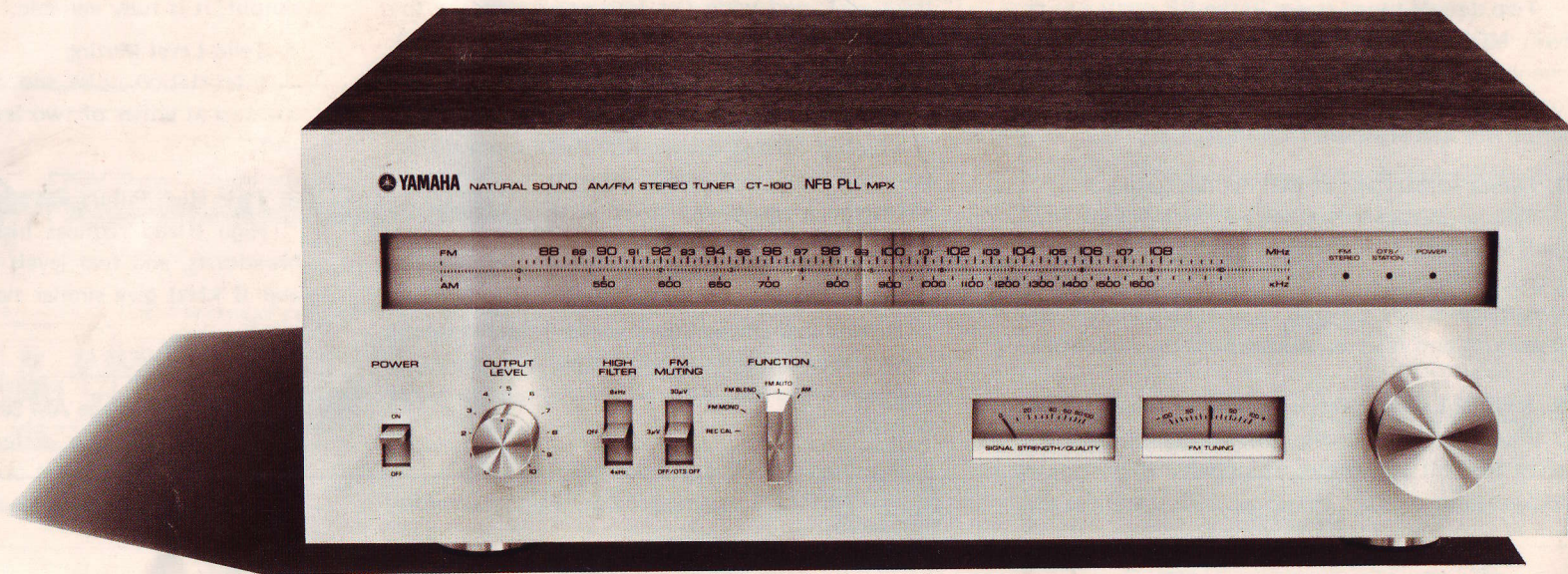


# YAMAHA

# CT-1010

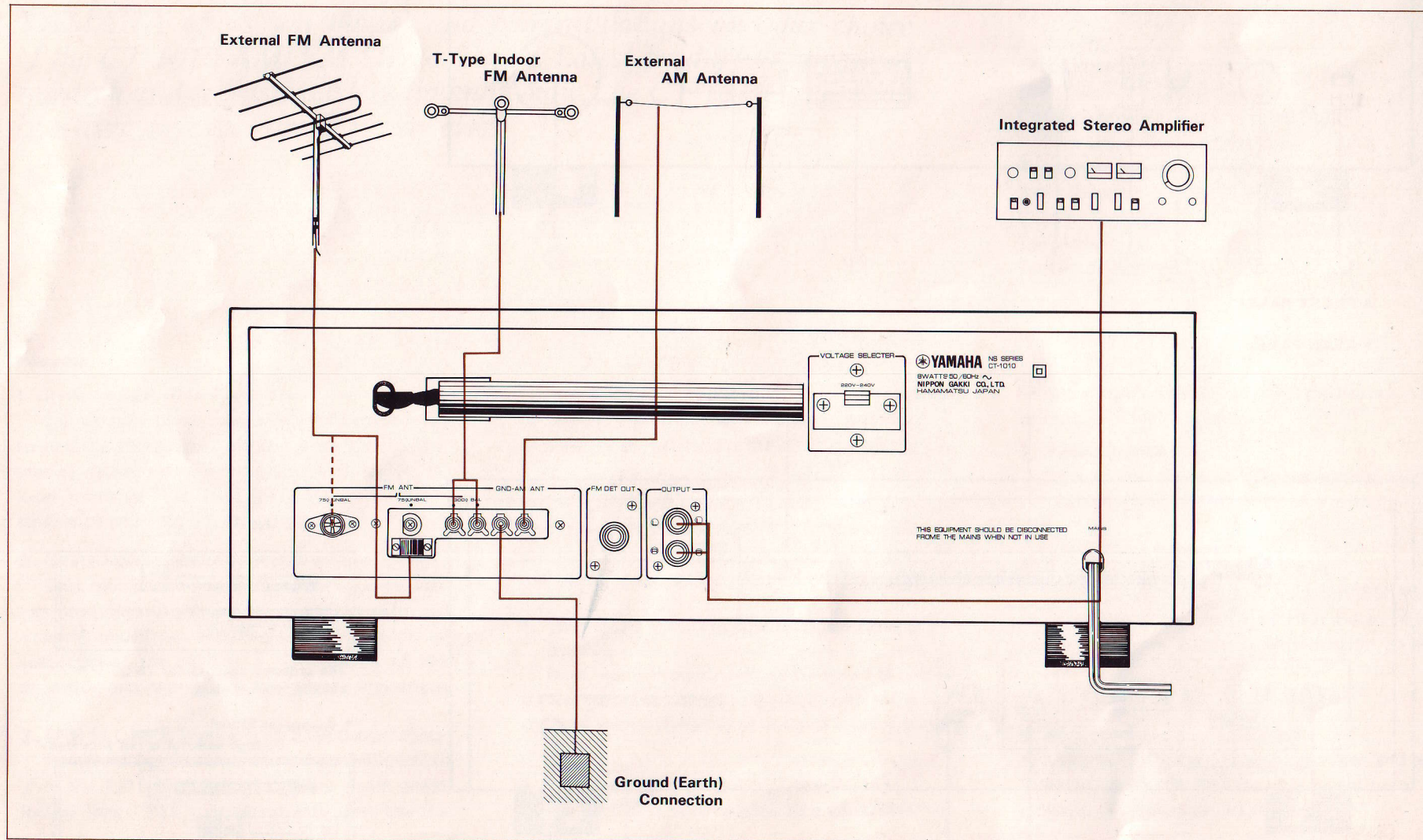
AM/FM Stereo Tuner

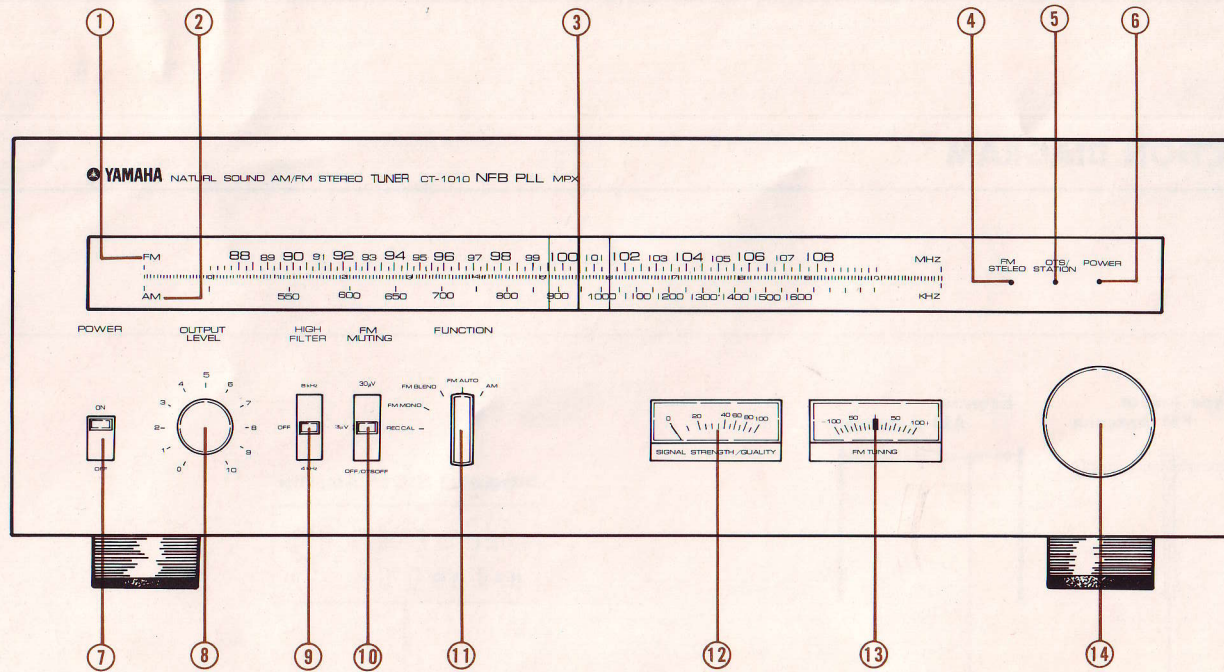
## *Owner's Manual*



# CT-1010

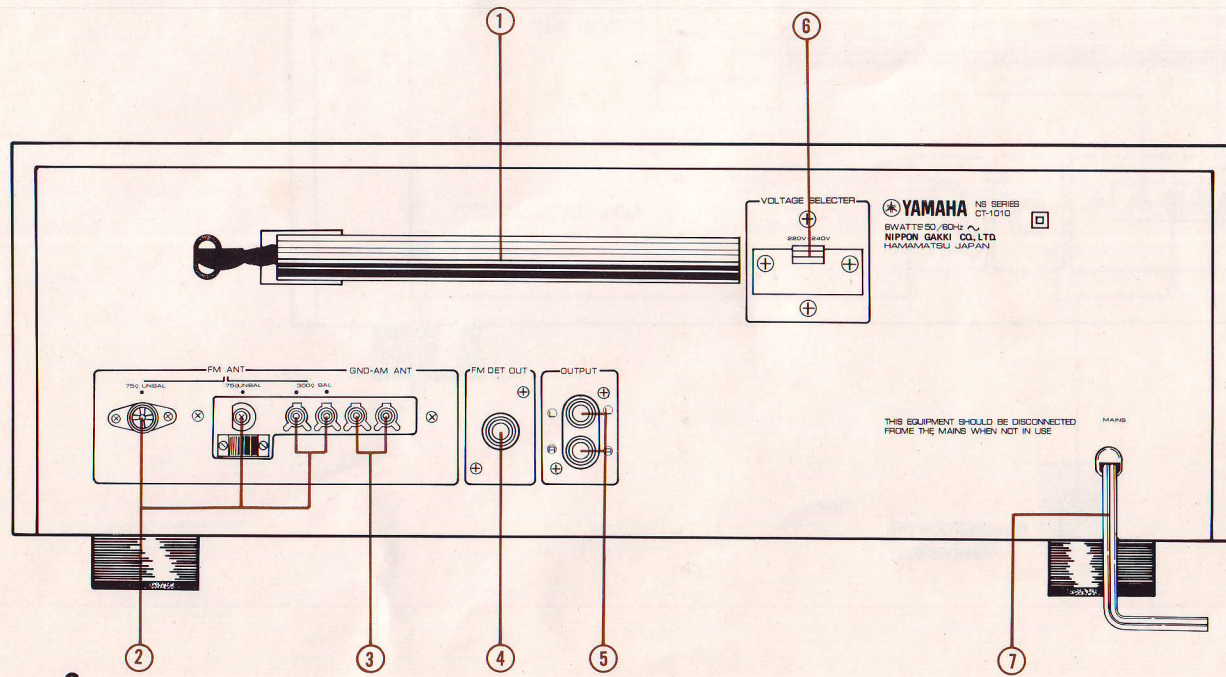
## CONNECTION DIAGRAM



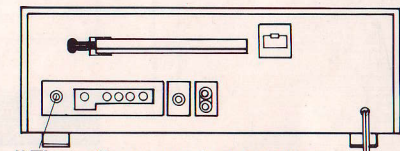


▲ FRONT PANEL

▼ REAR PANEL



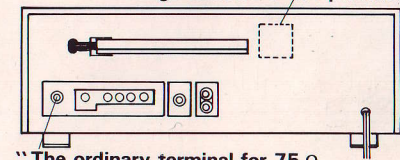
▼ General Model



"The ordinary terminal for 75 Ω coaxial cable is used."

▼ Australian Model

"Voltage selector is not provided."



"The ordinary terminal for 75 Ω coaxial cable is used."

# CT-1010

## CONTENTS AND FEATURES

*YAMAHA offers you thanks and congratulations on your choice of the CT-1010 AM/FM Stereo Tuner. Latest product of advanced research and sophisticated audio know-how, the CT-1010 is currently setting new standards for its class.*

Caution — Read this Before Operating Your	
CT-1010 .....	5
Front Panel and Controls .....	6
Rear Panel and Connections .....	7
Connecting and Operating the CT-1010	
with Other Components .....	8
Performance Graphs .....	12
Block Diagram .....	13
Circuit Diagram .....	14
Specifications .....	15
Trouble Shooting .....	16

### Features

#### 1. Stable and Sensitive Front End

Two double-tuned stages in the RF section with twin MOS FETs and five-gang wide air-gap frequency linear variable capacitor, and special IC local oscillator for low drift, ensure excellent sensitivity and freedom from drift.

