wires and the inner insulator cover.



4. Cut the shield wires which are stuck out.

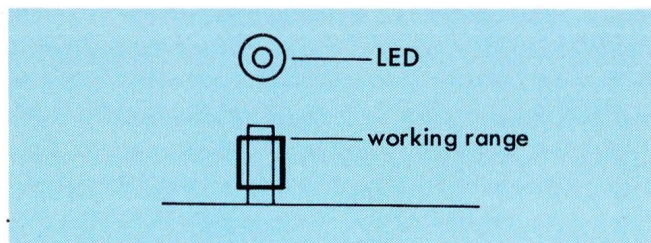


5. Tighten the ring by pliers.



HOW TO OPERATE THE TOUCH SWITCH EFFECTIVELY

The touch switch is the new type of the electric switching device. You surely touch the place as indicated in following picture and switch will be put on.



This operation is checked by LED lamp above. LED lamps show the functions of many touch switches as follows;

MAINTENANCE

It is important to keep clean for the touching places. Dust and humidity can be harmful to it. You had better to wipe the surface made of glass by clean, dry clothe.

Please pay attention to the things as follows;

1. Don't scratch the surface.
2. Don't touch with a glove.
3. Don't touch with a wet hand.

* You touch the switch during the other one is operated, the switch operation designated before is released automatically.

NAME	FUNCTION	LED lamp
MUTING LEVEL 1 2 3	To designate the sensitivity of stopping operation, Muting operation is OFF. To designate the sensitivity of stopping operation. To designate the sensitivity of stopping operation.	When muting operation is OFF, three LED lamp is turned off. When you designate the sensitivity of stopping operation, only designated LED lamp is turned on.
1 MHz (UP DOWN) 0.1 MHz (UP DOWN)	To move a 1 MHz unit every interval. To move a 0.1 MHz unit every interval.	There is no LED lamp, but designated frequency display changes UP or DOWN.
MEMORY	To take memory.	LED lamp is lighted on slightly during about 3 seconds and is lighted brightly at the reading operation.
PRESET CH-1~CH-7	To memorize and to read out the received frequency.	LED lamp of the designated channel is lighted on at the memory and read out operation.
AUTO TUNNING UP, DOWN	To designate the UP or DOWN of the automatic tuning operation.	LED lamp of the designated direction is lighted on during the tuning operation.
STEREO ONLY STOP MONO	To designate the STEREO ONLY STOP switch. To designate the compulsive monoural switch. } *	LED lamp is lighted on at the designated stereo only stop operation. LED lamp is lighted on at MONO operation.

APPLICATION

■How to receive the broadcasts which frequency is not the number multiplied 0.1 MHz unit.

ST-910 is the synthesizer tuner and can receive the broadcasts at a 0.1 MHz interval. In many broadcasts, there are broadcasts which minimum figure of the frequency is 10 kHz interval as in European countries.

And in case of operating the wireless microphone, its frequency would not be stable as broadcasting waves.

ST-910 can receive that waves in accordance with following operation.

1. Put off Muting operation

You can listen that program by putting off Muting operation. Because Muting level is related with signal level indicator and it is not operated when ST-910 receives the broadcasts which frequency is not the number multiplied a 0.1 MHz unit. If you put off muting operation, ST-910 becomes the ordinary tuner with broad muting Band. You can receive the broadcast in the face of nearly equal frequency.

2. Use Manual tuning operation

In case of automatic tuning operation, its operation is operated at a 0.1 MHz interval. When the sensitivity of the signal level indicator is superior to that of automatic tuning operation, its operation is stopped. If not superior, not stopped. So you must try the tuning operation by manual.

