

294

DENON

Hi-Fi AM-FM Stereo Receiver

For U.S.A., CANADA & ASIA Models

SERVICE MANUAL

MODEL DRA-325R

AM-FM STEREO RECEIVER



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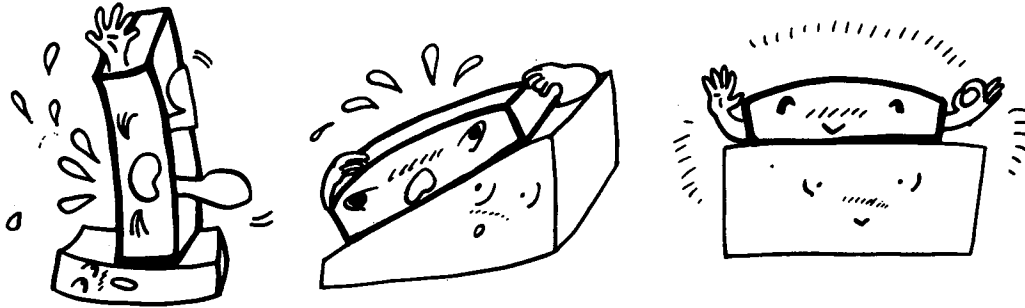
NIPPON COLUMBIA CO., LTD.

PRECAUTIONS FOR INSTALLATION

DRA-325R uses a newly developed heat emitting unit by employing heat pipes. Since the heat pipes contain a coolant, the DRA-325R must be set level or the desired heat emitting effect cannot be achieved. Always install this unit horizontally.

PRECAUTIONS DE MISE EN PLACE

Le DRA-325R emploie une unité thermique nouvellement développée comportant des tuyaux thermiques. Ces tuyaux contenant un liquide réfrigérant toujours placer le DRA-325R en position horizontale, faute de quoi l'effet de radiation thermique ne pourra être obtenu. Toujours placer cet appareil en position horizontale.

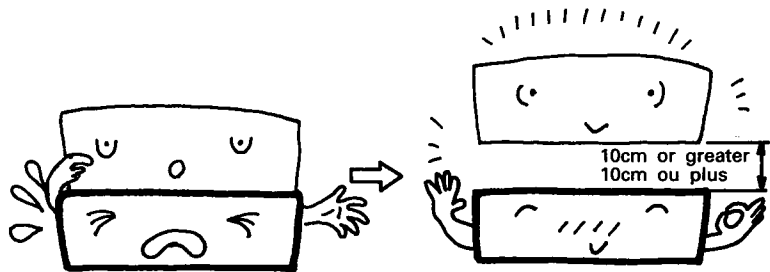


PRECAUTIONS FOR INSTALLATION

Leave at least 10cm of space between this unit and any other component placed above.

PRECAUTIONS D'INSTALLATION

Prévoir un espace d'au moins 10cm entre l'unité et tout autre appareil se trouvant au-dessus.



CAUTION

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION

TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION

POUR PREVENIR LES CHOCES ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

SAFETY INSTRUCTIONS

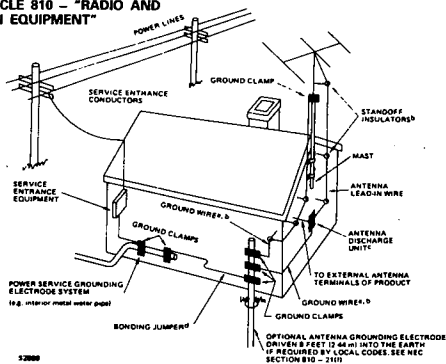
1. Read Instructions – All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions – The safety and operating instructions should be retained for future reference.
3. Heed Warnings – All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions – All operating and use instructions should be followed.
5. Water and Moisture – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.



6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

7. Wall or Ceiling Mounting – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. Ventilation – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. Heat – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. Power Sources – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. Grounding or Polarization – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.

FIGURE A
EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 – "RADIO AND TELEVISION EQUIPMENT"

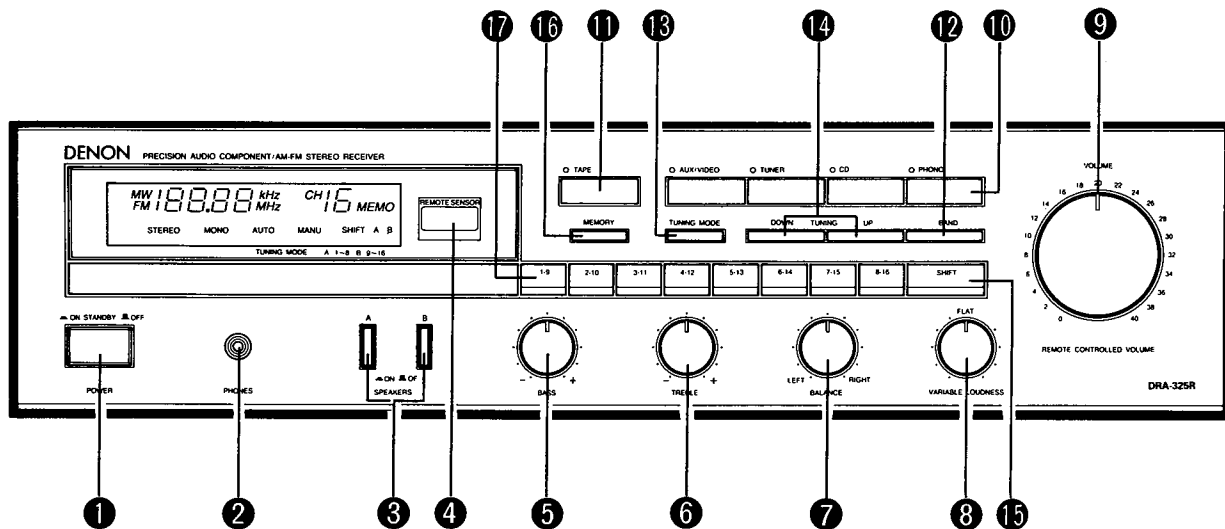


12. Power-Cord Protection – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. Protective Attachment Plug – The appliance is equipped with an attachment plug having overload protection. This is a safety feature. See Instruction Manual for replacement or resetting of protective device. If replacement of the plug is required, be sure the service technician has used a replacement plug specified by the manufacturer that has the same overload protection as the original plug.
14. Cleaning – The appliance should be cleaned only as recommended by the manufacturer.
15. Power Lines – An outdoor antenna should be located away from power lines.
16. Outdoor Antenna Grounding – If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure A.
17. Nonuse Periods – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
18. Object and Liquid Entry – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
19. Damage Requiring Service – The appliance should be serviced by qualified service personnel when:
 - A. The power-supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the appliance; or
 - C. The appliance has been exposed to rain; or
 - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
 - E. The appliance has been dropped, or the enclosure damaged.
20. Servicing – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

- a Use No. 10 AWG (5.3 mm²) copper, No. 8 AWG (8.4 mm²) aluminum, No. 17 AWG (1.0 mm²) copper-clad steel or bronze wire, or larger, as a ground wire.
- b Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4-6 feet (1.22-1.83 m) apart.
- c Mount antenna discharge unit as close as possible to where lead-in enters house.
- d Use jumper wire not smaller than No. 6 AWG (13.3 mm²) copper, or the equivalent, when a separate antenna-grounding electrode is used. See NEC Section 810-21 (j).

NAME AND FUNCTION OF PARTS

FRONT PANEL




① POWER (Power Switch)

When the power cord is plugged into an AC power outlet, pressing this button once, the power is turned on and the DISPLAY lights. It takes a few seconds before sound is output, thanks to the built-in muting circuit, preventing audio output until the receiver has stabilized.

② PHONES (Headphones Jack)

Connect a pair of headphones (sold separately) to this jack for private listening.

③ SPEAKERS (Speaker Selector Switches)

These switches are used to engage speaker system A and B. Both systems may be used simultaneously, provided your speakers have the correct impedance. No sound is heard through the speakers when both switches are reset to the  position.

④ REMOTE SENSOR (Remote Control Sensor)

This sensor receives the infra-red light transmitted from the wireless remote control unit. For remote control, point the wireless remote control unit towards the sensor.

⑤ BASS (Bass Control)

Use this control to adjust the low-range response. When the control is set to the center position, the frequency characteristic curve (below 100 Hz) is flat. Turn the control clockwise to increase the bass response and counter-clockwise to decrease it.

⑥ TREBLE (Treble Control)

Use this control to adjust the high-range response. When the control is set to the center position, the frequency characteristic curve (above 10,000 Hz) is flat. Turn the control clockwise to increase the treble response and counter-clockwise to decrease it.

⑦ BALANCE (Balance Control)

Use this control to balance the volume levels between left and right channels. The volume levels in both channels are equal when the control is set to the center position.

⑧ VARIABLE LOUDNESS (Loudness Control)

At low volumes, the human ear is less sensitive to low (BASS) and high (TREBLE) frequencies. Use this control to compensate for this deficiency when listening at low volume levels. Turn this control counter-clockwise until a natural balance of bass and treble sound has been restored.

⑨ VOLUME (Volume Control)

This knob is used to adjust the volume level of both channels.

Turn the knob clockwise to raise the volume and counter-clockwise to lower it.

⑩ INPUT SELECTOR (Input Selector Buttons)

These buttons are used to select the audio input source.

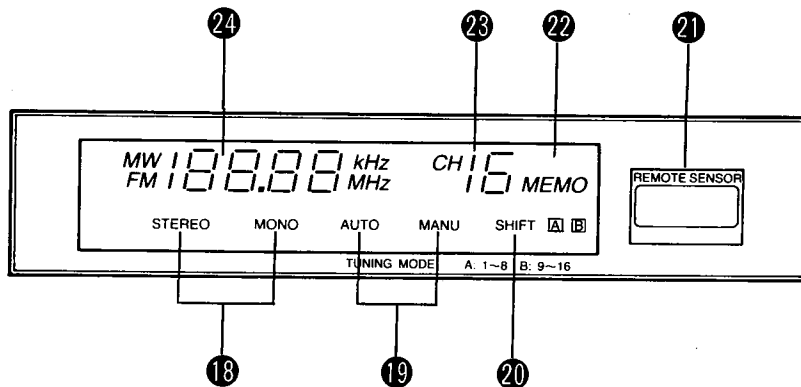
- PHONO: Press to play a record on a record player connected to the PHONO input jacks.
- CD: Press to listen to a compact disc player or another component connected to the CD input jacks.
- TUNER: Press to listen to FM or AM programs.
- AUX/VIDEO: Use when playing back the audio from a Hi-Fi video, TV tuner, video disc player or other component connected to the AUX/VIDEO terminal.

* If a function switch is pressed quickly, the function may not actually change and no signal may be heard from the speakers for an instant. To avoid this, be sure to press function switches carefully.

- 11 TAPE (Tape Monitor Switch)**
Press this switch (ON) to play TAPE and release (OFF) to play the source selected by the INPUT SELECTOR 10.
- 12 BAND (Band Selector Switch)**
Press this switch to select the FM or AM (MW) band.
- 13 TUNING MODE (Tuning Mode Switch)**
This switch allows selection between Auto Tuning and Manual Tuning.
AUTO TUNING: Pressing the UP key, the tuner will begin tuning to a higher frequency and pressing the DOWN key, it will begin tuning to a lower frequency until a broadcasting station is found.
MANUAL TUNING: Stations are tuned in manually by use of the UP and DOWN keys.
- 14 TUNING (Tuning Buttons)**
Press these buttons to tune in a station. In the MANUAL TUNING mode, each press of the buttons will change the frequency in 100 kHz (50 kHz for Asia) steps on FM and 10 kHz (9 kHz for Asia) steps on AM.
Keeping one of these buttons pressed, the frequency will change until the button is released.
During the AUTO TUNING mode, pressing one of these buttons will affect station search up or down the band.