#### 2. Direct Assessment of Differential Gain

This sophisticated technique, with the six low-loss, low-spurious content ceramic filters used, and a special impedance-matching phase compensation circuit, gives the CT-1010 a combination of low distortion and high selectivity hitherto impossible.

#### 3. NFB PLL MPX Section with Pilot Cancellation

Pioneered by Yamaha, this unique MPX circuit gives the full advantages of stability (from phase-locked loop - PLL - circuitry) with ultra low dis-

tortion (from full application of NFB - negative feedback), and wide flat frequency response (by completely cancelling out the 19 kHz pilot signal).

#### 4. Optimum Tuning System (OTS)

The OTS system will take over from you the fine-tuning needed to maintain minimum distortion and maximum stereo separation, so that all FM stereo programs are heard at their best.

#### 5. Twin-Meter FM Tuning with Signal Quality Reading

Both signal strength and center-zero FM tuning meters are provided on the CT-1010, with the signal strength meter doubling as a signal quality meter on FM.

#### 6. Standard 333 Hz Signal for Level Setting

The REC CAL setting provides a signal ideal for

recording-level calibration. Like the normal tuner output, it is fully variable.

#### 7. Twin-Level Muting

Inter-station noise and distant stations can be silenced at either of two levels of sensitivity (3/30  $\mu$ V).

#### 8. Twin High Filters and High Blend

High Blend reduces hiss noise on FM stereo broadcasts, and two levels of High Filter (4 kHz and 8 kHz) give similar noise reduction on AM.

#### 9. High Performance AM Section

Untuned RF stage, differential mixer, and peak detector assure the best possible reception of the crowded AM (medium wave) band.

# CT-1010

## CAUTION-READ THIS BEFORE OPERATING YOUR CT-1010

1

The CT-1010 is a high performance AM/FM stereo tuner with excellent selectivity, sensitivity, and several special features. This manual is required reading if you are to get the best from it.

2

Do not drop or otherwise jar the CT-1010, which is a precision instrument.

3

Do not place the CT-1010 where it will be exposed to direct sunlight, excessive heat (for instance over a radiator or on top of an amplifier which generates a fair amount of heat), moisture, or dust.

4

Do not use chemical solvents (such as benzene or alcohol) to remove traces of dirt. Wipe only with a soft, slightly damp cloth.

5

Do not attempt to carry out internal adjustments or repairs. Leave this to your local service representative.

6

Do not assume your CT-1010 is faulty before checking the 'Trouble Shooting' list on page 16 for common operating errors.

7

Keep this manual in a safe place for future reference, and refer to it frequently until you are perfectly familiar with all CT-1010 controls and functions.

8

Operate all switches and knobs in accordance with the instructions. Avoid applying undue force, which should never be necessary, and do not attempt to use intermediate settings.

9

Check that the voltage selector on the rear panel has been set to your local voltage *before* you plug in the AC supply.

If not properly set, unscrew the two switch-guard retaining screws, and reset the switch to indicate your supply voltage (110–130 V, or 220–240 V).

Be sure to replace the switch guard and its two retaining screws after making the adjustment, inverting it so that the new voltage setting shows.

# CT-1010

## FRONT PANEL AND CONTROLS

### 1 FM Tuning Scale

This frequency linear scale is calibrated in MHz.

### 2 AM Tuning Scale

This scale, calibrated in kHz, is used when tuning in medium waveband stations.

### 3 Tuning Indicator

The slide-rule type pointer accurately indicates the frequency of the station to be tuned in.

### 4 FM STEREO Indicator

This light-emitting diode (LED) illuminates when FM stereo broadcasts are being received. It will go out, however, if the FUNCTION selector is turned to the FM MONO position.

### 5 OTS / STATION Indicator

This LED illuminates fully when the optimum tuning system is in operation, and glows faintly while tuning in a station.

### 6 POWER Indicator

This LED illuminates when the POWER switch is ON and the main supply connected.

### 7 POWER Switch

Switch ON to connect the main electrical supply.

### 8 OUTPUT LEVEL Control

Use this to set the output level so that the volume setting of your amplifier does not need to be changed when switching from TUNER to PHONO or TAPE sources. The center position gives a calibrated output which is detailed in the specifications.

### 9 HIGH FILTER Switch

This switch offers a choice of 4 kHz and 8 kHz filters which are particularly effective in cutting out the high-pitched whistles which can mar AM reception (but with some loss of high frequency response).

### 10 FM MUTING Switch

The 30  $\mu$ V setting cuts out all stations except those capable of acceptable stereo reception. The

3  $\mu$ V setting includes stations only suitable for mono reception. The OFF/OTS OFF position enables even the weakest stations to be heard, without OTS.

### 11 FUNCTION Switch

This selects whether FM or AM broadcasts are to be received, and if FM, whether in STEREO, MONO, or with HIGH BLEND. It also offers a REC CAL position for tape recorder calibration.

### 12 SIGNAL STRENGTH / QUALITY Meter

This indicates the strength of the signal for AM and FM, and indicates the presence of FM interference waveforms by wavering.

### 13 FM TUNING Meter

The indicator points to dead center when an FM station is perfectly in tune.

### 14 Tuning Knob

This gives smooth, precise, and positive tuning.

# CT-1010

## REAR PANEL AND CONNECTIONS

### ① AM Bar Antenna

This rod is a special indoor antenna for AM reception. It should be folded out, away from the chassis of the CT-1010, to get the best results. In most situations this bar antenna will give satisfactory reception, but in locations remote from the broadcasting station, or where the terrain (hills or mountains) or the environment (steel-frame buildings, etc.) are unfavorable, an external antenna may give noticeably better results.

### ② FM ANT Connections

75  $\Omega$  coaxial cable may be attached either to the special bracket and terminal or, if a coaxial plug is fitted to the cable, to the coaxial jack provided. This cable, with its central core shielded by an outer braided sheath, reduces losses in signal strength between the antenna and the CT-1010, and also reduces the amount of interference picked up.

If ordinary twin-type feeder wire, like that used in the indoor T-type antenna provided with the CT-1010, is used, it should be connected to the two terminals marked 300  $\Omega$  BAL. Note that an external FM antenna will always give better results than an indoor antenna.

### ③ GND-AM ANT Terminals

Wherever adequate AM reception cannot be achieved with the bar antenna provided, and particularly if remote or low strength stations are required, an external antenna should be connected. Sensitivity will be further increased and interference reduced if a ground or 'earth' connection is made at the same time.

### ④ FM DET OUT Jack

This is provided for connection to a four-channel adaptor, as soon as regular discrete 4-ch broadcasts begin.

### ⑤ OUTPUT Terminals

The output terminals of the CT-1010 provide a fully variable signal, suitable for all types of integrated amplifier or tape recorder. The level is set by the OUTPUT LEVEL control on the front panel, which gives a calibrated output at the center click-stop position.

### ⑥ Voltage Selector

Ensure that the Voltage Selector is adjusted exactly in accordance with the instructions in the CAUTIONS on page 5. A higher setting than your AC supply voltage will give seriously impaired performance, and a lower setting will severely damage the CT-1010. If in doubt, check with your local Yamaha dealer.

