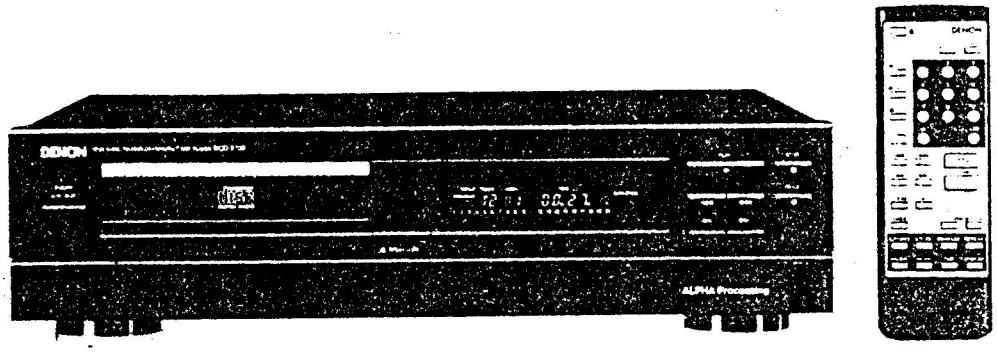
DENON

Hi-Fi Component

SERVICE MANUAL

MODEL DCD-2700

STEREO CD PLAYER



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NIPPON COLUMBIA CO., LTD.

IMPORTANT TO SAFETY

WARNING:

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

CAUTION:

1. **Handle the power supply cord carefully**
   Do not damage or deform the power supply cord. If it is damaged or deformed, it may cause electric shock or malfunction when used. When removing from wall outlet, be sure to remove by holding the plug attachment and not by pulling the cord.
2. **Do not open the top cover**
   In order to prevent electric shock, do not open the top cover. If problems occur, contact your DENON DEALER.
3. **Do not place anything inside**
   Do not place metal objects or spill liquid inside the CD player. Electric shock or malfunction may result.

Please, record and retain the Model name and serial number of your set shown on the rating label.

Model No. DCD-2700 Serial No. _____

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 of 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 of the presence of important operating and maintenance (servicing) instruction in the literature accompanying the appliance.

IMPORTANT (BRITISH MODEL ONLY)

The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral Brown: Live

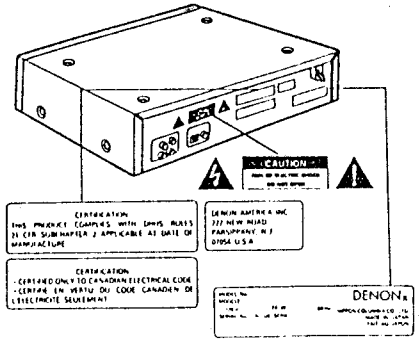
The colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

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.

NOTE:
This CD player uses the semiconductor laser. To allow you to enjoy music at a stable operation, it is recommended to use this in a room of 5°C (41°F) – 35°C (95°F).

LABELS (for U.S.A. model only)



CAUTION:
USE OF CONTROLS OR ADJUSTMENTS OR REFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

THE COMPACT DISC PLAYER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.

NOTE:
This unit may cause interference to radio and television reception if you do not operate it in strict accordance with this OPERATING INSTRUCTIONS.

This unit complies with Class B computing device rules in accordance with the specifications in Sub part J or Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. If the unit does cause interference to any radio or television reception, try to reduce it by one or more of the following means:

a) Turn the other unit to improve reception
b) Move this unit
c) Move this unit away from others
d) Plug this unit respectively into a different AC outlet

* This is note in accordance with Section 15.838 of the FCC Rules.

* FOR U.S.A. & CANADA MODEL ONLY

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.

* POUR LES MODELES AMERICAINS ET CANADIENS UNIQUEMENT

ATTENTION

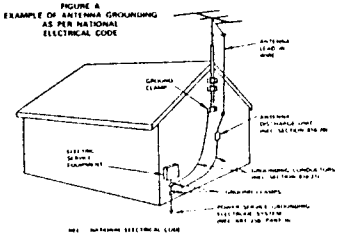
POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

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.

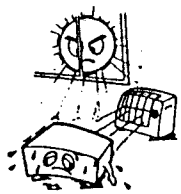
6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

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 – Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

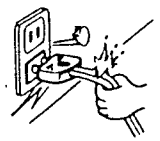


12. Power-Cord Protection – Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
14. Cleaning – The appliance 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. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard 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.

NOTE ON USE/OBSERVATIONS RELATIVES A L'UTILISATION/NOTAS SOBRE EL USO

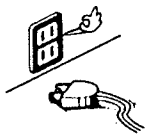


- Avoid high temperatures
  Allow for sufficient heat dispersion when installed on a rack.
- Eviter des températures élevées
  Tenir compte d'une dispersion de chaleur suffisante lors de l'installation sur une étagère.
- Evite altas temperaturas
  Permite la suficiente dispersión del calor cuando está instalado en la consola.

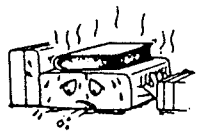


- Handle the power cord carefully. Hold the plug when unplugging the cord.
- Manipuler le cordon d'alimentation avec precaution.
  Tenir la prise lors du débranchement du cordon.
- Maneje el cordón de energía con cuidado.
  Sostenga el enchufe cuando desconecte el cordon de energía.

- Keep the set free from moisture, water, and dust.
- Protéger l'appareil contre l'humidité, l'eau et la poussière.
- Mantenga el equipo libre de humedad, agua y polvo.



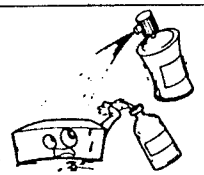
- Unplug the power cord when not using the set for long periods of time.
- Débrancher le cordon d'alimentation lorsque l'appareil n'est pas utilisé pendant de longues periodes.
- Desconecte el cordón de energía cuando no utilice el equipo por mucho tiempo.



*(For sets with ventilation holes)

- Do not obstruct the ventilation holes.
- Ne pas obstruer les trous d'aération.
- No obstruya los orificios de ventilación.

- Do not let foreign objects in the set.
- Ne pas laisser des objets étrangers dans l'appareil.
- No deje objetos extraños dentro del equipo.



- Do not let insecticides, benzene, and thinner come in contact with the set.
- Ne pas mettre en contact des insecticides, du benzène et un diluant avec l'appareil.
- No permita el contacto de insecticidas, gasolina y diluyentes con el equipo.

- Never disassemble or modify the set in any way.
- Ne jamais démonter ou modifier l'appareil d'une manière ou d'une autre.
- Nunca desarme o modifique el equipo de ninguna manera.

Thank you for purchasing this DENON Compact Disc Player. Please read the operating instructions thoroughly in order to acquaint yourself with the CD player and achieve maximum satisfaction from it.

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Please check to make sure the following items are included with the main unit in the carton:

(1) Operating Instructions 1
(2) Connection Cord 1
(3) Remote Control Unit RC-240 1
(4) R6P AA Dry Cell Battery 2

FEATURES

The DCD-2700 is a CD player equipped with Denon's unique lambda super linear converter which eliminates loss of sound quality in the PCM playback section, plus carefully selected parts. It reproduces all the sounds of the studio or hall where the compact disc was recorded with high performance and rich musical expression.

(1) **Ultimate signal reproduction using a newly developed ALPHA processor**
   1. High speed interpolation by the newly developed ALPHA processor recreates the data below the LSB (least significant bit) lost upon recording to provide smooth waveform reproduction.
   2. The original signals, including such unusual waveforms as impulse response, can also be reproduced with no ringing.
   3. The effects of ALPHA processing are particularly noticeable at low levels, such as when music gently fades out or gradually emerges from total silence.

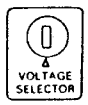
(2) **Real 20-bit S.L.C.**
   The DCD-2700 uses a new "S.L.C." (super linear converter) circuit in effect eliminating zero cross distortion, the main cause of loss of sound quality in the PCM playback section. Together with a real 20-bit digital/analog converter with excellent resolution, it greatly improves music reproducibility, especially at low volumes.
   In addition, two digital/analog converters are used for each channel, and the 16-times oversampling further reduces noise and improves resolution to recreate sound fields with rich musical expression.

(3) **Brawny power source**
   The DCD-2700 uses a large transformer with independent coils for the digital servo circuitry and audio circuitry.
   In conjunction with a high capacity smooth capacitor, this offers power with room to spare.

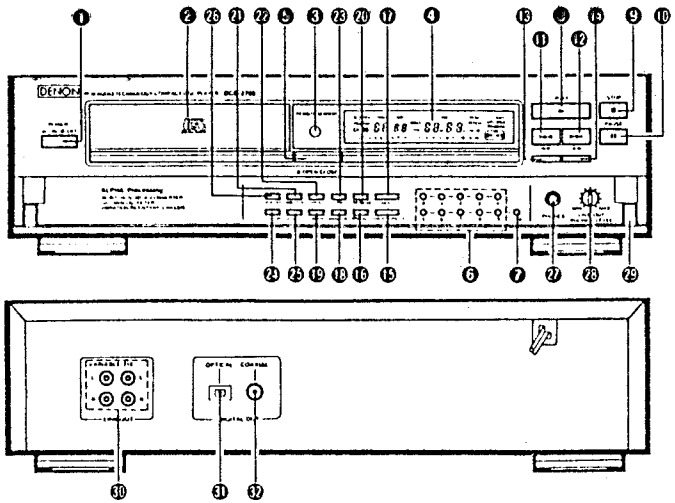
(4) **A wealth of functions**
   The DCD-2700 is equipped with a wide variety of functions, including such editing functions as time editing, auto editing, peak search and fading, as well as pitch control and remote control volume adjustment.

(5) **Simple design**
   Controls for seldom used functions are hidden behind a trap door to keep the appearance simple and elegant.

- **Line Voltage Selection (for multiple voltage model only)**
  - The desired voltage may be set with the VOLTAGE SELECTOR knob on the rear panel, using a screwdriver.
  - Do not twist the VOLTAGE SELECTOR knob with excessive force as this may cause damage.
  - If the VOLTAGE SELECTOR knob does not turn smoothly, please contact a qualified serviceman.



NAMES AND FUNCTIONS OF PARTS

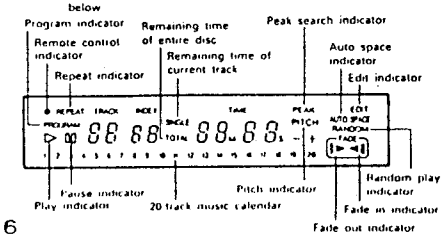


❶ Power Switch (POWER)
- When the power is turned on, "00" appears at the track number display, and if no disc is loaded, "00:0000" appears on the number display and the calendar lights.
- If a disc is loaded when the power is turned on, in several seconds the total number of tracks on the disc appears at the track number display, the total time appears at the time display, and the numbers on the calendar display light up to the total number of tracks on the disc, then playback starts.

❷ Disc Holder
- This is where the disc is loaded.
- Press the disc holder open/close button ❺ (▲ OPEN/CLOSE) to open and close the disc holder.
- The disc holder is also closed if the play button ❽ (▶ PLAY), pause button ❾ (II PAUSE), or one of the number buttons ❻ is pressed.

❸ Remote Control Sensor(REMOTE SENSOR)
- This is the sensor for the wireless remote control signals.
- For remote control, point the supplied remote control unit RC 240 towards this sensor.
- When a signal is transmitted from the remote control unit, the remote control indicator in the display ❹ will light up briefly.

❹ Display Window
- The digital display is divided into sections, such as displays for track number, index, playback time and calendar, as shown below.



❺ Disc Holder Open/Close Button (▲ OPEN/CLOSE)
- Press this to open and close the disc holder ❷.
- When pressed, the disc holder ❷ opens. When pressed again, the disc holder ❷ closes.
- If a disc is loaded, the total number of tracks on the disc and the total playing time appear on the display window ❹ several seconds after the disc holder ❷ is closed.

❻ Number Buttons (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9)
- Use these buttons for the direct search and program memory functions.
  For direct search, press for example button [3] if you want to hear track number 3. For track number 12, press [+10] then [2].
  To program tracks, press the PROG/DIRECT button ⓯ to set to the program mode.

❼ +10 Button (+10)
- Press this button first when selecting track numbers over 10. Use it together with the number buttons ❻. For example, to select track number 15, press [+10] then [5].
  For track number 33, press [+10] three times, then press [3].

❽ Play Button (▶ PLAY)
- Press this button to start playback of a disc.
- When this button is pressed, [▶] is displayed, and the track number being played is displayed together with the elapsed playback time of the track.
- Tracks are shown on the calendar display. Once a track has been played, the corresponding track number goes out on the calendar display.

❾ Stop Button (■ STOP)
- Press this button to stop playback.
  The disc will stop rotating, and the number of tracks and total playing time of the disc are displayed on the TRACK NO. and TIME displays, respectively.
- In case programmed playback is engaged when this button is pressed, the number of tracks and total playing time of the program are displayed.

❿ Pause Button (II PAUSE)
- Press this button to interrupt playback momentarily.
- When pressed during playback, playback stops, the [▶] indicator turns off, and the [II] indicator lights.
- To cancel the pause mode, either press the play button ❽ or press the pause button ❾ again.

⓫ Automatic Search Reverse Button (⏮)
- Press this button to return the pickup to the beginning of the present track. Press again to return to other tracks.
- By pressing the button a number of times, the pickup will move back the corresponding number of tracks.

⓬ Automatic Search Forward Button (⏭)
- Press this button to move the pickup forward to the beginning of the next track. Press again to move ahead to other tracks.
- By pressing the button a number of times, the pickup will advance the corresponding number of tracks.

⓭ Manual Search Reverse Button (◀◀)
- Press this button during playback for fast reverse search. As long as the button is kept pressed, music signals are played back faster than normal.
- Pressing this button when the pause mode is engaged, you can quickly reverse the pickup to a desired position, three times faster compared to manual reverse search during playback. During this time, no sound is heard.

⓮ Manual Search Forward Button (▶▶)
- Press this button during playback for fast forward search. As long as the button is kept pressed, music signals are played back faster than normal.
- Pressing this button when the pause mode is engaged, you can quickly forward the pickup to a desired position, three times faster compared to manual forward search during playback. During this time, no sound is heard.

⓯ Program/Direct Button (PROG/DIRECT)
- Press this button when you want to enter tracks for programmed playback. (Refer to page 9, 10 for details.)

⓰ Repeat All/1 button (REPEAT ALL/1)
- Press to play repeatedly.
  When pressed once, the [REPEAT] indicator lights and all tracks on the disc are played repeatedly. When pressed again, only one number is displayed on the calendar display, and only that track is repeated.
  When pressed a third time, the [REPEAT] indicator turns off and the repeat mode is cancelled.
  Only the all track repeat mode will function during programmed playback.

⓱ Index button (INDEX)
- Press this button to start playback from an index number within the track.
  Use the number buttons to specify the desired index number. (See Page 9.)

⓲ Random Play Button (RANDOM)
- Press this button to play the tracks on the disc in random order.

⓳ Fader Button (FADER)
- Press to perform fade out or fade in. (Refer to Page 12).

⓴ Time/Side A/B button (TIME/SIDE A/B)
- Press this button to switch between the displays for side A and B of the tape during the time editing operation. (Stop only)
- Use this button to switch the time display between the elapsed time for the track being played, the remaining time for the track being played, and the total remaining time. (During play or when stopped.)

  Normally the elapsed time for the track being played is displayed. If the button is pressed once, the [SINGLE] indicator lights and the display changes to the remaining time for the track being played. If pressed again, the [SINGLE] indicator turns off, the [TOTAL] indicator lights, and the total remaining time is displayed. If pressed once again, the [TOTAL] indicator turns off and the display returns to the elapsed time for the track being played.
  During program playback, the total remaining time for all programmed tracks is displayed when the [TOTAL] indicator is lit.

㉑ Time Edit Button (TIME EDIT)
- Press this button to edit in conjunction with the tape time. (Refer to Page 12.)

㉒ Pick Button (PICK)
- Press this button when substituting a track with the time edit. (Refer to Page 12, 13.)

㉓ Link Button (LINK)
- Press this button when editing spans a number of discs. (Refer to Page 13.)

㉔ Pitch – Button (PITCH –)
- Press this button to slow down the playing speed. (Refer to Page 14.)

㉕ Pitch + Button (PITCH +)
- Press this button to make the playing speed faster. (Refer to Page 14.)

㉖ Display Button (DISPLAY)
- Press this button to change the brightness of the display.
- Press once to make the display 2/3 as bright as normal.
- Press again to make the display 1/3 as bright as normal.
- Press once again to turn the entire display off during playback and all but the track number off in any other mode.

㉗ Headphones Jack (PHONES)
- Use this jack to plug in headphones. (Headphones are sold separately.)

㉘ Volume Adjust Control (LINE OUT)
- Use this to adjust the output level (volume) of the headphones or the line out (VARIABLE) output level.
- This operation is also possible using the included remote control unit (RC 240). (Refer to Page 17.)

㉙ Trap Door
- Press the right edge to open the door.
- To close it, press on the right edge. A click is heard to indicate that the door is closed.

㉚ Output Terminal (FIX and VARIABLE)
- Connect these to the amplifier's input jacks. (Refer to page 6.)

㉛ Digital Output Jack (OPTICAL)
- Digital data is output in optical form from this jack.
- Contact your nearest Denon Consumer Center or office for information on the optical fiber cable to be used for connection.

㉜ Digital Output Jack (COAXIAL)
- This jack outputs digital data.
- We recommend using a 75 ohms pin cord (available in stores) for connections.

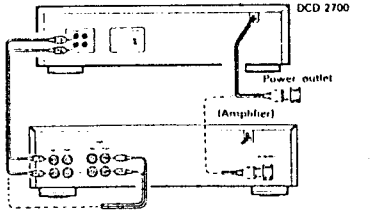
Continuous Operation
If the automatic search reverse button ⓫, the automatic search forward button ⓬, the pitch – button ㉔, the pitch + button ㉕ or the +10 button ❼ are held in, the function of that button will be repeated.