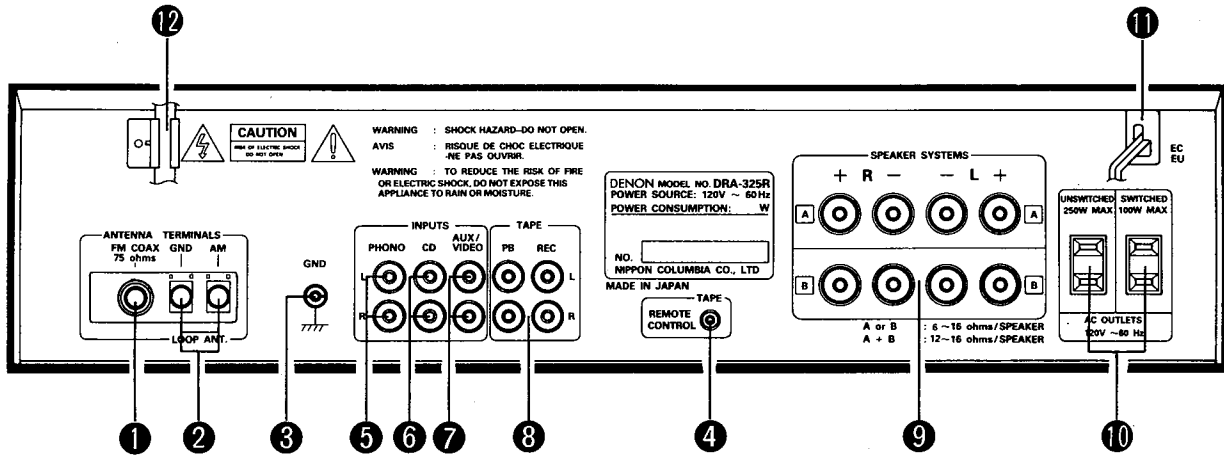
- 15 SHIFT (Shift Button)**
Each time this button is pressed, the preset station range will be shifted between "1 ~ 8" and "9 ~ 16". (A: 1 ~ 8, B: 9 ~ 16)
- 16 MEMORY (Memory Button)**
This switch is used to store the desired radio station on a PRESET CHANNEL button. When pressing this button, the MEMORY indicator lights for approximately 5 seconds. During this interval, the desired station can be stored in the memory.
- 17 PRESET CHANNEL 1 ~ 16 (Preset Station Buttons)**
These buttons are used for storing stations or recalling stations which have been preset. Using the SHIFT button you can preset a total of 16 FM or AM stations into preset channels 1 ~ 8 and 9 ~ 16.
Once a radio has been memorized on a PRESET CHANNEL button, the same station can later be tuned in instantly simply by pressing the corresponding PRESET CHANNEL button.

DISPLAY



- 18 STEREO/MONO (Stereo/Mono Indicator)**
The STEREO indicator will automatically light up when a stereo broadcast is received. The MONO indicator will light up when a broadcast is not being received or at the time of a monaural broadcast.
- 19 TUNING MODE (AUTO/MANUAL)**
Pressing TUNING MODE 16 causes AUTO and MANU to light up alternately.
- 20 SHIFT (Shift Indicator)**
The preset channel which is selected with the Shift Button 15 is displayed by the SHIFT [A] or [B].
- 21 REMOTE SENSOR (Remote Control Sensor)**
This sensor receives the infra-red light transmitted from the wireless remote control unit.
For remote control, point the wireless remote control unit towards the sensor.
- 22 MEMORY (Memory Indicator)**
This indicator lights for approximately 5 seconds when the MEMORY button has been pressed and a station can be stored on a PRESET CHANNEL button.
- 23 CHANNEL (Preset Channel Display)**
When using the channel preset button 17, the channel is displayed and the frequency for that channel stored in memory is displayed in 24.
- 24 FREQUENCY DISPLAY (Frequency Indicator)**
The frequency is displayed in numerals. It is displayed in MHz for FM and in kHz for AM (MW).

BACK PANEL



- 1 FM ANT (FM Antenna Terminals)**
Both 75-ohm coaxial cable and 300-ohm feeder can be connected to this terminal. For antenna connecting procedure, see the ANTENNA INSTALLATION.
- 2 AM ANT (AM Antenna Terminals)**
Connect the attached AM loop antenna. (Refer to page 7 for connections).
Connect to this terminal when a medium wave outdoor antenna is used.
- 3 GND (Grounding Terminal)**
The grounding wire of the turntable is connected here.
• Hum or noise may be generated if the grounding wire is not connected.
- 4 TAPE/REMOTE CONTROL**
This terminal is exclusively used for sending the remote control signals to the tape deck. Connect it with a 3.5mm mini-jack cord.

Note:
Do not hook up a headphones or microphone jack cord. Use this jack to connect a Denon cassette deck with a remote control jack (wired).
If the cassette deck does not have this jack, wired remote control is not possible.

- 5 PHONO (Phono Input Terminals)**
The output cord of the turntable is connected here. Since the input sensitivity of "PHONO" is extremely high, do not use the unit without the input pin cord. If used without this cord, the speakers may generate hum.
- 6 CD**
The output cord of the CD player is connected here.
- 7 AUX/VIDEO**
An AUX/VIDEO, such as a VCR or Video Disk may be connected here.
- 8 TAPE (Audio Playback and Recording Terminals)**
Tape decks can be connected for full use including playing or copying.
- 9 SPEAKER SYSTEMS (Speaker Terminals)**
Two pairs of speakers A and B can be connected to these terminals.
- 10 AC OUTLET (AC Power Outlets)**
UNSWITCHED
This power outlet is available independently of the power switch. The power capacity is a maximum of 250 W.
SWITCHED
This AC outlet is controlled by the power switch. Maximum capacity is 100 W.
- 11 AC CORD (Power Cord)**
Connect this cord into the wall outlet.
- 12 AM LOOP ANT (AM Loop Antenna)**
Correctly connect the AM loop antenna to the antenna terminal. Broadcasting cannot be received when the connection is incomplete.
Adjust the antenna for optimum reception while receiving the medium wave broadcasting. Do not place a pin cord, SP cord or electric cord near the antenna. This may cause noise generation.

ANTENNA INSTALLATION

- FM ANTENNA**
The supplied T-type indoor FM antenna (300 ohms) can be used inside wooden houses for receiving local FM stations and other strong FM signals. Stretch out the ends of the antenna and mount the antenna on the wall or ceiling where optimum reception is achieved. FM T-type antennas may not consistently ensure stable reception, due to environment changes. In such cases, the FM T-type antenna should only be used temporarily until an outdoor FM antenna has been installed. When connecting an outdoor FM antenna, the use of 75 ohm coaxial cable (3C-2V, 5C-2V) is strongly recommended. Using a 300-ohm feeder cable will cause noise and you will not be able to achieve the high sound quality the built-in tuner is capable of delivering.
- AM ANTENNA**
Attach the supplied AM loop antenna to the antenna holder on the back panel.
Connect the leads to the AM and GND terminals.

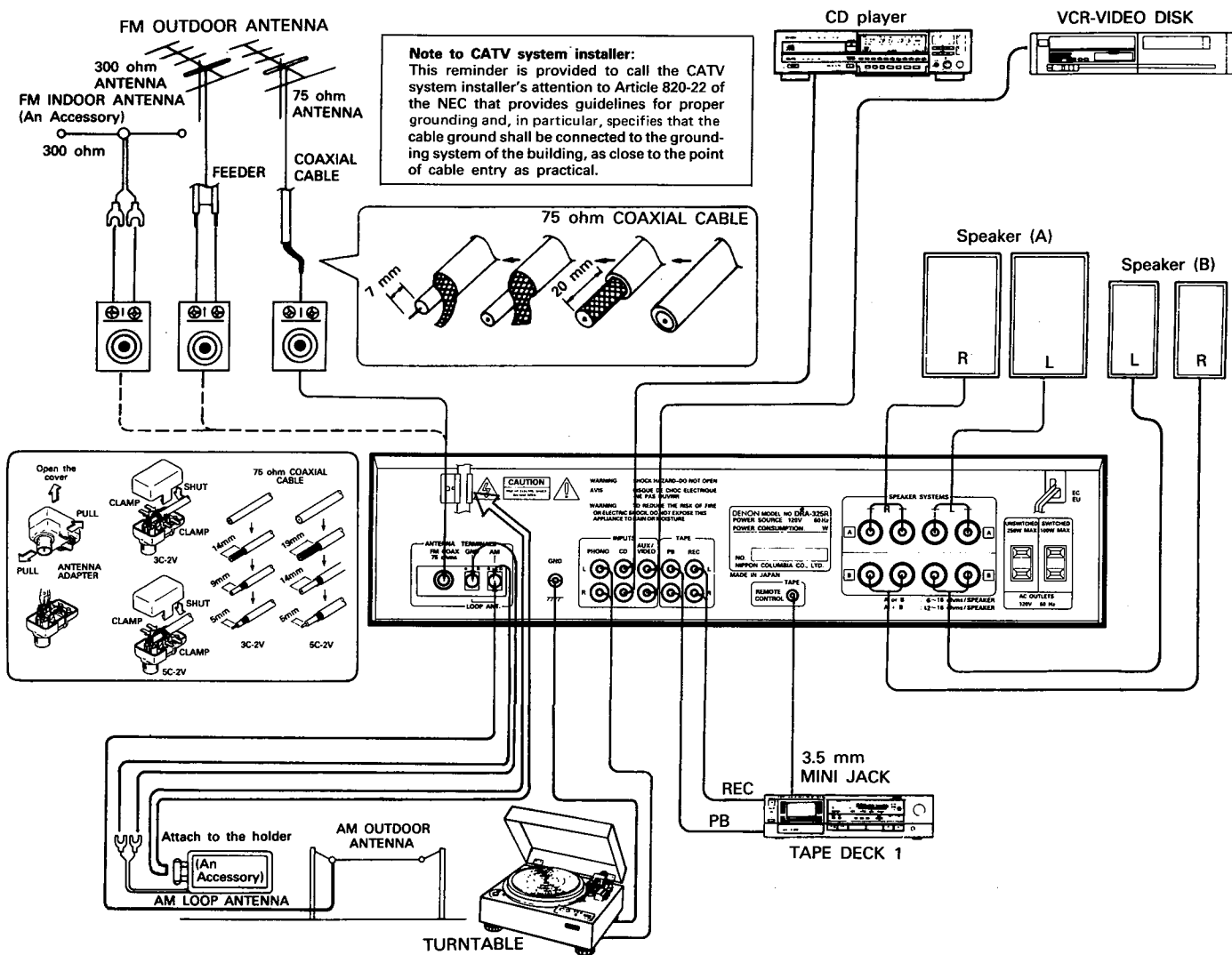
Also use the AM terminals for connecting an outdoor AM antenna (when making such a connection do not disconnect the AM loop antenna.)

Adjust the loop antenna to obtain optimum reception. Where broadcast stations are distant and only weak signals are received, or where signals are blocked, it is best to install an outdoor AM antenna.

NOTES

- This receiver has a full back-up system. When the power is turned on, the INPUT SELECTOR buttons are set to the last mode set before the power was turned off.
- When using this receiver in close proximity to video equipment (TV, VCR, VDP, etc.), noise may be generated in AM broadcasts. To avoid this, keep the receiver as far away from other video components as possible, or detach the AM loop antenna from the antenna holder and place it where noise is reduced. If the noise is not reduced, turn off the power of the video components when listening to AM broadcasts.

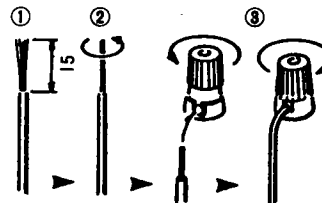
CONNECTIONS



SPEAKER CONNECTION

Confirm polarity (+, -) and left and right channels (L, R). Connect the speaker pairs to the SPEAKER terminals A or B on the back panel. Connections must be made with power cord disconnected.

1. Peel off the sheathing from the end of the cord.
2. Twist the wire strands.
3. Loosen the speaker terminal, insert the wire lead portion of the cord, and then tighten the terminals.



Notes on Connection

- Do not plug the power cord into the AC wall outlet until all connections have been completed.
- Make sure channels are correctly connected. Connect Left channels to Left channels and Right channels to Right channels. Follow the color markings of plugs and terminals to make sure mistakes are not made.
- Connect all pin-plugs securely, pushing them completely into the jacks. Incomplete connections will cause noise generation.
- Binding the connection cables to power cords, or running such cables close to power supply transformers will cause humming or noise, and should thus be avoided.
- The PHONO input jacks are extremely sensitive. Avoid using the power amplifier if no connection has been made to these jacks, as this otherwise may cause low humming from the speakers when the power-amplifier is on. In case a record player is not used, short-circuit the jacks by inserting a jumper pin into them.