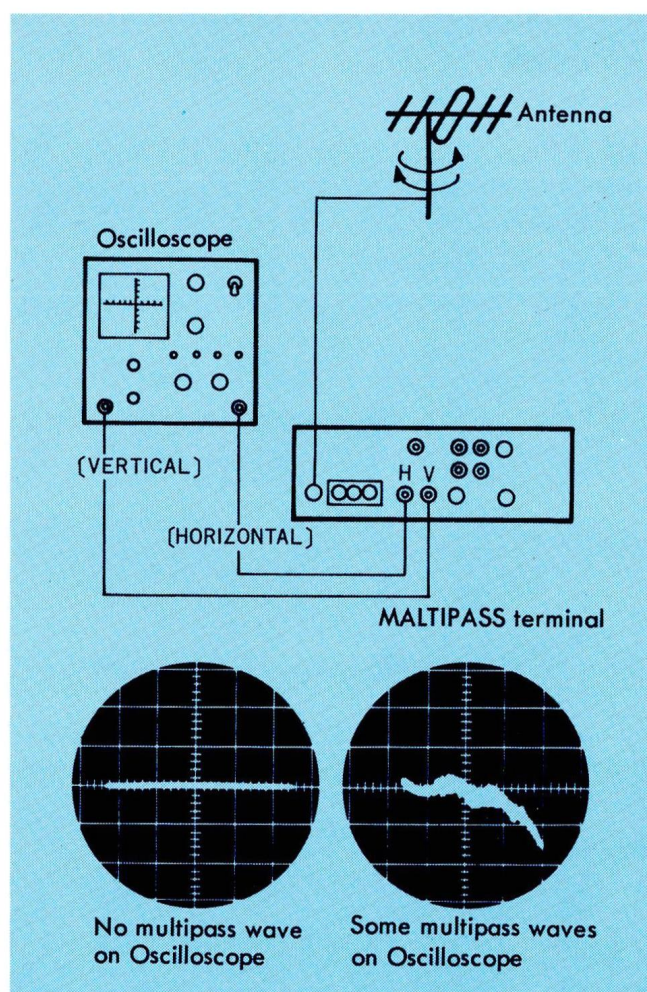
In case of Preset tuning operation, you must try its operation by manual at first and memorize the received frequency. When you want to try to read out operation, you must put off Muting operation as explained above.

MULTIPASS PHENOMENON

Multipass is the phenomenon that when receiving FM broadcasts, the antenna is received simultaneously the radio waves which received after traveling directly from a broadcasting station and reflected by obstacles of mountains and high buildings.

If Hi-Fi set receives the reflected waves, they interfere mutually and with direct wave. It may result in producing the combination wave. It brings about the distortion and the stereo separation decreases. This disturbance of Multipass often occurs in urban districts where many high buildings are constructed.

By using the MULTIPASS OUTPUT terminal on the rear panel of ST-910. You can adjust the direction of the antenna for which the numbers of the multipass waves are minimized by looking them on oscilloscope.



AN OUTLINE OF THE SYNTHESIZER TUNNER

About Synthesizer

Synthesizer originally means "mixer" and used the name of the mixer for electronic music and 4 channel sounds. In this manual, Synthesizer means the frequency synthesizer which can produce the many frequencies based on the accurate of the quartz crystal oscillator and so on. The features of this device are that the accuracy and stability of the produced frequency is nearly equal to the standard oscillator. And the many accurate and stable frequencies are produced by using a standard oscillator.

In case of applying the synthesizer to FM tuner, it can be achieved to exchange the local signal oscillator for the frequency synthesizer. If the frequency of the standard oscillator is selected broadcasts frequency interval (for example, 100 kHz) by using Synthesizer, the local oscillation signal is produced. As explained above, the tuner having high stability and high accuracy can be achieved easily. Synthesizer using PLL system is the one of the most fittest system for this tuner.

About PLL system

PLL (Phase locked loop) is, in general, the circuit technique which treats the filter operation, the multiplex operation and the rectification operation without the inductance as coil and so on. As explained in figure A, PLL system is the feedback system composed of the three fundamental function blocks of Phase comparator, Low pass filter, Voltage controlled oscillator (VCO).

Now in figure A, when there is no input signal $V_s(t)$, the error voltage $V_e(t)$ is equal to zero and VCO oscillate at the free running frequency as f_o . If the signal is put into this system, Phase comparator block produces the error voltage $V_e(t)$ by comparing the phase of the input signal with that of VCO output. That operation relates the difference of the phase or frequency of two signals. In case of the frequency difference, $V_e(t)$ is detected as alternative voltage and phase difference, directly. $V_e(t)$ is put into VCO as control input through Low pass filter. When the input frequency as f_s becomes nearly equal to f_o , the frequency of $V_e(t)$ decreases and output voltage through Low pass filter increases. Consequently it makes system to synchronize f_o of VCO output to the input signal. When system stays under synchronized condition of Phase locked condition, VCO frequency would be equal to the input frequency with a little phase difference.