### ⑦ AC Cord

# CT-1010

## CONNECTING AND OPERATING THE CT-1010 WITH OTHER COMPONENTS

### CONNECTIONS TO A STEREO AMPLIFIER

Use the pin-plug cables provided with the CT-1010 to connect the OUTPUT terminals on the rear panel to the TUNER or AUX input terminals of your preamplifier or pre-main amplifier. Make sure that you connect the LEFT (upper) output terminal of the CT-1010 to the left-channel input terminal, and the RIGHT to the right-channel.

Adjust the OUTPUT LEVEL control so that there is no significant change in volume when

switching from TUNER to other sources (PHONO or TAPE) with your amplifier.

You can record directly from the CT-1010 with a tape recorder: use pin-plug cables to connect the OUTPUT terminals to the tape recorder LINE IN terminals. Check that the LEFT (upper) output terminal is connected to the left-channel input terminal, and the RIGHT to the right-channel. See also the instructions for using the REC CAL setting of the FUNCTION switch, which can be particularly useful when recording direct from the CT-1010

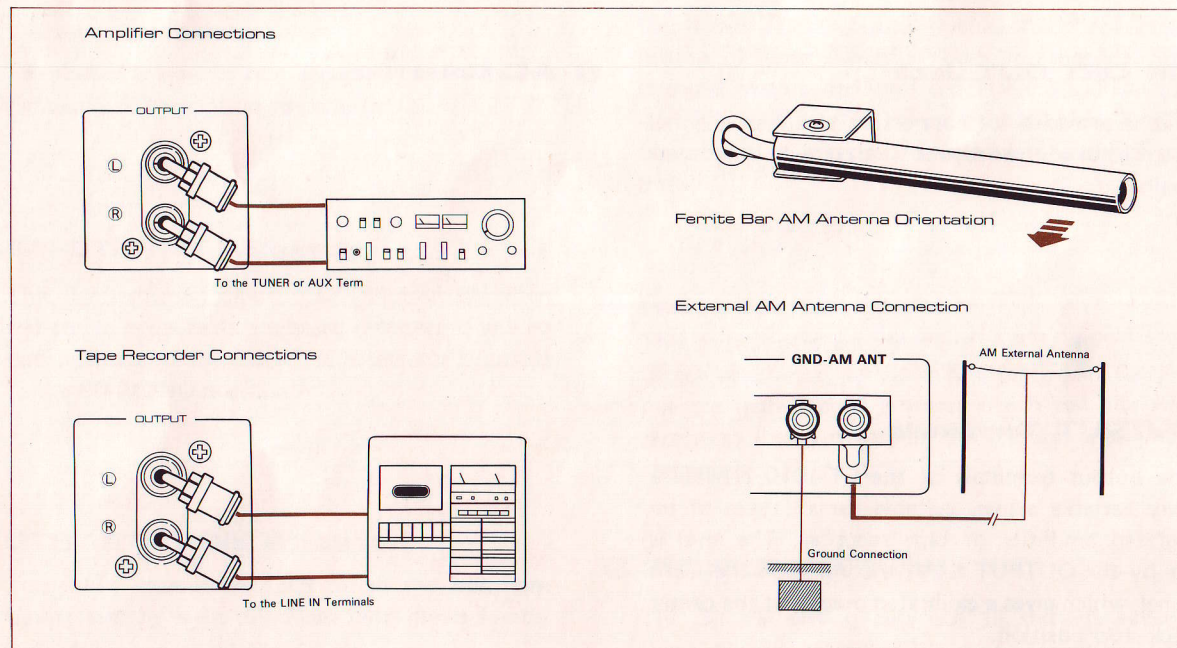
### AM RECEPTION

- 1 Set the FUNCTION switch on the front panel to AM.
- 2 Turn the tuning knob until the tuning indicator is at the station's frequency.
- 3 Adjust the tuning knob to give the maximum reading on the SIGNAL meter.
- 4 Note that the TUNING meter does not work for AM.

### ADJUSTING THE AM BAR ANTENNA

The high efficiency ferrite bar antenna provided with the CT-1010 is all that is required for satisfactory reception except in low signal strength areas, so that usually no external AM antenna will be needed. The bar antenna is hinged so that it can swing out: try swinging it while watching the SIGNAL strength meter. Set it at the angle which gives the maximum reading for the weakest station you will normally be listening to.

In a metal-frame building, or in locations remote from the station or where reception conditions are unfavorable, an external AM antenna should be connected to the AM ANT terminal. Even better results will be obtained if at the same time a good ground (earth) connection is made. A good ground connection can sometimes be made to a water pipe. However, under NO circumstances should you attempt to make a ground connection to a gas pipe. Your dealer will advise you.



## CONNECTING AN FM ANTENNA

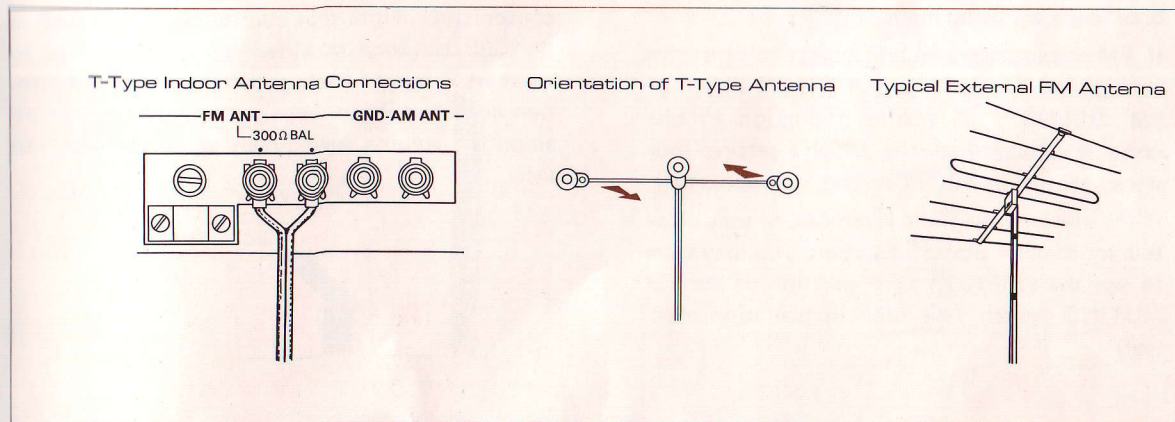
First, connect the T-type internal (indoor) antenna provided with the CT-1010 to the 300  $\Omega$  BAL Terminals on the rear panel. The two arms of the 'T' should be tacked at full stretch to the ceiling or walls of your room. Try them in different positions, and choose that which gives the best reception for the weakest station to which you will normally be listening. If you cannot obtain satisfactory reception even varying the angle of the horizontal T through a full 180°, this is an indication that you need an external FM antenna.