Notes:

- Do not connect two FM antennas simultaneously.
- Even if an external AM antenna is used, do not disconnect the AM loop antenna.
- Make sure AM loop antenna lead terminals do not touch metal parts of the panel.

CAUTION

Protective Circuit

This set is equipped with a high speed protective circuit. This circuit protects the internal circuitry from damage due to large currents flowing when the speaker jacks are not completely connected or when an output is generated by a short circuit. This protective circuit's operation cuts off the output to the speakers. In such a case, be sure to turn the power to the set off and check the connections to the speakers. Then turn the power on again. After muting for several seconds, the set will operate normally.

HOW TO PRESET THE STATION

1. Set the BAND SELECT button to "AM" or "FM", and press the TUNING button to tune the desired station.
2. Specify the preset buttons 1 ~ 8 or 9 ~ 16 by the SHIFT button.
3. Press the MEMORY buttons and MEMORY indicator lights for about 5 seconds. During this time, press one of the eight PRESET channel buttons.
4. The channel corresponding to the pressed button is displayed and the indicated frequency is stored in memory for that channel.

NOTE: If preset button is inoperative with MEMORY illuminated, press MEMORY and preset buttons again.

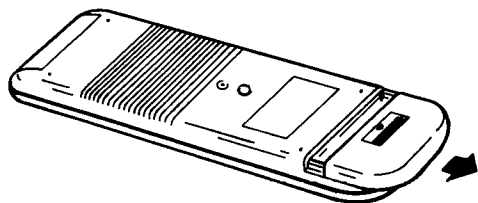
- This model has a last channel memory system. It stores the last channel used power off.
- This model is designed to store and retain the stations that have been previously registered in the memory, even if the tuner is deenergized temporarily. The memory can hold resistered data for approximately about a month [Temperature: 68°F (20°C), relative humidity: 65%]. If the memory is erased reset the preset data.

PLAYBACK USING THE REMOTE CONTROL

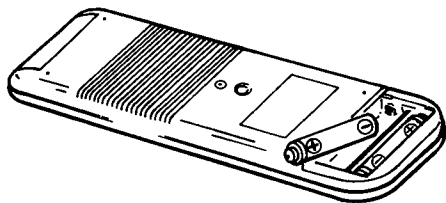
The accessory RC-113 remote control unit is used to control the RECEIVER from a distance.

(1) Inserting the dry cell batteries

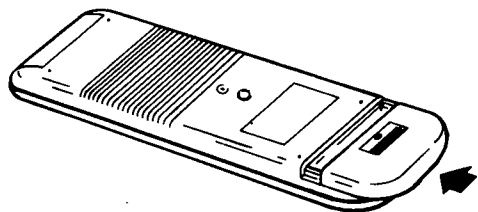
- 1 Remove the rear cover on the remote control unit.



- 2 Insert two size "AAA" (R03) dry cell batteries as shown in the diagram on the battery supply unit.



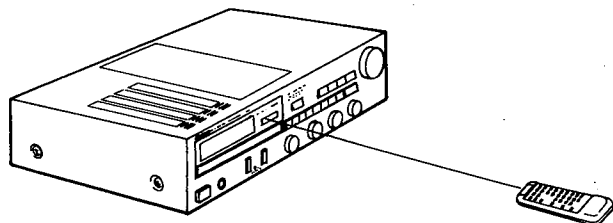
- 3 Replace the rear cover.



Notes on Use of the Batteries

- The remote control unit uses size "AAA" (R03) dry cell batteries.
- The batteries will need to be replaced approximately once a year. This will depend upon how often the remote control is used.
- If, in less than a year from the time new batteries were inserted, the remote control fails to operate the receiver from a near-by position, it is time to replace the batteries.
- Insert the batteries properly, following the diagram on the remote control battery supply unit, and making sure to align the plus and minus sides of each battery.
- Batteries are prone to damage and leakage. Therefore:
 - Do not combine new batteries with used ones.
 - Do not combine different types of batteries.
 - Do not jumper the opposite poles of the batteries, expose them to heat or break them open, or put them into open fire.
- When the remote control is not to be used for a long period of time, remove the batteries from the unit.
- If the batteries have leaked, remove any battery fluid from the inside of the battery supply unit by wiping it out thoroughly, and insert new batteries.

(2) Directions for use



- Operate the remote control unit while pointing it towards the remote control sensor on the receiver as shown in the diagram left.
- The remote control unit can be used at distances up to about 8 meters in a straight line from the receiver. This distance will decrease if there are obstructions blocking the infra-red light transmission or if the remote control unit is not directed straight at the receiver.

Note on Operation

- Do not press the operating buttons on the receiver and the remote control unit at the same time. This will cause misoperation.
- Operation of the remote control unit will become less effective or erratic if the infrared remote control sensor on the receiver is exposed to strong light or if there are obstructions between the remote control unit and the sensor.
- In case you operate your VCR, TV or other components by remote control, do not operate buttons on two different remote control units at the same time. This will cause mis-operation.

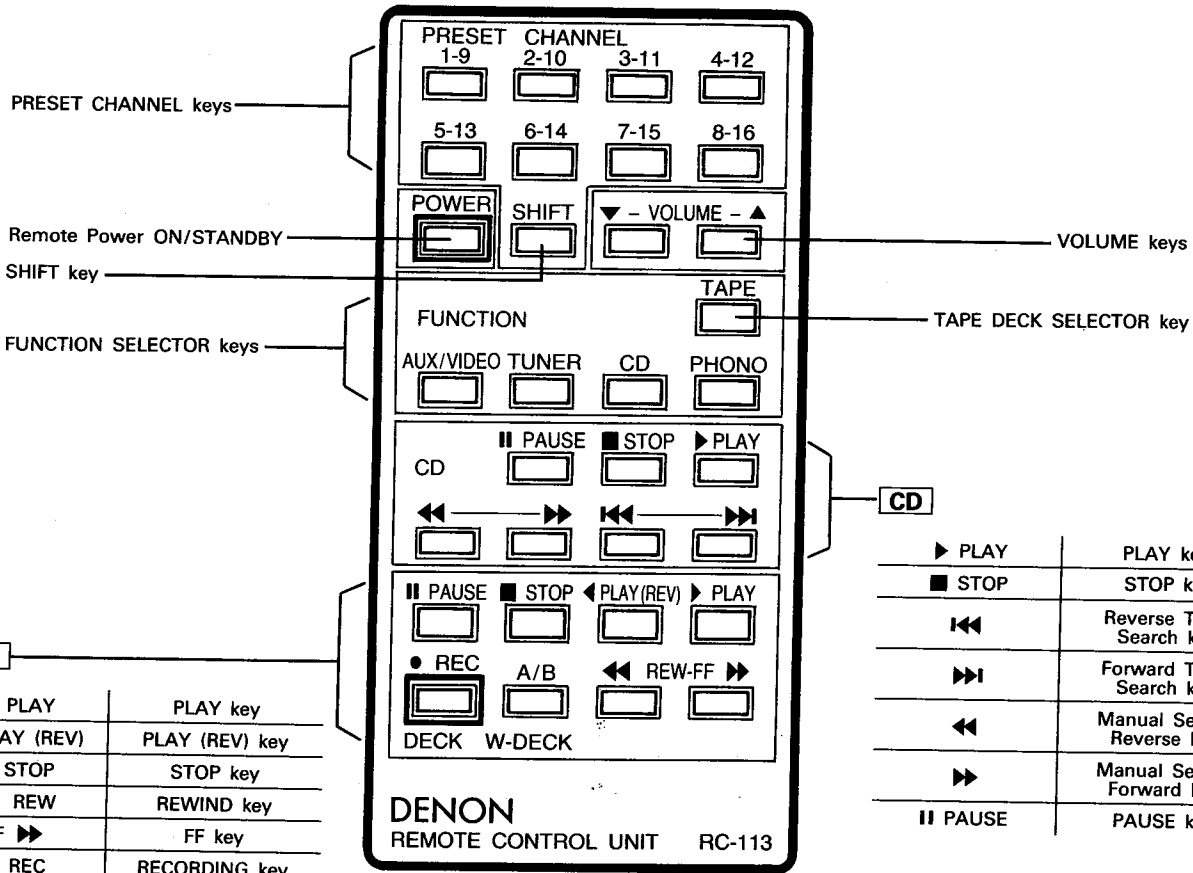
Besides being able to operate the DRA-325R receiver with this remote control unit, you can also operate a DENON cassette deck and CD player from this handy full-system remote control unit.

Remote Control Section
Full-system Remote Control Unit

The full-system remote control unit operates all major functions of the receiver such as function switching, volume control, and preset station selection. But that's not all! The same control pad can also control the major functions of a DENON CD player and cassette deck when combined with the DRA-325R to create a remarkably ergonomic and versatile DENON system with all the quality sound reproduction that the devoted audiophile expects.

Remote Control Unit RC-113 supplied with DRA-325R

RECEIVER



DECK

▶ PLAY	PLAY key
◀ PLAY (REV)	PLAY (REV) key
■ STOP	STOP key
◀◀ REW	REWIND key
FF ▶▶	FF key
● REC	RECORDING key
PAUSE	REC PAUSE/ MUTE key
A/B W-DECK	A/B DECK SELECT key

CD

▶ PLAY	PLAY key
■ STOP	STOP key
◀◀	Reverse Track Search key
▶▶	Forward Track Search key
◀◀	Manual Search Reverse key
▶▶	Manual Search Forward key
PAUSE	PAUSE key

- The RC-113 Remote Control Unit can control all CD players (excluding the DCD-1800R) and cassette decks made by DENON.
- Keys are conveniently separated into groups, each group controlling one specific component. The groups are RECEIVER, FUNCTION, CD and DECK.

For details on operating other components, refer to the instruction manuals for the CD player and/or cassette deck.

CAUTION:

- If the power is turned off with the remote control unit, the receiver is switched to the power stand-by state. If you are to be absent for a long period of time, be sure to turn the power off using the POWER switch on the receiver.
- The LED indicators of Input selector or Tape monitor light while the receiver is in the power stand-by state.
- You may experience erratic operation of the remote control unit if it is operated in fluorescent light and direct sunlight, in particular if this light strikes the remote control sensor on the receiver. However, this is not a malfunction, and if this should happen, protect the sensor against such light.

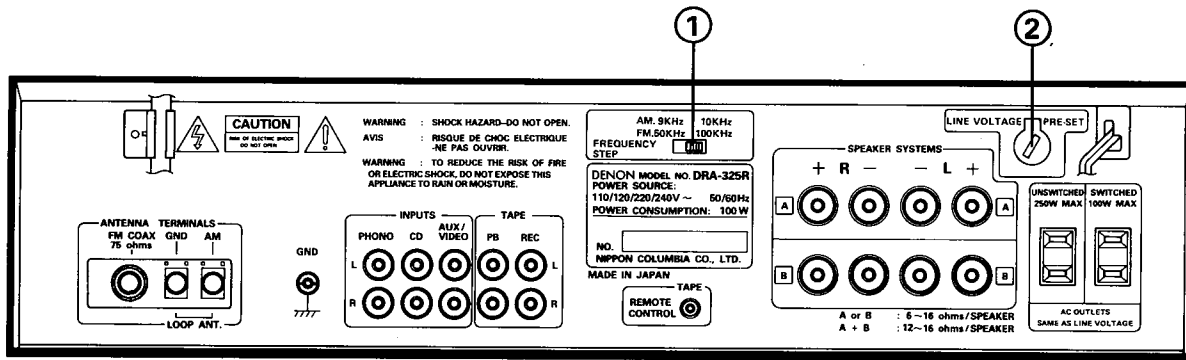
TROUBLESHOOTING

1. Have all connections been made properly?
2. Have you followed all operational instructions correctly?
3. Check speaker and the turntable systems for proper operation.

When your unit does not seem to be operating correctly, first check the items in the following table. If the symptom does not correspond to any of the problems as shown below, turn off the power sources immediately and contact your DENON dealer.