CONNECTION

(1) Connections to the Output Jacks (FIX and VARIABLE)

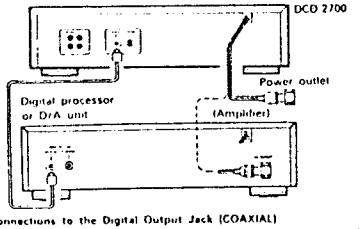
Using the included pin cords, connect the left (L) and right (R) output jacks (FIX and VARIABLE) on the DCD-2700 to the left (L) and right (R) CD, AUX, or TAPE PLAY input jacks on an amplifier.

There are two types of output jacks. The output is variable for the VARIABLE jacks, and fixed for the FIX jacks. If you want to be able to control the output level on the DCD-2700, use the VARIABLE jacks.



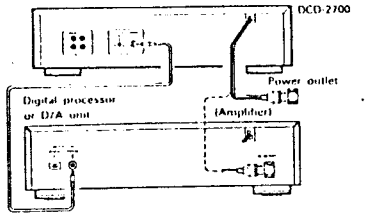
(2) Connections to the Digital Optical Output Jack (OPTICAL)

Use an optical fiber cable to connect the digital optical output jack on the DCD-2700 to the optical input jack on a digital processor or D/A unit.



(3) Connections to the Digital Output Jack (COAXIAL)

Use a 75 ohm pin cord to connect the digital output jack (COAXIAL) of the DCD-2700 to the digital input jack (COAXIAL) on a digital processor or D/A unit, available in stores.



Connection Precautions

- Before proceeding with connections or disconnections of cables and power cords, be sure to turn all system components off.
- Ensure that all cables are connected properly to the L (left) and R (right) jacks.
- Insert plugs fully into the terminals.
- Connect the output jacks to the amplifier CD, AUX or TAPE PLAY input jacks.

OPENING AND CLOSING THE DISC HOLDER AND LOADING A DISC

Opening and closing the disc holder (This operation only works while the power is on.)

1 Press the power switch (POWER) to turn on the power.
2 Press the open/close button (⏏ OPEN/CLOSE).

How to load a disc

- Make sure the disc holder is completely open.
- Hold the disc by the edges and place it on the disc tray. (Do not touch the signal surface, i.e., the glossy side.)
- When using 12 cm. diameter discs, make sure the outer edge matches the tray guide circumference (Fig. 1), and when using CD singles (8 cm. diameter) match the outer edge with the inner tray guide circumference (Fig. 2).
- Press the open/close button (⏏ OPEN/CLOSE) to close the disc holder.
- When the disc holder is closed, the disc is read and after a few seconds the number of tracks and total playing time are displayed on the TRACK NO. and TIME displays, respectively.
- When the disc holder is open and a disc is loaded, you may also press the play (▶ PLAY) or pause (⏸ PAUSE) button to close the disc holder. (If the play button (▶ PLAY) is pressed, playback will start immediately upon the disc contents having been read.)

Fig. 1 Tray guide for 12 cm disc

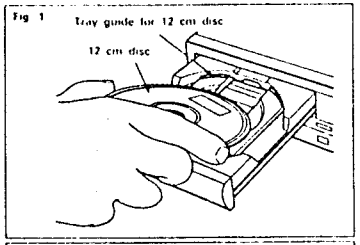
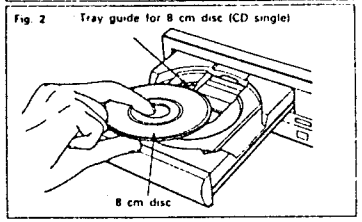


Fig. 2 Tray guide for 8 cm disc (CD single)

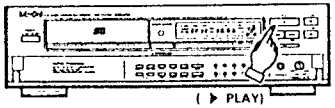


Caution:

- If your finger should get caught in the disc holder when it closes, press the open/close button (⏏ OPEN/CLOSE).
- Do not place any foreign objects on the disc tray, and do not place more than one disc on the tray at a time. Otherwise malfunction may occur.
- Do not push on the disc tray manually when the power is off as this may cause malfunction and damage the CD player.

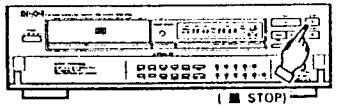
NORMAL CD PLAYBACK

(1) Starting Playback



1 Turn the power switch on and load the disc.
2 Press the play button (▶ PLAY).
- The number of the track currently playing, the index number, and the elapsed time, etc., are displayed.

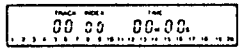
(2) Stopping Playback



1 Press the stop button (■ STOP).
- The stop mode is set automatically once all tracks on the disc are played.

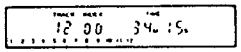
NOTE:

- If no disc is loaded or if the disc is loaded upside down, the track number, index, and time displays will all read zero, and the entire calendar will light.

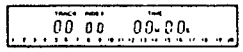


- If the information at the innermost side of the disc cannot be read properly due to dirt or scratches, the display will be as shown below, and the number of tracks and remaining time per track will not be displayed. Also, the search operation may take longer than usual.

When normal

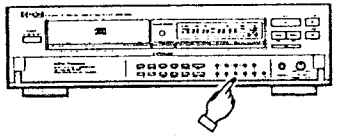


When data cannot be read properly



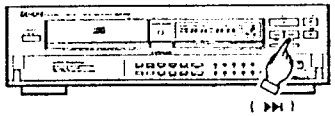
ADVANCED CD PLAYBACK

❶ Playing a Specific Track ..... Direct Search

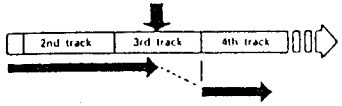


① Use the number buttons and the +10 button to input the number of the desired track.
For example, to play the fourth track press [4], and to play the 12th track press [+10] and [2]. The beginning of the track is found and playback starts.

❷ Moving to Following Tracks During Playback ..... Automatic Search

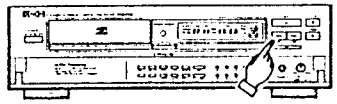


Press the automatic search forward button (⏭)

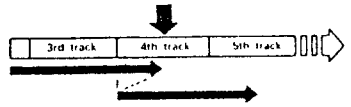


① Press the automatic search forward button (⏭).
- If the automatic search forward button (⏭) is pressed again during the search operation, the pickup moves on to the next track, etc.

❸ Returning to the Beginning of the Current Track ..... Automatic Search



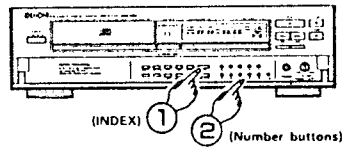
Press the automatic search reverse button (⏮)



① Press the automatic search reverse button (⏮).
- If the automatic search reverse button (⏮) is pressed again during the search operation, the pickup moves on to the previous track, etc.

❹ Finding Sections Within a Track ..... Index Search

- Use this function to start playback from certain sections within a track divided by index numbers.



① Press the INDEX button. "--" appears at the TRACK NO. display.
② Use the number buttons to specify the track number.
"--" now appears at the INDEX display. Input the desired index number. Playback starts from there.
For example, to start listening from index number 2 on track 3, press INDEX, 3 and 2.

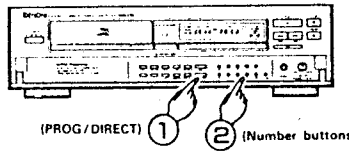
Indexes

- Indexes are numbers which are assigned to sections within a track. Check the disc's explanatory notes for the index numbers.
- If you make an index search for an index number that is not on the disc, playback will start from the last index number on the track.

❺ Playing Specific Tracks in a Specific Order ..... Programmed Play

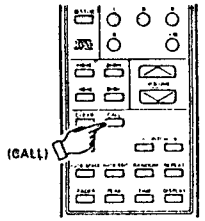
- With this function, you can choose any of the tracks on the disc and program them to play in any order.
- Programming is possible with the disc holder open.
- Up to 20 tracks can be programmed.
- The programmed tracks are shown on the calendar.

(1) Programming



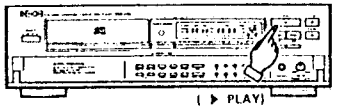
- The [PROGRAM] indicator lights when the program/direct button (PROG/DIRECT) is pressed. Next, use the number buttons and the +10 button to program the tracks.
To program tracks 3, 12, and 7, for example, press [PROG/DIRECT], [3], [+10], [2], and [7].
The track number lights on the calendar each time a track is programmed. The number of tracks programmed is displayed at the index display, and the total playing time for the programmed tracks is indicated at the time display. After the tracks are programmed, the total number of programmed tracks is displayed at the track number display, and the total playing time for the programmed tracks is indicated at the time display.

(2) Checking the Programmed Tracks (Remote control only)



- Press the CALL button.
  The programmed tracks are displayed in order on the TRACK NO. display each time the CALL button is pressed.

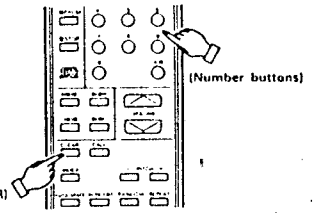
(3) Playing the Programmed Tracks



- Press the (▶ PLAY) button to play the tracks in the programmed order.

(4) Correcting Programs

(Remote control only)



- To correct a programmed track, first press the CLEAR button, then program the correct track.
  The last track programmed is replaced with the correct track.
- To clear a track in the middle of the program, use the CALL button to call out that track, then press the CLEAR button to clear it from the program.

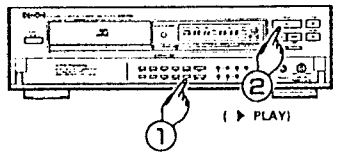
(5) Clearing the Entire Program

- Press the PROG/DIRECT button once again to clear the entire program.
  The entire program can also be cleared by pressing the OPEN/CLOSE button.
- If the PROG/DIRECT button is pressed during programmed playback, the program mode is cleared and normal playback continues from that track on.

NOTES

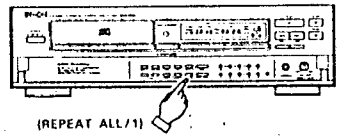
- If the programming operation is performed in the play or pause mode, the current track is programmed as the first track in the program. Other programs can be added, but the number of programmed tracks and playing time will not be displayed.
- Direct search is not possible during programmed playback. Pressing the number buttons adds tracks to the end of the program.
- Programming is also possible when the disc holder is open. A track number greater than the number of tracks on the disc can be set in the program, but it will automatically be cleared from the program before playback starts.
- The remaining time per track can only be displayed for the first 20 tracks on the disc.
- The total program time and remaining program time as well will not be displayed if tracks numbers greater than 20 are programmed.

❺ Playing All Tracks Repeatedly ..... Repeat Playback

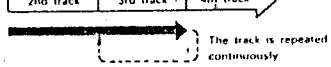


- Press the REPEAT ALL/1 button. The [REPEAT] indicator lights.
- The operation is the same whether button ① or ② is pressed first.
- The one track repeat mode is set if the REPEAT ALL/1 button is pressed again during repeat playback.
- The all track repeat mode is set even if the REPEAT ALL/1 button is pressed during playback.
- To cancel the repeat mode, press the REPEAT ALL/1 button twice.
- If the REPEAT ALL/1 button is pressed during programmed playback, the tracks are repeated in the programmed order.

❼ Playing a Single Track Repeatedly ..... One track Repeat



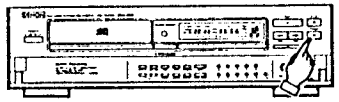
Press the REPEAT ALL/1 button twice.



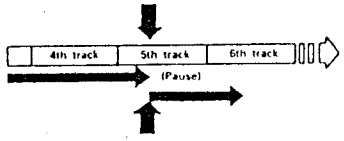
- Press this button when you hear a track you want to play repeatedly.
- Press the REPEAT ALL/1 button twice during playback. The [REPEAT] indicator lights, and if you are at track number 20 or less, that number appears on the calendar display and that track is played repeatedly.
- For track numbers 21 and above, the track number is not displayed on the calendar display but the one-track repeat mode will function.
- If the REPEAT ALL/1 button is pressed twice in the stop mode, track number 1 appears on the calendar display and one track repeat is possible. Press the PLAY button to start playback.
- Press the REPEAT ALL/1 button once again to cancel the one-track repeat mode. The display and playback return to normal.

❽ Stopping Momentarily During Playback ..... Pause

- Playback can be stopped momentarily then resumed from the same point.



① Press the pause button (II PAUSE).



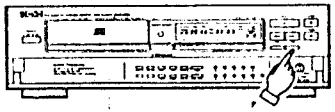
② Press the play button (▶ PLAY) or the pause button (II PAUSE).

- To resume playback, press either the play button (▶ PLAY) or the pause button (II PAUSE).

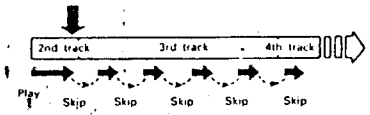
❾ Finding a Track While Listening at High Speed ..... Manual Search

- You can skip through the disc while listening at high speed.
  This function comes in handy for finding a certain part in the middle of a long track and starting playback from there.
- Once you find the desired position using the manual search operation, release the manual search forward button (▶▶) or manual search reverse button (◀◀) to start normal playback.

(1) Manual Search Forward



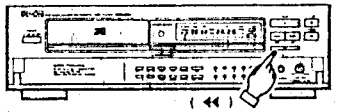
Hold in the manual search forward button (▶▶)



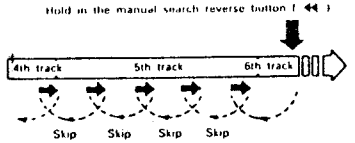
① During playback, press and hold in the manual search forward button (▶▶) to skip through the disc while listening at high speed.

- The number of the track being skipped through, the index, number, and the elapsed time for that track are indicated on the display window.
- In the pause mode, the disc moves at about three times the speed as during the play mode, but no sound is heard.
- When the end of the last track is reached while pressing the manual search forward button (▶▶), "⟩⟩" appears on the display window and the manual search operation is stopped.
  To resume playback, press the manual search reverse button (◀◀), then do another operation once the "⟩⟩" disappears from the display.

(2) Manual Search Reverse



Hold in the manual search reverse button (◀◀)



① During playback, press and hold in the manual search reverse button (◀◀) to skip through the disc while listening at high speed.

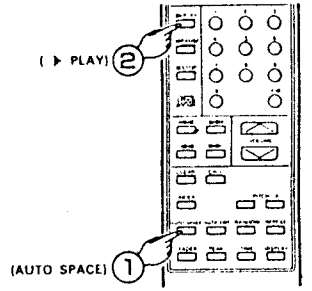
- The display is the same as during the manual search forward operation.

- In the pause mode, the disc moves at about three times the speed as during the play mode, but no sound is heard.
- When the beginning of the first track is reached while pressing the manual search reverse button (◀◀), "⟨⟨" appears on the display window and the manual search operation is stopped.
  To resume playback, press the manual search forward button (▶▶), then do another operation once the "⟨⟨" disappears from the display.

❿ Inserting Blanks Between Tracks ..... Auto Space

(Remote control only)

- This function inserts blank spaces between tracks, making editing easier.

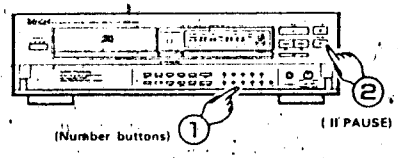


① The AUTO SPACE indicator lights when the auto space button is pressed.
② Press the play button (▶ PLAY) to start playback. When the end of a track is reached, a blank space of approximately 4 seconds is inserted before the beginning of the next track.
③ Press the auto space button again to turn the auto space function off.

⓫ Pausing At the Beginning of a Track After Searching ..... Pause

(1) Direct Search

- Pausing at the beginning of a track found with the direct search operation comes in handy for practicing karaoke.



① Use the number buttons to set the desired track.
② Press the pause button (II PAUSE).

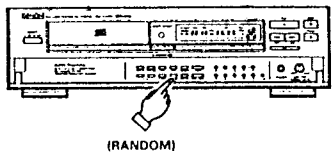
- To start playback, press either the play button (▶ PLAY) or the pause button (II PAUSE).

(2) Program Search

- Press the pause button (II PAUSE) after programming tracks. The beginning of the first track in the program is found and the disc is paused there.

⑫ Playing Tracks in Random Order ..... Random Playback

- All of the tracks recorded on the disc can be played once in random order.



(RANDOM)

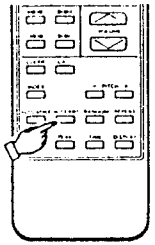
- When the random button (RANDOM) is pressed, the [RANDOM] indicator lights and random playback starts automatically.
- If the random button (RANDOM) is pressed when tracks are programmed, only the programmed tracks are played at random.
- If the random button (RANDOM) is pressed when the repeat function is set, all tracks will be played through once in random order, after which all tracks will be played through again in different order, and so on.
- During the search operation, the track numbers from the first to the last track on the disc are displayed in rapid succession on the track number display, so you cannot tell what track is going to be played next until playback begins.

NOTE:
- The total remaining time is not displayed during the random mode.
- The auto edit mode is cancelled if the random button (RANDOM) is pressed during the random mode.

⑬ Edit Recording on Sides A and B of the Tape ..... Edit Function

(1) Auto Edit Function (AUTO EDIT) (Remoto control only)

The auto edit function automatically divides the tracks on the compact disc into sides A and B, with the division at the beginning of a track in such as way that the disc's total playing time is divided as close as possible by one half.

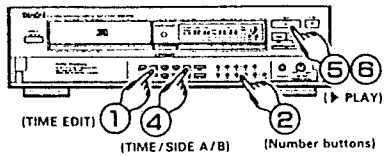


(AUTO EDIT)

① When the AUTO EDIT button is pressed in the stop condition, the total play time of side A (the first half) and the track numbers (on the calendar) are displayed for about 2 seconds. Next, the side B (last half) information is similarly displayed after which the player automatically pauses at the beginning of the first track of side A. [EDIT] and [PROGRAM] will be lit on the display at this time.
② Pressing the play button (▶ PLAY) or the pause button (⏸ PAUSE) will start the play mode. When side A has finished playing, the player will pause at the beginning of the first track on side B.
③ Pressing the play button (▶ PLAY) or the pause button (⏸ PAUSE) again will start the play mode. When side B has finished playing, the player automatically stop.