The T-type antenna is adequate only in high signal strength areas under favorable conditions. In all other cases, an external multi-element FM antenna is needed. To ensure the very best results, a motor driven antenna assembly with remote control of orientation is best, but the CT-1010 has

sufficient sensitivity to operate extremely well with a fixed antenna.

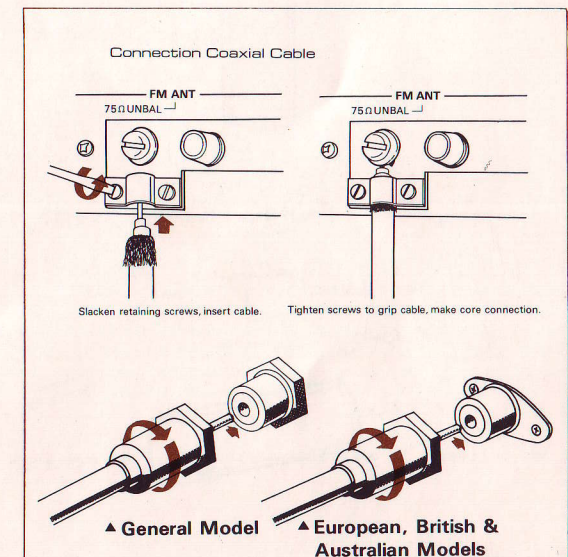
External antennas are available for use with the 300  $\Omega$  and 75  $\Omega$  terminals: the latter will use the shielded coaxial cable which reduces losses and interference. Antennas intended for 300  $\Omega$  balanced feeder wire can also be used with 75  $\Omega$  coaxial cable, but a matching transformer is necessary at the antenna. Coaxial cable should be used where the antenna must be located some way from the CT-1010, or where interference from automobile ignition, etc., is troublesome.

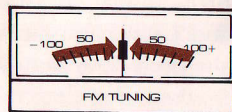
The external antenna should be located as close as convenient to the CT-1010, and as high as possible. It should be oriented to give the highest SIGNAL meter reading possible for the weakest station you will normally be listening to. If this direction is not too critical, you can orient the antenna for minimum interference from automobile ignition, etc.



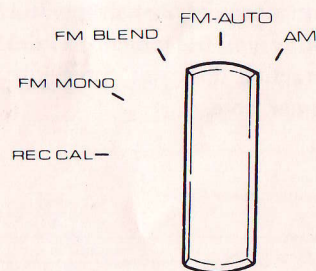
## CONNECTING COAXIAL CABLE

- 1 Strip insulation from outside braided sheath, and bend back outside the insulation. Expose the projecting central core wire as shown.
- 2 Slacken the two retaining screws, insert the coaxial cable, and re-tighten the screws so that the clip grips the exposed braided sheath.
- 3 Connect the central core wire to the 75  $\Omega$  terminal.
- 4 Your CT-1010 is provided with a coaxial jack; use this with a coaxial plug on the 75  $\Omega$  coaxial cable. Whether you use plug or terminal, ensure that the braiding does not come into contact with the inner core.

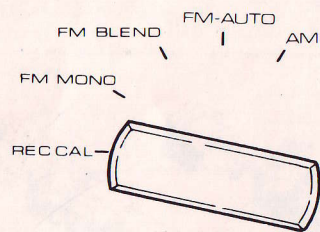




### FUNCTION



### FUNCTION



## FM BROADCAST RECEPTION

- 1 Set the FUNCTION switch on the front panel to FM AUTO.
- 2 Turn the tuning knob until the tuning indicator is at the frequency of the station wanted. The OTS/STATION indicator will illuminate faintly to indicate the presence of the station.
- 3 Adjust the tuning knob for maximum deflection of the SIGNAL STRENGTH/QUALITY meter, and ensure that the TUNING meter indicates dead center. The station will be perfectly in tune.
- 4 Release the tuning knob, and the OTS/STATION indicator will go to full brightness as the OTS circuit goes into action.
- 5 The FM STEREO indicator will illuminate if the broadcast is in stereo, unless the FUNCTION indicator will go to full brightness as the The LED will automatically go out when mono broadcasts are being made.
- 6 If FM stereo programs are subject to obtrusive background hiss, set the FUNCTION switch to FM BLEND. A further reduction in hiss noise is achieved at the MONO setting (but stereo reception will, of course, be impossible).
- 7 If the station you want is remote, or very close to a much more powerful station, you may have to use the OFF/OTS OFF position of the FM MUTING switch (see fuller explanation overleaf).

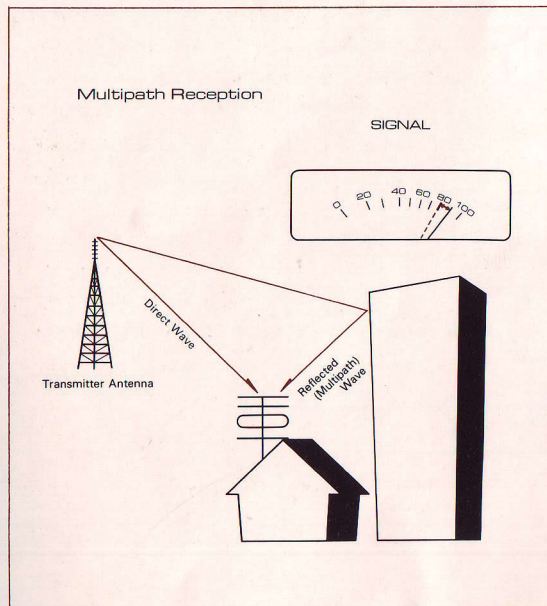
## REC CAL POSITION

In this position, instead of broadcast reception, the CT-1010 output will consist of a 333 Hz signal, the level of which corresponds to 50% modulation of the FM signal. When using a tape deck to record from the CT-1010, whether via an amplifier or by direct connection with the CT-1010, set the OUTPUT LEVEL control and the tape recorder input level controls to give a reading of  $-6$  VU on the tape deck level meters. This can be increased slightly, depending on the tape deck and the brand and type of tape being used, but should not normally exceed  $-2$  VU. The best signal-to-noise level in your recordings will be obtained when the setting is as high as possible without producing unacceptable distortion during very loud passages.

Once you have determined the ideal setting for your combination of deck and tape, the REC CAL position enables you to find it again quickly and conveniently. Note that continuous signals such as the 333 Hz tone provided can cause damage to speakers if played back at high levels, not to mention considerable annoyance to neighbors, so turn amplifier volume well down while carrying out tests.