Problem	Cause	Remedy
FM AND AM RECEPTION		
Radio program can not be received.	<ul style="list-style-type: none"> • Antenna connection is wrong. • A signal strength is weak. 	<ul style="list-style-type: none"> • Check the connection. • Check the antenna installation.
Noise is reproduced.	<ul style="list-style-type: none"> • A signal strength is weak. • Automobile ignition noise interferes with reception. • Other electrical equipment interferes with reception. 	<ul style="list-style-type: none"> • Install an outdoor antenna. • Keep the antenna away from the street. • Keep the equipment away from this set, or turn off the power of the other equipment.
The preset frequencies are erased.	<ul style="list-style-type: none"> • The memory back-up term (about 1 month) passed. 	<ul style="list-style-type: none"> • Preset again.
In automatic tuning, the frequency doesn't stop at the radio station.	<ul style="list-style-type: none"> • A signal strength is weak. 	<ul style="list-style-type: none"> • Use manual tuning
In automatic tuning, it stops at the one step lower or higher frequency than the radio station.	<ul style="list-style-type: none"> • Noise or strong signal strength is received. 	<ul style="list-style-type: none"> • Use manual tuning for optimum reception.
PLAYBACK OF THE AUDIO EQUIPMENTS		
No sound is produced with power on.	<ul style="list-style-type: none"> • Input and speaker cords connection are wrong. • Speaker switch is off. • The INPUT SELECTOR buttons are in wrong position. • The protective circuit is operating. • The fuse has blown out. 	<ul style="list-style-type: none"> • Check the connection. • Turn on speaker switch. • Check these position. • Turn the power off once, check the connections to the speakers, then turn the power on again. • Ask your dealer, or the nearest DENON representative.
Audible hum when playing records.	<ul style="list-style-type: none"> • The input and grounding cords connection of the turntable are wrong. • The cords connection of the cartridge are wrong. • The interference from the nearby TV or radio transmission antenna. 	<ul style="list-style-type: none"> • Check the connection. • Check the connection. • Ask your dealer, or the nearest DENON representative.
Howling is produced when the volume control is turned up too high while playing records.	<ul style="list-style-type: none"> • The vibrations and sounds transmit from the speakers to the turntable. 	<ul style="list-style-type: none"> • Insulate the vibrations, or keep the speakers away from the turntable.
Cracking noise is produced when playing records.	<ul style="list-style-type: none"> • The record is stained with the dust. • The stylus tip of the cartridge is stained with the dust. • The cartridge is defective. 	<ul style="list-style-type: none"> • Clean the record. • Clean the stylus tip. • Try the other cartridge.

FOR ASIA MODEL ONLY



1. Setting the frequency step.

Set the FREQUENCY STEP switch as described below.

- In the U.S.A. and Canada – set the switch to the right side. With this setting, the frequency varies in 100 kHz steps in the range of 87.5 to 108.0 MHz (FM) and in 10 kHz steps in 520 to 1710 kHz (AM).
- Elsewhere – set the switch to the left side. With this setting, the frequency varies in 50 kHz steps in the range of 87.50 to 108.00 MHz (FM) and in 9 kHz steps in 522 to 1611 kHz (AM).

2. Setting the line voltage (Power Supply: AC 110/120/220/240 V 50/60 Hz)

- The customer can set the VOLTAGE SELECTOR KNOB on the back panel for appropriate line voltage by using a screwdriver.
- Do not use excessive force in setting the VOLTAGE SELECTOR KNOB – you may damage it.
- If the VOLTAGE SELECTOR KNOB does not turn smoothly, call qualified service personnel.

SPECIFICATIONS

AMPLIFIER SECTION

Continuous Power Output:	DRA-325R: 40 watts per channel minimum RMS, both channels driven into 8 ohms from 20 Hz ~ 20 kHz, no more than 0.05% THD.	
Power Bandwidth (IHF):	10 Hz~40 kHz (0.15% THD, both channels driven into 8 ohms)	
Total Harmonic Distortion: Frequency Response:	0.03% (-3 dB at rated output, 8 ohms) PHONO RIAA Standard Curve (Recording Output)	
	MM	20 Hz ~ 20 kHz ±0.5 dB
	CD, TAPE	20 Hz ~ 50 kHz ±1.5 dB (at 1 W)
	AUX/VIDEO	(at 1 W)
Input Sensitivity and Impedance:	PHONO MM	2.5 mV 47 k ohms
	CD, TAPE	150 mV 29 k ohms
	AUX/VIDEO	
Maximum Input Level (at 1 kHz):	PHONO MM	150 mV
Signal to Noise Ratio (IHF-A):	PHONO MM	78 dB at 5.0 mV input
	CD, TAPE	95 dB
	AUX/VIDEO	
Tone Controls:	BASS	±10 dB at 100 Hz
	TREBLE	±10 dB at 10 kHz
Loudness, Control Effect:	VARIABLE LOUDNESS, 10 position – 50 Hz: +10 dB, 10 kHz: +5 dB	

TUNER SECTION

[FM] (note: μV at 75 ohms, 0 dBf = $1 \times 10^{-15} W$)	
Receiving Range:	87.5 ~ 108 MHz
Usable Sensitivity:	0.9 μV (10.3 dBf)
50 dB Quieting Sensitivity:	MONO 1.6 μV (15.3 dBf)
	STEREO 23 μV (38.5 dBf)
Signal to Noise Ratio (IHF-A):	MONO 82 dB
	STEREO 78 dB

Total Harmonic Distortion (at 1 kHz):

MONO	0.10%
STEREO	0.15%

- Capture Ratio:** 1.5 dB
- Image Rejection:** 42 dB
- AM Suppression:** 50 dB
- Selectivity (±400 kHz):** 55 dB

Frequency Response: 30 Hz ~ 15 kHz +0.5 dB -1.5 dB

Stereo Separation (at 1 kHz): 40 dB

- [AM (MW)]**
- Receiving Range:** 520 ~ 1710 kHz
- Usable Sensitivity:** 18 μV
- Signal to Noise Ratio:** 55 dB

GENERAL

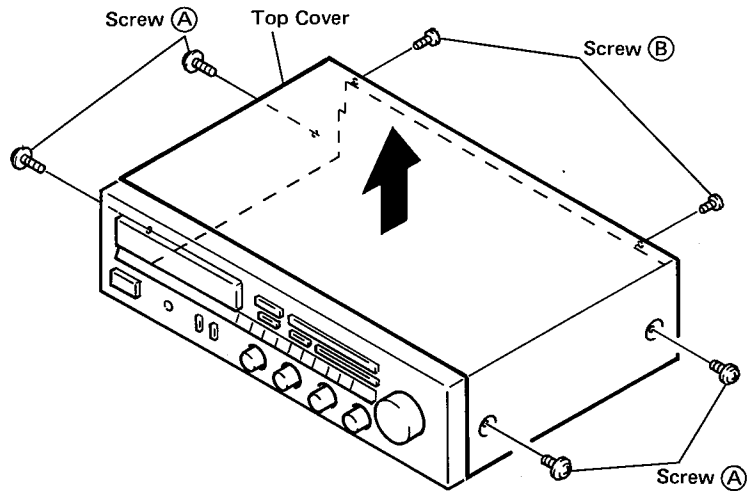
Power Supply:	AC 120V, 60 Hz (U.S.A. & Canada Model)
	AC 110/120/220/240 V, 50/60 Hz (Asia Model)
Power Consumption:	180 W (U.S.A. & Canada Model)
	100 W (Asia Model)
Power Outlets:	SWITCHED 100 W
	UNSWITCHED 250 W
Dimensions:	434 mm (17-3/32")W x 120 mm (4-23/32")H x 311.5 mm (12-17/64")D
	6.8 kg (15 lbs)
Weight:	RC-113
REMOTE CONTROL UNIT	
Remote control system:	Infrared pulse system
Power supply:	3V DC Two size "AAA" (R03) dry cell batteries
External dimensions:	60 mm (2-23/64")W x 165 mm (6-31/64")H x 16 mm (5/8")D
Weight:	80 g (about 2 oz) (Including batteries)

Design and specifications are subject to change without prior notice.

REMOVAL OF EACH SECTION

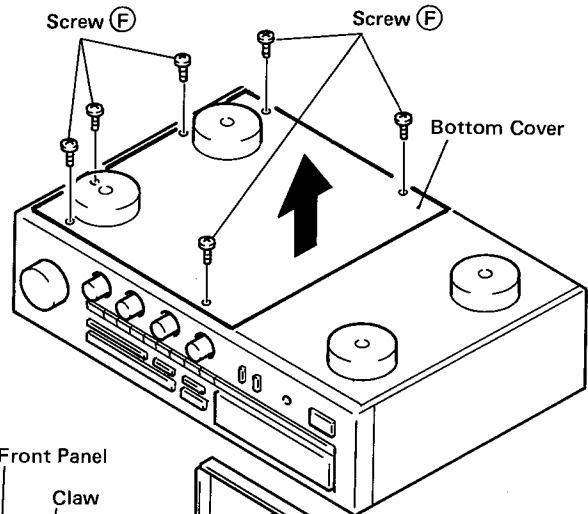
1. Top Cover

Remove 4 screws (A) and 2 screws (B).
And detach the Top Cover upward in the arrow direction.



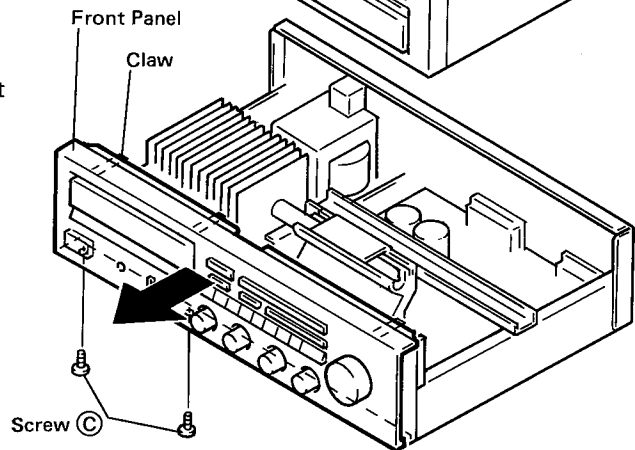
2. Bottom Cover

Remove 6 screws (F) and detach the Bottom Cover upward in the arrow direction.



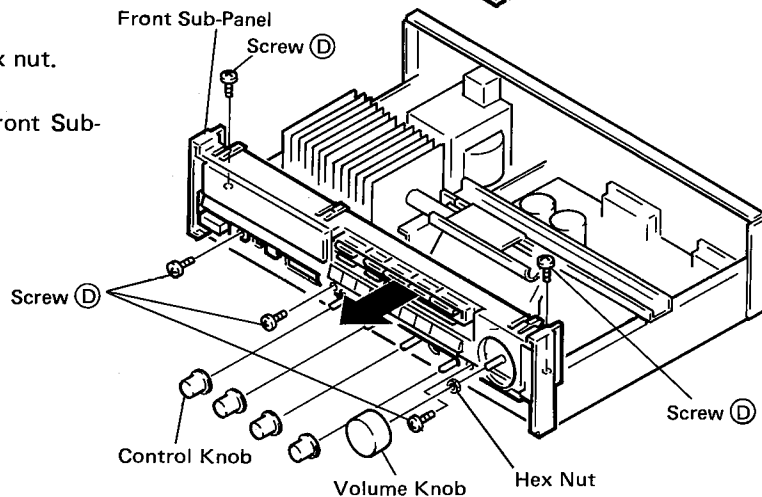
3. Front Panel

1) Remove 2 screws (C) out of the Bottom Panel.
2) Pushing 3 claws downward, and draw out the Front Panel forward as the arrow shows.



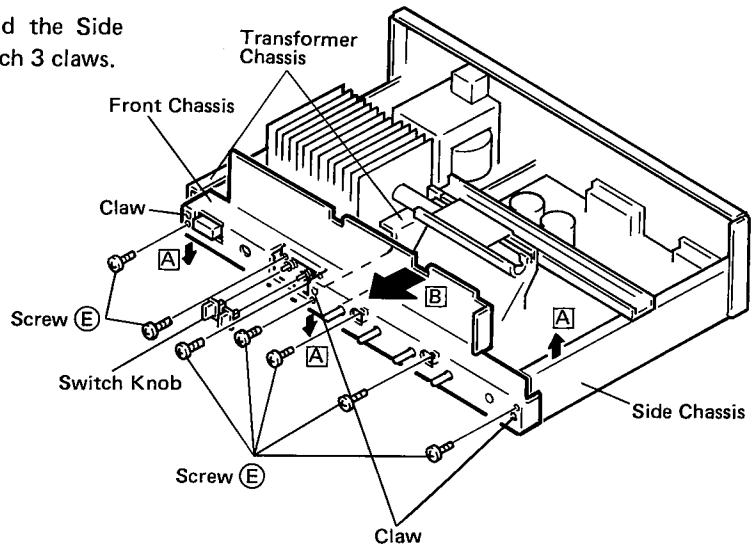
4. Front Sub-Panel

1) Pull out the Volume Knob and unfasten the hex nut.
2) Pull out 4 Control Knobs.
3) Remove 5 screws (D) and draw out the Front Sub-Panel as the arrow direction.