The output of PLL system is different from the purpose. For example, Low pass filter output is used for FM rectification and VCO output, for the filter.

Formally PLL system was complicated and difficult to treat actually. Today in accordance with the improvement of the digital technique, we can take the stable and easy to treat PLL system.

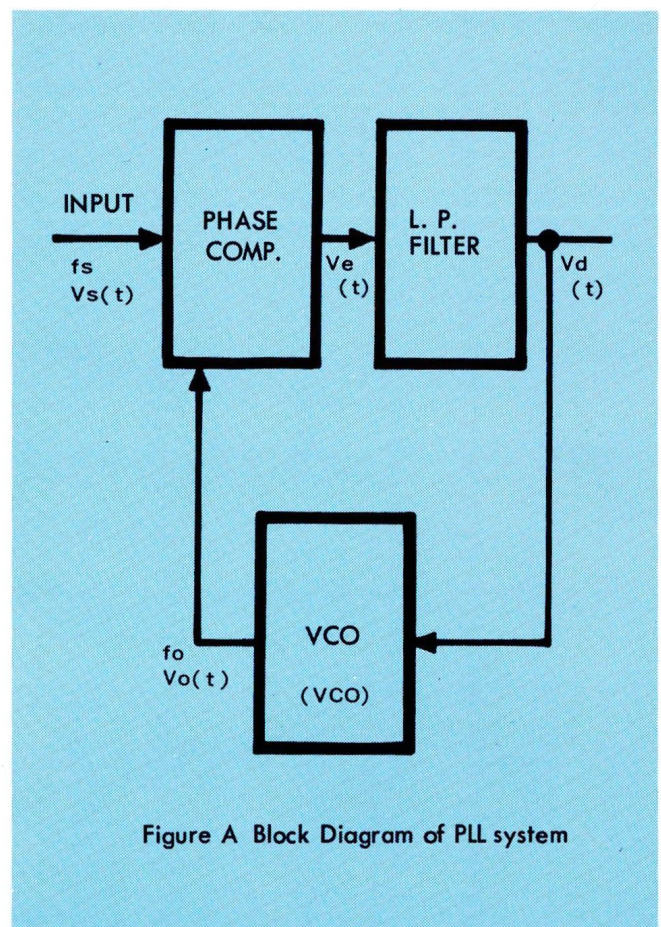


Figure A Block Diagram of PLL system

■About Synthesizer tuner

Synthesizer tuner with the programmed input as tuning input can be composed that VCO output in Figure B is employed as the local signal oscillator and the standard frequency f_{ref} is adopted as broadcasts frequency interval (100 kHz at ST-910).

The greatest feature of this tuner is that received frequency is very accurate without AFC and nearly equal to the accuracy of the quartz crystal oscillator as used the standard oscillator. In the face of using the ordinary quartz crystal, it is very excellent for the frequency difference to reaches under 0.005%. The more accurate the quartz crystal is, the less the frequency difference reaches. To this extent, the accuracy of broadcast frequency becomes important.

It is better for the distortion of received frequency to rise the accuracy of the tuning frequency. The tuning operation is to separate one broadcasting station from the other one and we evaluate that performance of the separation named Selectivity by number. At the high performance tuner (FM), Selectivity reaches beyond 80 dB at 400 kHz interval. If the side band which contains the sound signal is cut, it may results in the distortion of the tuner output.

Figure C shows the typical characteristic of the distortion ratio. As shown in Figure C, you can understand that the range of the low distortion of tuner output is limited to around the tuning frequency. The more the selectivity of the tuner increases, the more its range becomes narrow and it becomes difficult for the tuner to keep the tuning frequency for a long time.

ST-910 synthesizer tuner is able to operate perfectly. Synthesizer tuner can be made to solid state as follows; In Figure B, the block of VCO is the local signal oscillator circuit and variable capacitor diode is used in general for voltage control. By supplying the controlled voltage of VCO directly to the variable capacitor diode of Front End tuning circuit, the difficult problems about the frequency drift at automatic tuning operation is solved and mechanical tuning unit does not become necessarily.