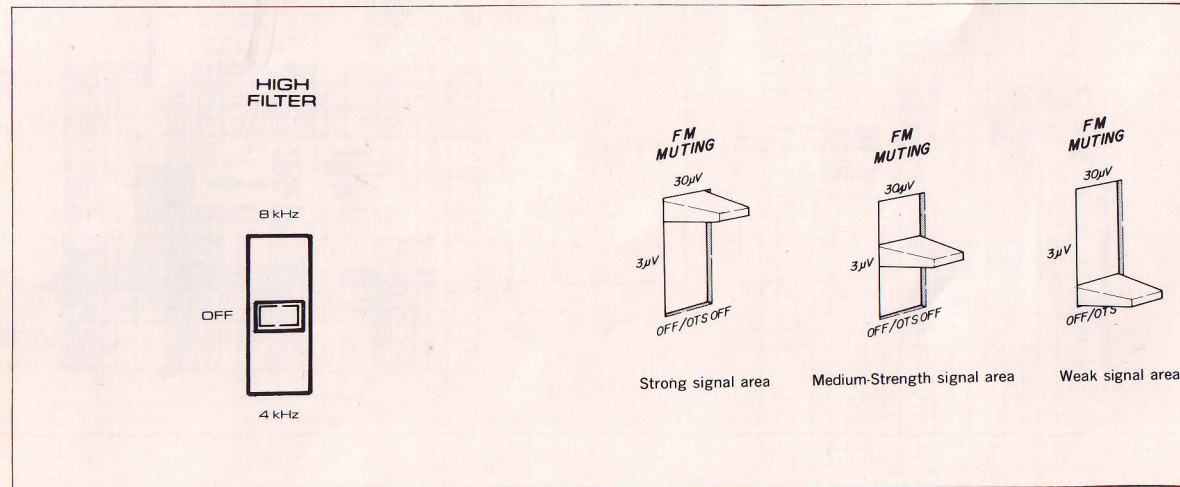
## SIGNAL STRENGTH/QUALITY

The signal strength meter also doubles as a signal quality meter on FM, indicating the presence of interference, particularly 'multipath' waves, by a regular fluctuation in the reading. Multipath waves, reflected from nearby hills or buildings, can seriously degrade FM reception. If you notice a fluctuating reading, alter the orientation of your antenna to give a steady meter reading. You will generally enjoy better tonal quality even if this level is a little lower than the maximum when indication is fluctuating.



## HIGH FILTER

A choice of two high frequency filters is offered: 4 kHz and 8 kHz. They are more useful on AM stations, where the high frequency response can be sacrificed to cut out 'whistles' and other high frequency interference without great deterioration in sound quality. (This is because AM programs have inherently lower limits to their high frequency response.) Keep the 4 kHz filter for really severe interference on AM, and the 8 kHz filter for AM stations or FM programs where you cannot get satisfactory noise reduction with the FM BLEND or MONO positions of the FUNCTION switch.



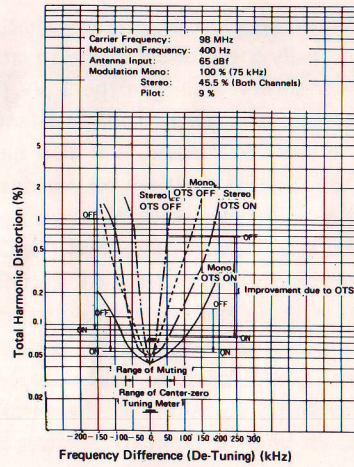
## FM MUTING

In the 30 µV position, all stations that are too weak to give really good stereo reception are muted with the inter-station noise. In the 3 µV position some weaker stations, capable of satisfactory reception in the MONO mode, will also be heard. In the OFF/OTS OFF position, no stations will be muted, not even the weakest. However, you will also hear the inter-station noise, and the OTS circuits will not be operative. Use the OTS OFF position if you wish to tune in a weak station very near a more powerful station on the dial: the OTS circuits may 'home' onto to the more powerful station, preventing audition of the weaker one even if it is not weak enough to be suppressed by the muting circuits.

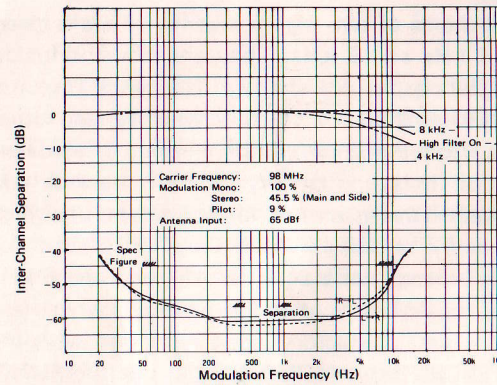
# CT-1010

## PERFORMANCE GRAPHS

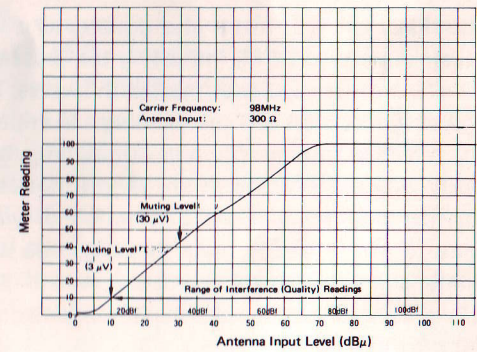
Effect of Mis-Tuning on Distortion for CT-1010 (OTS)



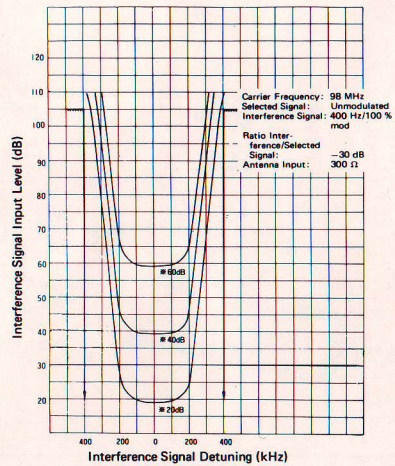
Stereo Separation vs. Frequency Response for CT-1010