(2) Editing by Tape Time Specification (TIME EDIT)

The time edit function permits highly efficient editing in conjunction with the length (tape time) of the cassette tape to be recorded.
① When the TIME EDIT button is pressed, [- - : - -] will appear and the player will wait for the tape time to be input. [EDIT] will light up.
② Input the tape time with the number buttons. (The tape time is the total time of sides A and B.)
Example. For a 46-minute tape, press 4 and 6.
③ When the tape time has been specified, the tracks of side A that can be recorded are displayed on the calendar and the blank time of tape side A is displayed at TIME. [A -] is displayed at TRACK NO. and the number of tracks that can be recorded are displayed at INDEX.
④ Pressing the TIME/SIDE A/B button permits a check of the tracks that can be recorded on side B and the blank time. [b -] is displayed at TRACK NO. and the number of tracks that can be recorded are displayed at INDEX.
Each press of this button alternately displays side A and side B.
⑤ Pressing the play button (▶ PLAY) starts the play from the first track of side A. When side A has finished playing, the player will automatically pause at the beginning of the first track of side B.
⑥ Pressing the play button (▶ PLAY) or the pause button (⏸ PAUSE) again will start the play mode. When side B has finished playing, the player automatically stop.



(TIME EDIT) ① ④ (TIME/SIDE A/B) ② (Number buttons) ⑤⑥ (▶ PLAY)

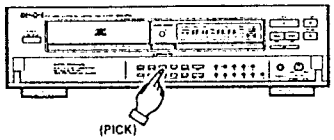
When a mistake has been made in the time specification and the play button (▶ PLAY) has not yet been pressed, pressing the TIME EDIT button will return the settings to the condition of Step ①. This can be done any number of times.

⑦ The time edit function also works in the program track selection mode (Page 9, 10). In this mode, sides A and B can be divided according to the program order.
When the auto space function has been turned on, 4 seconds will be added to the play time of each track.

NOTE:
- The time edit function will not work for discs containing more than 21 tracks.
- The automatic search buttons (⏮, ⏭) and the manual search buttons (◀◀, ▶▶) do not function during the time edit operation.
- Pressing the stop button (■ STOP) or the open/close button (⏏ OPEN/CLOSE) (except for at the time of the link operation) will cancel the time edit operation.

(3) Pick Function (PICK)

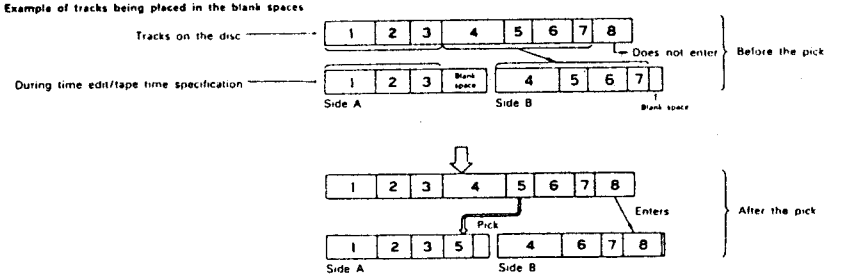
In (2) time edit, the tracks are ordered from the first track or in the programmed order so that a large blank space might remain at the end of the tape. The pick function is used to shorten this blank space and effectively use the time of the specified tape.



(PICK)

① In (2) time edit, press the pick button (PICK) following the tape time specification and before pressing the play button (▶ PLAY).
② When the display is showing side A, pick is executed from among the tracks other than those fixed on side A (in the blank portion of side A).
When the display is showing side B, pick is executed from among the unfixed tracks (in the blank portion of side B).

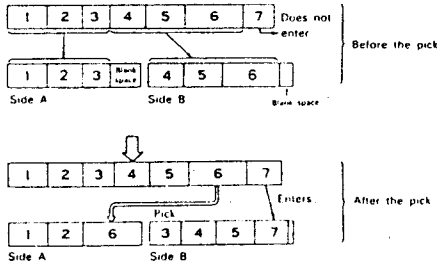
Example of tracks being placed in the blank spaces



③ When there are no tracks that can be picked in the blank portion of side A (side B), cancel the last track of side A (side B), increase the blank portion, and pick an available track in the new blank portion.
At this time the tracks cancelled from side A are automatically fixed on side B.
When there are no tracks that can be picked even though the last track of side A (side B) has been cancelled, the setting will remain the same even if the cancellation is suspended.

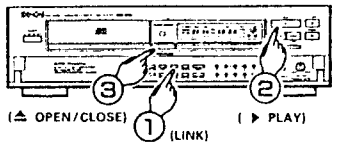
Example of tracks not being placed in the blank spaces

When tracks are not placed in blank spaces as shown in the diagram to the right, the last track (track 3 in the example) is cancelled and substituted with a track from side B.



(4) Link Function (LINK)

The link function provides the convenience of editing a number of discs in succession.
The link operation is used following the tape time specification of the time edit function and before the end of playback.
① When the link button (LINK) is pressed, [EDIT] will start flashing.
② After the tracks have been played, the player will stop automatically. The blank time of the tape will be displayed at this time.
③ Press the open/close button (⏏ OPEN/CLOSE) of the disc holder and change the disc.
④ Pressing the time edit (TIME EDIT) button will permit editing using the blank time of the tape in Step ②.



(⏏ OPEN/CLOSE) ③ ① (LINK) ② (▶ PLAY)

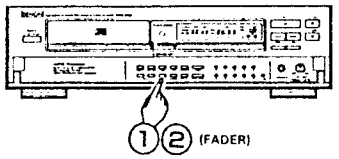
NOTE:
- The link operation is cancelled by the stop button (■ STOP). It will also be cancelled if the disc holder is opened during play.
- When editing has not been performed as far as side B with the time edit (i.e., only for part of side A), editing will be done within the blank time of side A and the blank time of side B.
- When editing has been performed as far as side B with the time edit, the blank time of side B will be used for editing.

⑭ Fading Out or Fading In at the Desired Location ..... Fader Function

(Analog output only)

(1) Fading out and fading in is possible at the desired position during play. Manual Fader

① Fade Out
When the fader button (FADER) is pressed during play, fade out will be provided for about 5 seconds. [FADE] will light up during the operation and (▶▪) will flash. When fade out is completed the player will automatically pause.
② Fade In
When the fader button (FADER) is pressed from the pause mode, the player will start playing and fade in will be provided for about 3 seconds. [FADE] will light up during the operation and (▪◀) will flash.

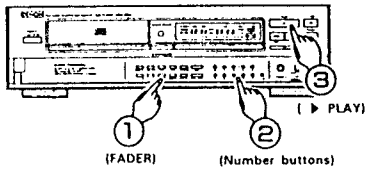


① ② (FADER)

(2) Setting the Fade Out Time in Advance (TIME FADE)

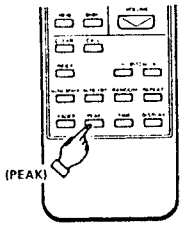
① When the fader button (FADER) is pressed in the stop mode, the FADE indicator (↓FADE) will light up, TIME will appear as —M—, and the player will wait for the input of the fade out time.
② Input the fade out time with the (0 - 9) number buttons.
③ Pressing the play button (▶ PLAY) will start the playback and the FADE indicator (↓FADE) will light up.
④ The (▶▶|) indication will start flashing 5 seconds before the specified fade out time and then the fade out will begin. The fade out will end at the specified time and the player will automatically pause.

The time fade function will be cancelled if an auto search or manual search is performed during playback.



⑮ **To Search for the Peak Level of the Disc** ..... Peak Search
(Remote control only)

- The player searches for the peak portion and plays a few seconds either side of this point repeatedly. This is convenient for making recording adjustments on the tape recorder.

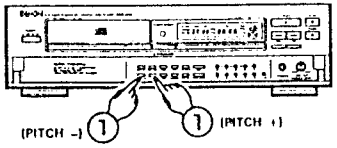


① When the peak search button (PEAK SEARCH) is pressed in the stop mode, the PEAK indicator will flash and the player will search for the portion having the peak level.
② After the search, the PEAK indicator lights up and a few seconds either side of the peak level point are played back repeatedly. This is convenient for making recording adjustments on the tape recorder.
③ To cancel the peak search, press the stop (■ STOP) button.
④ When the play button (▶ PLAY) or the pause button (⏸ PAUSE) is pressed during peak search or while playing the peak portion back repeatedly, the player will go to the beginning of the first track (the first track of the program for program playback, or the track that was first selected in the time edit) and begin playback from here if the play button was pressed or enter the pause mode if the pause button was pressed.

NOTE
- The peak search function reads the level of the disc from the beginning of the disc to the end at a fixed interval and regards the maximum value that was read as the peak. Peak search takes a little time for this reason.
- The peak portion may change each time the disc is read and there may be a slight difference in the actual peak level, but since this difference ever so slight there will be no adverse affects on the adjustment of the recording level.
- The time fade function is cancelled when the peak search operation is performed. To use the time fade function, set to the stop mode then reset the function.
- Buttons other than the open/close button (⏏ OPEN/CLOSE), play button (▶ PLAY), pause button (⏸ PAUSE), and stop (■ STOP) button will not function during peak search or repeat play of the peak portion.

⑯ **Changing the Speed of Playback** ..... Pitch Control

- Playback can be speeded up or slowed down.



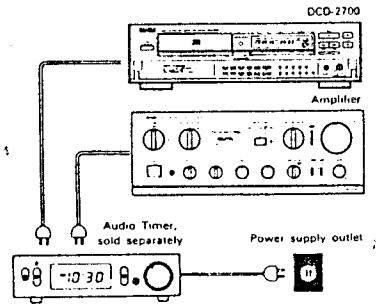
① Press the PITCH + or PITCH – button during the play or pause mode to change the speed of playback.
② When one of the PITCH buttons is pressed, the amount of the speed change appears on the seconds section ("S") of the TIME display for approximately 2 seconds. "PITCH –" appears when the speed is slower than normal, "PITCH +" when the speed is faster than normal. The speed can be changed in steps of 0.1% from -12.0% to +12.0%.
③ Press the PLAY button (▶ PLAY) during playback with a different speed to return to normal speed playback.
Also, the speed setting is cancelled if the stop mode is set during playback at a different speed.

NOTES
- No data is output from the digital output jack (OPTICAL/COAXIAL) during playback with a different speed (when "PITCH" is lit). If you want to output data, press the PLAY button (▶ PLAY) to return to normal speed playback.
- The pitch also changes when the speed is changed.
- If the speed is changed during the time edit operation, the total playing time changes, so the time of the blank space is not calculated accurately.
- The time display (elapsed playback time, remaining time per track, or total remaining time) will not be accurate during playback with a different speed.
- A maximum of 3 second is required to return to the normal speed when the PLAY button (▶ PLAY) is pressed during playback with a different speed. During this time, only the OPEN/CLOSE (⏏ OPEN/CLOSE) and STOP buttons (■ STOP) will function.

TIMER-CONTROLLED PLAYBACK

■ **Operation**
1. Turn on the power of all system components.
2. Set the input selector on the amplifier to correspond to the inputs the CD player is connected to.
3. Make sure a disc has been loaded in the disc holder.
4. Check the time on the timer and then set the desired turn-on time.
5. Turn the audio timer ON.
Power is turned off automatically in all components connected to the timer.
6. When the preset turn-on time is reached, power is turned on in the system components, and CD playback starts from the first track.

■ **Connection**



INSTALLATION PRECAUTIONS

The CD player uses a microcomputer for controlling internal electronic circuits. In the event that the player is used while a near-by tuner or TV is turned on, although unlikely, interference could occur either in the sound from the tuner or the picture of the TV. To avoid this, please take the following precautions.
- Keep the CD player as far away from the tuner or TV set as possible.
- Keep the power cable and connecting cable of the CD player separate from the antenna wires of the tuner and TV.
- Interference is particular likely to occur when an indoor antenna or a 300-ohm feeder cable is used. Thus, use of an outdoor antenna and 75-ohm coaxial cable is strongly recommended.

300-ohm feeder cable — 75-ohm coaxial cable

TROUBLESHOOTING

If the CD player does not seem to be functioning properly, check the following:

Disc holder does not open or close
- Is the power on?

When a disc is loaded, 00:00:00 is displayed
- Is the disc loaded properly? ..... See page 8

When the play button (▶ PLAY) is pressed, playback does not start.
- Is the disc dirty or scratched? ..... See page 15

There is no sound, or it is distorted
- Is the output cord properly connected to the amplifier? ..... See page 8
- Have the amplifier controls been set correctly?

Volume is low.
- Is volume setting (with volume buttons on remote control unit) correct? ..... See page 17

A specific section of the disc will not play
- Is the disc dirty or scratched? ..... See page 15

Programmed playback does not work
- Have programming been properly done? ..... See pages 9, 10 and 17

Incorrect operation when buttons on the remote control are pressed.
- Is the remote control unit being operated too far from the CD player? ..... See page 17
- Are there obstacles blocking the ray?
- Is the remote control sensor exposed to strong light?
- Are the batteries exhausted?

THE COMPACT DISC

1. **Precautions on handling compact discs**
- Do not allow fingerprints, oil or dust on the surface of the compact disc. If the signal surface is dirty, wipe it off with a soft, dry cloth. Wipe in circular motions from the center and out.
- Do not use water, benzene, thinner, record sprays, electrostatic proof chemicals, or silicone treated cloth to clean discs.
- Always use care when handling discs to prevent damaging the surface, in particular when removing a disc from the case and returning it.
- Do not bend compact discs.
- Do not apply heat to compact discs.
- Do not enlarge the hole in the center of the disc.
- Do not write on the disc and do not attach any labels.
- Condensation will form on the disc surface if it is brought into a warm room from a cold area, such as outdoors during winter. Wait until the condensation disappears. Never dry discs with hair dryers, etc.

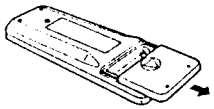
2. **Precautions on storage**
- After playing a disc, always return it to its case.
- Keep discs in the cases when they are not to be played. This will protect them from dust and dirt and prolong their service life.
- Do not store discs in the following places:
1) Places exposed to direct sunlight for a considerable time.
2) Places subject to accumulation of dust or high humidity.
3) Places exposed to high temperatures, such as close to heater outlets.

PLAYBACK USING THE REMOTE CONTROL UNIT

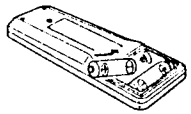
The accessory RC-240 remote control unit can be used to control the CD player from a convenient distance.

(1) Inserting the dry cell batteries

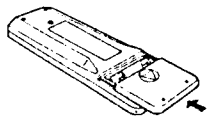
1. Remove the battery cover on the back of the remote control unit.



2. Insert two R6P (standard size AA) dry cell batteries with correct polarity as indicated inside the battery compartment.



3. Replace the battery cover.

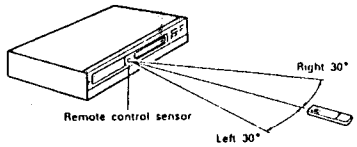


Notes on the Batteries

- The remote control unit uses standard size AA dry cell batteries.
- The batteries will need to be replaced approximately once a year. Replacement may be necessary earlier depending on how much the remote control unit is used.
- If, in less than a year from the time new batteries were inserted, the remote control fails to operate the CD player from a near-by position, it is time to replace the batteries.
- Insert the batteries properly, following the polarity diagram inside the battery compartment, in other words make sure (+) and (–) terminals are properly aligned.
- 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 opposite poles of the batteries, expose them to heat, break them open nor expose of them in open fire.
- If the remote control unit is not to be used for a long period of time, remove the batteries from the unit.
- If the batteries have leaked, remove any traces of battery fluid from the battery compartment, wiping thoroughly with a dry cloth. Then insert new batteries.

(2) Directions for Use

- Operate the remote control unit while pointing it towards the remote control sensor on the CD player (see below).



When a remote control signal is received, the remote control indicator on front of the CD player lights briefly.

- The remote control unit can be used at a distance up to 8 meters in a straight line from the CD player. This distance decreases if there are obstructions blocking the signal path or when the remote control unit is operated at an angle from the remote control sensor.
- The buttons on the remote control unit have identical functions with those on the CD player. However, the following functions cannot be remote controlled: Power ON/OFF.

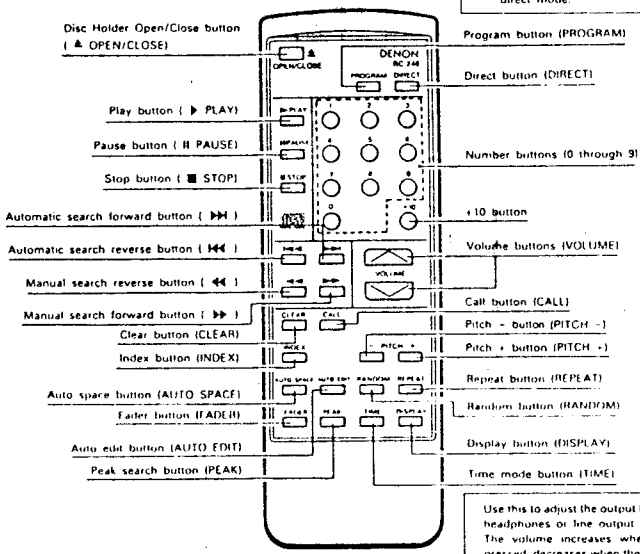
Cautions on Use

- Do not press the operation buttons on the main unit and on the remote control unit simultaneously, as this will result in malfunction.
- The remote control unit may not operate properly if the remote control sensor is exposed to direct sunlight or strong artificial lighting, or if there is an object between the remote control unit and the remote control sensor.

REMOTE CONTROL UNIT RC-240

Setting to the Program Mode

- For program search, press the PROGRAM button then the number buttons (0 through 9 and +10).
- The remote control unit is normally set to the direct mode.



Use this to adjust the output level (VOLUME) of the headphones or line output (VARIABLE).
The volume increases when the (+) button is pressed; decreases when the (–) button is pressed.

- **Direct Search**
  Normally, direct search is possible simply by pressing the desired number buttons.
- **Program Search (During playback, the track which is currently playing is programmed as the 1st track.)**
  Press the PROGRAM button, then press the number buttons.
  For example, to program tracks number 3, 11, and 5, press PROGRAM → 3 → +10 and 1 → 5.
  To cancel the program, press the DIRECT button.
- **Inputting the Track Numbers**
  For track numbers below 9, simply press the corresponding button. For track numbers of 10 and greater, press the +10 then the number buttons.
  For example, for track number 22 press +10 twice then 2.
- **Volume**
  The volume control on the unit will operate when the volume buttons are pressed. The volume can be checked by looking at the position of the control.