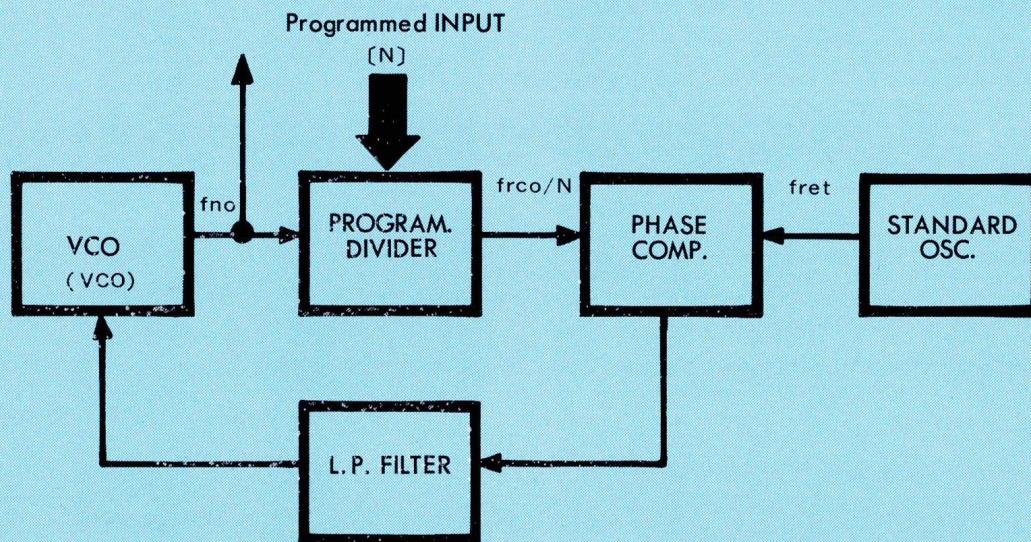


Figure B Block Diagram of Synthesizer using PLL system

■ About Synthesizer using PLL system

By using PLL system techniques as explained above, Synthesizer using PLL system is composed. Figure B shows its Block Diagram.

Figure B is different from figure A about two points as follows; One of that the function block of the programmable frequency divider is put into the loop and it is located between VCO and Phase comparator. The other is to make the input signal at Figure A to the standard oscillator as fret.

The programmable frequency divider is the device which can draw up the program of work and can change easily the divided ratio by putting the external signal. In figure B, VCO output is divided by N using programmable frequency divider and the frequency equal to f_{ref}/N is given. It compared with f_{ref} as the frequency of the standard frequency oscillator by using Phase comparator. When the phase difference is minimized, the loop is locked and f_{rco} is equal to the f_{ref} multiplied N correctly. In other word, the frequency divider put into the loop is operated the multiplex operation equivalent to multiplier. When the quartz crystal oscillator is used as the standard oscillator, VCO output has the excellent stability and can be given easily many VCO outputs in accordance with the divided ratio N of the programmable frequency divider.

And the tuning frequency can be given by digital code (Binary coded decimal . . . BCD at ordinary case) and the received frequency can be shown by digital number on the display device easily. It is reliable display having no difference between the received and displayed frequency. As shown in Figure D, the automatic tuning operation can be achieved by connecting the output of the counter to the input of programmable divider. The counter operation is stopped when the tuning frequency is received.

To memorize the digital code of the programmed input to digital memory device and to read out the memorized the digital code if necessary, so called preset operation can be achieved. It differs from the former preset device using variable resistance at the electronic tuner and so on. It has high performance to be able to neglect the frequency difference completely.

That is the real synthesizer tuner, which can meets three demands.