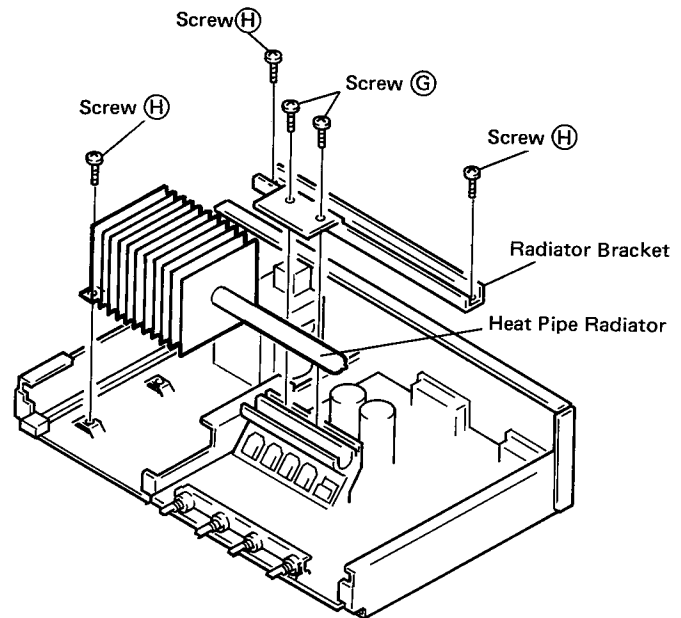
5. Front Chassis

- 1) Remove 2 Switch Knobs.
- 2) Remove 7 screws (E).
- 3) Drawing both the Transformer Chassis and the Side Chassis out as the arrow (A) shows, and detach 3 claws.
- 4) Pull out the Front Chassis as the arrow (B)



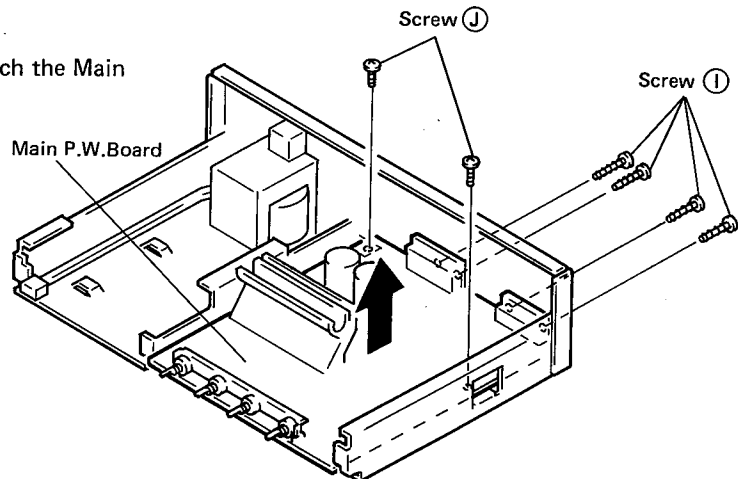
6. Heat Pipe Radiator

Remove 2 screws (G) and 3 screws (H). Detach the Heat Pipe Radiator and the Radiator Bracket.

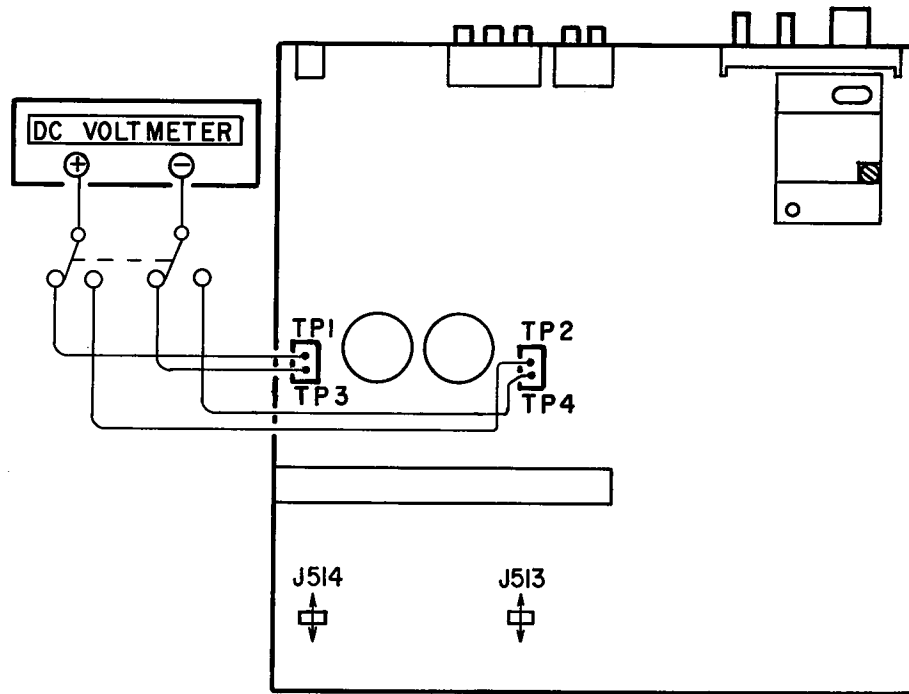


7. Main P.W.Board

Remove 4 screws (I) and 2 screws (J), and detach the Main P.W.Board as per the arrow direction.



METHOD OF ADJUSTMENTS



IDLE CURRENT ADJUSTMENT

1. Keep the unit away from direct wind blown by an air-conditioner and an electric fan, and keep the unit under normal conditions. Adjust the range of ambient temperature to 15 – 30°C (59 – 86°F).
2. Set the following switches as follows:
 - POWER (power switch) to off
 - VOLUME (VOLUME CONTROL) to 0 (⌚)
 - Speakers (speaker terminal) to no load (speakers disconnected)
3. Remove the top cover and connect a DC digital voltmeter to the test points (between the positive terminal TP1 ⊕ and the negative terminal TP3 ⊖ (L ch), and between the positive terminal TP2 ⊕ and the negative terminal TP4 ⊖ (R ch)).
4. Connect the power source cord to an AC wall outlet and turn on the power switch, read and confirm the measured value after 3 minutes to be within a tolerance of 2 mV~50 mV (DC). If that measured value should be 2mV (DC) or less, disconnect jumper wire J513 (R ch) and J514 (L ch) respectively.

FM/MPX ALIGNMENT

Table 1

Step	Alignment Item	Tuning Frequency Setting	Input					Output		Adjust		Remarks
			Type	Frequency	Input Level	Modulation	Coupling	Type	Connect to	Points	Adjust to	
1	Tuning Center	98 MHz	FM SSG, MoNo	98 MHz	60 dBμ	None	Antenna Terminal	Digital Voltmeter	T.P. 6, 5	T504	±50mV	Function: FM Mode: Auto
2	Distortion (Mono)	98 MHz	FM SSG, Mono	98 MHz	60 dBμ	1 kHz 100%	Antenna Terminal	Distortion Meter	TAPE REC (L)	T503	Minimum Distortion	Function: FM Mode: Auto
3	Distortion (Stereo)	98 MHz	FM SSG Stereo (L)	98 MHz	60 dBμ	Main: 1 kHz L-ch 90% Pilot: 10%	Antenna Terminal	Distortion Meter	TAPE REC (L)	IFT on Front End	Minimum Distortion	Function: FM Mode: Auto
4	Noise Center & Distortion	Repeat 1, 2 and 3 to obtain minimum distortion and same time indicating ±50mV on Digital Voltmeter.										

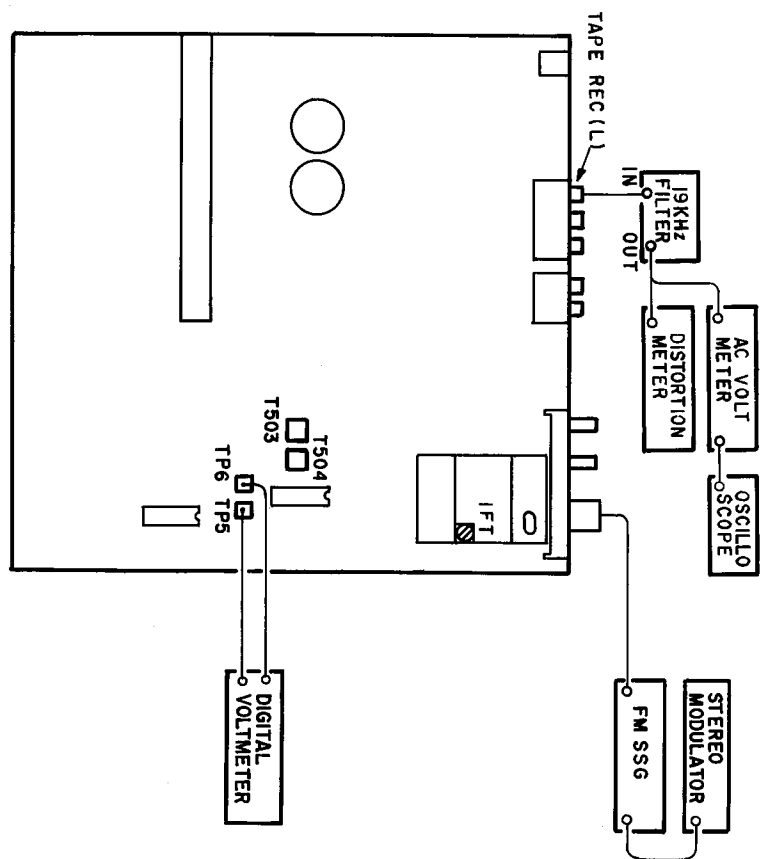
AM ALIGNMENT

Table 2

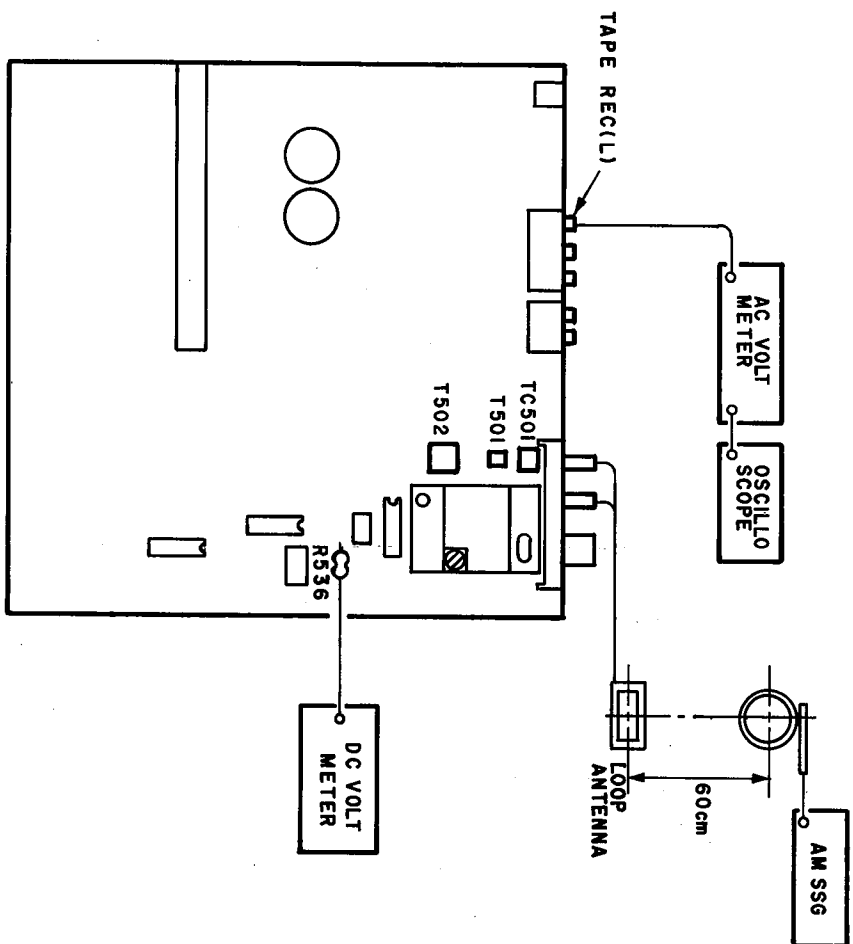
Step	Alignment Item	Tuning Frequency Setting	Input					Output		Adjust		Remarks
			Type	Frequency	Input Level	Modulation	Coupling	Type	Connect to	Points	Adjust to	
1	Receiving Band Alignment	520 kHz	AM SSG	520 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Electric DC Voltmeter	R536 GND	T502	1.0V ±20mV	Function: AM
2	Tracking Alignment	600 kHz	AM SSG	600 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.M.	TAPE REC (L)	T501	Maximum Output	Function: AM
		1400 kHz	AM SSG	1400 kHz	Input Level is not over to work A.G.C.	400 Hz 30%	Loop Antenna	Audio V.M.	TAPE REC (L)	TC501	Maximum Output	Function: AM