SPECIFICATIONS

AUDIO

No. of Channels:	2 channels
Frequency Response:	2 – 20,000 Hz
Dynamic Range:	100 dB
Signal-to-noise Ratio:	117 dB
Harmonic Distortion:	0.0018% (1 kHz)
Separation:	110 dB (1 kHz)
Wow & Flutter:	Below measurable limit (±0.001% W peak)
Output Voltage:	FIX 2.0 V VARIABLE 0 – 2.0 V

DISCS
Compact Disc format

GENERAL CHARACTERISTICS

Power Supply:	50/60 Hz, voltage is shown on rating label
Power Consumption:	24 W
Dimensions:	434 (W) × 122 (H) × 360 (D) mm (17-3/32") × (4-51/64") × (14-11/64")
Weight:	9.2 kg

FUNCTIONS AND DISPLAY

Functions:	Direct selection, automatic search, programmed playback, repeat playback, manual search, auto space, time mode, auto edit, pitch control, index search, fader, pick, link, peak search, time edit, emphasis feature
Display:	Track number, time, music calendar, and engaged modes
Others:	Headphones jack

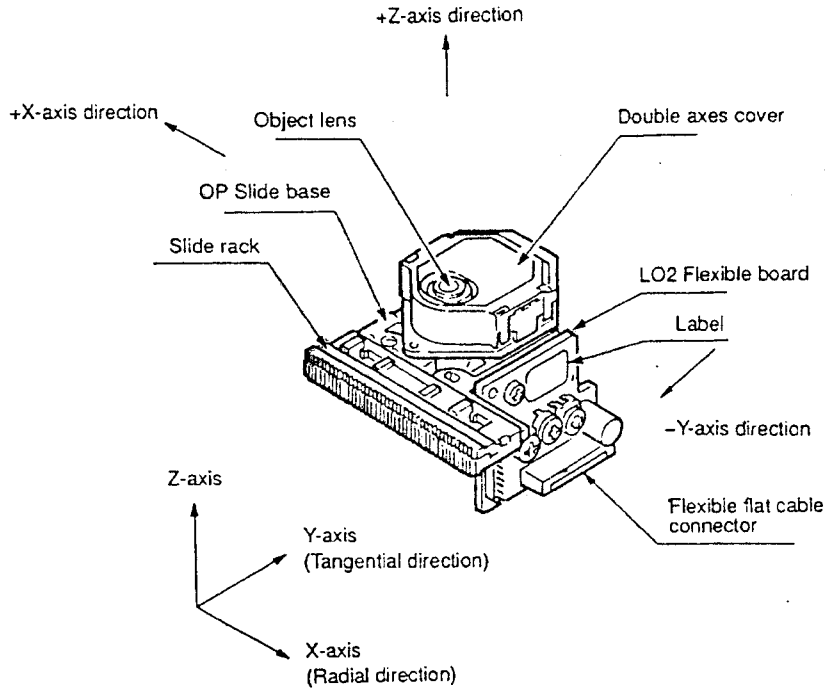
REMOTE CONTROL UNIT

Remote Control System:	Infrared pulse system
Power Supply:	3 V DC, two R6P (standard size AA) dry cell batteries
External Dimensions:	60 (W) × 177 (H) × 18 (D) mm (2-23/64") × (6-31/32") × (45/64")
Weight:	100 g (including batteries)

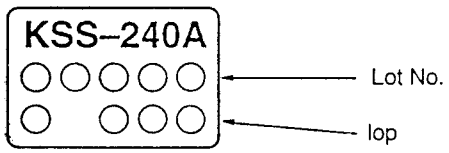
• Design and specifications are subject to change without notice in the course of product improvement.

NOTE FOR HANDLING OF LASER PICK-UP

DESCRIPTION OF THE COMPONENTS

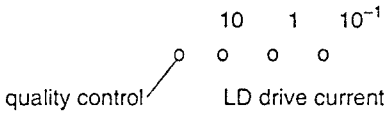


Label



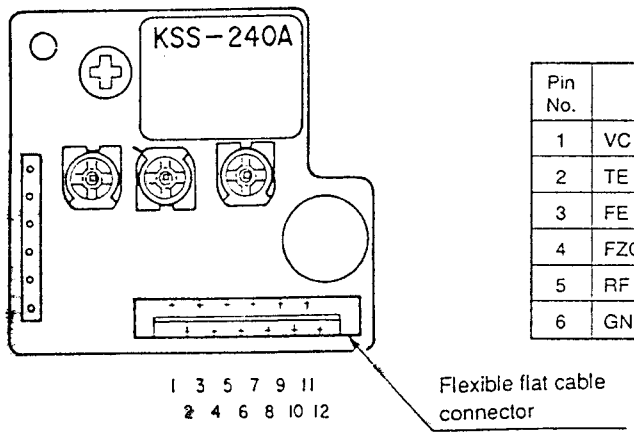
year
(last figure)
day month | quality control No.

but Oct. Nov. and Dec. are expressed by alphabetical letters of X, Y and Z.



The expressed unit is by mA, with omission of the decimal point as for example, 56.5mA will be expressed as 565, but the head of English letter means the control in the manufacturning plant.

PIN CONNECTOR



Pin No.	Description	Input/ Output	Pin No.	Description	Input/ Output
1	VC (+2.5V)	OUT	7	Vcc (+5V)	IN
2	TE (TRK ER signal)	OUT	8	LDC (LD Control)	IN
3	FE (FCS ER signal)	OUT	9	FCS+ (Double axes)	IN
4	FZC (FZC signal)	OUT	10	TRK+ (Double axes)	IN
5	RF (RF signal)	OUT	11	TRK- (Double axes)	IN
6	GND	IN	12	FCS- (Double axes)	IN

Caution for Handling the Laser Pick-up

The laser pick-up KSS-240A is assembled and precisely adjusted using a sophisticated manufacturing process in our plant. Do not disassemble or attempt to readjust it. Please keep the following instructions carefully in handling pick-up.

1. Handle with Care

(1) Storage
Do not store the pick-up in dusty, high-temperatured or high-humidity environments.

(2) Please take care for preventing from shock by falling down or careless handling.

2. Laser Diode (LD)

(1) Protect your eyes
The laser beam may damage the human eye, since the intensity of the focused spot may reach 7×10^3 W/cm^2 even if the intensity at the objective lens is 400 μW maximum. As the light beam spreads after focused through the objective lens, it does not effect you in the place as far as more than 30 cms. However, do not look at the laser light beam either through the objective lens directly nor another lens or a mirror.

(2) Poison of As
Since the LD chip contains As (Arsenic), as GaAs + GaAlAs, as known as the poison, although the poison is relatively weak, in comparing with others, e.g.As_2O_3, $AsCl_3$ etc., and the amount is small, avoid putting the chip in acid or an alkali solution, heating it over 200°C or putting it into your mouth.

(3) Avoid surge current or electrostatic discharge
The LD may be damaged or deteriorated by its own strong light if a large current is supplied to it, even if only a short pulse.
Make sure that there is no surge current in the LD driving circuit by switches or else. Be careful to handle pick-up as it may be damaged in a moment by human electrostatic discharge. The pins of the LD are short-circuited by solder for protection during shipment.
For safety handling of an LD, grounding the human body, measuring equipments and jig is strongly recommended. And still it is further desirable to make use of mat on the platform and floor for handling the LD.
To open the short-circuit, remove the soldering quickly with a soldering iron whose metal part is grounded.
The temperature of the soldering iron should be less than 320°C (30W).

3. Actuator

(1) The performance of the actuator may be effected if magnetic material is located nearby, since the actuator has a strong magnetic circuit. Do not permit dust to enter through the clearance of the cover.

(2) Cleaning the lens
It may change the specifications by attaching dust or ash on the objective lens. Clean the lens with a cleaning paper dampened with a little water, not pressing lens with so much strength by the cleaning paper.

4. Metal Bearing

As the metal bearing of Cu-compound sintered alloy is impregnated with FROIL946P (*Part No. 529 0054 007), never fail to supply the bushing with the same lubricant at the time of replacing the pick-up.

5. Handling

Please handle the laser pick-up with holding the side base (rosin molded part).
When either a part of human body or some other things may happen to touch directly with the circuit part of P.W.Board, it may cause deterioration, take careful attention in handling this base.

6. Deterioration

As KSS-240 comprises built-in RF Amp and APC curcuit, it resists stronger against external electrostatic damages than the former typed pickup. However, there is possibility of pickup deterioration in the following cases.

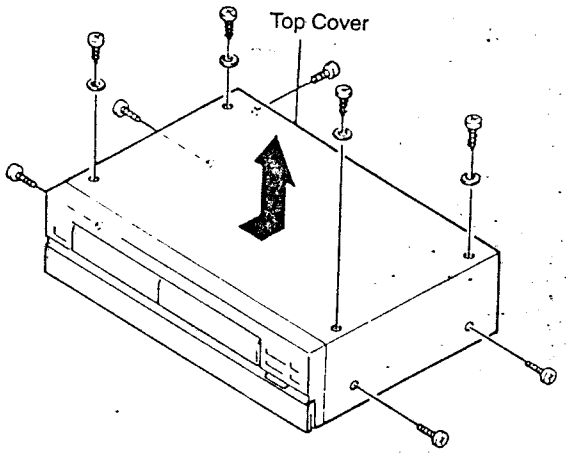
(1) Low HF level, or with great numbers of jitters.

(2) Tracking offset (EF Balance) is out of order (Refer to "Confirmation Method of Adjustment " for confirmation on (1) and (2)).

DISASSEMBLY

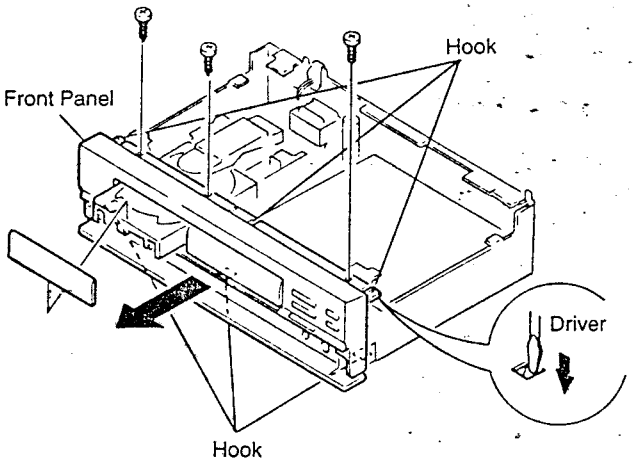
1. Top Cover

Remove 4 screws from top cover and 5 screws from both sides. Then, remove top cover toward the screw direction while expanding the both side cover outside.



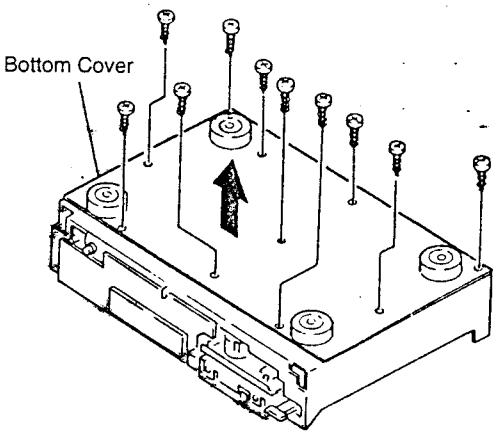
2. Front Panel

Firstly, remove 3 screws on front panel.
Secondly, remove hook by inserting of screwdriver on 3 parts of top and 3 parts of bottom, and then remove front panel toward the arrow direction. (At this time do not push the hook excessively strong as this may invite the breakage of hook.)



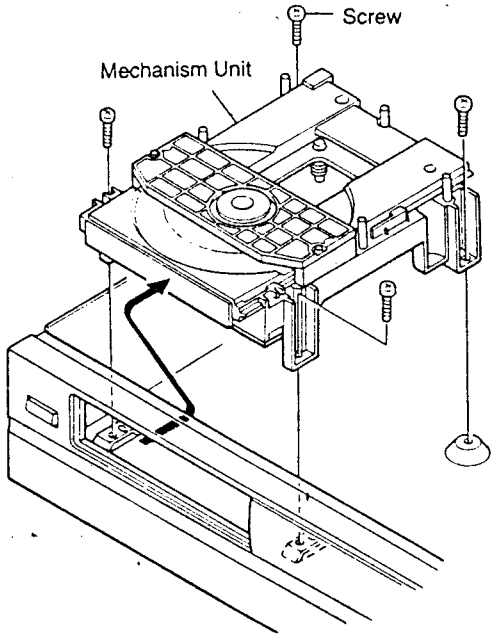
3. Bottom Cover

Remove ⑩ screws from bottom cover, and then remove bottom cover toward the arrow direction.



4. Mechanism Unit

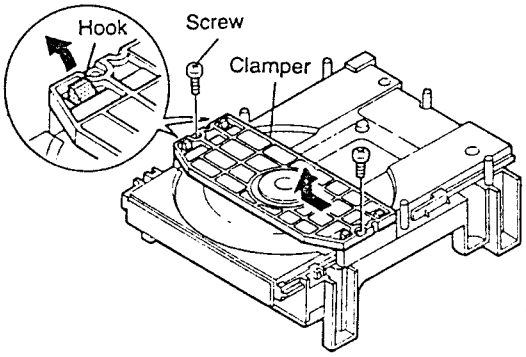
Remove 4 screws.



5. Clamper

Remove 2 screws.

Pull clamper and undo 4 hooks.



ADJUSTMENT

Microcomputer built in the unit, comprises service program to facilitate servo adjustment by pushing operation button.

1. Start service program

(1) Turn power switch OFF.

(2) Shortcircuit pin ③ (SWCL) and ④ pin (SWOP) of connector (TP102) on P.W.B. (Main Unit)
(Caution) Do not touch other pins.

(3) Turn power switch ON.
(Service program starts, and displays track number 01)

(Caution)

- When service program started normal operation of buttons will be defeated.

2. Service program function

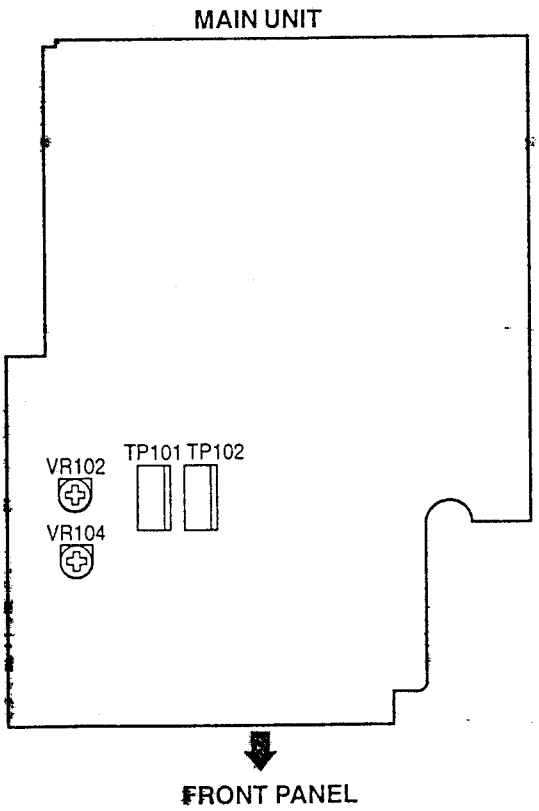
Button	Function	Description
▲ OPEN/CLOSE	Opens or closes the disc holder.	• Opens or closes only when disc is stopped. • Operate other keys after open or close.
■ STOP	Stops system function.	• Displays track number 01. • Push when adjustment completed, or do it again.
▶ PLAY	Starts focus servo and disc turns.	• Push when adjust tracking offset. • When completed, displays track number 02.
❚❚ PAUSE	Starts focus servo, tracking servo, slide servo, spindle servo.	• When PAUSE button is pushed, starts tracking servo and slide servo. • When completed, track number 03.
Other button	No normal operation.	• Do not operate buttons other than above. • If misoperated, immediately turn power switch OFF.

(Caution)

- Do not use remote control during service program mode.