1. High accurate tuning operation.
2. Display the frequency at digital number.
3. Preset using digital memory device.

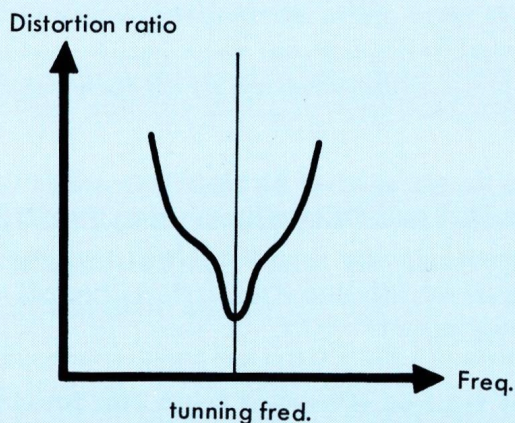


Figure C Distortion characteristic of FM tuner

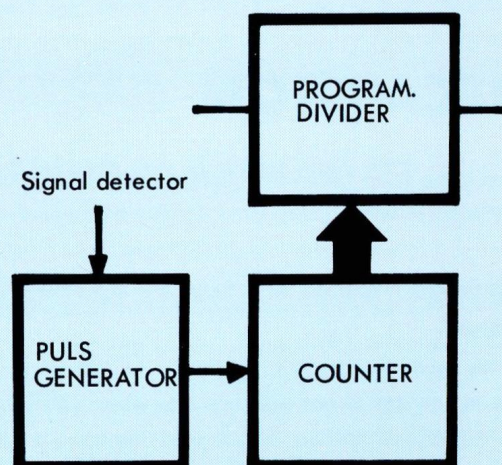


Figure D Automatic tuning of PLL system

■About ST-910

ST-910 can meet the demands of the real synthesizer tuner and introduces the electronic controlled device as possible. ST-910 has every touch switch except Power Supply switch as operating by touching the switch. They are made of transparent electrode of new trial. Its electrode has high impedance about 20 MΩ and connected to the input of detector device of CMOS IC.

It is employed hum detected type at ordinary condition. Its operation is that the small difference of the voltage of the alternative current between you and the electrode when you touch only the switch is detected and many functions are operated. When touching the electrode having contact with another parts of the set except the electrode, the voltage of the electrode is detected directly. Switching operation of the single type or the cooperated type is operated electronically using the Logic circuit, so the degradation by the mechanical abrasion and so on can not exist.

Preset operation has the functions that to write and to read out can be achieved purely electronically using 64 bit × 2 shiftregister of CMOS. Its operation is very easy to operate in comparison with mechanical memories by the cards and tapes made of paper. Beside, it provide the memory device refreshed constantly having regard to be moved the received frequency by repeating to put on and off the power supply switch.

PRECAUTION

You should be tried following handlings after you put on the power supply switch at first.

1. Strange figures are turned up the Display panel.

Don't be anxious about it. Because the memory function device in the set is not operate set when you put on the power supply switch. So the strange figures are turned up the Display panel. Try the following handlings.

- a. Decide the broadcasting station you want to listen to.
- b. Touch the AUTO TUNNING switch (DOWN START or UP START), and the green indicator lamp is turned off.
The tuning operation is settled.
- c. Touch the MEMORY switch and the red indicator lamp is turned on.

The counter for automatic tuning is employed UP/DOWN type and operated to start for arbitrary direction UP or DOWN.

At the end of the received band, the counter operation is reversed by using digital comparator automatically and return motion can be operated. Stop operation by broadcast frequency can be achieved by using the blocks of the mono stable multivibrator circuit and RS flip-flop circuit.

The linear circuit of the set, of course, is designed for high performance and composed with two RF circuit by FET cascade amplifier, 6 channel varicap diode for Front End and IC concentrated filter, OP amp IC, broad band ratio detector for intermediate frequency amplifier circuit and PLL system for multiplex circuit.

- d. Touch the one switch of the SENSOR CHANNEL CH-1 ~ CH-7, while the red indicator lamp of the MEMORY switch is lighted on. So the red indicator lamp is turned off and the green indicator lamp of the SENSOR CHANNEL switch is turned on.

2. The figures different from the Band frequency numbers are turned up.

Don't be anxious about it. Try the same handlings as 1-a, b.

The memory function of the ST-910 can be held during one day without power source. There are no troubles happened by connecting Plug to Power outlet. When there is no Power source as the stoppage of electric current beyond one day, the situation as explained above may be occurred.

CAUTION AND REQUEST

●About management of power supply plug

Be sure to insert the power plug to power outlet for AC100/120/220/240V. If you touch its bare part with your hand, or hairpin without inserting it firmly, it causes shock hazard.

When disconnecting the power cord from the power outlet, put out it by the plug. Don't pull it directly. It may cause broken wires or short circuit.

●About spare AC Receptacle

Don't connect the electric device exceeding rated power to the spare outlet, because it may result in overheating and fire.

●About protection of AC line

ST-910 has the circuit breaker for protection of AC line.

When putting the power supply switch and tuner is not operated and moreover LED lamp is not lighted on. You should put off the power supply switch at first and push AC LINE PROTECTOR RESET BUTTON on the rear panel. If the set cannot be repaired, contact your service station that you purchased this set.