CONNECTION DIAGRAM OF MEASURING INSTRUMENTS

• FM



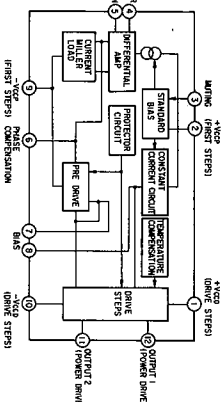
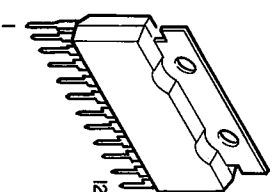
• AM



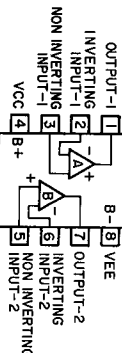
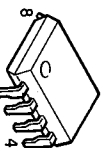
SEMICONDUCTORS

• ICs

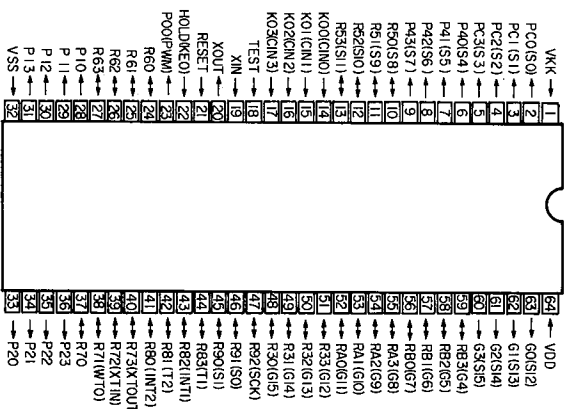
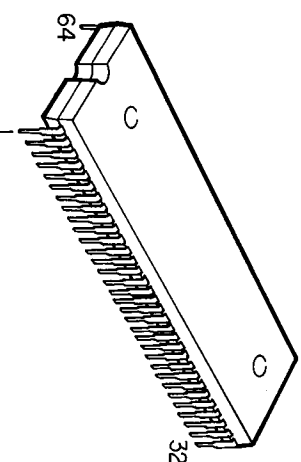
JPC1225H



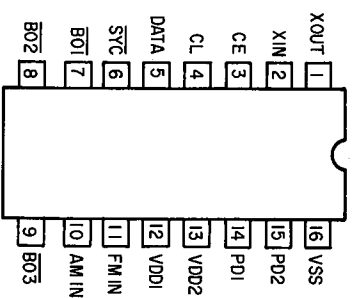
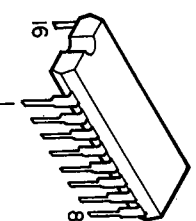
M-5218P
(Mitsubishi)



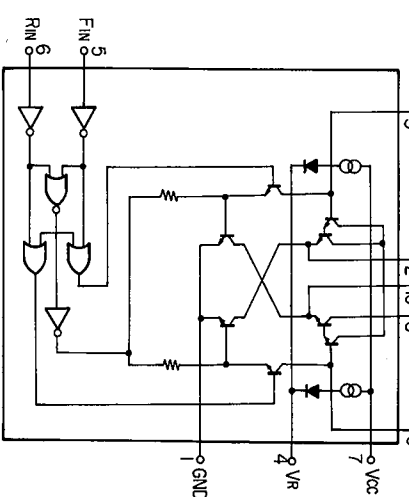
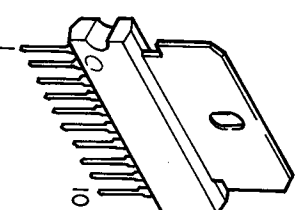
TMP47C670N



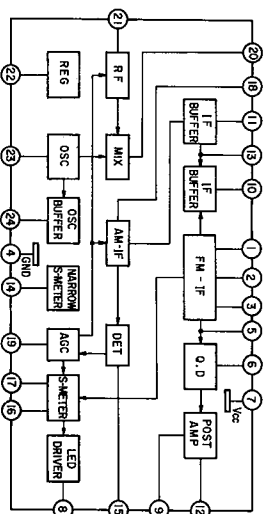
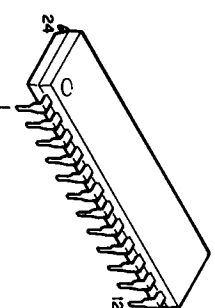
LM7001



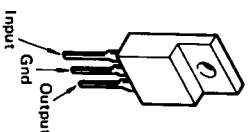
BA6109



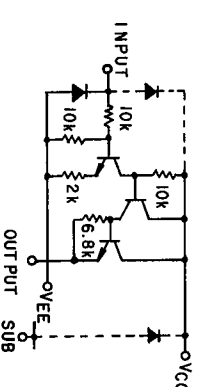
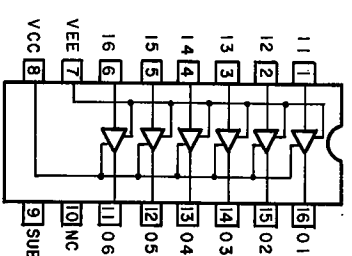
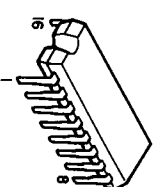
LA1266



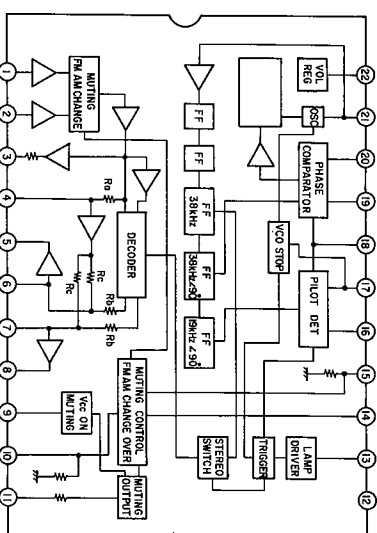
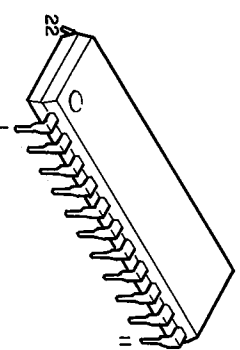
L78M06ML
NJM78M12FA



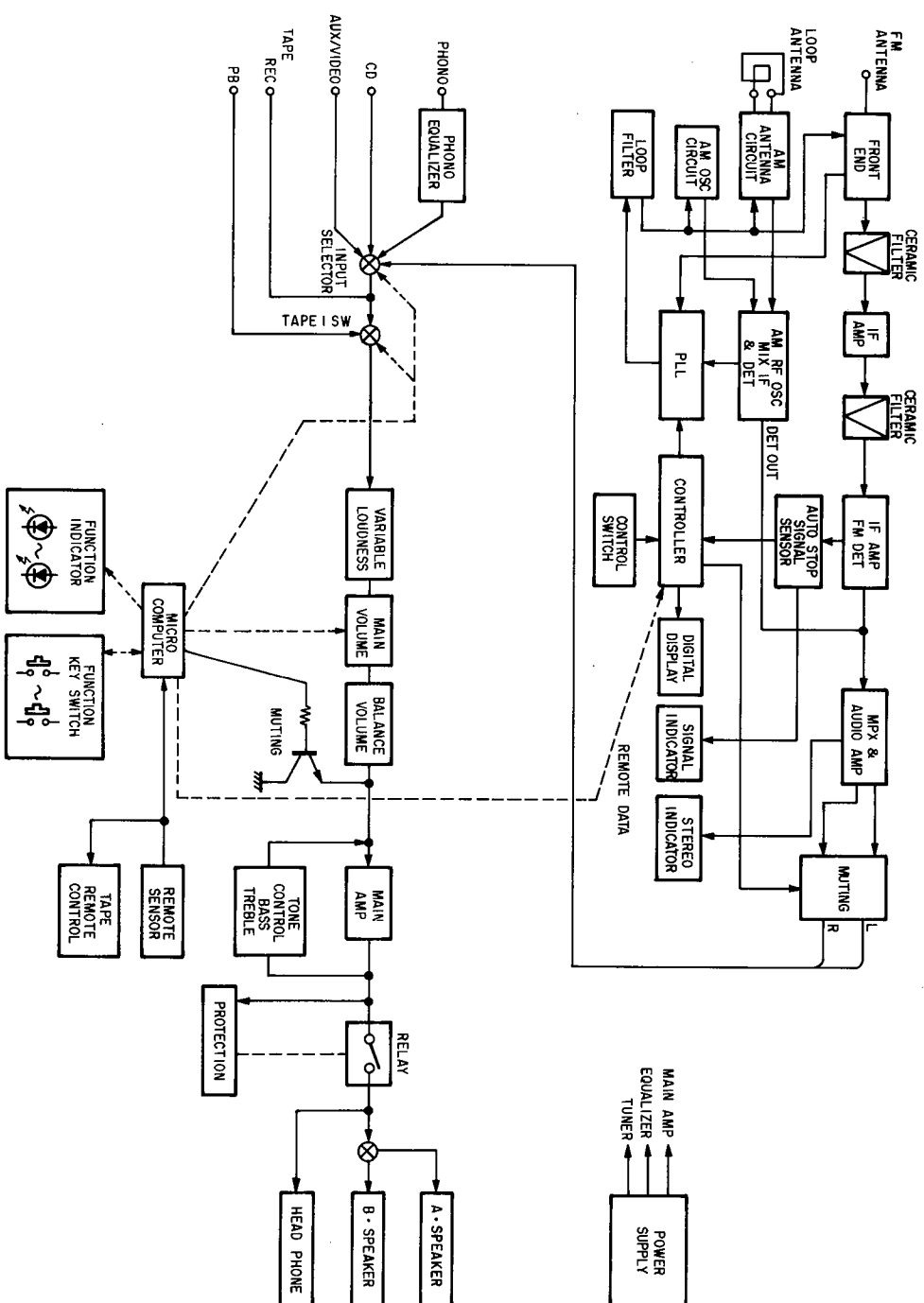
TD62706P



LA3401

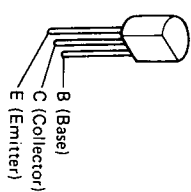


BLOCK DIAGRAM

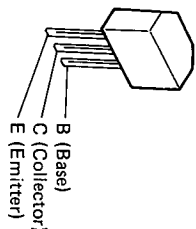


• Transistors

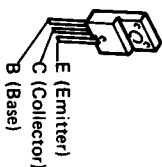
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2SC3853(O/P/Y/I/Z)



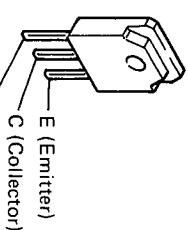
2SA1048(Y/GR)
2SC2458(Y/GR)
2SC2458(BL)
2SC2839(E)



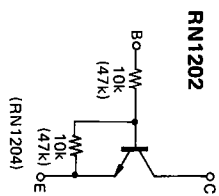
2SC3851(Y)/(G)
2SA1488(Y)/(G)