3. Adjustment

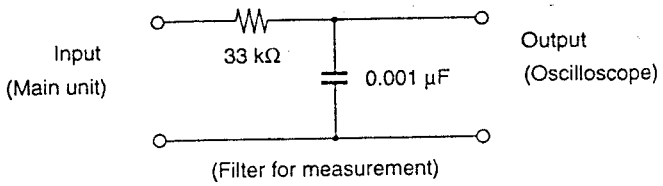
(1) Location



TP101	TP102
⑥ TEI	⑥ +5V
⑤ VC	⑤ NC
④ FOK	④ SWOP
③ TEO	③ SWCL
② FEI	② GND
① FEO	① HF

(2) Necessary equipment for adjustment

1. Dual trace oscilloscope
2. Reference disc (CA-1094)
3. Oscillator (10 Hz ~ 10 kHz, 0 ~ 3 Vp-p)
4. Frequency counter (readable no less than 5 KHz)
5. Filter for measurement

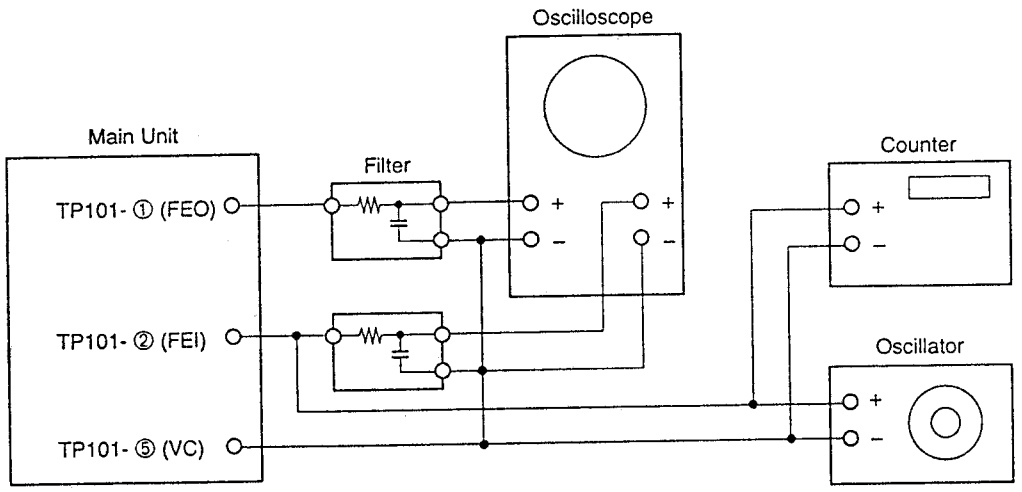


(3) Preset

1.	Start service program.	
2.	Preset VR102, 104 as per right figure.	VR102 (F-GAIN) 12 O'clck VR104 (F-GAIN) 12 O'clck
3.	Step.	1. Focus gain (VR102) 2. Tracking gain (VR104)

4. Focus gain

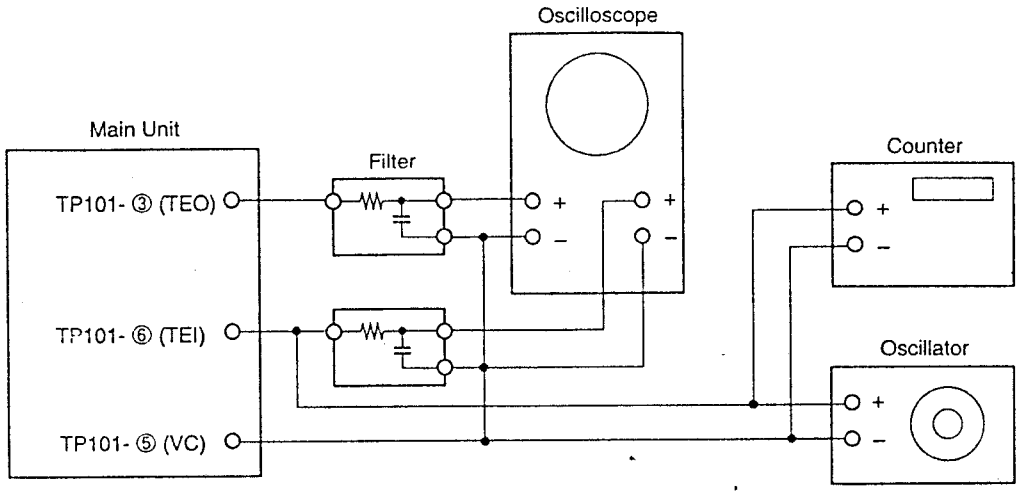
Connection



Oscillator	Counter	Oscilloscope V	Oscilloscope H	Adjust	Check	Step
930 Hz 2 Vp-p (±0.1 V)	930 Hz	• DC range • X-Y mode		VR102	(Oscilloscope) Y axis / X axis Phase 90° Waveform not right Y axis / X axis	1. Push [II PAUSE]. (Displays track number 03) 2. Connect oscillator. 3. Set oscillator to 930 Hz/2 Vp-p. 4. Switch oscilloscope input to X-Y mode. 5. Adjust VR102 [F-GAIN] to symmetrize Lissajous figures to X-Y axes.

5. Tracking gain

Connection

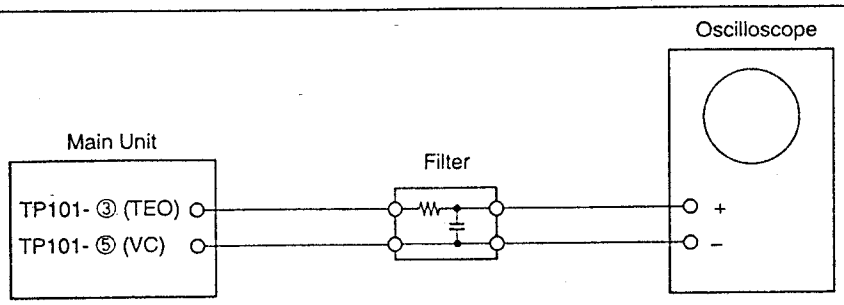


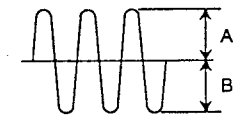
• Caution: Connect oscillator after [II PAUSE] pushed and servo function started.

Oscillator	Counter	Oscilloscope V	Oscilloscope H	Adjust	Check	Step
		V	H	(Volume)	(Oscilloscope)	
• 3.0 kHz (±120 Hz) • 0.8 Vp-p (±0.1V)	3.0 kHz (±120 Hz)	• DC range • X-Y mode		VR104	Y axis / X axis Phase 90° Waveform not right Y axis / X axis	1. Push [II PAUSE]. (Displays track number 03) 2. Connect oscillator. 3. Set oscillator to 3.0 kHz/0.8 Vp-p. 4. Switch oscilloscope input to X-Y mode. 5. Adjust VR104 [T-GAIN] to symmetrize Lissajous figures to X-Y axes.

6. Tracking offset (E/F Balance)

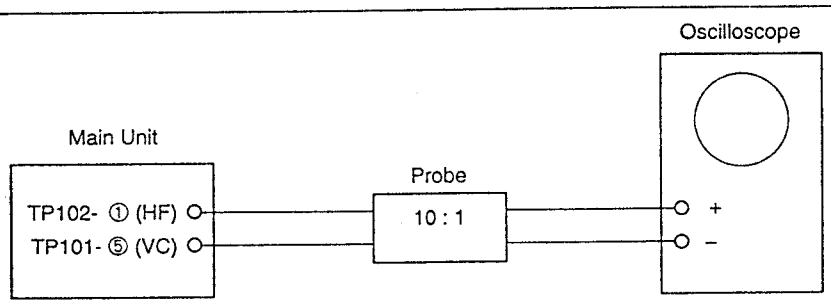
Connection

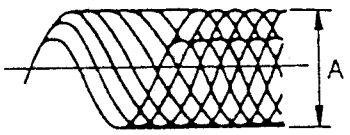
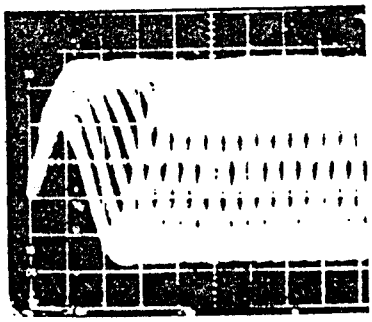


Osciloscope		Check	Step
V	H	(Oscilloscope)	
0.1v/div	1~2 ms/div	 $\frac{A-B}{A+B} < 20\%$	1. Push ⏏ OPEN/CLOSE and load disc holder referrence disk. 2. Push ⏏ OPEN/CLOSE and close disc holder. 3. Push ▶ PLAY to turn disc. (Displays track number 02) 4. Short (+)(–) of oscilloscope and check the base line. 5. Confirm that upper and lower amplitude of the waveform is symmetric against 0V.

7. HF level

Connection



Osciloscope		Check	Step
V	H	(Oscilloscope)	
50mv/div or 20mV/div	0.2μ/div or 0.5μ/div	 A=1.2±0.3Vp-p 	1. Push ⏸ PAUSE. (Displays track number 03) 2. Check HF level of oscilloscope. 3. Confirm that the waveform is in good shape. (◊ pattern in center must be able to discriminate clearly.)
• Set input mode to ALTERNATE or CHOPPER.			

HEAT RUN MODE FUNCTION

Heat Run Mode

1) To activate

While hold pushing 1, 4, 7, simultaneously, turn the unit power on. The remote control sensor indicator will light to show that the unit is shifted in Heat Run mode.
Be sure to load the disc previously.
Press the disc holder open/close button (⏏ OPEN/CLOSE) to cancel Heat Run mode.
Never push the PAUSE button.

2) Operation

During the Heat Run mode to shift the unit in Play mode makes the unit replays from the first music after opens the loader once and re-closes it when finish playing the last track (comes into lead out).
Hereafter, operates open/close of loader, servo on, reading of TOC, and playing repeatedly, For a disc with more than 30 tracks, repeats playing the two tracks; the first and the last ones.

3) Error Message

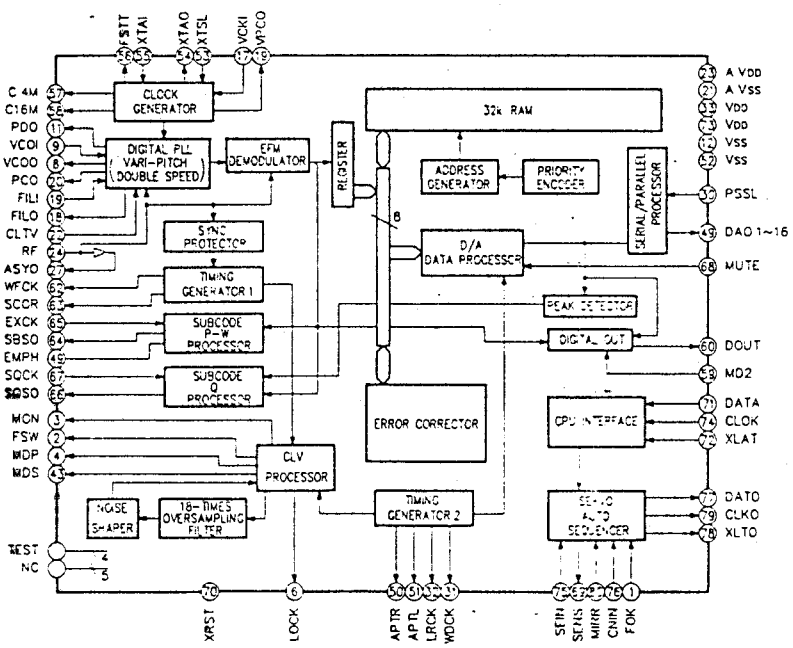
When the system error occurs while in Heat Run mode, the following error message will display on the Track No. indicator and stops operation.

1. E1
   At the time of Focus Servo does not activate.
2. E2
   When unable to detect synchronous pattern however the disc is in rotating. (GFS does not drive.)
3. E3
   No synchronous pattern can be detected while in Play mode. (No GFS drives.)
4. E4
   When TOC is unreadable in despite of servo is activated.
5. E5
   In case of loader malfunctions. (Unable to turn on the switch.)
6. E6
   The inner circle switch of Pick-up does not turn off.
7. E7
   The inner circle switch of Pick-up does not turn on.

★ Also, displays the number of operation up to this time on the Time (Min.) indicator.

IC TERMINAL FUNCTION LIST

CXD2500BQ

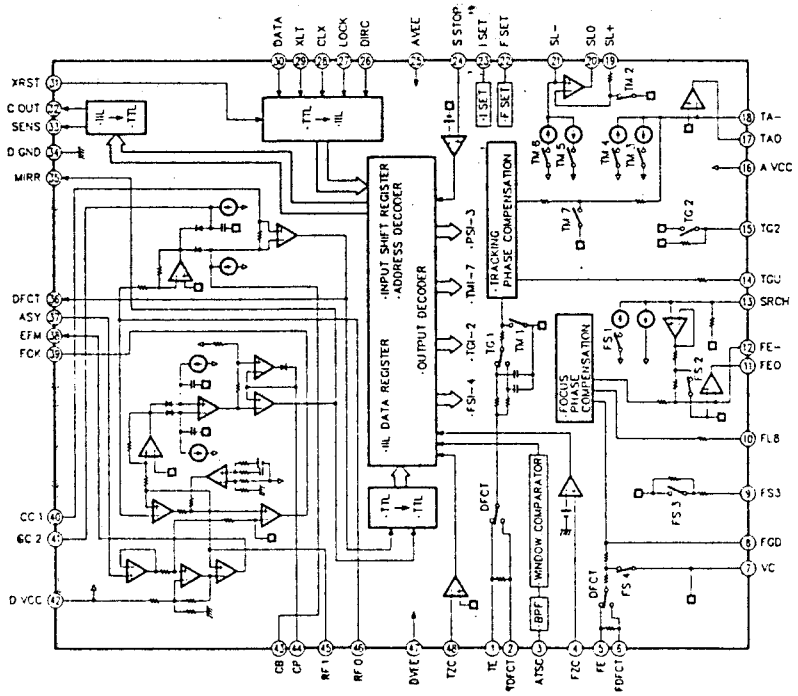


CXD2500BQ Terminal Function

Terminal No.	Symbol	I/O	Terminal Function
1	FOK	I	Input terminal for OK focussing. Use for Servo-autosequencer.
2	FSW	O	Output to shift time constant of output filter for spindle motor.
3	MON	O	ON/OFF control output for spindle motor.
4	MDP	O	Servo control for spindle motor.
5	MDS	O	Servo control for spindle motor.
6	LOCK	O	Sampling GFS by 460 Hz and if it is "H", delivers "H" ; if it is continuously "L" 8 times, delivers "L".
7	NC	—	
8	VCOO	O	Oscillation current output for analog EFM PLL.
9	VCOI	I	Oscillation current output for analog EFM PLL. f LOCK=8.6436MHz.
10	TEST	I	TEST output. Normally GND.
11	PDO	O	Charge pump output for analog EFM PLL.
12	Vss		GND.
13	NC	—	
14	NC	—	
15	NC	—	
16	VPCO	O	Charge pump output for variable pitch PLL.
17	VCKI	O	Clock input from external VCO for variable pitch. fc center=16.9344MHz.
18	FILO	O	Filter output for master PLL. (slave=digital PLL)
19	FILI	I	Filter input for master PLL.
20	PCO	O	Charge pump output for master PLL.
21	AVss		Analog GND.
22	CLTV	I	Control voltage output for master VCO.
23	AVDD		Analog power supply (+5V).
24	RF	I	EFM signal input.
25	TEST2	I	Put to GND.
26	TEST3	I	Put to GND.
27	ASYO	O	Full swing output for EFM. (L=Vss, H=V_{DD}).
28	TEST4	I	Put to GND.
29	NC	—	
30	PSSL	I	Input to shift output mode of audio data. Serial output at L; parallel output at H.
31	WDCK	O	D/A Interface for 48 bit slot. Word-clock f=2 Fs.
32	LRCK	O	D/A Interface for 48 bit slot. LR-clock f= Fs.
33	VDD		Power supply (+5V).
34	DA16	O	At PSSL=1 for DA16 (MBS) output; PSSL=0 for serial data of 48 bit slot. (2s'COMP, MSB first).
35	DA15	O	At PSSL=1 for DA15 output; PSSL=0 for bit clock of 48 bit slot.
36	DA14	O	At PSSL=1 for DA14 output; PSSL=0 for serial data of 64 bit slot. (2s'COMP, LSB first).
37	DA13	O	At PSSL=1 for DA13 output; PSSL=0 for bit clock of 64 bit slot.
38	DA12	O	At PSSL=1 for DA12 output; PSSL=0 for LR clock of 64 bit slot.
39	DA11	O	At PSSL=1 for DA11 output; PSSL=0 for GTOP output.
40	DA10	O	At PSSL=1 for DA10 output; PSSL=0 for XUGF output.
41	DA09	O	At PSSL=1 for DA09 output; PSSL=0 for XPLCK output.
42	DA08	O	At PSSL=1 for DA08 output; PSSL=0 for GFS output.
43	DA07	O	At PSSL=1 for DA07 output; PSSL=0 for RFCK output.
44	DA06	O	At PSSL=1 for DA06 output; PSSL=0 for C2PO output.
45	DA05	O	At PSSL=1 for DA05 output; PSSL=0 for XRAOF output.
46	DA04	O	At PSSL=1 for DA04 output; PSSL=0 for MNT3 output.
47	DA03	O	At PSSL=1 for DA03 output; PSSL=0 for MNT2 output.
48	DA02	O	At PSSL=1 for DA02 output; PSSL=0 for MNT1 output.
49	DA01	O	At PSSL=1 for DA01 output; PSSL=0 for MNT0 output.
50	APTR	O	Control output for aperture compensation. In H for R-ch.
51	APTL	O	Control output for aperture compensation. In H for L-ch.

Terminal No.	Symbol	I/O	Terminal Function
52	Vss		GND.
53	XTAI	I	X'tal oscillation circuit input. By selecting of mode, f=16.9344MHz or 33.8688MHz.
54	XTAO	O	X'tal oscillation circuit input. f=16.9344MHz.
55	XTSL	I	Selection input terminal of X'tal. "L" for X'tal 16.9344MHz; H for 33.8688MHz.
56	FSTT	O	2/3 Dividing output of 53 and 54 terminal. No change by variable pitch.
57	C4M	O	4.2336MHz output. When variable pitched, simultaneously changes.
58	C16M	O	16.9344MHz output. When variable pitched, simultaneously changes.
59	MD2	I	Digital-out ON/OFF control. ON at H; OFF at L.
60	DOUT	O	Digital-out output terminal.
61	EMPH	O	When playback disc emphasized, outputs H; otherwise outputs L.
62	WFCK	O	WFCK (Write Flame Clock) output.
63	SCOR	O	Output of subcode sync. S0+S1. H output when either one detected.
64	SBSO	O	Serial output of Sub P~W.
65	EXCK	I	Clock iutput for SBSO read-out.
66	SQSO	O	Output for Sub Q 80 bits and PCM peak level 16 bits.
67	SQCK	I	Clock input for SQSO read-out.
68	MUTE	I	Mute at H; remove mute at L.
69	SENS	—	SENS output. Outputs to CPU.
70	XRST	I	System reset input. Resets at "L".
71	DATA	I	Input of serial data from CPU.
72	XLAT	I	Input for latch from CPU. Latches serial data at release.
73	VDD		Power supply (+5V).
74	CLOK	I	Serial data transfer clock input from CPU.
75	SEIN	I	SENS input from SSP.
76	CNIN	I	Input of tracking pulse.
77	DATO	O	Serial data output to SSP.
78	XLTO	O	Serial data latch output to SSP.
79	CLKO	O	Serial data transfer clock output to SSP.
80	MIRR	I	Mirror signal input. Use for track jump for over 128 tracks, using autosequencer.