●About stoppage of electric current

Put off the power supply switch at the stoppage of electric current. If the set is overheated or fived, disconnect the power supply cord from the power outlet as soon as possible and contact your nearest TOSHIBA Representative or Agent which this set was purchased.

■Don't use possible at the following place. When use at such place, carefully use.

- Using the set a long time in such a place as kitchen where is filled with oily smoke and steam may cause the failure of operation on account of adhesion of oily dust.
- Don't use the set in the place of high humidity such as bath room. It may cause the ill insulation, shock hazard and failure of operation.
- If the set is used a long time in such sulfuric place as hot spring, it may cause the failure of operation by sulfurating the contact of switch and jack.

- Using the set in sandy place such as the sands or desert may cause the abrasion of the rotating components on the troublesome operation. Take enough care.

- When you use the set in a winter mountain or a skiing ground, the set may be unoperatable in the beginning. Use it after some idle running. If the set is moved from cold place to the warm room, it may not work properly due to the dew-drops staged in the set. In this case, wait till the dew-drops disappear, or warm gradually so that dew-drops may not stay in the set.

- Don't use the set in the place of high temperature such as under sunshine and near place by a heater.

- When the set is wetted and operated under this condition, it may cause shock hazard. If the set is wetted heavily, contact near your service station.

■In case of carrying the set

- On carrying the set, take care not to let it fall by mistake. Be care to carry it between the two.
- When the set is shaken for a long time in the heavily vibrated car, its fine mechanism will probably go wrong. Handle it so as to give less vibration as possible.
- When you move the set, don't draw it. It may cause the damage to a mat, carpet or floor, or break the leg of the set. Move the set by lifting its body.

■Caution on the using set

- Don't open the cabinet and touch the inner components to avoid a accidental shock hazard or burn.
- If children insert knitting stick or hairpin into the jack or ventilation hole, it may cause shock hazard. Take care to locate the set at the place beyond their reach.
- If the set is splashed with insecticide or hair spray, it may damage the cabinet. Take enough care.
- Take care not to place the set on the painted table or shelf for a long time, since it sometimes leave the mark of rubber cap of the leg on the table or shelf according to the kind of paints.

FEATURES

■PLL frequency synthesizer system using the quartz crystal oscillator

The local frequency of FM tuner is set to the multiplied frequency of the quartz crystal oscillator compulsively. By using PLL system, the received and broadcast frequency are met correctly.

■Frequency Display using 7 segment LED lamp

The received frequency is indicated by number using the divided ratio of programmable frequency divider of Synthesizer.

■High performance Front End using 6 Channel varicap diode

ST-910 is used the cascade connection of FET for RF circuit and FET for the local frequency oscillator circuit. It contributes Sensitivity, Image rejection ratio, Spurious rejection ratio, IF rejection ratio, etc of the high performance.

■High performance intermediate frequency amplifier circuit using the concentrated LC filter

The concentrated LC filter having flat group selected delay characteristics is employed for IF circuit. It contributes Capture ratio, IHF, Distortion characteristics.

■PLL system for MPX circuit

By using PLL system IC for MPX circuit, there are no influences of the temperature and time. The reliability and stability have been greatly improved. In case of recording with tape recorder, there is no beat disturbance.

■Selecting system by MANUAL, AUTO, PRESET

ST-910 has three selecting system, MANUAL, AUTO, PRESET by using synthesizer system. In particular, Preset tuning operation is provided with 7 channel. Its operation can be achieved by IC memory of CMOS and held under the stoppage of electric current during 2 days.

■Electronic touch switch and LED lamp indicator

Switching operation except Power Supply switch is employed electronic touch switches. Consequently there are no mechanical failures as shown in former switch operation. Display of the switching operation is employed LED lamps, so the reliability has been greatly improved.

SPECIFICATION

■Circuit system

PLL frequency synthesizer system using the quartz crystal oscillator.
High performance Front-End using 6-channel varicap diode.
Stereo demodulation circuit using the PLL ICs.