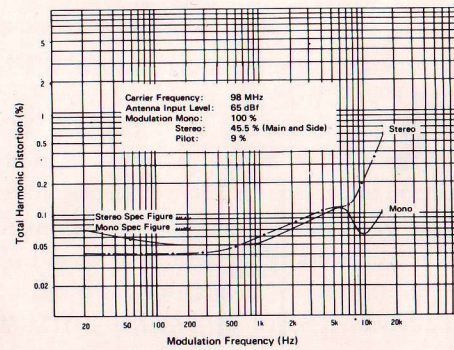
Signal Meter Characteristic for CT-1010



Selectivity Characteristics for CT-1010

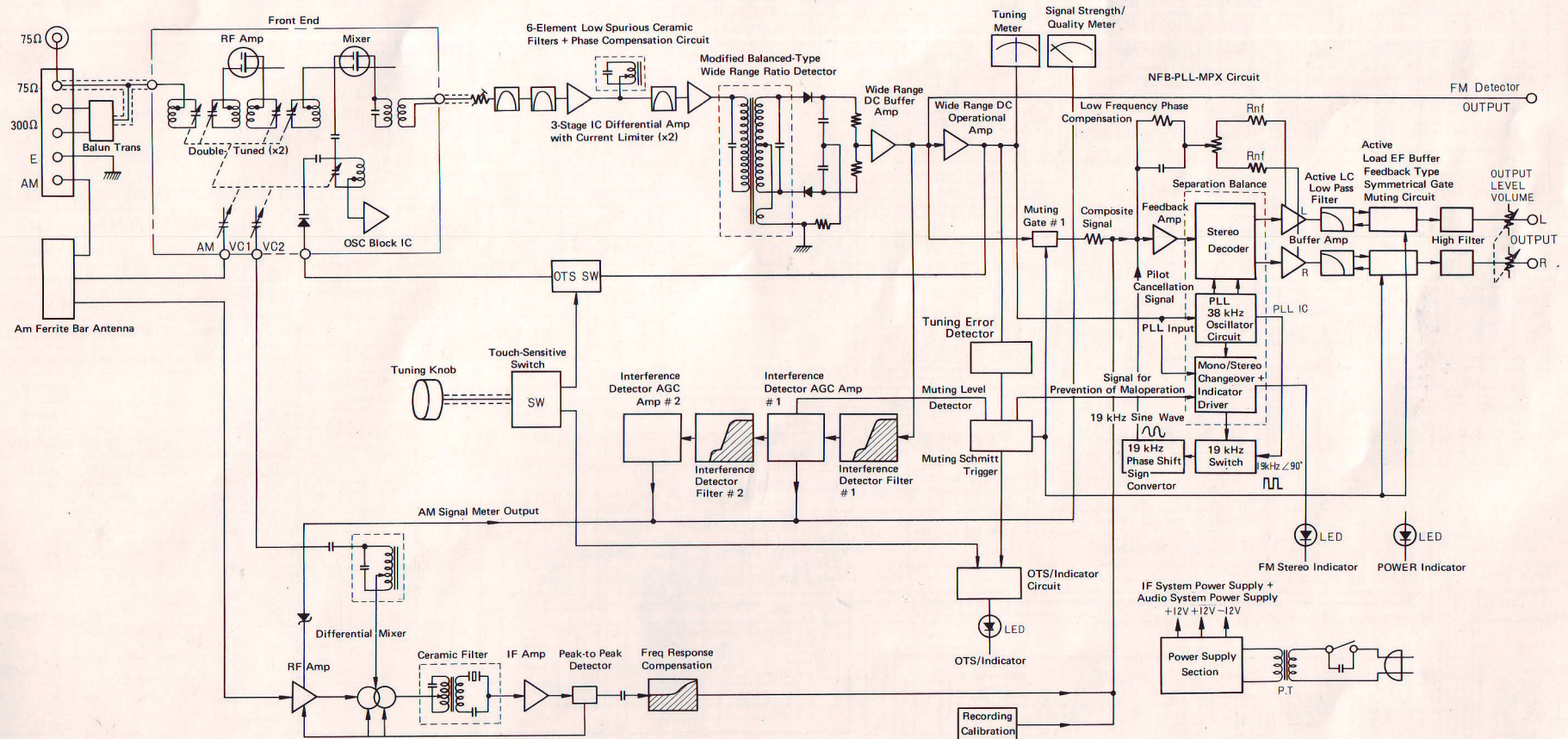


Modulation Frequency vs. Total Harmonic Distortion for CT-1010



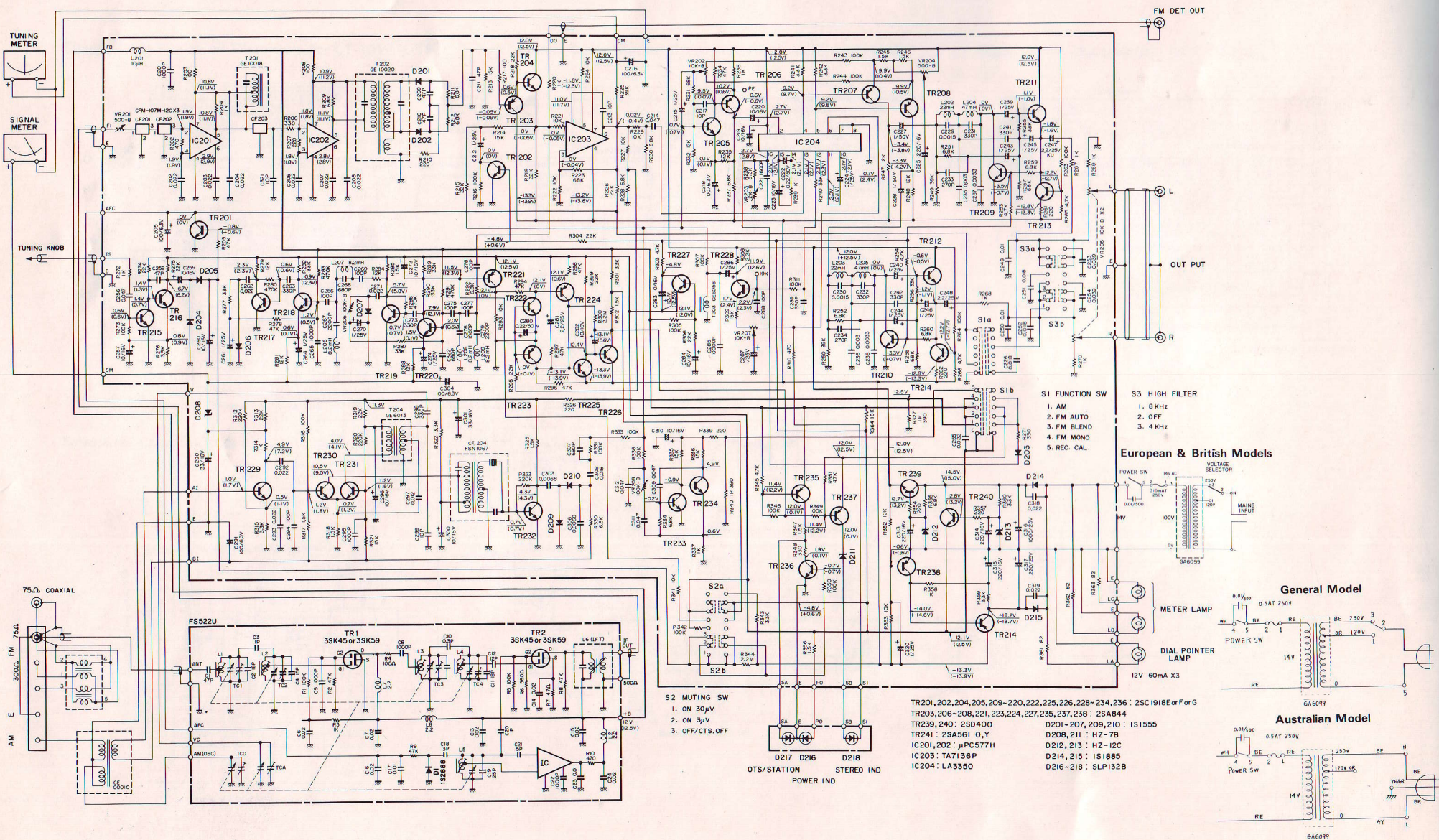
# CT-1010

## BLOCK DIAGRAM



# CT-1010

## CIRCUIT DIAGRAM



# CT-1010

## SPECIFICATIONS

### FM SECTION

<b>Tuning Range</b>	88 to 108 MHz	
<b>Usable Sensitivity (IHF 98 MHz)</b>		
300 $\Omega$	1.9 $\mu$ V (10.8 dBf)	
75 $\Omega$	0.95 $\mu$ V (10.8 dBf)	
<b>50 dB Quieting Sensitivity</b>		
Mono	3.2 $\mu$ V (15.3 dBf)	
Stereo	40 $\mu$ V (37.2 dBf)	
<b>Image Response Ratio (98 MHz)</b>	110 dB	
<b>IF Response Ratio (98 MHz)</b>	110 dB	
<b>Spurious Response Ratio (98 MHz)</b>	110 dB	
<b>AM Suppression Ratio (IHF)</b>	65 dB	
<b>Capture Ratio</b>	1.0 dB	
<b>Alternate Channel Selectivity</b>	85 dB	
<b>Signal-to-Noise Ratio (at 65 dBf, IHF)</b>		
Mono	80 dB	
Stereo	75 dB	
<b>Distortion (at 65 dBf)</b>		
Mono 100 Hz	0.07 %	
1 kHz	0.07 %	
6 kHz	0.15 %	
Stereo 100 Hz	0.09 %	
1 kHz	0.07 %	
6 kHz	0.15 %	

### Intermodulation Distortion (IHF)

Mono	0.05 %
Stereo	0.1 %
<b>Sub-Carrier Product Ratio</b>	70 dB
<b>Stereo Separation</b>	
1 kHz	52 dB
50 Hz to 10 kHz	45 dB
<b>Frequency Response</b>	
50 Hz to 10 kHz	$\pm 0.3$ dB
30 Hz to 15 kHz	+0.3 ~ -0.5 dB
<b>Muting Threshold</b>	3 $\mu$ V (14.8 dBf)
	30 $\mu$ V (34.8 dBf)

### AM SECTION

<b>Tuning Range</b>	525 to 1,605 Hz
<b>Sensitivity (IHF, bar antenna)</b>	300 $\mu$ V/m (49 dB/m)
<b>Selectivity (1,000 kHz)</b>	30 dB
<b>Signal-to-Noise Ratio</b>	50 dB (at 80 dB/m)
<b>Image Response Ratio (1,000 kHz)</b>	55 dB
<b>IF Response Ratio (1,000 kHz)</b>	40 dB
<b>Spurious Response Ratio (1,000 kHz)</b>	55 dB
<b>Total Harmonic Distortion</b>	0.4 % (at 80 dB/m)

### AUDIO SECTION

<b>Output Level Impedance (1 kHz)</b>		
FM (100% mod, Vol. Min/Max)	0.1 V – 1.0 V/2.5 k $\Omega$	
FM (100% mod, Vol. Center)	500 mV/2.5 k $\Omega$	
AM (30% mod, Vol. Min/Max)	25 mV – 250 mV/2.5 k $\Omega$	
AM (30% mod, Vol. Center)	125 mV/2.5 k $\Omega$	
<b>Recording Calibration Output (333 Hz, corr. to FM 50 % Mod)</b>		
Vol. Min/Max	50 mV – 500 mV/2.5 k $\Omega$	
Vol. Center	250 mV/2.5 k $\Omega$	

### GENERAL

<b>Semiconductors</b>	5 ICs, 41 Transistors, 2 FETs, 12 Diodes, 3 Zener Diodes, 3 LEDs, FM 6-Element Ceramic Filter, AM 1-Element
<b>Power Supplies</b>	Models available for all AC main voltages, 50/60 Hz.
<b>Power Consumption</b>	8 Watts
<b>Dimensions (W x H x D)</b>	461 x 170 x 408 mm 18-1/8" x 6-11/16" x 16"
<b>Weight</b>	7.7 kg (16 lb 15 oz)

*Specifications subject to change without notice*

# CT-1010

## TROUBLE SHOOTING

Before assuming that your CT-1010 is malfunctioning, check the following trouble-shooting list, which details corrective action you can take yourself, without having to call a service representative.

	Fault	Cause	Cure
AM Broadcasts	A persistent 'hum' occurs when the station is tuned in.	Known as modulation hum, this can affect whole areas where reception conditions are unfavorable.	In certain areas this cannot be eliminated, but sometimes changing the CT-1010's position will give an improvement.