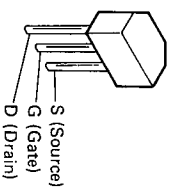
2SA1489(O/P/Y/I/Z)
2SC3853(O/P/Y/I/Z)



RN1202(10K-10K)
RN1204(47K-47K)
RN2202(10K-10K)
RN2204(47K-47K)

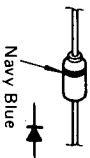


2SK365 (BL/GR)

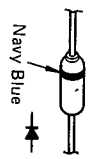


• Diodes & LED

1SS270A



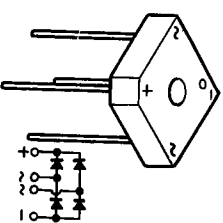
1S2076A



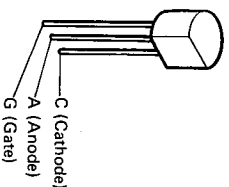
HZS6B-1 HZS16-3
HZS27-2 HZS6C-1
HZS27-1 HZS7B-2



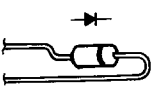
S4VB20



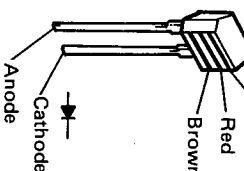
SF0R1A42



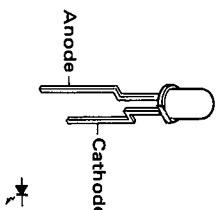
DSM1D2 (TYPE3)



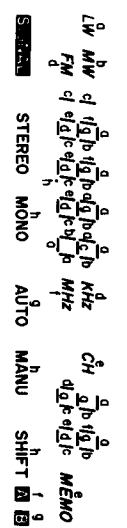
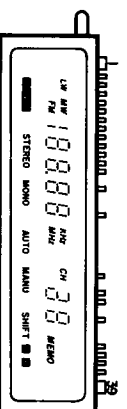
SVC321D2-S



SEL-2210R(TP-2)



FLD(FIP10TM7)

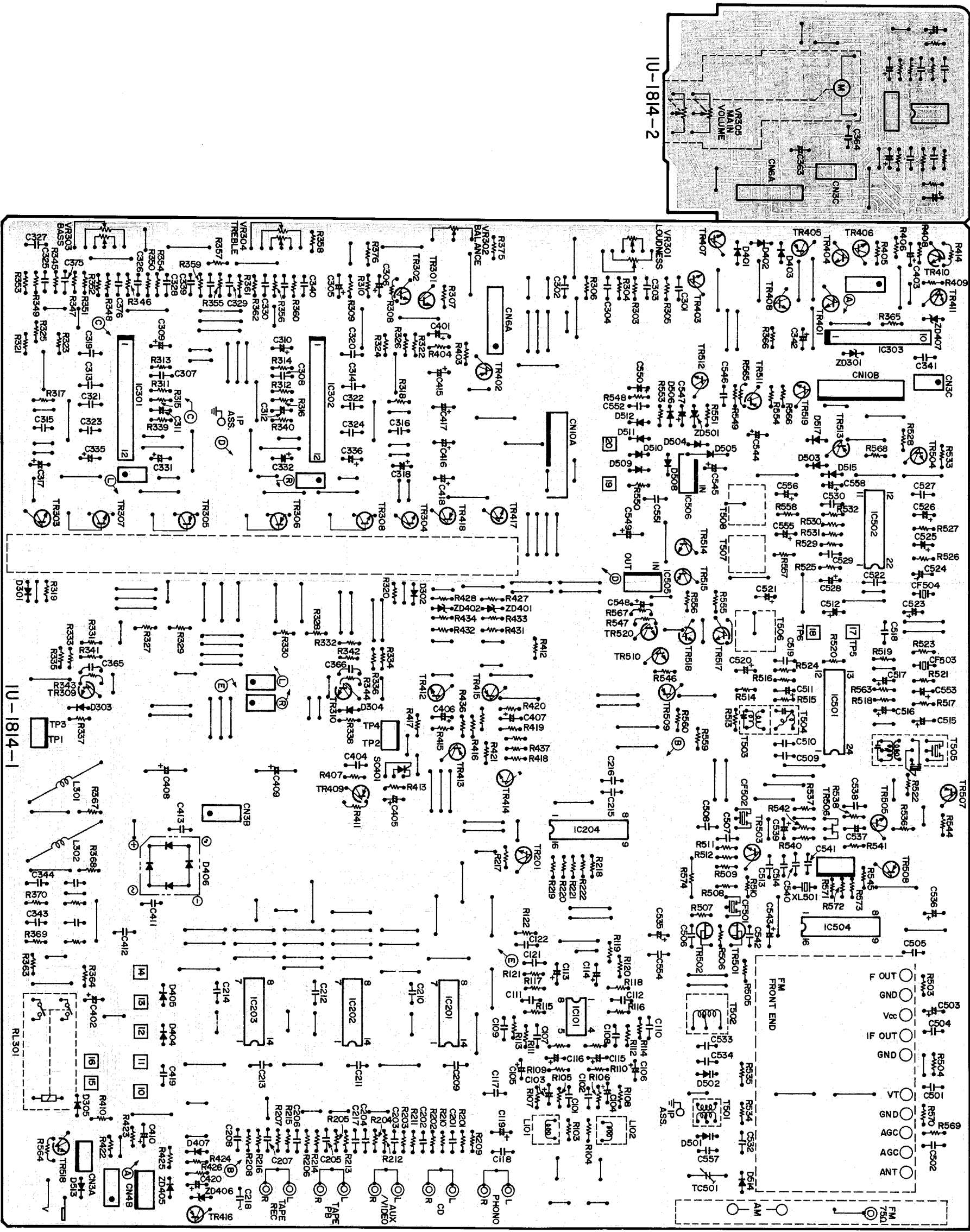


TERMINAL NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ELECTRODE	F	F	BG	P(h)	P(g)	P(f)	P(e)	P(d)	BG	P(c)	7G	P(b)	P(a)	6G	NP	5G	NP	4G	NP	3G
TERMINAL NO	21	22	23	24	25	16	27	28	29	30	31	32	33	34	35	36	37	38	39	
ELECTRODE	NP	NP	NP	NP	4G	NP	(Z)	3G	NP	2G	NP	NP	(Z)	1G	(Stereo)	(Signal)	F			

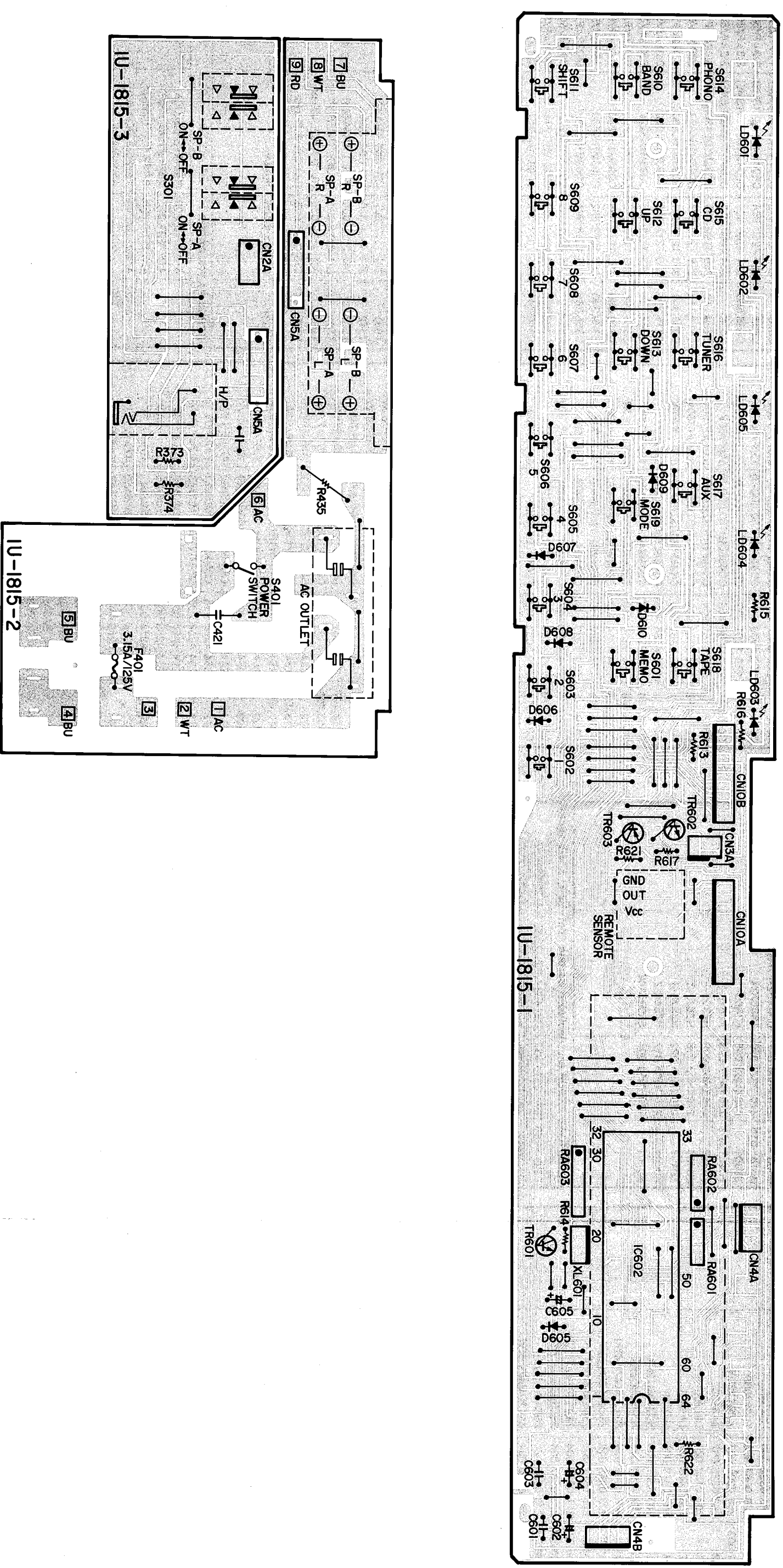
Notes: F: Filament NP: No Pin
G: Grid P: Anode

PRINTED WIRING BOARD PATTERNS

1U-1814 AMP TUNER UNIT




IU-1815 DISPLAY UNIT



1U-1815 DISPLAY UNIT PARTS LIST

Ref. No.	Part No.	Part Name	Remarks	Qty
	205 0343 032	3P CONN. BASE (KR-PH)		1
	205 0343 045	4P CONN. BASE (KR-PH)		1
	205 0321 041	4P CONN. BASE(RED)		1
	205 0375 000	10P CONN. BASE (KR-PH)		1
	205 0321 009	10P CONN. BASE (RED)		1
	203 0322 073	1P CONTACT ASSY		1

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC602	262 1143 001	TMP47C670N-1287	
TR601	273 0222 004	25C2458Y(GRI)	
TR602	269 0025 008	RN1202(10K-10K)	
TR603	269 0026 007	RN2202(10K-10K)	
D605~610	276 0432 000	1SS270A	
LD601~605	393 9416 005	SEL-2210R(TP2)	
RESISTORS GROUP			
R373,374	244 2052 931	RS14B3A391JST(S)	380ohm, 1W ±5%
R435	242 0073 000	RC05GF2H225K	2.2Mohm, 1/2W ±10%
R613	241 2403 031	RD14B2E104JT(5)	100kohm, 1/4W ±5%
R614	241 2400 034	RD14B2E662JT(5)	5.6kohm, 1/4W ±5%
R615,616	241 2397 040	RD14B2E331JT(5)	330ohm, 1/4W ±5%
R617	241 2400 092	RD14B2E103JT(5)	10kohm, 1/4W ±5%
R621	241 2400 092	RD14B2E103JT(5)	10kohm, 1/4W ±5%
R622	241 2398 052	RD14B2E102JT(5)	1kohm, 1/4W ±5%
R998,999	241 2400 092	RD14B2E103JT(5)	10kohm, 1/4W ±5%
RA601	246 2052 005	RK99 = =103JP4	10kohm
RA602	246 2053 004	RK99 = =103JP5	10kohm
RA603	246 2054 003	RK99 = =103JP7	10kohm
CAPACITORS GROUP			
C359~362	255 1120 084	CQ93M1H472J	4700PF/50V
C421	253 8014 702	CK45F2GAC103MC	0.01 μF/400V AC
C601	253 1181 904	CK45F1H103Z(DD-3)	0.01 μF/50V
C602	254 4250 042	CE04W0J831M(SME)	330 μF/6.3V
C603	253 1181 904	CK45F1H103Z(DD-3)	0.01 μF/50V
C604	254 4258 057	CE04W1V101M(SME)	100 μF/35V
C605	254 4260 045	CE04W1H010M(SME)	1 μF/50V
SWITCHES GROUP			
S301	212 1012 001	2P PUSH SW	SPEAKER
S401	212 4886 007	POWER SWITCH-5	
S601~619	212 4388 907	TACT SWITCH	
OTHER PARTS GROUP			
XL601	393 4043 004	FLD (FIP10TM7)	1
	412 2268 302	FLD BRACKET	1
	499 0088 002	GH3031HO	1
	399 0034 002	CST 4.00MG	1
F401	206 1039 089	FUSE 3.15A	1
	202 0022 008	FUSE HOLDER	2
	203 3941 008	AC OUTLET(2P)	1