■Semiconductors

Transistor:	32
FET:	9
Diode:	100
IC:	linear 11
	digital 85
LED:	24

■Tuner section

Frequency range:	87.5~107.9 MHz
Usable sensitivity(IHF):	1.8 μ V
Distortion factor:	MONO 0.15% (400Hz, 100%) STEREO 0.2% (400Hz, 100%)
S/N ratio:	75 dB

Frequency response:	20Hz~15kHz, ± 0.5 dB
Selectivity(IHF):	85 dB
Image rejection ratio:	100 dB
IF rejection ratio:	100 dB
Capture ratio:	1.5 dB
Spurious ratio:	100 dB
AM suppression ratio:	65 dB
FM stereo separation:	40 dB (100Hz~8 kHz)
Rated power output:	FIXED 650 mV (400Hz, 100%) VARIABLE 0~2.0V(400Hz, 100%)
Output impedance:	1 k Ω (at the maximum power input)

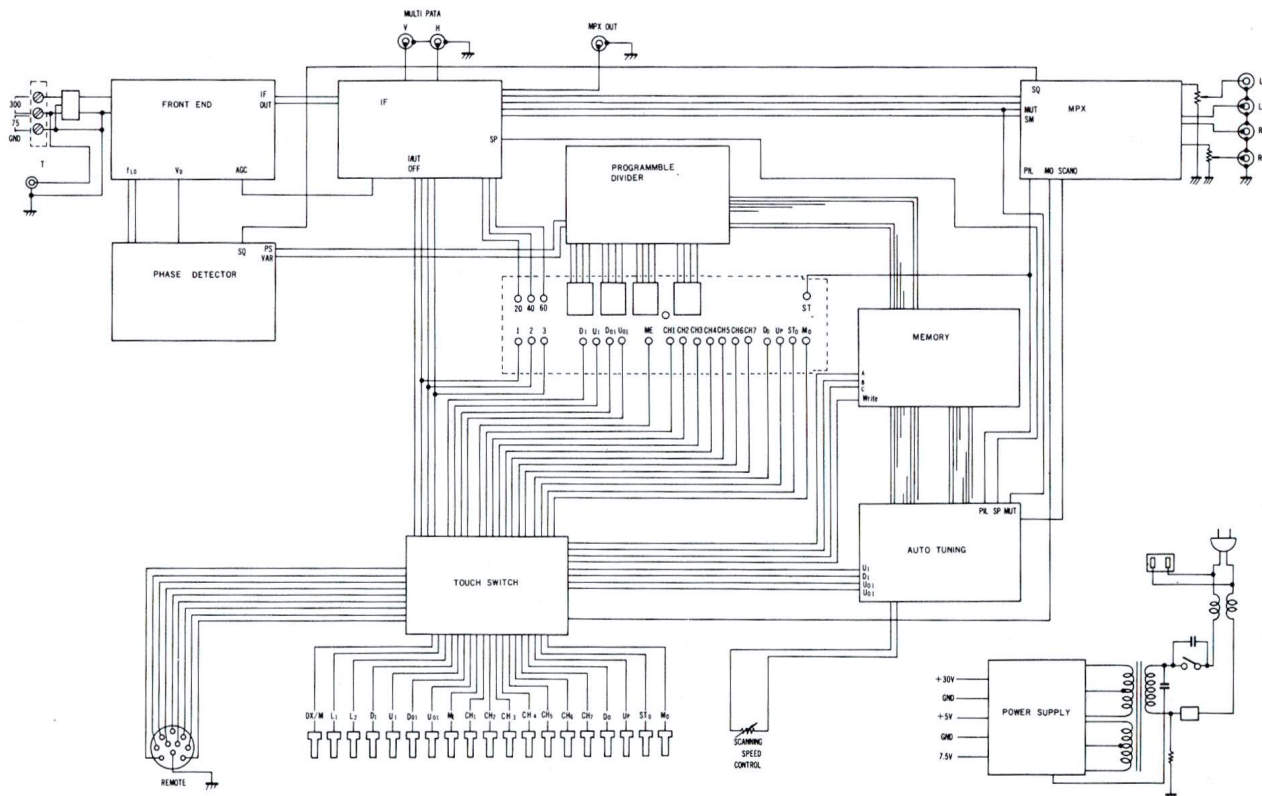
■Power source and others

Power source:	AC 100/120/220/240V, 50/60Hz
Power consumption:	30 W
Dimensions:	450W $\times$ 135H $\times$ 340D
Weight:	8 kg

■Accessory

FM feeder antenna, FM coaxial connector, connecting codes, silicon clothe, felt pad, Owner's manual.

WIRING DIAGRAM





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