CXD1372S



CXA1372S Terminal Function

Terminal No.	Symbol	I/O	Terminal Function
1	TE	I	Tracking error signal input terminal.
2	TDFCT	I	Capacitor connecting terminal for time constant at the time of defect.
3	ATSC	I	Input terminal of ATSC detecting window comparator.
4	FZC	I	Input terminal of focus zero-cross comparator.
5	FE	I	Focus error signal input terminal.
6	FDFCT	I	Capacitor connecting terminal for time constant at the time of defect.
7	Vc	I	Mid-point voltage input terminal.
8	FGD	I	In case of reducing higher range gain of focus servo, connect a capacitor between this terminal and terminal number (9).
9	FS3	I	Shifts higher range gain of focus servo by FS3 ON/OFF.
10	FLB	I	Terminal for external time constant to increase lower range of focus servo.
11	FEO	O	Focus drive output.
12	FE–	I	Reverse input terminal for focus amplifier.
13	SRCH	I	Terminal for external time constant to make focus search waveform.
14	TGU	I	Terminal for external time constant to shift higher range gain of tracking.
15	TG2	I	Terminal for external time constant to shift higher range gain of tracking.
17	TAO	O	Tracking drive output.
18	TA–	I	Reverse input terminal for tracking amplifier.
19	SL+	I	Non-reverse input terminal for sled amplifier.
20	SLO	O	Sled drive output.
21	SL–	I	Reverse input terminal for sled amplifier.
22	FSET	I	Terminal to compensate peak in focus/tracking phase.
23	ISET	I	Delivers a current to set the height of focus search, track jump, and sled kick.
24	SSTOP	I	Terminal for limit switch ON/OFF to detect disc innermost circle.
26	DIRC	I	Terminal is used at the time of 1 track jump. A 47 kohm pull up resistor is included.
27	LOCK	I	Reckless drive protection circuit of sled; activates at "L". A 47k ohm pull up resistor is included.
28	CLK	I	Serial data transfer clock input from CPU.
29	XLT	I	Latch input from CPU.
30	DATA	I	Serial data input from CPU.
31	XRST	I	Reset input terminal. Resets at "L".
32	C.OUT	O	Terminal to output signal for track number count.
33	SENS	O	Terminal to output FZC, AS, TZC, SSTOP by command from CPU.
35	MIRR	O	Output terminal for MIRR comparator.
36	DFCT	O	Output terminal for DEFECT comparator.
37	ASY	I	Input terminal for auto-symmetric control.
38	EFM	O	Output terminal for EFM comparator.
39	FOK	O	Output terminal for focus OK (FOK) comparator.
40	CC1	O	DEFECT bottom hold output terminal.
41	CC2	I	Input terminal to input DEFECT bottom hold output by capacitance combination.
43	CB	I	Capacitor connecting terminal for DEFECT bottom hold.
44	CP	I	MIRR hold capacitor connecting terminal. A non-reverse input terminal for MIRR comparator.
45	RFI	I	Input terminal to input RF summing amplifier output by capacitance combination.
46	RFO	O	Output terminal for RF summing amplifier. Check point for eye pattern.
48	TZC	I	Tracking zero-cross comparator input terminal.

NOTE FOR PARTS LIST

- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.
- Not including Carbon Film ±5%, 1/4W Type in the P.W.Board parts list. (Refer to the Schematic Diagram for those parts.)

WARNING:

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

● Resistors

Ex.: RN (Type) 14K (Shape and performance) 2E (Power) 182 (Resistance) G (Allowable error) FR (Others)

RD : Carbon RC : Composition RS : Metal oxide film RW : Winding RN : Metal film RK : Metal mixture	2B : 1/8W 2E : 1/4W 2H : 1/2W 3A : 1W 3D : 2W 3F : 3W 3H : 5W	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20%	P : Pulse-resistant type NL : Low noise type NB : Non-burning type FR : Fuse-resistor F : Lead wire forming

• Resistance

1 8 2 ⇒ 1800 ohm = 1.8 kohm
- 2: 2-digit effective number.
- 8: Indicates number of zeros after effective number.

• Units: ohm

1 R 2 ⇒ 1.2 ohm
- 2: 2-digit effective number, decimal point indicated by R.
- R: 1-digit effective number.

• Units: ohm

● Capacitors

Ex.: CE (Type) 04W (Shape and performance) 1H (Dielectric strength) 2R2 (Capacity) M (Allowable error) BP (Others)

CE : Aluminum foil electrolytic CA : Aluminum solid electrolytic CS : Tantalum electrolytic CQ : Film CK : Ceramic CC : Ceramic CP : Oil CM : Mica CF : Metallized CH : Metallized	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 2A : 100V 2B : 125V 2C : 160V 2D : 200V 2E : 250V 2H : 500V 2J : 630V	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20% Z : +80% −20% P : +100% −0% C : ±0.25pF D : ±0.5pF = : Others	HS : High stability type BP : Non-polar type HR : Ripple-resistant type DL : For charge and discharge HF : For assuring high frequency U : UL part C : CSA part W : UL-CSA type F : Lead wire forming

• Capacity (electrolyte only)

2 2 2 ⇒ 2200μF
- 2: 2-digit effective number.
- 2: Indicates number of zeros after effective number.

• Units: μF.

2 R 2 ⇒ 2.2μF
- 2: 2-digit effective number, decimal point indicated by R.
- R: 1-digit effective number.

• Units: μF.

• Capacity (except electrolyte)

2 2 2 ⇒ 2200pF = 0.0022μF
- 2: 2-digit effective number.
- 2 (More than 2): Indicates number of zeros after effective number.

• Units: μF.

2 2 1 ⇒ 220pF
- 2: 2-digit effective number.
- 1 (0 or 1): Indicates number of zeros after effective number.

• Units: pF.

• When the dielectric strength is indicated in AC, "AC" is included after the dieelectric strength value.

PARTS LIST OF P.W. BOARD
1U-2674 MAIN UNIT

Ref. No	Part .No	Part Name	Remarks
IC101	262 1305 001	IC CXA1372S(S-DIP)	
IC103	263 0223 006	IC TL4558P-B	
IC105.106	263 0223 006	IC TL4558P-B	
IC201	262 1819 005	IC CXD2500BQ	
IC202	262 1891 007	IC M38173M6***	
IC203	262 1352 009	IC TC74HCT04AP	
IC204	262 0824 004	IC SN74LS624N	
IC207	262 1869 000	IC SM5845AF	
IC209	262 1265 002	IC TC74HCU04AP	
IC210	263 0652 907	IC PST529C	
IC212	263 0223 006	IC TL4558P-B	
IC301~304	262 1837 016	IC PCM1702P-J	
IC309~312	262 0223 006	IC TL4558P-B	
IC313~318	262 0864 006	IC UPC4570	
IC355.356	263 0432 907	IC NJM78L05AT	
IC357.358	263 0722 905	IC NJM79L05AT	
IC501	263 0198 005	IC NJM4556D	
TR101	274 0136 009	Transistor 2SD1913	
TR109	274 0036 905	Transistor 2SD468(C)TF	
TR110	274 0025 907	Transistor 2SB562(C)TF	
TR111	274 0036 905	Transistor 2SD468(C)TF	
TR112	274 0025 907	Transistor 2SB562(C)TF	
TR113	274 0036 905	Transistor 2SD468(C)TF	
TR112	274 0025 907	Transistor 2SB562(C)TF	
TR113	274 0036 905	Transistor 2SD468(C)TF	
TR114	274 0025 907	Transistor 2SB562(C)TF	
TR115	274 0036 905	Transistor 2SD468(C)TF	
TR116	274 0025 907	Transistor 2SB562(C)TF	
TR117	274 0036 905	Transistor 2SD468(C)TF	
TR118	274 0025 907	Transistor 2SB562(C)TF	
TR351	269 0026 900	Transistor RN2202(10k-10k)	Built in Resistor
TR352	269 0025 901	Transistor RN1202(10k-10k)	Built in Resistor
TR353	271 0192 905	Transistor 2SA933S(S)TP	
TR401	271 0192 905	Transistor 2SA933S(S)TP	
TR501.502	273 0253 918	Transistor 2SC2878(A/B)	
D201	276 0432 903	Diode 1SS270A TE	
D351	276 0432 903	Diode 1SS270A TE	
D403	276 0484 906	Zener Diode HZS33-1TD	
D404	276 0466 908	Zener Diode HZS7C-1TD	
RESISTORS GROUP (Not Included Carbon Film ±5% 1/4W)			
VR102	211 6093 954	Adjust 22kohm (B)	V06PB223
VR104	211 6093 954	Adjust 22kohm (B)	V06PB223
VR300	211 0544 111	Variable 20kohm (A)	V06PB203
⚠ R335.336	241 2420 043	Carbon 150ohm ±5% 1/4W (Non-Burning)	RD14B2E151J(PSNB)
CAPASITORS GROUP			
C102	253 9036 909	Ceramic 0.1μF/25V	CK45=1E104ZT
C106	253 9030 934	Ceramic 0.0033μF/25V	CK45=1E332KT
C107	253 9035 962	Ceramic 0.027μF/25V	CK45=1E273KT
C108	253 9030 921	Ceramic 0.0022μF/25V	CK45=1E222KT
C109~112	256 1034 979	Metalized 0.1μF/50V	CF93A1H104JT
C113	254 4337 910	Electrolytic 6.8μF/50V	CE04W1H6R8MT SME

Ref. No	Part .No	Part Name	Remarks
C114	256 1035 910	Metalized 0.22μF.50V	CF93A1H224JT
C116	253 9030 963	Ceramic 0.01μF.25V	CK45=1E103KT
C117	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C118.119	253 1180 921	Ceramic 0.001μF/50V	CK45B1H102KT DD-3
C120	253 9036 909	Ceramic 0.1μF/25V	CK45=1E104ZT
C121	253 1181 404	Ceramic 0.01μF.50V	CK45F1H103ZT DD-3
C122.123	254 4260 919	Electrolytic 0.22μF/50V	CE04W1HR22MT SME
C124	253 9030 963	Ceramic 0.01μF 25V	CK45=1E103KT
C125	253 9030 992	Ceramic 0.033μF/25V	CK45=1E333KT
C126	253 9030 963	Ceramic 0.01μF.25V	CK45=1E103KT
C127	253 9030 934	Ceramic 0.0033μF/25V	CK45=1E332KT
C128	253 9031 962	Ceramic 0.0027μF/25V	CK45=1E272KT
C129	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C130	253 1179 990	Ceramic 560pF.25V	CK45B1H561KT DD-3
C131	253 9031 988	Ceramic 0.0056μF/25V	CK45=1E562KT
C133	253 4536 909	Ceramic 10pF/50V	CK45SL1H100DT DD-3
C134	256 1034 979	Metalized 0.1μF.50V	CF93A1H104JT
C135	254 3056 959	Electrolytic 10μF.50V (Bipolar)	CE04D1H100MSPT SME
C141	253 9030 934	Ceramic 0.0033μF/25V	CK45=1E332KT
C142	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C170.171	254 4254 938	Electrolytic 47μF/16V	CE041C470MT SME
C173	254 4254 938	Electrolytic 47μF/16V	CE041C470MT SME
C174	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C204	253 4536 909	Ceramic 10pF/50V	CK45SL1H100DT DD-3
C205.206	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C207	254 4260 948	Electrolytic 1μF/50V	CE04W1H010MT SME
C208	254 4258 934	Electrolytic 33μF/35V	CE04W1V330MTH010MT SME
C209	253 9036 909	Ceramic 0.1μF.25V	CK45=1E104ZT
C210	253 4538 949	Ceramic 100pF/50V	CK45SL1H101JT DD-3
C212	253 4535 955	Ceramic 5pF/50V	CC45SL1H050CT DD-3
C213	253 4535 939	Ceramic 3pF/50V	CC45SL1H030CT DD-3
C215	254 4356 713	Electrolytic 100μF/50V	CE04W1H101MC ARS
C216	254 4260 922	Electrolytic 0.33μF/50V	CE04W1HR33MT SME
C217	256 1034 937	Metalized 0.047μF/50V	CF93A1H473JT
C218	253 1180 947	Ceramic 0.0015μF/50V	CK45B1H152KT DD-3
C221	253 4537 937	Ceramic 36pF/50V	CC45SL1H360JT DD-3
C223~226	253 9036 909	Ceramic 0.1μF/25V	CK45=1E104ZT
C228	253 1180 921	Ceramic 0.001μF/50V	CK45B1H102KT DD-3
C325~332	254 4313 918	Electrolytic 10μF.50V	CE04W1H100MT ASF
C333~340	254 4356 713	Electrolytic 100μF/50V	CE04W1H101MC ARS
C341~344	254 4356 027	Electrolytic 22μF/50V	CE04W1H220M ARS
C343~346	254 4347 706	Electrolytic 10μF/50V	CE04W1H100MC ARSA
C347~350	254 4356 042	Electrolytic 470μF/16V	CE04W1H471 ARS
C351	254 4256 952	Electrolytic 220μF/25V	CE04W1E221MT SME
C353~356	255 4235 921	Film 270pF/100V	CQ93P2A271JT NH
C357~360	255 4235 918	Film 100pF/100V	CQ93P2A101JT NH
C361~368	254 4356 713	Electrolytic 100μF/50V	CE04W1H101MC ARS
C371.372	255 4232 911	Film 180pF/100V	CQ93P2A181JT NH
C373.374	255 4232 908	Film 820pF/100V	CQ93P2A821JT NH
C375~380	255 4237 903	Film 0.0027μF/100V	CQ93P2A272JT NH
C381~384	254 4356 755	Electrolytic 220μF/50V	CE04W1H220M ARS
C391~394	254 4356 713	Electrolytic 100μF/50V	CE04W1H101MC ARS
C403	254 4254 967	Electrolytic 330μF/16V	CE04W1C331MT SME
C503	254 4260 980	Electrolytic 10μF.50V	CE04W1H100MT SME
C504	254 4256 952	Electrolytic 220μF/25V	CE04W1E221MT SME

Ref. No.	Part No.	Part Name	Remarks
OTHER PARTS			
X200	399 0036 013	Crystal Oscillator	(16.9344MHz)
X201	399 0111 006	Ceramic Oscillator	(CST4.23MGW040)
RL301	214 0127 003	Relay	(RY-12W)
CB302	205 0343 032	3P Connector Base (KR-PH)	
CB102	205 0343 058	5P Connector Base (KR-PH)	
CB101	205 0321 054	5P Connector Base (RED)	
CB301	205 0343 087	8P Connector Base (KR-PH)	
CB701	205 0343 087	8P Connector Base (KR-PH)	
CB103	205 0683 006	FFC Connector Base (12P)	
CB203	205 0736 021	31P FFC Base	
CB703,704	205 0233 032	EH Connector Base	
CC301	204 2447 001	8P PH-SAN Shield Cord	
CC302	203 4650 026	3P PH-SAN Connector Cord	
TP101,102	205 0190 065	NH Connector Base	

2U-2135 POWER SUPPLY UNIT

Ref. No.	Part No.	Part Name	Remarks
IC701	263 0516 001	IC NJM7812FA	
IC702	263 0539 004	IC NJM79M12FA	
IC703	263 0553 006	IC NJM7805FA	
IC705	276 0405 901	Diode S1WB(A)10	
IC706,707	268 0074 904	IC Protector ICP-N20T	
D701-704 713,714	276 0553 905	Diode 1SR35-200A	
C701,702	254 4356 768	Electrolytic 2200µF/50V	CE04W1H222MC(ARS)
C703,704	254 4403 721	Electrolytic 2200µF/25V	CE04W1E222MC(SMG)
C705	254 4262 946	Electrolytic 47µF/63V	CE04W1J470MT(SME)
C706	254 4260 906	Electrolytic 0.1µF/50V	CE04W1H0R1MT(SME)
C900	253 8014 702	Ceramic 0.01µF/400VAC	CK45F2GAC103MC
CB703,704	205 0233 032	3P EH CONN. BASE	
	205 0581 001	2P VH CONN. BASE	
	204 2446 002	8P PH-SAN CORD	
⚠	212 4697 009	POWER SWITCH	
⚠	233 5857 007	POWER TRANS.	Europe
⚠	233 5858 006	POWER TRANS. (EU)	U.S.A., Canada

2U-2133 DISPLAY UNIT

Ref. No.	Part No.	Part Name	Remarks
D601~604	276 0049 914	Diode 1S2076ATE	
709~712			
	393 4095 007	FL TUBE	FIP10SM6
	499 0172 002	REMOTE SENSOR	GR1U521X-38
	205 0491 010	31P FFC CONN.	
		BASE	
	009 0011 009	31P FFC	
	212 4699 900	TACT SWITCH	

PARTS LIST OF PACKING & ACCESSORIES

Ref. No.	Part No.	Part Name	Remarks
	504 0092 060	STYRENE PAPER	For AC Cord
	505 0102 092	STYRENE PAPER	
	505 0038 030	POLY COVER	Accessories
	503 0905 206	CUSHION	
	501 1478 011	CARTON CASE	
	513 9111 001	COLOR LABEL	(Gold) Only
	511 2574 102	INST. MANUAL(3)	Europe, Canada
			U.S.A.
	511 2575 101	INST. MANUAL(5)	Europe
	204 8121 004	2P PIN CORD	
	499 0227 009	(REMOTE CONTROLLER)	RC-240

PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
• 1	411 0884 714	CHASSIS	
• 2	105 1108 109	BACK PANEL	Europe
•	105 1108 112	BACK PANEL	U.S.A. ,Canada
• 3	2U-2133	DISPLAY UNIT	
• 4	105 0927 307	BOTTOM COVER	
• 5	105 0926 308	INSIDE BOTTOM COVER	
• 6	1U-2674	SIG. AUDIO UNIT	
• 7	2U-2135C	POWER S.(E2) UNIT	Europe
•	2U-2135A	POWER S.(EU) UNIT	U.S.A., Canada
⚠ 8	233 5857 007	POWER TRANS.	Europe
⚠	233 5858 006	POWER TRANS. (EU)	U.S.A., Canada
⚠ 9	206 2089 106	AC CORD W/CON. E2	Europe
⚠	206 2110 004	AC CORD W/CON. E3	U.S.A., Canada
⚠ 10	445 0056 008	CORD BUSH	
12	113 1067 335	POWER SW. LEVER ASS'Y	
	113 1067 351	POWER SW. LEVER ASS'Y	(Gold)
• 13	337 0031 007	CD MECHA. UNIT (FG-72)	
⚠ 15	212 4697 009	POWER SWITCH	
16	435 0113 009	LATCH (Y3Y18)	
17	112 0572 103	VOL. KNOB	
	112 0572 116	VOL. KNOB	(Gold)
19	144 2352 108	FRONT PANEL ASS'Y	
	144 2352 111	FRONT PANEL ASS'Y	(Gold)
20	146 1191 667	SUB PANEL ASS'Y	
	146 1191 670	SUB PANEL ASS'Y	(Gold)
21	113 1223 085	SERIES KNOB	
	113 1223 043	SERIES KNOB	(Gold)
22	113 1223 098	SERIES KNOB	
	113 1223 056	SERIES KNOB	(Gold)
23	113 1226 354	FUNCTION KNOB ASS'Y	
	113 1226 367	FUNCTION KNOB ASS'Y	(Gold)
24	113 1387 219	OPEN/CLOSE KNOB	
	113 1387 222	OPEN/CLOSE KNOB	(Gold)
• 26	102 0438 004	TOP COVER	
•	102 0438 017	TOP COVER	(Gold)
• 27	412 3126 100	TOP PLATE	
28	146 0772 003	TOP COVER WASHER	
	146 0772 016	TOP COVER WASHER	(Gold)
• 29	009 0011 009	31P FFC	
30	393 4095 007	FIP10SM6	FL TUBE
31	204 8322 007	HEADPHONE JACK	
32	211 0544 111	V1620FA203M	OUTPUT VOL.
33	269 0098 006	GP1F32T (OPT.OUT)	OPTICAL OUT
• 34	122 0193 000	SOUND PROOF SHEET	
35	204 8265 009	4P RCA PIN JACK	ANALOG OUT
37	144 2359 004	TRAP DOOR	
	144 2359 017	TRAP DOOR	(Gold)
38	401 0120 413	HINGE (L)	
	401 0120 426	HINGE (L)	(Gold)
39	401 0121 315	HINGE (R)	
	401 0121 328	HINGE (R)	(Gold)
40	144 2354 009	LOADER PANEL ASS'Y	
	144 2354 012	LOADER PANEL ASS'Y	(Gold)
• 48	129 0155 104	RUBBER SHEET	
	129 0155 117	RUBBER SHEET	U.S.A., Canada
• 49	412 2812 402	MECHA. FIX BRACKET	
50	412 3167 101	TRANS. FIX BRACKET	
58	104 0180 112	FOOT ASS'Y	
59	421 9007 007	MINI DAMPER	

Ref. No.	Part No.	Part Name	Remarks
70	499 0172 002	GP1U521X-38	REMOTE SENSOR
71	212 4699 900	TACT SWITCH (IM)	
72	205 0491 010	31P FFC BASE	
73	204 8375 009	1P RCA PIN JACK	
101	473 7005 073	3×5 CBTS (S)-Z	
102	473 7002 021	3×8 CBTS (S)-Z	
103	473 7500 015	3×8 CBTS (P)-Z	
104	471 9020 018	SPECIAL SCREW	
	471 9020 005	SPECIAL SCREW	(Gold)
105	473 7007 000	4×8 CBTS (S)-B	
	473 4601 005	4×8 CTTS	(Gold)
106	473 7508 017	3×10 CBTS (P)-B	
107	473 7002 021	3×8 CBTS (S)-B	
	473 8016 003	3×8 CBTS (C)-N	(Gold)

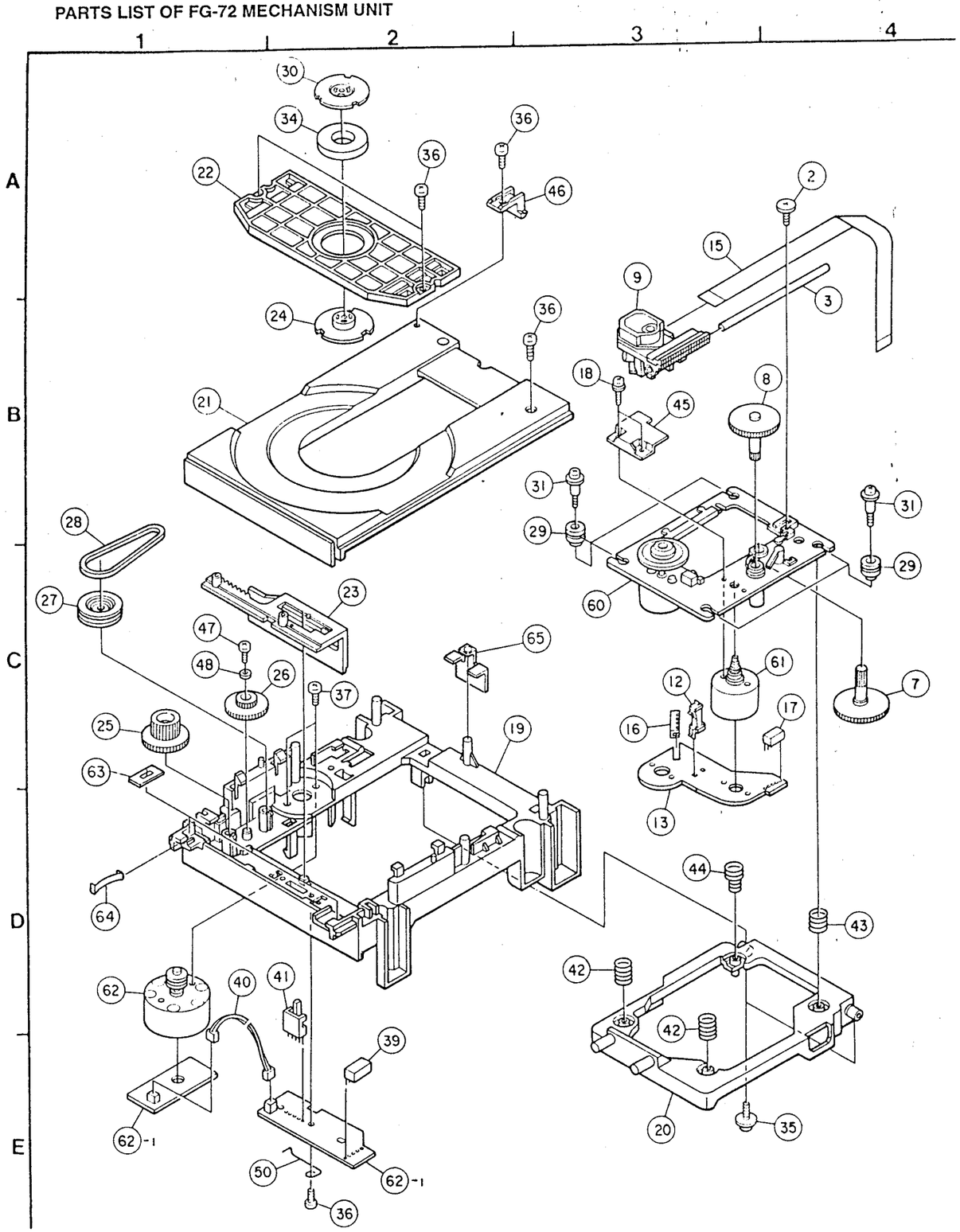
WARNING:

- Parts marked with ⚠ and/or shading have special characteristics important to safety.
  Be sure to use the specified parts for replacement.
- (Gold) in the Remarks column refers to models with gold front panels.

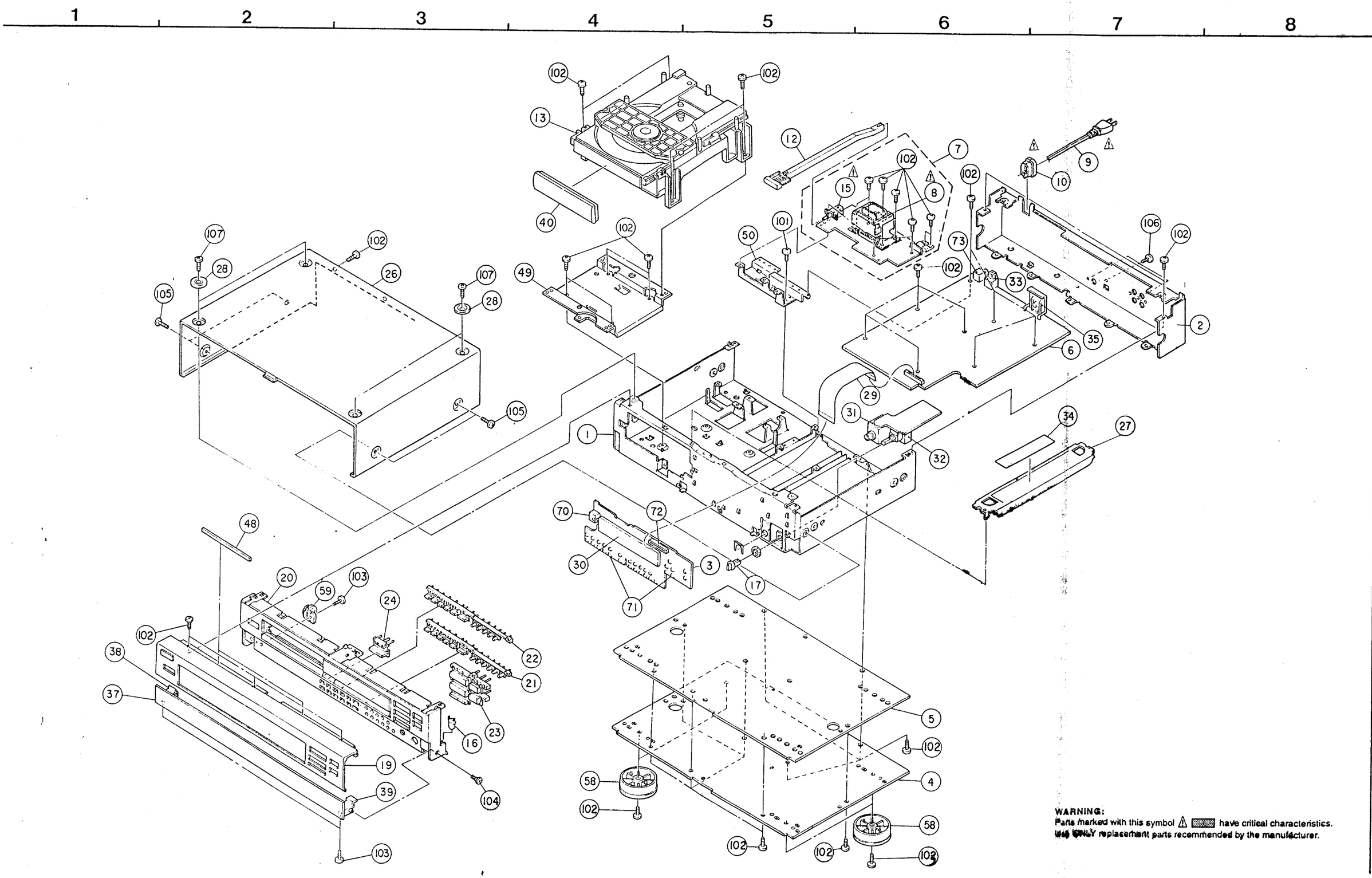
PARTS LIST OF FG-72 MECHANISM UNIT

Ref. No	Part .No	Part Name	Remarks
2	9KA 90H0 06	FS FIXING SCREW	
3	9KA 90H0 05	FEED SHAFT	
7	9KA 80G0 17	DRIVE GEAR (A)	
8	9KA 80G0 18	DRIVE GEAR (B)	
9	439 0191 009	LASER P.U	KSS-240A
12	9KS 01W1 47	LEAF SWITCH	
13	9KA 85P0 09	MOTOR P.W.B.	
15	009 0051 001	12P FFC CABLE	
16	443 1093 006	FFC BUSH	
17	9KA 82G2 53	S5B-PH CONNECTOR BASE	
18	9KM 20S0 04	2x4 SCREW	
19	9KA 85G0 26	MECHA.PLATE(FG70)	
20	9KA 85G0 20	MECHA.FRAME(FG70)	
21	9KA 85G0 48	CD TRAY(FG72)	
22	9KA 85G0 04	CLAMPER FRAME	
23	9KA 85G0 22	UD PLATE GEAR(FG70)	
24	9KA 85G0 06	CLAMPER (F)	
25	9KA 85G0 07	RELAY GEAR(A)	
26	9KA 85G0 08	RELAY GEAR(B)	
27	9KA 85G0 09	RELAY GEAR(C)	
28	9KA 85G0 10	GEAR BELT(F)	
29	9KA 85G0 30	DAMPER(FG40)	
30	9KA 85P0 01	CLAMPER PLATE (F)	
31	9KA 85H0 01	SCREW(F)	
34	9KA 82G0 57	MAGNET	
35	9KA 91H0 02	3x8 (W-10)SCREW	
36	9KB 30B0 08	3x8 BAIND SCREW	
37	9KM 26B0 04	2.6x4 BAIND SCREW	
39	9KA 82G3 08	S5B-PH(RED)	
40	9KA 85G0 27	CNW2(FG70)	
41	9KS 01W1 48	OP/CL SWITCH(SSS12)	
42	9KA 85S0 01	SPRING (A)	
43	9KA 85S0 02	SPRING (B)	
44	9KA 85S0 03	SPRING (C)	
45	9KA 85G0 33	GEAR GUIDE	
46	9KA 85G0 36	TRAY STOPPER	
47	9KB 20B0 05	2x5 BAIND (B)	
48	9KS 21W6 04	STW2.1x6x0.4	
50	9KA 85S0 05	HOLD SPRING	
60	9KA 85A0 07	SPINDLE MOTOR ASS'y	
61	9KA 85A0 08	FEED MOTOR ASS'y	
62	9KA 85A0 06	LOADING MOTOR ASS'y	
62-1		MOTOR P.W.B.	
62-2		SWITCH P.W.B.	
63	9KA 85P0 17	SPACER 72	
64	9KA 85P0 14	TRAY SPRING FG72	
65	9KA 85P0 12	TRAY G-ANGLE	

PARTS LIST OF FG-72 MECHANISM UNIT

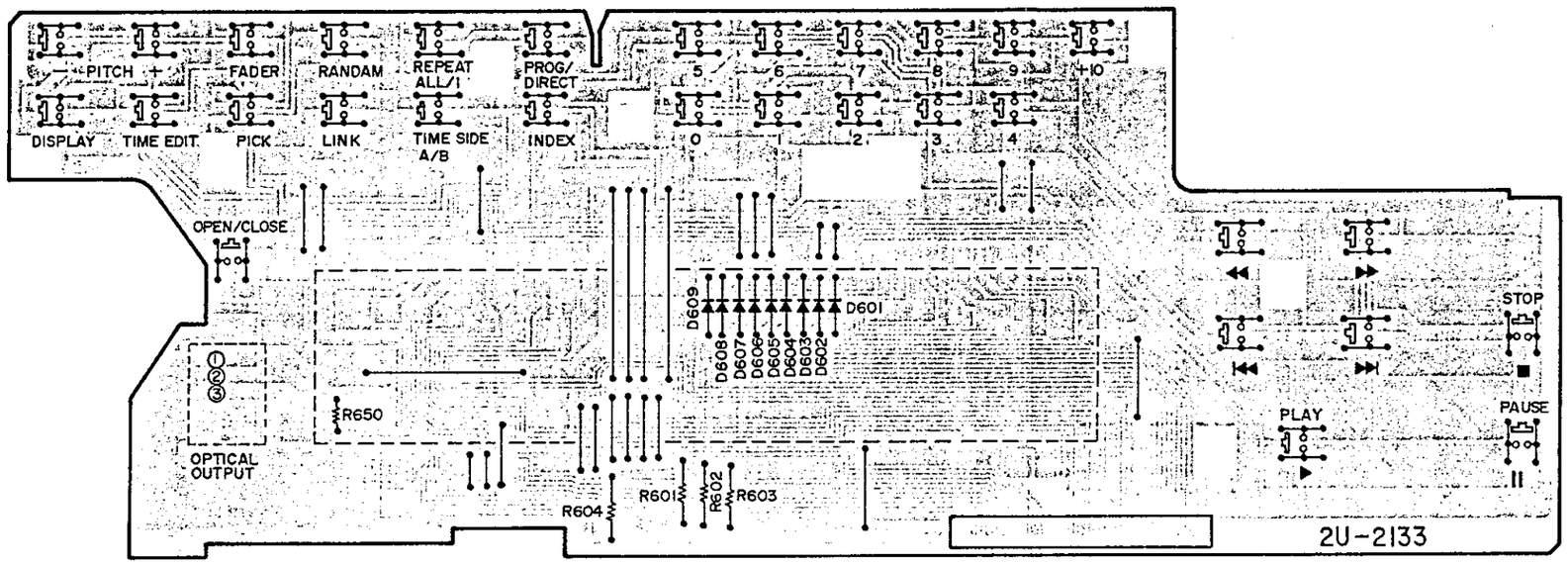


EXPLODED VIEW

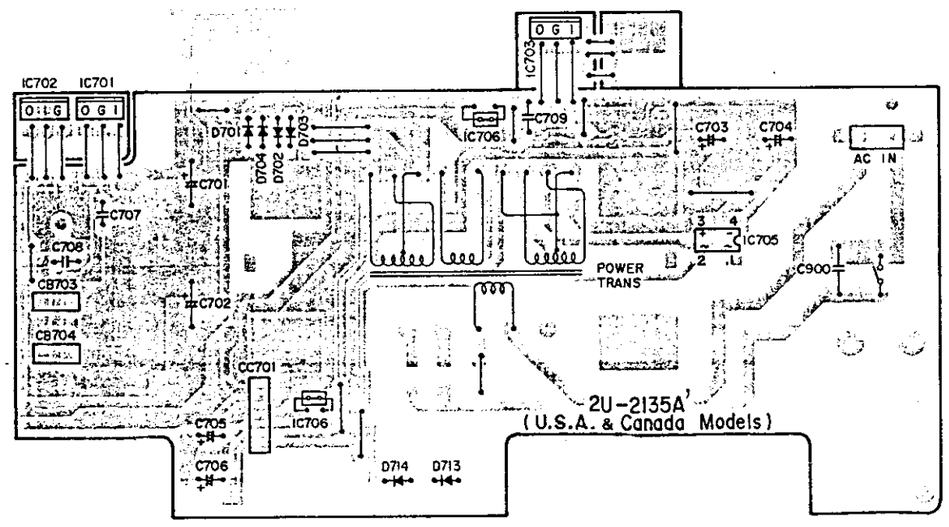


WARNING:
Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

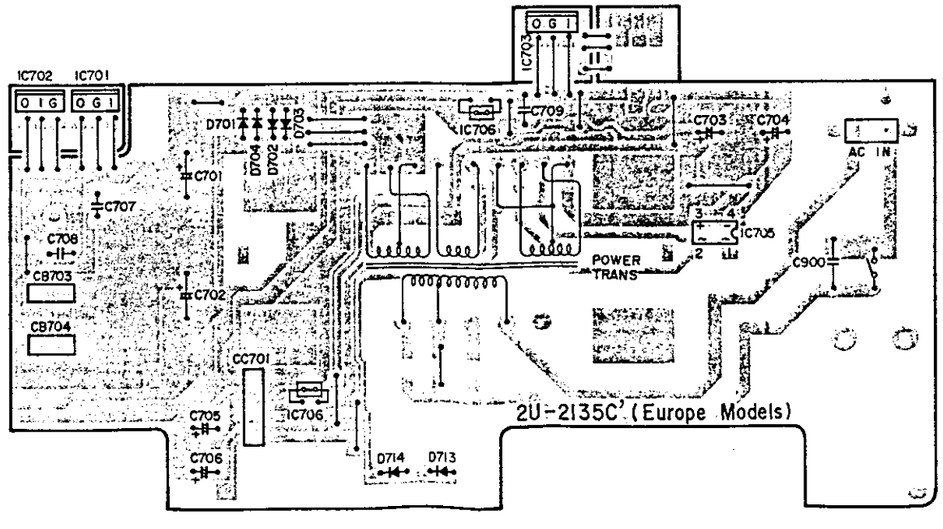
2U-2133 DISPLAY UNIT



2U-2135A POWER SUPPLY UNIT (U.S.A. & Canada models)