WARNING:
Parts marked with this symbol  have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

Ref. No.	Part No.	Part Name	Remarks	Qty
	204 8167 000	HEADPHONES JACK	U.S.A.	1
	205 0472 000	8P SP TERMINAL		1
	205 0185 025	2P WIRE HOLDER		1
	205 0185 054	5P WIRE HOLDER		2
	205 0343 032	3P CONN. BASE (KR-PH)		1
	205 0343 045	4P CONN. BASE (KR-PH)		1
	205 0321 041	4P CONN. BASE(RED)		1
	205 0375 000	10P CONN. BASE (KR-PH)		1
	205 0321 009	10P CONN. BASE (RED)		1

1U-1814C AMP TUNER UNIT PARTS LIST
(for ASIA)
[Same as 1U-1814 (for U.S.A.) except the followings.]

Ref. No.	Part No.	Part Name	Remarks
CAPACITORS GROUP			
C629,630	253 4453 901	CC45SL1H511JT	510PF/50V C
SWITCH			
S510	212 4293 005	SLD SWITCH	A
OTHER PARTS			
	205 0321 038	3P CONN. BASE (RED)	A 1

NOTE: A:ADD C:CHANGE D:DELETE

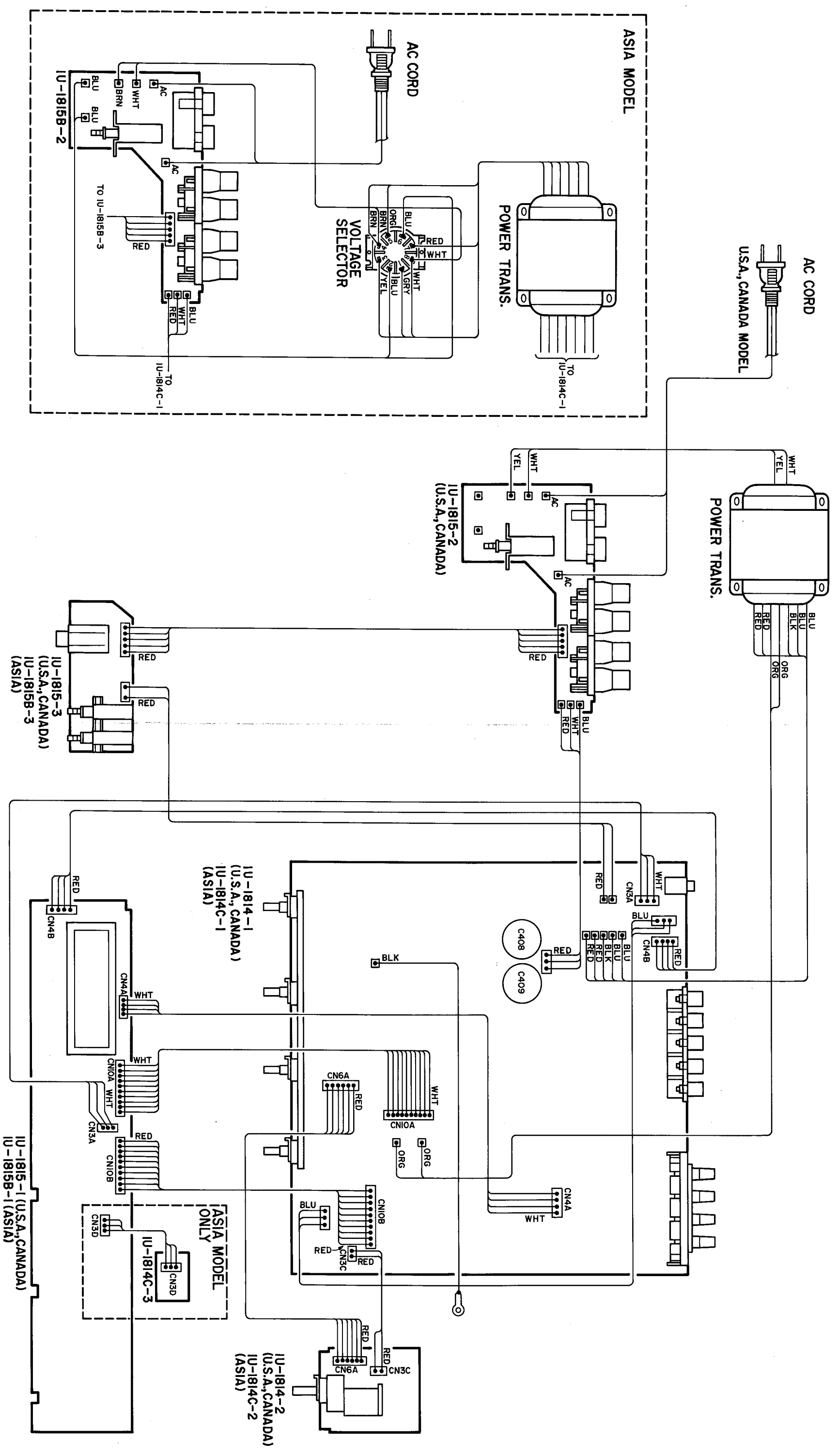
1U-1815B DISPLAY UNIT PARTS LIST
(for ASIA)

[Same as 1U-1815 (for U.S.A.) except the followings.]

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
D601	276 0432 000	1SS270A	A
D612	276 0432 000	1SS270A	A
RESISTORS GROUP (not included Carbon Film ±5%, 1/4W type)			
R435	242 0073 000	RC05GF2H225K	2.2Mohm 1/2W ±10% D
OTHER PARTS GROUP			
F402	415 0299 000	CONDENSER COVER	C-421 A 1
	206 1015 016	FUSE (1.25A)	A 1
	202 0022 008	FUSE HOLDER	C 4
	513 1451 073	FUSE LAYEL	F402 A 1
	205 0321 038	3P CONN.BASE (RED)	1.25A, 250V CN3D A 1




NOTE: A:ADD C:CHANGE D:DELETE

WIRING DIAGRAM



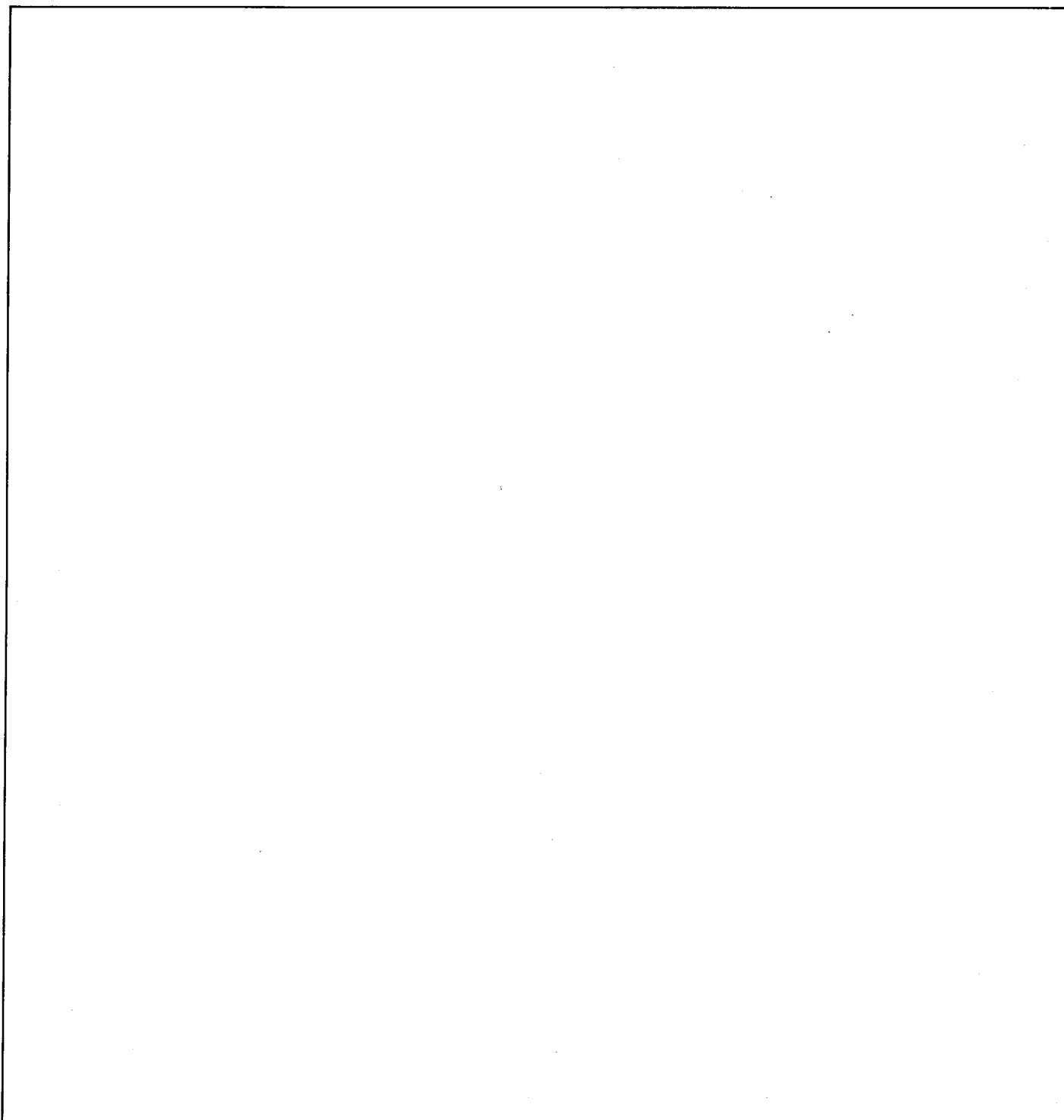
ADDENDUM LIST

WARNING:
 Parts marked with this symbol  have critical characteristics.
 Use ONLY replacement parts recommended by the manufacturer.

Ref. No.	Part Name & Description	Part No.			
		CANADA	ASIA		
1	AMP TUNER UNIT	1U-1814	1U-1814C		
2	DISPLAY UNIT	1U-1815	1U-1815B		
9	BACK PANEL	1050826204	1050826233		
 12	AC CORD (POLARIZED) AC CORD	2062060002 —	— 2006031026		
 16	POWER TRANS	2335730001	2335732009		
 62	VOLTAGE SEL SWITCH	—	2129555007		
63	PRESET LABEL	—	5158030008		
101	TAPPING SCREW(S) (BLACK) 3×6	4737002034(14)	4737002034(16)		
112	CROSS-RECESSED HEAD MACHINE SCREW 2.6×4	—	4713201024(2)		
	UL LABEL	—	—		
203	DAI WARRANTY HOME DCI WARRANTY	— 5150388004	— —		
215	INST. SHEET	—	5111845007		

- Note 1. See addendum list above for the parts with asterisk (*) on the Ref. No. and the other parts not included in the list.
 2. ★ marked not included EXPLODED VIEW OF CHASSIS AND CABINET.
 3. This list is prepared based on U.S.A. BLACK VERSION.

DENON



NIPPON COLUMBIA CO. LTD.

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TLX: JAPANOLA J22591

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