	Intermittent crackling or continuous background 'roaring.'	Atmospheric electricity or electrical storms, possibly fluorescent lighting or other electrical equipment.	Difficult to eliminate, an external antenna and good ground connection will give considerable improvement.
	High pitched whistles, etc., particularly at night.	Signals from adjacent stations are interfering with reception.	Nothing can be done to cut out this interference, but try the 8 kHz or 4 kHz positions of the HIGH FILTER switch.
		The CT-1010 is being operated alongside a TV set.	Increase the distance between the TV and CT-1010.
FM Broadcasts	Occasional crackling interference (particularly with remote, weak signal stations)	Electrical noise from automobile or motor cycle ignition systems.	Set up an external FM antenna, located as high and as far from the road as convenient, and use coaxial cable feeder.
		Interference from other electrical equipment, particularly thermostats.	Fit an interference suppressor to the offending item of electrical equipment.
	Noisy interference becomes particularly marked for stereo broadcasts, and spoils enjoyment.	FM stereo broadcasts are inherently more liable to this at remote, low signal strength locations.	Set up an external FM antenna. If you are already using an external FM antenna, increase the number of elements in the antenna array. Listen at the FM BLEND setting of the FUNCTION switch.
	The FM STEREO indicator flickers when listening to stereo broadcasts.	Signal input from the antenna is too weak.	Use an external FM antenna suitable to your local signal strength.
		You are not perfectly tuned in to the station.	Tune in correctly (see the section on FM Broadcast Reception).
	Reception suffers from unclear, distorted sound, although an external FM antenna is being used.	Signal input from the antenna is too strong.	Connect an attenuator between the antenna and the CT-1010, or turn the antenna away from the strongest (closest) station.
	During stereo test transmissions, sound which should come from only one channel can be heard faintly from the other.	This is known as crosstalk, and normally occurs to some extent.	Provided the 'leakage' of one channel into the other is very small compared with the normal level for that channel, this does not constitute a fault.

**Special Instructions for British-Standard Model**

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**IMPORTANT**

THE WIRES IN THE MAINS LEAD ARE COLOURED  
IN ACCORDANCE WITH THE FOLLOWING CODE:

BLUE: NEUTRAL  
BROWN: LIVE

As the colours of the wires in the mains lead of this  
apparatus may not correspond with the coloured markings  
identifying the terminals in your plug proceed as follows.  
The wire which is coloured BLUE must be connected to  
the terminal which is marked with the letter N or coloured  
BLACK. The wire which is coloured BROWN must be  
connected to the terminal which is marked with the letter  
L or coloured RED.

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