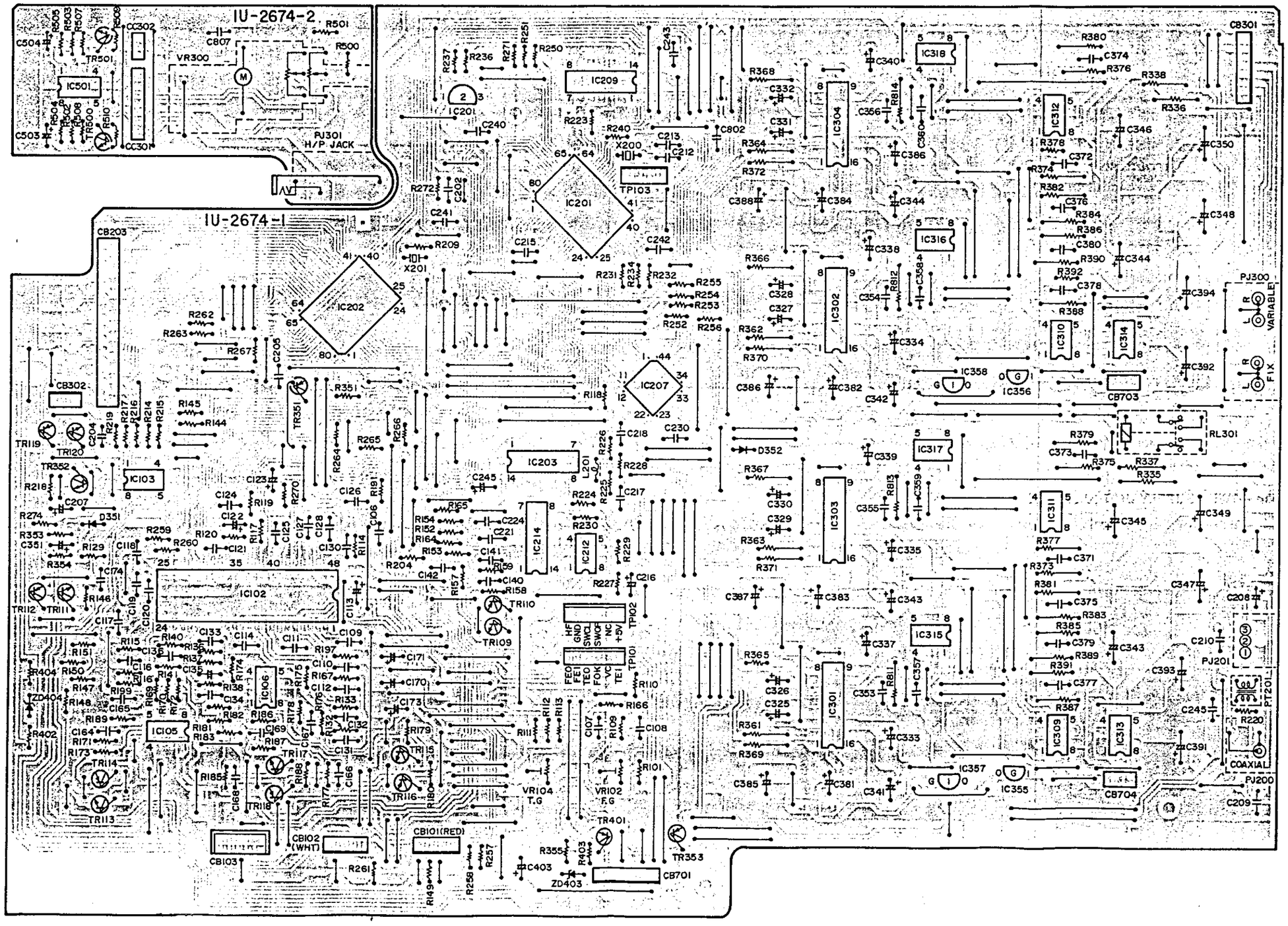


2U-2135C POWER SUPPLY UNIT (Europe model)



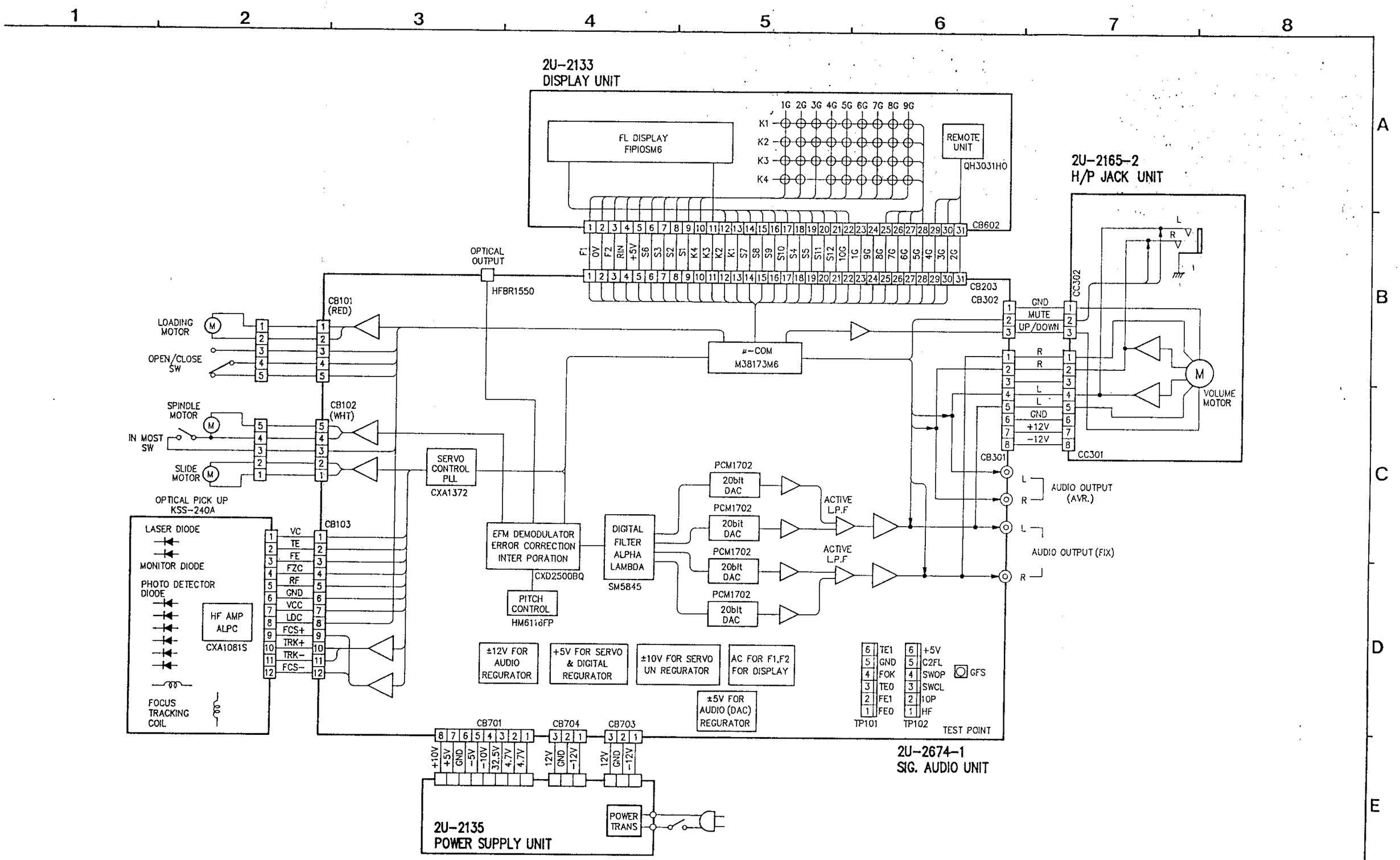
P.W.BOARD

1U-2674 SIGNAL AUDIO UNIT



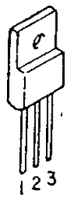
A B C D E

WIRING DIAGRAM



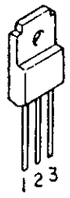
SEMICONDUCTORS

● IC's



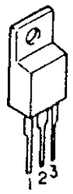
1: Input
2: Gnd
3: Output

NJM7805FA



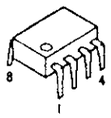
1: Gnd
2: Output
3: Input

NJM79M12A

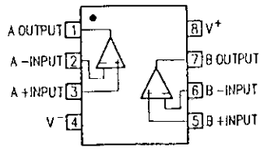


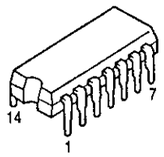
1: Gnd
2: Input
3: Output

NJM7812FA(S)
MC7812

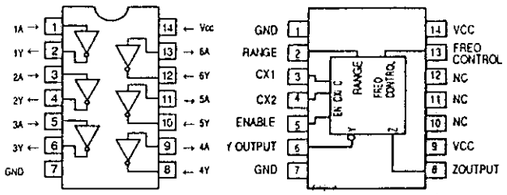


NJM4556D
μPC4570C
BA15218
TL4558P

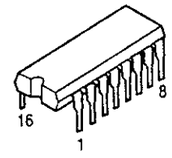




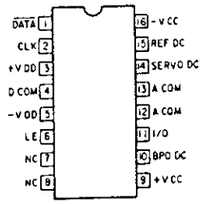
TC74HCT04AP
TC74HCU04AP
SN74LS624

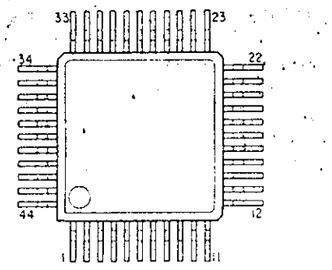


TC74HCT04AP
TC74HCU04AP
SN74LS624

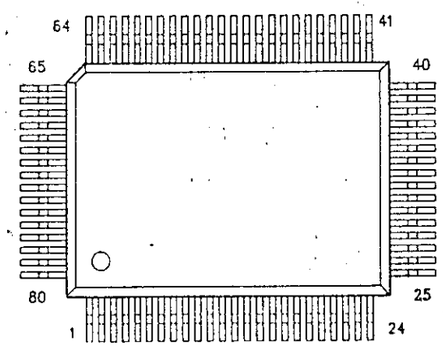


PCM1702P





SM5845AF



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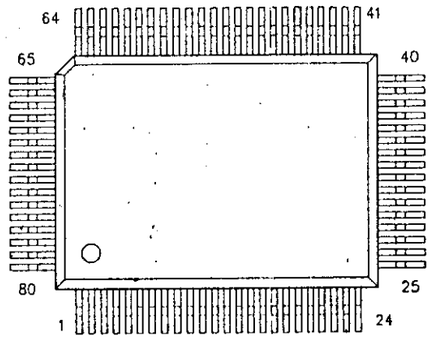
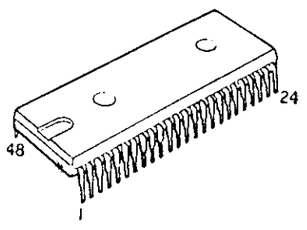
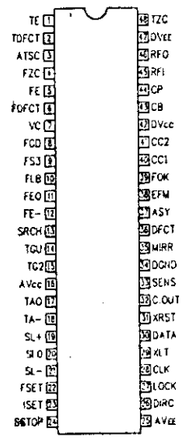
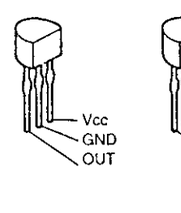


CXD2500Q

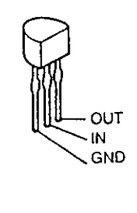


CXA1372S





PST529C



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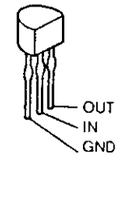
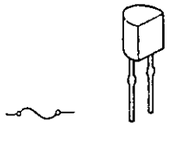


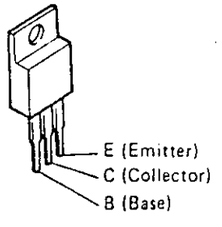
NJM78L05A

● IC PROTECTOR



CP-N15

● TRANSISTORS

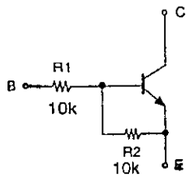


2SD1913

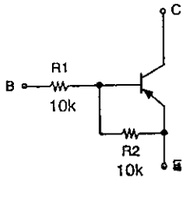
2SA933(Q)
2SA1015(Y)
2SC1740(R/S)T-70
2SC2878(A/B)

2SB562
2SD468(C)

RN1202(10K-10K)NPN
RN2202(10K-10K)PNP

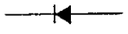


RN1202

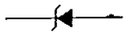


RN2202

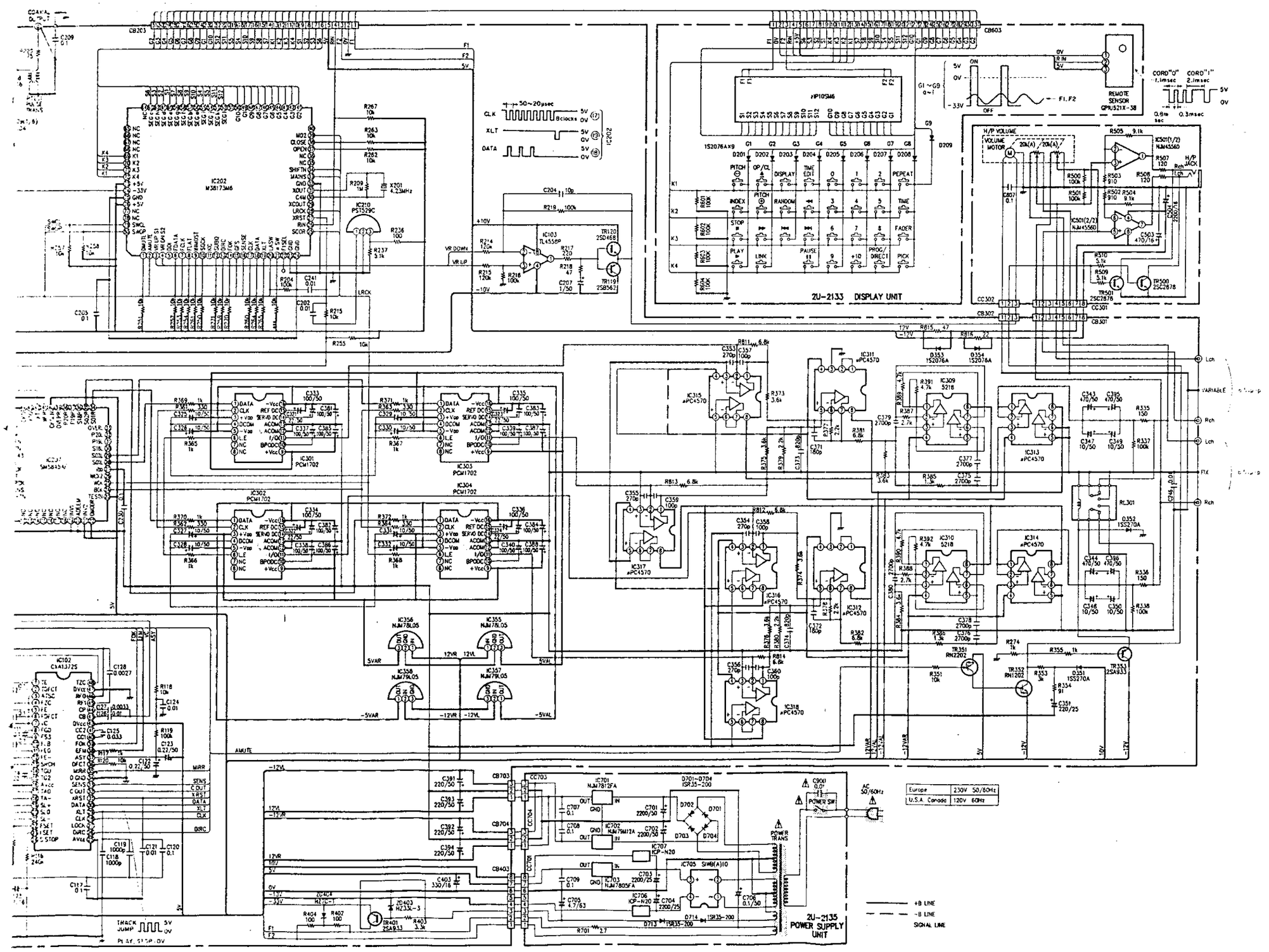
● DIODES



1S2076A
1SS270A
1SR35-200A



HZS7C-2
HZ33L-3



NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM

ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD

EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.

CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

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

CAUTION:
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 kohms, the unit is defective.

WARNING:
DO NOT return the unit to the customer until the problem is located and corrected.

SCHEMATIC DIAGRAM

1 2 3 4 5 6 7 8

2U-2674 SIG. AUDIO UNIT

2U-2133 DISPLAY UNIT

2U-2135 POWER SUPPLY UNIT